Andhra Pradesh State Council of Higher Education

Structure of B. A. HISTORY Syllabus under CBCS

Table-1: w.e.f. 2015-16 (Revised in April, 2016)

Semester	*Paper*	***Title***
Semester I (Core)	I	Ancient Indian History & Culture (from earliest times to 600 A.D)
Semester II (Core)	II	Early Medieval Indian History & Culture (600 A.D to 1526 A. D.)
Semester III (Core)	III	Late Medieval & Colonial History of India (1526 to 1857 A. D.)
Semester IV (Core)	IV	Social Reform Movement & Freedom Struggle (1820s to 1947 A.D.)
Semester V (Core)	V	Age of Rationalism And Humanism The World Between 15^{th}& 18^{th} Centuries
Semester V (Core)	VI	History & Culture of Andhra Desa (from 12^{th} to 19^{th} Century A.D.)
Semester VI Elective - 1	VII–A	History of Modern Europe (from 19^{th} Century to 1945 A. D.)
Semester VI Elective – 2	VII–B	History of East Asia (from 19^{th} Century A.D.to 1950 A.D)
Semester VI Elective - 3	VII–C	Contemporary History of The World (1945 to Circa 2000 A. D.)
Semester VI Elective - 4	VII-D	Basics of Journalism
Semester VI Elective - 5	VII-E	Historical Application in Tourism
Semester VI Elective - 6	VII–F	Modern Techniques in Archaeology
Semester VI Cluster Electives Elective - 1	VIII-A-1	Cultural Tourism in Andhra Pradesh
Elective – 2	VIII-A-2	Popular Movements in Andhra Desa (1848 TO 1956 A.D.)
Elective - 3	VIII-A-3	Contemporary History of Andhra Pradesh (1956-2014)

Structure of B.A. HISTORY Syllabus under CBCS

Table-2:

Sl. No	Sem	Paper	Name of Paper	Nature	Hours/ Week	Credits	Marks	
							Mid Sem	Sem End
1	I	I	Ancient Indian History & Culture (From earliest times to 600 A.D)	Core	**5**	**4**	**25**	**75**
2	II	II	Early Medieval Indian History & Culture (600 A.D to 1526 A. D.)	Core	**5**	**4**	**25**	**75**
3	III	III	Late Medieval & Colonial History of India (1526 to 1857 A. D.)	Core	**5**	**4**	**25**	**75**
4	IV	IV	Social Reform Movement & Freedom Struggle (1820s to 1947 A.D.)	Core	**5**	**4**	**25**	**75**
5	V	V	Age of Rationalism and Humanism The World Between 15th& 18th Centuries	Core	**5**	**4**	**25**	**75**
6		VI	History & Culture of Andhra Desa (from 12th to 19th Century A.D.)	Core	**5**	**4**	**25**	**75**
7	VI	VII–(A)	History of Modern Europe (from 19th Century to 1945 A. D.)	El	**5**	**4**	**25**	**75**
		VII-(B)	History of East Asia (from 19th Century A.D.to 1950 A.D)					
		VII–(C)	Contemporary History of The World (1945 to Circa 2000 A. D.)					
		VII–(D)	Basics of Journalism					
		VII–(E)	Historical Application in Tourism					
		VII –(F)	Modern Techniques in Archaeology					
8		VIII–A-1	Cultural Tourism In Andhra Pradesh	Cl El (3)	**5**	**4**	**25**	**75**
		VIII–A-2	Popular Movements In Andhra Desa (1848 TO 1956 A.D.)					
		VIII–A-3	Contemporary History of Andhra Pradesh (1956-2014)					
					TOTAL	**32**	**200**	**600**

B. A. HISTORY

I Year B. A. Programme (UG) Courses – Under CBCS

Semester – I

Paper – I (Core Paper)

ANCIENT INDIAN HISTORY & CULTURE (from earliest times to 600 A.D)

(Indian History and Culture from Earliest Times to 647 A.D)

Unit – 1	Survey of Sources: Literary & Archaeological Sources; Influence of Geography on History; Unity in Diversity; Traces of Stone Age Cultures (Circa 3,50,000 B. C to 3,000 B. C); Indus Valley Civilization (Circa 3000 B. C to 1,500 B. C): Origin, Extent, Salient Features.
Unit – II	Vedic Age & Religious Reform Movements (Circa 1500 B. C to 600 B. C): Society, Polity, Economy, Culture during early and later Vedic period; Jainism and Buddhism: Causes, Doctrines, Spread, Importance and Impact.
Unit - III	Transition from Territorial States to Emergence of Empires (Circa 600to Century to 300 B. C): Rise of Mahajanapadas – Causes for Magadha's Success; Persian and Macedonian Invasions; Mauryan Empire: State, Imperial Administration, Economy, Ashoka'sDhamma, Art & Architecture, Significance & Downfall.
Unit - IV	Conditions during 200 B. C to 300 A. D.: Central Asian Contacts – Kushanas – Aspects of polity, society, Economy, Religion, Art& Architecture; The Age of Satavahanas: Pattern of Administration – Social, Economic, Religious & Cultural Developments; Sangam Age: The Three Early Kingdoms (Chola, Chera& Pandya) – Society, Language & Literature.
Unit – V	India between 300 A. D & 600 A. D.: The Rise and Growth of Guptas: Administration, Society, Economy, Religion, Art, Literature and Science & Technology – Decline.

References:

1	A.L. Basham, The Wonder That Was India
2	D.N.Jha, Ancient India
3	D.D.Kosambi, An Introduction to the Study of Indian History
4	D.P.Chattopadhyay, Science and Society in Ancient India
5	B.N.Mukherjee, The Rise and Fall of the Kushana Empire
6	K.A. NilakanthaShastri, A History of South India
7	R.C.Majumdar, K.K.Dutta&H.C.RoyChowdhuri (ed.), Advanced History of India
8	Kumkum Roy, The Emergence of Monarchy in North India: eighth to fourth centuries BC
9	RomilaThapar (et. al). India: Historical Beginnings and the Concept of the Aryan
10	M.L.K. Murthy, *Pre-and Protohistoric Andhra Pradesh upto 500 B.C.,* New Delhi, 2003

Study Tour: Study tour to local museum or at least to nearby historical sites is to be conducted.

Students should be asked to prepare an inventory of items preserved in the museum and their usage.

Students can be asked to create a calendar charting the dates of key events. This can be applied to an historical event or the sequence of events.

B. A. HISTORY

I Year B. A. Programme (UG) Courses – Under CBCS

Semester – II

Paper – II (Core Paper)

EARLY MEDIEVAL INDIAN HISTORY & CULTURE (600 A.D to 1526 A. D.)

(Indian History and Culture from 647 to 1526 A.D)

Unit – 1	Harsha & His Times: Administration, Religion – Hiuen Tsang -Polity, Society, Economy and Culture from 7th to 11th Century A. D. under Chalukyas of Badami& Eastern Chalukyas of Vengi.
Unit – II	Age of later Pallavas during 7th& 8th Centuries A. D.: Contribution to Cultural Development & Art & Architecture; The Chola Empire from 9th to 12 Century A. D.: Rise of the Empire, Administration and Cultural Life.
Unit - III	Conditions in India on the eve of Turkish Invasions; Early Invasions: Traces of Arab Invasion, Ghazni&Ghori; Delhi Sultanate (1206 to 1290 A.D.) under Slave Dyanasty.
Unit - IV	Delhi Sultanate (1290 to 1526 A.D.): Khaljis: Expansion & Consolidation, Administrative & Economic Reforms - The Tughlaqs - Decline & Disintegration of the Delhi Sultanate; Administration, Society, Economy, Technology, Religion, Art & Architecture under the Sultanate.
Unit – V	Cultural Development in India between 13th& 15th Centuries A. D.: Impact of Islam on Indian Society and Culture – Bhakti and Sufi Movements – Emergence of Composite Culture.

References:

1	Basham, A.L (ed) A Cultural History of India
2	Champakalakshmi, R Trade, Ideology and Urbanization : South India 300 BC – AD 1300
3	Chandra, S History of Medieval India (800 – 1700)
4	Chattopadyay, B.D The Making of Early Medieval India. (Delhi, 1994)
5	Habib, Irfan, Medieval India: The Study of a Civilization
6	Habibullah, A.B.M, The Foundation of Muslim Rule in India
7	Kumar Sunil, The Emergence of the Sultanate of Delhi
8	Nizami, K.A. Some Aspects of Religion and Politics in India in the 13th c
9	K.A. NilakantaSastri, A History of South India from Prehistoric Times to the Fall of Vijayanagara
10	K.A.NilkantaSastri, The Cholas
11	Shireen Moosvi, The Economy of the Mughal Empire
12	Stein, B Peasant, State & Society in Medieval South India
13	Yazdani, G. (ed) The Early History of the Deccan
14	R.C.Majumdar, The Age of Imperial Kanauj

Project: Students may be asked to prepare a project on influence of Islam and Hinduism in their respective areas.

Encourage students to write their autobiography or biography of their inspiringpersonalities

B. A. HISTORY

II Year B. A. Programme (UG) Courses – Under CBCS

Semester – III

Paper – III (Core Paper)

LATE MEDIEVAL & COLONIAL HISTORY OF INDIA (1526 to 1857 A. D.)

(History and Culture of India (1526 – 1857))

Unit – 1	India from 1526 to 1707 A. D.: Emergence of Mughal Empire - Sources, Conditions in India on the eve of Babur's invasion, Brief Summary of Mughal Polity – Sher Shah & Sur Interregnum – Expansion & Consolidation of Mughal Empire – Rise of Marathas &Peshwas.
Unit – II	Administration, Economy, Society and Cultural Developments under the Mughals – Disintegration of Mughal Empire.
Unit - III	India under Colonial Hegemony : Beginning of European Settlements – Anglo-French Struggle – Policies of Expansion - Subsidiary Alliance & Doctrine of Lapse - Consolidation of British Empire in India up to 1857 A. D.
Unit - IV	Economic Policies of the British (1757-1857): Land Revenue Settlements – Commercialization of Agriculture – Impact of Industrial Revolution on Indian Industry ; Administration of the Company – Regulating Charter Acts; Cultural & Social Policies: Humanitarian Measures & Spread of Modern Education
Unit – V	Anti-Colonial Upsurge –Peasant & Tribal Revolts - 1857 Revolt – Causes, Nature& Consequences.

References:

1	Bipan Chandra, Modern India
2	Bipan Chandra, Rise and Growth of Economic Nationalism in India
3	C.A.Bayly, Indian Society and the Making of the British Empire
4	HarbansMukhia, The Mughals of India
5	Irfan Habib, Medieval India: The study of a Civilization
6	L.P.Sharma, The Mughal Empire
7	R.P.Dutt, India Today
8	Sathis Chandra, Essays on Medieval Indian History
9	Tripathi R.P., The Rise & Fall of the Mughal Empire

Project Work: Students should be asked to identify structures belonging to Mughal period or colonial period and present status.

Make students to create a collage or collection of images related to a topic.

Images can be hand drawn, printed, or clipped from a magazine or newspaper.

B. A. HISTORY

II Year B. A. Programme (UG) Courses – Under CBCS

Semester – IV

Paper – IV (Core Paper)

SOCIAL REFORM MOVEMENT & FREEDOM STRUGGLE (1820 to 1947 A.D.)

(History and Culture of India (1857 – 1947))

Unit – 1	Social, Religious & Self-Respect Movements: Social & Cultural Awakening – Brahma Samaj, Arya Samaj, Theosophical Society, Ramakrishna Mission, Aligarh Movement – Emancipation of Women – Struggle Against Caste: JyotibaPhule, Narayana Guru, Periyar, Dr. B. R. Ambedkar.
Unit – II	Growth of Nationalism in the 2nd Half of 19th Century – Impact of British Colonial Policies under Viceroys' Rule and the Genesis of Freedom Movement – Birth of Indian National Congress.
Unit - III	Freedom Struggle from 1885 to 1920: Moderate Phase — Partition of Bengal - Emergence of Militant Nationalism –Swadeshi & Boycott Movement – Home Rule Movement.
Unit - IV	Freedom Struggle from 1920 to 1947: Gandhiji's Role in the National Movement – Revolutionary Movement –Subhas Chandra Bose.
Unit – V	Muslim League & the Growth of Communalism – Partition of India – Advent of Freedom - Integration of Princely States into Indian Union – SardarVallabhai Patel.

References:

1	Anil Seal, Emergence of Indian Nationalism
2	Banerjee, Sekhar, From Plassey to Partition
3	Bayly, C A., Indian Society and Making of the British Empire
4	Brown, Judith: Gandhi's Rise to Power
5	Chandra, Bipan, et. al., India's Struggle for Independence
6	Chatterjee, Jaya, Bengal Divided: Hindu Communalism and Partition 1932-1947
7	Desai, A. R, : Social Background to Indian Nationalism
8	Dutt, R.P., India Today
9	Joshi, P.C., Rammohun and the Forces of Modernisation in India
10	Sarkar Sumit: Modern India 1885 to 1947
11	Stokes, Eric, Peasants and the Raj
12	R.C. Majumdar, The Struggle for Freedom, BharatiyaVidhyaBhavan Series

Project Work: As part of Internal Assessment, Project Work may be given on regional or local history related to culture, economy, struggles, land relations, cultural institutions and their influence on the society.

They can also be asked to create a play centered on any event in social reform movement or freedom struggle.

B. A. HISTORY

III Year B. A. Programme (UG) Courses – Under CBCS

Semester – V

Paper – V (Core Paper)

AGE OF RATIONALISM AND HUMANISM

THE WORLD BETWEEN 15TH& 18TH CENTURIES

(History of Modern World (1453 – 1821 A.D))

Unit – 1	Feudalism -Geographical Discoveries: Causes – Compass & Maps – Portugal Leads and Western World Follows – Consequences;
Unit – II	The Renaissance Movement: Factors for the Growth of Renaissance – Characteristic Features - Transformation from Medieval to Modern World; Reformation & Counter Reformation Movements: The Background – Protestantism – Spread of the Movement– Counter Reformation– Effects of Reformation
Unit - III	Emergence of Nation States: Contributory Factors - England and other Nation States – Impact due to the Emergence of Nation States.;Age of Revolutions: The Glorious Revolution (1688) – Origin of Parliament – Constitutional Settlement – Bill of Rights – Results.
Unit - IV	Age of Revolutions: The American Revolution (1776) – Opening of New World – Causes – Course – Declaration of Independence, 1776 – Bill of Rights, 1791 – Significance.
Unit – V	Age of Revolutions: The French Revolution (1789) – Causes - Teachings of Philosophers - Course of the Revolution – Results.

References:

1	Burke, Peter, The Renaissance
2	C.J.H. Hayes, Modern Europe up to 1870
3	C.D. Hazen, Modern Europe up to 1945
4	Christopher Hill, From Reformation to Industrial Revolution
5	Elton, G.R., Reformation Europe, 1517-1559
6	Ferguson, The Renaissance
7	Gilmore, M.P., The World of Humanism, 1453-1517
8	Hilton, Rodney, Transition from Feudalism to Capitalism
9	J.H.Parry, The Age of Renaissance
10	J.N.L. Baker, History of Geographical Discoveries and Explorations
11	The New Cambridge Economic History of Europe, Vol. I, VII.

Project Work: Individual or group projects may be presented by the students regarding preparation of bibliography on various topics.

Students should also be asked to construct glossaries to help them study and review lessons while helping them to understand a large array of vocabulary words.

B. A. HISTORY

III Year B. A. Programme (UG) Courses – Under CBCS

Semester – V

Paper – VI (Core Paper)

HISTORY & CULTURE OF ANDHRA DESA (from 12th to 19th Century A.D.)

(History and Culture of Andhra from Satavahanas to 1857 A.D)

Unit – 1	Andhra during 12th& 13th Centuries A.D.: Kakatiyas – Origin & its Antecedents – Administration – Social & Economic Life – Industries & Trade - Promotion of Literature and Culture – Architecture & Sculpture – Decline; The Age of Reddy Kingdoms: Patronage to Literature – Trade & Commerce.
Unit – II	Andhra between 14th & 16th Centuries A.D.: Vijayanagara Empire: Polity, Administration, Society & Economy – Sri Krishna Devaraya and his contribution to Andhra Culture – Development of Literature & Architecture – Decline and Downfall.
Unit - III	Andhra through 16th& 17th Centuries A.D.: Evolution of Composite Culture - The QutbShahis of Golkonda – Origin & Decline – Administration, Society & Economy – Literature & Architecture.
Unit - IV	The 18th& 19th Centuries in Andhra: East India Company's Authority over Andhra – Three Carnatic Wars – Occupation of Northern Circars and Ceeded Districts – Early Uprisings – Peasants and Tribal Revolts.
Unit – V	The 18th& 19th Centuries in Andhra: Impact of Company Rule on Andhra – Administration – Land Revenue Settlements – Society – Education - Religion – Impact of Industrial Revolution on Economy – Peasantry & Famines – Contribution of Sir Thomas Munroe, C. P. Brown & Sir Arthur Cotton – Impact of 1857 Revolt in Andhra

References:

1	BalenduSekharam, The Andhras Through the Ages
2	K. Sathyanarayana, A Study of the History and Culture of Andhras
3	Mallampalli Soma SekharaSarma, History of the ReddiKindogms
4	K.A.N.Sastry, A History of South India
5	H.K.Sherwani, History of the KutubShahi Dynasty
6	P.R.Rao, History of Modern Andhra
7	KhandavalliLakxmiranjanam&BalenduSekharam, □□□□□□□□□□□□□ – □□□□□□□□
8	SuravaramPratap Reddy, □□□□□□□□□□□□□□□□□□□□
9	B.S.L.Hanumanta Rao, □□□□□□□□□□□□□
10	I.K.Sarma, *Early Historic Andhra Pradesh,500 B.C.-624 A.D.*, New Delhi, 2008
11	B. Rajendra Prasad, *Early Medieval Andhra Pradesh, A.D.624 -1000 A.D.*, New Delhi, 2009
12	C. Somasundara Rao, *Medieval Andhra Pradesh, A.D. 1000 -1324 A.D.*, New Delhi, 2011
13	R. Soma Reddy, *Late Medieval Andhra Pradesh, A.D. 1324-1724 A.D.*, New Delhi, 2014

Project Work: Students may be asked to identify families/ areas/ institutions/ personalities/ monuments related to freedom struggle and prepare dissertation under the guidance of a teacher

so as to equip them with better understanding of society and historical processes. This exercise should also aim at exposing the spirit of research, analysis, criticism, innovation and invention among the students.

B. A. HISTORY

III Year B. A. Programme (UG) Courses – Under CBCS

Semester – VI

Paper – VII-(A) :: (Elective Paper)

HISTORY OF MODERN EUROPE (from 19th Century to 1945 A. D.)

(History of Modern World (1821 – 1945))

Unit – 1	Industrial Revolution: Origin, Nature and Impact.
Unit – II	Unification Movements in Italy & Germany and their Impact.
Unit - III	Communist Revolution in Russia – Causes, Course and Results – Impact on World Order.
Unit - IV	World War I: Age of Rivalry in Europe Between 1870 and 1914 – Results of the War – Paris Peace Conference - League of Nations.
Unit – V	World War II: Causes, Fascism & Nazism – Results; The United Nations Organization: Structure, Functions and Challenges.

References:

1	J.A.Hobson, Imperialism: A Study
2	C.D. Hazen, Modern Europe up to 1945
3	H.A.L.Fisher, History of Europe
4	C.M.M.Ketelbey, A History of Modern Times
5	Grant and Temperley (ed), Europe in the 18th and 20th Centuries
6	David Thomson, Europe Since Napoleon
7	A.P.J.Taylor, The Struggle for Mastery in Europe
8	S.P.Nanda, History of Modern World
9	S.N.Dhar, International Relations and World Politics Since 1919

Project Work: Project work on the consequences of industrialization & globalization on society and economy should be given to students.

B. A. HISTORY

III Year B. A. Programme (UG) Courses – Under CBCS

Semester – VI

Paper – VII-B :: (Elective Paper)

HISTORY OF EAST ASIA (from 19th Century A.D.to 1950 A.D)

Unit – 1	Pre-colonial China - The nature and structure of the traditional Chinese Society, Polity, Economy; Colonial Penetration in China -Tribute system, Canton system and their collapse - Opium Wars and Treaties with imperialist powers and struggle for concessions in China - Increasing western economic interests- Open-Door Policy.
Unit – II	Chinese Popular Movements with special reference to Taiping Revolt - Cause, Nature & Legacy; The Self-Strengthening Movement - Boxer Rebellion and its consequences - Republican Revolution of 1911- Role of various social classes - Sun Yat Sen.
Unit - III	Nationalism and Communism in China - Emergence of the Republic and Yuan Shi Kai - New Intellectual ideas and May Fourth Movement- Political crisis in the 1920's- The first United Front- Kuomintang-Communist Conflict- Ten years of Nanking Government - The Communist Party under Mao Tse Tung- Red Army- Long March- The Chinese Revolution (1949)- ideology, causes and significance - the Establishment of the Peoples' Republic of China.
Unit - IV	Japan during Pre- Restoration Period - The Tokugawa Shogunate- Encounter with the West- the Perry Mission and the opening up of Japan to the West - The crisis and fall of Shogunate - Meiji Restoration (1867-68) - Processes of modernization- social, military, political and educational - Popular and Democratic Movements - Meiji Constitution - Rise of Political Parties.
Unit – V	Economic Modernization - Emergence of Japan as an Imperial Power - The Sino-Japanese War - The Anglo-Japanese Alliance - The Russo- Japanese War - World War I and after- Japan in the Pacific and the Washington Conference - Manchurian Crisis - Failure of the Democratic System and the Rise of Militarism in the1930's and 1940's - Japan and the World War II - Post War Japan under General MacArthur.

References:

1	Allen George – A Short Economic History of Modern Japan
2	Beckmann George M – Modernization of China and Japan
3	Beckmann George M - The Making of Meiji Constitution
4	Bianco Lucian – Origins of the Chinese Revolution, 1915-1949
5	The Cambridge History of Japan Vols V and VI
6	The Cambridge History of China Vol X
7	Chen Jerome – Mao Tse Tung and the Chinese Revolution

8	Fitzgerald C.P. – Birth of Communist China
9	Peffer Nathaniel – The Far East: A Modern History
10	Vinacke H – A History of the Far East in Modern times

Project Work: A project report on Sino-India Relations; Chinese economic leadership; Japan's present status

B. A. HISTORY

III Year B. A. Programme (UG) Courses – Under CBCS

Semester – VI

Paper – VII-(C) :: (Elective Paper)

CONTEMPORARY HISTORY OF THE WORLD (1945 to Circa 2000 A. D.)

Unit – 1	Debate on the origins of the Cold War - Emergence of Soviet and American economic and military alliances: NATO, WTO, IMF, World Bank, Warsaw, COMECON.
Unit – II	USSR's relation with the East European countries (1945-64) - The US foreign policy in the Post war period: Truman Doctrine and Marshall Plan.
Unit - III	Disintegration of European Empires and the emergence of the Third World - The Non-Aligned Movement - Indo-Pakistan relations - Liberation war of Bangladesh - The Liberation Struggle of Vietnam (1945-54 and 1954-1975) - Sino- Soviet relations - Sino- U.S. relations – SAARC.
Unit - IV	Bi-polarism and regional conflicts: War in Korea – Crisis in Cuba – Conflict in the Middle East (Arab – Israel wars of 1948-49,67, 1973) – Activities of P.L.O- Intifada – Gulf War of 1990-91 -
Unit – V	Reunification of Germany - The end of Socialist regime and the disintegration of USSR; The end of the Cold War - The onset of Globalization - American Uni-polarism and its significance for international politics.

References:

1	C.Brown&J.Mooney, Cold War to Détente 1945-83
2	Chain Herzog, The Arab Israeli War
3	Eric Hobsbawm, Age of Extremes: The Short Twentieth Century 1914-1991
4	H.Higgins, Vietnam
5	J.Bhagwati, In Defense of Globalization
6	J.N.Dixit, Across Borders: Fifty Years of Indian's Foreign Policy
7	Karuna Kaushik, History of Communist Russia 1917-1991
8	LipyongJ.Kim, The Strategic Triangle: China, the United States and the Soviet Union
9	O.Leorose and Richard Sisson, War and Secession: Pakistan, India and the creation of Bangladesh
10	M.Hastings, The Korean War

Project Work: Project work on India's foreign policies – Strengths & Challenges; Regional Cooperation; International Relations

B. A. HISTORY

III Year B. A. Programme (UG) Courses – Under CBCS

Semester – VI

Paper – VII-D (Elective Paper)

BASICS OF JOURNALISM

Unit – 1	Definition of Journalism – Nature and Scope – Principles and Functions – Mass Communication Media – Concept of Fourth Estate – Democracy and the Press – Freedom of Press - Limitation of Freedom.
Unit – II	Early Forms of Mass Communication – Primitive Types of Journalism - Proclamations –War Reports in Medieval times - Significance of Print Revolution– Telegraphic Communication – Morse Code –Radio - Changes in Printing Techniques – Offset – DTP – Electronic Revolution - Digitalization – Online Journalism.
Unit - III	Journalism in the Contemporary World- Press Commission of 1947 – Newspaper Magnates – Corporate Bodies – Commercialization – News Agencies – Reuters – AP, UPI, AFT etc.,. TV & Journalism.
Unit - IV	Ideologies & the Press –Social Responsibility – Woman Issues - Workers & Peasant Issues - Politicization - Competition - Advertising and Journals – Cost of Production and Marketing - Sensationalisation – Networking.
Unit – V	Beginnings of Indian Press – James Hicky – Early Publications from Bengal – Contents of early English Journals – Indian Vernacular Pres – Aims & Objectives of the early Newspapers - Development of Press after Independence

References:

1	Agee Ault & Emery, Introduction to Mass Communication
2	Asa Briggs, A Social History of Media From Gutenberg to the Internet
3	Gardiner Lambert, A History of Media
4	Kamat M V., Professional Journalism
5	Krishnamurthy N, Indian Journalism
6	Herman Edward and Nom Chomsky, The Political Economy of Mass Media
7	Raghavan G N S, The Press in India
8	Rivers Williams, Mass Media and Society

Project Work: Students should be given assignment to collect news on important activities in their local areas and present reports. They should also be asked to prepare reports on college level activities and approach the local reporters for the publication of the same.

Students can also be asked to create a questionnaire and survey in the locality to gather an understanding about thematic issues like water, sanitation, health for a presentation.

B. A. HISTORY

III Year B. A. Programme (UG) Courses – Under CBCS

Semester – VI

Paper – VII-E :: (Elective Paper)

HISTORICAL APPLICATION IN TOURISM

Unit – 1	Tourism: Definition, Nature and Scope, Concepts- History of Tourism and its Development- Motivations for Travel-Types of Tourism - Components of Tourism
Unit – II	Social and Economic significance of Tourism - Tourism as an Industry - Components of Tourism Industry - Attractions, Transport, Accommodation, Shopping, Entertainment, Hospitality, Airlines, Travel Agencies – Impact of Tourism on Physical Environment.
Unit - III	History as Tourism product- Archaeological and Historical Monuments –Ajanta, Ellora , Sanchi, Amaravati, Nagarjunakonda, Mahabalipuram, Kanchi, Badami, TanjavurBrihadisvara temple, Puri, Ramappa temple, Alampur, Halebid, Mukhalingam, Tadiparti, Hampi.
Unit - IV	Cultural and Pilgrimage Tourism- Fairs and Festivals- Ajmir, Amruthsar, Madhurai, Mount Abu, Warangal, Goa, Mahanandi, Tirupati, Lepaskhi, Simhachalam; Kuchapudi dance, Khajuraho Festival, JagannathRathayatra, Flamingo Festival.
Unit – V	Field Trip & Viva-voce: It would be compulsory for the students to attend the field trip to the tourist centers/ historical monuments and submit a comprehensive Report to the Department. The Viva – Voce would be based especially on field trip of tourist centers / historical monuments in surrounding areas. The Viva – Voce will be of 10 marks, and Tour Report should be evolved for 15 marks.

References:

1	Lucas Jr., H. C. *Information Technology for Management*, McGraw Hill, 2005
2	Shobita Chopra, *Tourism and Development in India,* New Delhi, 1992
3	Singh Ratandeep : *Handbook of Environmental Guidelines for Indian Tourism*
4	Bhatia, A.K., *Tourism Development Principles and Practices*, New Delhi, 1983
5	Bhatia, A.K., *Tourismin India,* New Delhi
6	VirendraKaul, *Tourism and the Economy*, New Delhi, 1994
7	Gopal Singh, *The Geography of India* , Delhi ,1988
8	Ghulam Yazdan, The Art and Architecture of Deccan
9	Burkart A.J. and Medlik , Tourism: Past Present & Future : (London, Heinemann)
10	M.P. Bezbaruah, Tourism : Future Challenges and Opportunities.
11	John Anderson, Catalogue and Handbooks of the Archaeological Collections in the Indian Museum, 2 Volumes
12	Seth P.N. *Successful Tourism –Planning and Management,* New Delhi, 1987

13	Allchin F.R. *Cultural Tourism in India; Its scope and Development,* New Delhi

B. A**B. A. HISTORY**

III Year B. A. Programme (UG) Courses – Under CBCS

Semester – VI

Paper – VII-F :: (Elective Paper)

MODERN TECHNIQUES IN ARCHAEOLOGY

Unit – 1	Dating Techniques in Archaeology - Relative Techniques – Stratigraphy - Absolute Dating Methods – Carbon 14 – Fluorine – Potassium Argon – Limitations of Carbon 14.
Unit – II	Dendrochronology – Pollen Analysis – Petrology – Thermo Luminescence – Typology – Terracotta, Metallic, Stone, Sarcophagi.
Unit - III	Post Excavation Activities – Collection and Classification of Artefacts – Field Laboratory – Services of Curator – Preservation of the Finds - Preparation and Publication of Archaeological Report.
Unit - IV	Conservation & Exhibition of Artefacts – Methods of Conservation – Organic Objects – Various kinds of Metallic Objects – Need and Importance.
Unit – V	Recent Trends in Indian Archaeology – Underwater Archaeology – Indian Institute of Oceanography, Goa – Recovery of Submerged Sites – Dwaraka – Environmental Archaeology.

References:

1	Atkinson R.J.C., Field Archaeology
2	Chakrabarti D.K., Theoretical Perspectives in Indian Archaeology
3	Rajan K., Archaeology, Principles and Methods
4	Raman K.V., Principles and Methods in Archaeology
5	Paddya K., *The New Archaeology and Aftermath*
6	Rao, S. R., Dwaraka Excavations

Study Tour: Study tour to archaeological sites & museums at least to nearby historical sites is to be compulsorily undertaken. Students should be asked to prepare notes on the objects, how they are collected and maintained in the museums.

. HISTORY

III Year B. A. Programme (UG) Courses – Under CBCS

Semester – VI

Paper – VIII-A-1 (Cluster Elective Paper –1)

CULTURAL TOURISM IN ANDHRA PRADESH

Unit – 1	Concepts of Tourism: Nature – Scope – Definition – Tourists & Excursionists – Domestic & International Tourists.
Unit – II	Types of Tourism: Heritage Tourism – Pilgrimage Tourism - Recreation Tourism – Sports & Adventure Tourism - Advance Tourism – Health Tourism – Environment Tourism.
Unit - III	History and Tourism – Heritage Sites – Definition – Ancient Monuments Preservation Act of 1904, Act of 1958 and Act of 1972 - Archaeological Survey of India – Stage Museums.
Unit - IV	Planning and Development of A.P. Tourism: APTDC – Aims & Objectives – Fairs & Festivals – Andhra Cuisine –Restaurants - Eco Tourism – Beaches & Hill Resorts – Mountaineering – Tourist Places in A.P.
Unit – V	Modalities of Conducting Tourism: Field Work - Visit to a Site – Conduct of Research – Preparation of Project Report

References:

1	APTDC Publications
2	Ashorth G.J, Marketing in Tourism Industry
3	Bhatia A.K., Tourism Development
4	Clare, Gunn, Tourism Planning
5	Khan, Nafees A, Development Tourism in India
6	Krishna K Karama, Basics of Tourism
7	Marrison A.M, Hospitality and Travel Marketing
8	RangaMukesh, Tourism Potential in India
9	Sarkar H, Museums and Protection of Monuments and Antiquities in India
10	Vijayalaxmi K.S., History of Tourism

Field Trip: Compulsory field trip to destinations of architectural, archaeological, historical and cultural importance is to be conducted. Students should be made to prepare detailed reports on the hand-on experience they gained in such trips.

Students should be encouraged to create **blogs** for local site seeing places and to write and organize articles on those spots.

B. A. HISTORY

III Year B. A. Programme (UG) Courses – Under CBCS

Semester – VI

Paper – VIII-A-2 (Cluster Elective Paper 2)

POPULAR MOVEMENTS IN ANDHRA DESA (1848 TO 1956 A.D.)

(History and Culture of Andhra from 1857 to 2014)

Unit – 1	Social & Self Respect Movements: Social Conditions –KandukuriVeeresalingam, Raghupathi Venkata Rathnam Naidu, GuruzadaApparao, Komarraju Venkata Laxmana Rao; New Literary Movements: Causes – RayaproluSubbarao, ViswanathaSathyanarayana, GurramJashua, BoyiBheemanna, SriSri – Impact.
Unit – II	Freedom Movement in Andhra (1885-1920): Contributory Factors – Vandemataram Movement – Swadeshi & Boycott programs – Glorious Events at Rajahmundry, Kakinada, Kotappakonda& Tenali – Home Rule Movement in Andhra.
Unit - III	Freedom Movement in Andhra (1920-1947): Non-Cooperation Movement – ChiralaPerala, Palanadu&Pedanandipadu Activities – Alluri Seetarama Raju &Rampa Revolt (1922-24) – Anti-Simon Commission Movement – Civil Disobedience Movement – Quit India Movement.
Unit - IV	Movement for Separate Andhra State (1953): Causes – Andhra Maha Sabha – Andhra Provincial Congress Committee – Andhra University – Conflict between Coastal Andhra &Rayalaseema – Sri Bagh Pact – Constitution of Committees & their Contribution – Martyrdom of PottiSriramulu – Formation of separate Andhra State.
Unit – V	Movement for formation of Andhra Pradesh (1956): VisalandhraMahasabha – Role of Communists – States Reorganization Committee – Gentlemen's Agreement – Formation of Andhra Pradesh.

References:

1	B. Kesava Narayana, Political and Social Factors in Modern Andhra
2	K.V.Narayana Rao, The Emergence of Andhra Pradesh
3	M. Venkata Rangaiah, The Freedom Struggle in Andhra Pradesh
4	P.R.Rao, History of Modern Andhra
5	SarojiniRegani, Highlights of Freedom Movement
6	SarojiniRegani, □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□
7	V. Ramakrishna, Social Reform Movement in Andhra

8	B. Kesava Narayana, Modern Andhra & Hyderabad – 1858 – 1956 A.D., 2016

Project Work: With the aim of understanding of techniques and methods of research and presentation, students should be encouraged to draft a report on local writers, struggles, human rights movements, different types of social discrimination etc.

B. A. HISTORY

III Year B. A. Programme (UG) Courses – Under CBCS

Semester – VI

Paper – VIII-A-3 (Cluster Elective Paper – 3)

COMTEMPORARY HISTORY OF ANDHRA PRADESH (1956-2014)

Unit – 1	Socio-Economic Changes in Andhra Pradesh – River Projects & Infrastructural Development – Education & Scientific Progress – Regional Politics – Emergence of Telugu Desam Party.
Unit – II	Growth of Leftist Ideology – Marxist & Radical Literature – Naxalbary Movement - Communist Activities - Electoral Politics – Present Status of Communist Movement.
Unit - III	Dalit Movement – Understanding Untouchability - Education – Literature - Struggle for Identity – Demand for Political Space.
Unit - IV	Early trends towards Bifurcation: Jai Telengana Movement (1969) – Mulki Rules – Legal Battle - Jai Andhra Movement (1972) – Six Point Formula (1973).
Unit – V	Bifurcation of Andhra Pradesh: Power Politics – Economic Discontentment – Riparian Disputes - Unemployment –Foundation of Telangana RastraSamiti – Movements for separate Telangana & unified Andhra Pradesh – Formation of Telangana State (2014)

References:

1	Barry Pavier, The Telangana Movement - 1944-51
2	Chinnayya Suri, Agrarian Movement in Andhra, 1921-71
3	K. Ramachandra Murthy, Unveiling Telangana State
4	P.R.Rao, History of Modern Andhra
5	S. Ratnakar, A Brief History of Telangana & Andhra Pradesh
6	Sri Krishna Committee Report
7	TarimelaNagireddy, India Mortgaged
8	Y.V.Krishna Rao, Growth of Capitalism in Indian Agriculture: A Case Study of A.P.
9	KattiPadmarao, □□□□□□□□□□
10	Y. Chinnarao, □□□□□□□□□□□□□□□
11	News Paper Clippings (2001-2014)

Project Work: Students may be asked to prepare assignments on local caste struggles; regional disparities; aspirations; recent developments etc., through interviews and verifying press reports.

COURSE: B. A. HISTORY (CBCS)MODEL QUESTION PAPER & PATTERN

Max. Marks: 75 **Time: 3 hrs**

SECTION A (Total: 20 Marks)

Matching (5 Marks: 5 x 1)

A		B
1	( )	A
2	( )	B
3	( )	C
4	( )	D
5	( )	E

Multiple Choice (5 Marks: 5 x 1)

1.
2
3
4
5.

Fill in the Blanks (5 Marks: 5 x 1)

1.	
2.	
3.	
4.	
5.	

SECTION B (Total: 3x5=15 Marks)

(Answer any **three questions**. Each answer carries **5 marks**

(At least 1 question should be given from each Unit)

1.	
2.	
3.	
4.	
5.	
6.	

SECTION C (Total: 3x15 = 45 Marks)

(Answer any **three questions**. Each answer carries **15 marks**

(At least 1 question should be given from each Unit)

1.	
2.	
3.	
4.	
5.	
6.	

@@@@@

(Code:)

<u>Xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx University</u>

<u>xx^th Semester End Examination</u>

<u>II B. A., HISTORY</u>

<u>Paper IV - xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx</u>

Max. Marks: 75 **Time: 3 hrs**

<u>SECTION A</u> (Total: 20 Marks)

<u>Matching</u> (5 Marks: 5 x 1)

A		B
1. Servants of Indian Society □□□□□□□□□□□□□□□□□□□ □□□□□□	( )	a. V.D.Savarkar □□. □□. □□□□□□□□
2. Home Rule League □□□□□□□□□□□	( )	b. Subash Chandra Bose □□□□□□□□□□□ □□□□
3. Gaddhar Party □□□□□□□□□□□□	( )	c. LalaHardayal □□□□□□□□□□□
4. Free Indian Society □□□□□□□□□□□□□□□□□	( )	d. Gokhale □□□□□
5. Indian National Army □□□□□□□□□□□□□□□□□	( )	e. Anne Besant □□□□□□□□□

<u>Multiple Choice</u> (5 Marks: 5 x 1)

1. When did Portuguese rule came to end in India?
   □□?

a.1612 b. 1947 c. 1962 d. 1565

2. Battle of Baxar took place in the year ____.
□□□□□□□□□□□□□o □□□□□□□□□□□□□□□ _____ .

a. 1526 b. 1556 c. 1757 d. 1764

3. First Viceroy of India was ------.
□□□□□□□□□□□□□□□□□□□□□□□□□?

a. Canning □□□□□□□ b. Rippon □□□□□ □□ c. Lytton □□□□□□□ d. Curzon □□□□□□□

4. Who wrote the book ‘My Experiments with Truth’?
‘My Experiments with Truth’□□□□□□□□□□□□□□□□□□□□□□□□□□□?

a. Sardar Patel □□□□□□□ □□□□□ b. Sarojini Naidu □□□□□□□ □□□□□□ c. Rajaji □□□□□□ d. M.K.Gandhi M K □□□□□

5.IndividualSathyagraha was started in the year ----.
□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ -----.

a. 1940 b. 1942 c. 1943 d. 1946

Fill in the Blanks (5 Marks: 5 x 1)

1. First Governor of Portuguese Company was --------.
□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□?
2. ------ gave the title ‘Raja’ to Ram Moham Roy.
□□□□□□□□□□□□□ ‘□□□□’ □□□□□□□□□□□□□□□□□ -----.
3. ------ wrote the book ‘Annihilation of Caste’.
‘□□□□□□□□□□□’ □□□□□□□□□□□ ----.
4. Salt Sathyagraha started from this area ----.
□□□ ----.
5. ----- is called as ‘Frontier Gandhi’.
-------- □□ ‘□□□□□□□□□□□□□□’ □□□□□□.

SECTION B (Total: 3x5=10 Marks)

(Answer any **three questions**. Each answer carries **5 marks**
□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□. □□□□□□□□□□□□□**5**
□□□□□□□□)

1. Give a brief account of Permanent Revenue Settlement.

□□ □□□□.

2. Narrate the contribution of William Bentinck in India.
□□□.

3. Write short notes on Brahma Samaj.
□□□.

4. Describe Home Rule Movement.
□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□.

5. What were the causes for the downfall of Mughal empire?
□□?

6. Describe the conditions in India during Moghal rule.
□□□.

SECTION C (Total: 3x15 = 45 Marks)

(Answer any **three questions**. Each answer carries **15 marks**
□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□. □□□□□□□□□□□□□□□**15** □□□□□□□□□)

1. How did Robert Clive establish British rule in India?
□□□ □□□□□□□□□□□□□□?

2. Give an account of main features of Regulating Charter Acts.
□□.

3. What were the reasons and results of 1857 revolt?
1857 □□□□□□□□□□□□□□□□□□□□□□, □□□□□□□□□□□□□□□□□□□□□□.

4. Describe the reforms of Rippon.
□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□.

5. Explain the role played by Gandhiji in freedom struggle.
□□□□□□□□□□□□□□□□□□□o□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□?

6. Why is SardarVallabhai Patel called as Builder of Modern India?
□□ □□□□□?

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Andhra Pradesh State Council of Higher Education

Structure of BA - Political Science under CBCS w.e.f.2015-16

Revised in April, 2016

Yr	Semester	Paper	Title	Hr/ Wk	Credits	Marks	
						Int	Ext
1	I	I	Basic Concepts of Political Science	5	4	25	
	II	II	Political Institutions (Concepts, Theories and Institutions)	5	4	25	75
2	III	III	Indian Constitution	5	4	25	75
	IV	IV	Indian Political Process	5	4	25	75
3	V	V	Indian Political Thought	5	4	25	75
		VI	Western Political Thought	5	4	25	75
	VI	VII	Electives (any one) VII-(A): Major issues in Indian Politics (or) VII-(B): Principles of Public Administration (or) VII-(C): Local Self - Government in Andhra Pradesh	5	4	25	75
		VIII	Cluster Electives (any one cluster, i.e., set of three papers) Elective VIII-A-1: Colonialism and Nationalism in India	5	4	25	75
			Elective VIII-A-2: Political Economy of Development in India	5	4	25	75
			Elective VIII-A-3: Feminism: Theory and Practice **(or)** Elective VIII-B-1: Comparative Constitutionalism; UK, USA Elective VIII-B-2: Human Rights in a Comparative Perspective Elective VIII-B-3: Political Sociology **(or)** Elective VIII-C-1: International Relations Elective VIII-C-2: Indian Foreign Policy ElectiveVIII-C-3: Contemporary Global Issues	5	4	25	75

Note: Student Activities like Data/picture analysis, Seminars, Assignments, Group Discussions, Case studies, Fieldwork, Surveys, Study Projects, Models are Part of Curriculum in all papers. The teacher shall identify appropriate activities for each unit and assign them to all the students for improving domain skills.

Andhra Pradesh State Council of Higher Education

CBCS: SYLLABUS - SEMESTER WISE (2015-16)
FIRST YEAR; SEMESTER – I
B.A. POLITICAL SCIENCE
PAPER-I(CORE): BASIC CONCEPTS OF POLITICAL SCIENCE

Unit-1: Explanatory Frameworks of Politics

1. What is Politics: Nature and Scope of Political Science
2. Approaches to the Study of Politics: Normative, Historical, Empirical Traditions

Unit-2: What is the State

1. Origin and Evolution of the Modern State
2. Different Conceptions on the role of the Modern State: Social Democratic and Neo Liberal conceptions

Unit-3: Nations and Nationalism

1. Conceptual Distinction between Nationality and Nation
2. Varieties of Nationalism: Culture and Civic Nationalism

Unit-4: Rights and Citizenship

1. Evolution of Rights: Civil and Social rights
2. Citizenship: Universal and Differential Citizenship

Unit-5: Freedom, Equality and Justice

1. Freedom: Negative and Positive Freedom
2. Equality: Formal Equality, Equality of Opportunity, Equality of Outcome
3. Justice: Justice based on Needs, Deserts and Rights

Reference books:

1. Bhargava Rajeev and Acharya Ashok (eds) (2008) Political Theory: An Introduction, Pearson, New Delhi.
2. Andrew Heywood (2007) Politics 3rd edition, Palgrave Macmillan, NewYork.
3. Bellamy R (1993) (Ed) Theories and Concepts of Politics, Manchester university press, New York.
4. Vincent A (2004) The Nature of Political Theory, Oxford Universit Press, NewYork.

CBCS: SYLLABUS - SEMESTER WISE (2015-16)
FIRST YEAR; SEMESTER – I
B.A. POLITICAL SCIENCE
PAPER-II (CORE): POLITICAL INSTITUTIONS
(CONCEPTS, THEORIES AND INSTITUTIONS)

Unit-1: Constitutionalism

1. The Purpose of Constitutional law, Theory of Separation of Powers
2. Structural Forms of the Modern State: Basic features of Parliamentary and Presidential forms of Government

Unit-2: Territorial Division of Authority of the Modern State

1. Basic features of Federal form of Government
2. Basic features of Unitary form of Government

Unit-3: Institutional forms of the Modern State

1. Democracy: Basic features of Classical and Modern Representative Democracy
2. Models of Democracy: Procedural Democracy and Substantive Democracy

Unit-4: Judiciary and Democratic State

1. The nature, role and functions of the Judiciary
2. Judicial Review: Debates on the Supremacy of legislature or Judiciary in the protection of Constitutional law

Reference books:

1. Andrew Heywood (2007) Politics 3rd edition, Palgrave Macmillan, New York
2. Held, David (2006) Models of Democracy 3rd edition Oxford Polity Press
3. Birch A.H (2000) The Concepts and Theories of Democracy, London Routledge
4. Bogdanor, V (Ed) (1988) Constitutions in Democratic Politics Gower, Aldershot
5. Scott Gordon (1999) Controlling the State: Constitutionalism from Ancient Athens to Today, Cambridge, Harvard University Press.

CBCS: SYLLABUS - SEMESTER WISE (2015-16)
SECOND YEAR; SEMESTER – III
B.A. POLITICAL SCIENCE
PAPER-III(CORE): INDIAN CONSTITUTION

Unit-1: The Making of the Constitution

1. The ideological legacy of the Indian National Movement on the Constituent Assembly
2. The Nature and Composition of the Constituent Assembly

Unit-2: Philosophical Premises of the Indian Constitution

1. Preamble: The underlying values of the Indian Constitution
2. Salient features of the Constitution of India

Unit-3: Fundamental rights and Directive principles of State Policy

1. Individual and Collective Rights: Limitations on the fundamental Rights
2. Judicial Interpretation of Fundamental Rights
3. The doctrine of 'Basic Structure' of the Constitution: KesavanandaBharathi Case

Unit-4: Indian Federalism

1. Unitary and Federal features in the Indian Constitution
2. Tension Areas between the Union and State Governments
   Legislative, Administrative and Financial Spheres

Unit-5: Working of the Indian Constitution

1. The Values of the Indian Constitution and Ushering of Social Revolution in India
2. The causes for the Ascendency of the Executive over legislature and Judiciary; Major Controversies regarding the Amendments to the Constitution
3. Nature and Role of Higher Judiciary in India; Recent Debates on the mode of appointment of Judges

Reference books:

1. Granville Austin (1972) the Indian Constitution, Cornerstone of a Nation Oxford university Press, New Delhi.

2. Madhavkhosla (2012) the Indian Constitution, oxford university press, New Delhi

3. Granville Austin (1999) Working a Democratic Constitution; A History of the Indian Experience, Oxford University Press, New Delhi

4. Zoya Hasan, Sridharan E and Sudharshan R (Eds) 2002 India's living Constitution, Permanent black, New Delhi

5. BaxiUpendra (1980) the Indian Supreme Court and Politics Eastern book co, Lucknow

CBCS: SYLLABUS - SEMESTER WISE (2015-16)
SECOND YEAR; SEMESTER – IV
B.A. POLITICAL SCIENCE
PAPER-IV (CORE): INDIAN POLITICAL PROCESS

Unit-1: Approaches to Study the Political Processes in India

1. Theory of Modernization: Transition from Tradition to Modernity
2. Marxian Approach: Transition from pre-capitalism to capitalism

Unit-2: Social Structure and Democratic Process

1. Transition of Caste System: From Hierarchy to Identity: Role of Agency
2. Politicisation of Intermediate and Dalit Caste Communities
3. Evolution of Modernity in India

Unit-3: Religion and Politics

1. Competing Communalisms: Majoritarian and Minoritarian
2. Debates on Secularism; Role of the State towards religion

Unit-4: Party and Electoral Processes in India

1. Electoral Trends of the lokSabha from 1952 to 2014:From the One Party Congress System to Multi Party Coalitions
2. Determinants of Voting Behavior in India;Caste,Class,Patronage, Money etc.
3. Evolution of Party System in India: the Ideology and Social bases of major Political Parties: INC,BJP,CPM, DMK,BSP,TDP

Reference books:

1. Chandhoke N and Priyadarshini P (Eds) (2009) Contemporary India Economy, society, politics, Pearson, NewDelhi.
2. Vanaik A and Bhargava R (Eds) (2010) Understanding Contemporary India Critical perspectives orient black swan New Delhi.
3. Jayal N G and Mehta PB (Eds) (2010) Oxford Companion to Indian Politics Oxford University Press, New Delhi.
4. Kohliatul and Prema Singh (Ed) (2013) Routledge Hand book of Indian Politics Routledge, NewYork.
5. Jaffrelot C (2003) India's Silent Revolution: The Rise of the Lower Caste in North India, C Hrust, London.
6. Stanely A. Kochanek, Robert L.Hardgrave, India Government and Politics in a Developing Nation, Boston, Wards Worth Publishing, 2006.
7. Rajeev Bhargava (Ed) Secularism and its Critics (1998), Delhi, OUP.

CBCS: SYLLABUS - SEMESTER WISE (2015-16)
THIRD YEAR; SEMESTER – V
B.A. POLITICAL SCIENCE
PAPER-V(CORE): INDIAN POLITICAL THOUGHT

Unit-1: Traditions of Ancient Indian Political Thought

1. Sources and features of Ancient Indian Political Thought
2. Manu: Social laws
3. Kautilya:Theory of the State

Unit-2: Renaissance Thought

1. Rammohun Roy: Religious and Social Reform
2. PanditaRamabai: Gender

Unit-3: Early Nationalism

1. DadabaiNaoroji: Drain Theory and Poverty
2. Ranade M G : The Role of the State and Religious Reform

Unit-4: Religious Nationalism

1. Savarkar V D : Hindutva or Hindu Cultural Nationalism
2. Mohammed Iqbal: Islamic Communitarian Nationalism

Unit-5: Democratic Egalitarianism

1. Gandhi-Swaraj and Satyagraha
2. Jawaharlal Nehru- Democratic Socialism
3. Dr.Ambedkar B R – Annihilation of Caste System
4. M.N.Roy: Radical Humanism

Reference books:

1. Pantham Thomas and Kenneth Deutsch(Ed)(1986)
   Political thought in modern India, Sage, New Delhi
2. BidyutChakrabarthy and Rajendra Kumar Pandey (2009) modern Indian political thought, Sage, New Delhi
3. Gurpreet Mahajan (2013), India : Political ideas and making of a democratic discourse, zed book, London
4. Partha Chatterjee (1986) nationalist thought and the colonial world: A derivative disclosure, zed books, London
5. Bhikhu Parekh (1999) colonialism, tradition and reform,Sage,New Delhi
6. Bhikhu Parekh(1989) Gandhi's political philosophy ,Macmillan, London

CBCS: SYLLABUS - SEMESTER WISE (2015-16)
THIRD YEAR; SEMESTER – V
B.A. POLITICAL SCIENCE
PAPER-VI (CORE): WESTERN POLITICAL THOUGHT

Unit-1: Classical Western Political Thought

1. Plato: Theory of Forms, Critique of Democracy, Justice
2. Aristotle: Citizenship, State, Justice, Virtue

Unit-2: Early Medieval to the Beginning of Modern Thought

1. St. Augustine: Earthly City and Heavenly City, Evil, Freewill, Moral Action
2. Machiavelli, Statecraft, Virtue, Fortuna

Unit-3: Liberal Thought

1. Thomas Hobbes: Human nature, Social Contract, liberty, State
2. John Locke: Natural Rights, Consent, Social Contract, State
3. Rousseau: Social institutions and Moral Man, Equality, liberty and General Will

Unit-4: Liberal Democratic Thought

1. Jeremy Bentham: Utilitarianism
2. John Stuart Mill: Individual liberty, Representative Government

Unit-5: Philosophical Idealism and its critique

1. Hegel: Individual Freedom, Civil Society, State
2. Karl Marx: Alienation, Surplus Value,Materialist Conception of History, State

Reference books

1. ShefaliJha (2010) Western Political Thought from Plato to Karl Marx, Pearson, NewDelhi
2. Boucher D and Kelly P (Eds) (2009) Political Thinkers from Socrates to the Present, Oxford University press, oxford
3. Coleman J (2000) A History of Modern Political Thought: From Ancient Greece to early Christianity, Blackwell publishers, oxford
4. Macpherson C B (1962) The Political Theory of Possessiveness Individualism, Oxford University press, oxford
5. Hampsher-monk I (2001) A History of Modern Political Thought: Major Political Thinkers fromHobbers to Marx,Blackwell publishers, oxford

CBCS: SYLLABUS - SEMESTER WISE (2015-16)
THIRD YEAR; SEMESTER – VI
B.A. POLITICAL SCIENCE
PAPER-VII-(A) (ELECTIVE): MAJOR ISSUES IN INDIAN POLITICS

Unit- I: Caste and Politics

1. Changing Power Relations Within the Caste Structure
2. Ethnicisation of caste

Unit- II: Secessionism

1. Causes for Secessionist Movement in the State of Jammu & Kashmir

2. Causes for Secessionist Movements in the States of North-East India

Unit- III: Regionalism in India

1. Centralizing tendencies in India Federalism
2. Regionalism as a Response to protection of autonomy of States: Regionalism in Tamilnadu, Punjab and Assam

Unit- IV: Crisis of Governance of the State Institutions in India

1. Proliferation of Corruption in the Institutions of the State: Beaucratic and Political Corruption.
2. Electoral Malpractices and Defections of Elected Representatives: Need for reforms in the Anti-Defection Law
3. Electoral Populism and Competitive Populist Welfarism

Reference Books:

1. Partha Chatterjee, (Ed) State and politics in India, Delhi, OUP,1998
2. Sudiptakaviraj (ed), Politics in India, Delhi, OUP,2007
3. NirajaJayal, Democracy and the State, Welfare, Secularison and Development in Contemporary India, Delhi, OUP.2001
4. Rajeev Bhargava, Secularism and its Critics, Delhi, OUP,1999
5. PratapBhanu Mehta and DeveshKapur (eds), Political Institutions in India, Delhi, OUP,2011
6. Niraja Gopal Jayal and Bhanupratap Mehta (ed), The Oxford Companion to Politics in India, Delhi, OUP,2011
7. SanjibBaruach, Ethnonationalisam in India: A Reader, Delhi, OUP, 2012.
8. SanjibBaruach, Durable Disorder: Understanding the Politics of North East India, Delhi, OUP, 2007.

CBCS: SYLLABUS - SEMESTER WISE (2015-16)
THIRD YEAR; SEMESTER –VI
B.A. POLITICAL SCIENCE
PAPER-VII-(B)(Elective): PRINCIPLES OF PUBLIC ADMINISTRATION

Unit-1: Nature of Public Administration

1. Meaning, Nature and Scope of Public Administration
2. Significance of Public Administration
3. Public and Private Administration

Unit-2: Administrative Theories

1. Classical Theory-Henry Fayol
2. Human Relations theory-Elton Mayo
3. Rational Decision making theory-Herbert Simon

Unit-3: Principles of Organization

1. Hierarchy- Span of control-Unity of command
2. Decision Making-Communication
3. Co-ordination-leadership

Unit-4: Structure of organization

1. Chief Executive-Types and Functions
2. Department-Bases of Departmentalization
3. Line and Staff Agencies

Unit-5: Theories of Motivation

1. Meaning and importance of Motivation
2. Hierarchy of needs theory; Abraham Maslow
3. Theories of X and Y ; Donglas Mc Gregor

Reference books:

1. Pardhasaradhi (Eds) (2011) Public Administration; Concepts, Theories and Principles, Telugu Academy, Hyderabad
2. R.kSapru (2014) 3rd Edition, Administrative Theories and Management Thought, PHI learning Pvt.Ltd, New Delhi.
3. Prasad D R, Prasad V S,(Eds) (2010),Administrative Thinkers, Sterling Publishers, NewDelhi.

CBCS: SYLLABUS - SEMESTER WISE (2015-16)
THIRD YEAR; SEMESTER – VI
B.A. POLITICAL SCIENCE
PAPER-VII-(C) (ELECTIVE): LOCAL SELF - GOVERNMENT IN ANDHRA PRADESH

Unit- I: Evolution of Local Self-Government in India

1. Constitutional Provisions on local Self-Government
2. Recommendations of Balwantrai Mehta and Ashok Mehta Committees on Local Self - Government

Unit-II: Importance of Constitutional Amendments

1. 73rd Amendment – Rural Local bodies;Basic features
2. 74th Amendment – Urban Local bodie; Basic features

Unit-III: Structure and functions of Panchayati Raj in Andhra Pradesh

1. Gram Panchayat
2. Mandal Parishad
3. ZillaParishad
4. Structure and functions of Urban local bodies in Andhra Pradesh; Municipalities Nagar Panchayat and Municipal Corporations

Unit-IV: Structure and functions of Urban local bodies in Andhra Pradesh

1. Nagar Panchayats
2. Municipalities
3. Municipal Corporations

Unit-V: Role of leadership and Emerging Challenges

1. Emerging patterns of leadership
2. Problems of autonomy: Financial and Administrative spheres

Reference Books:

1. Maheswari, S.R., Local Self Government in India, Orient longman,1971
2. Venkatesan V, InstitutionalisingPanchayati Raj in India, Institute of Social Sciences, New Delhi 2002
3. Baviskar B.S, Inclusion and Excusion in Local Governance, Sage Publication, New Delhi 2009.
4. M.P. Dube and Padalia, M (Ed), Democratic Decentralization and Panchayati raj in India, Anamika Publishers, New Delhi, 2002.
5. BalaRamulu, CH and Ravinder D, "Five Decades of Democratic Decentralization process in Andhra Pradesh" in Social Change (Journal of the Council for Social Development published by Sage International) Vol.42, No.2, PP165-186, June 2012.

CBCS: SYLLABUS - SEMESTER WISE (2015-16)
THIRD YEAR; SEMESTER – VI
B.A. POLITICAL SCIENCE
PAPER: VIII-A-1 (Cluster Elective): COLONIALISM AND NATIONALISM IN INDIA

Unit- I: The Impact of Colonial Rule on India

1. The Nature of Indian Society on the Eve of Colonial Rule
2. The impact of Colonial Rule on the Indian Society; On Agriculture, Handlooms and Industry

Unit-II: Reforms and Resistance

1. 1857 Rebellion : Causes, Nature and Aftermath
2. Socio - Religious Movements in 19th century; BrahmoSamaj, Arya Samaj etc.

Unit-III: Emergence and Growth of Nationalism

1. Liberal Constitutionalism: Swadeshi Movement
2. Role of Gandhiji in Mass Mobilization: Non- Cooperation, Civil Disobedience and Quit India Movements.

Unit-IV: Communalism, Partition and Establishment of Indian Republic

1. Colonial roots of Communalism and Partition of the Country
2. An Evaluation Civic and Secular Nationalism leading to the Constitution of India as a Republic.

Reference Books:

1. Chandra Bipan, Essays on Colonialism, Hyderabad, Orient Longman, 1999.
2. Chandra Bipan (Eds), India's struggle for Independence, Delhi, Penguin, 1988.
3. Sumit Sarkar, Modern India (1885-1947), New Delhi, Macmillan,1983
4. SekharBandopadhyay, From Plassey to Partition and after; A History of Modern India, Delhi, Orient Longman, 2015.
5. Jalal, A and Bose, S, Modern South Asia: History, culture and Political Economy, Delhi, OUP, 1999.

CBCS: SYLLABUS - SEMESTER WISE (2015-16)
THIRD YEAR; SEMESTER – VI
B.A. POLITICAL SCIENCE
PAPER: VIII-A-2 (Cluster Elective): POLITICAL ECONOMY OF DEVELOPMENT IN INDIA

Unit- I: Colonialism and Indian Economy

1. Self-Sufficiency of Indian Village Structure
2. The Impact of Colonial Rule on the Indian Economy: De-Industrialization Thesis

Unit-II: Economic Development in the Post-Independent Era

1. Planning as a Strategy of Development
2. State led Import Substitution Industrialization for Self Reliant Economic Development

Unit-III: Agrarian Development

1. Politics of Land Reforms: legislative measures for the abolition of Zamindari System, Ceiling on Land Ownership Rights.
2. Green Revolution Strategy for Rapid Development of Agriculture

Unit-IV: Politics of Economics Reforms

1. The assertion of dominant class interests: Rich peasants, State Bureaucracy and Industrial Capitalist classes on the State.
2. Economic Reforms: Liberalization of regulation of the State controls on the economy: Strategy of Market led growth of the Indian economy from 1991 onwards.
3. The impact of Economic Reforms on the Indian Polity: Rising inequalities across Regions and Classes.

Reference Books:

1. Frankel Francine R, Indian Political Economy, Delhi, OUP,
2. Rudolph, Llyod and Rudolph Susan, In Pursuit of Lakshmi, Delhi, OUP, 2004.
3. Terry Byres, The Indian Economy: Major debates since Independence, New Delhi, OUP, 1999.
4. BardhanPranab,The Political Economy of Development, Delhi, OUP,1998
5. Jenkins Rob, Economics Reforms in India, Delhi, OUP,2000
6. Mukherjee Rahul, (Ed) India's Economic Transition: The politics of Reforms, New Delhi, OUP, 2007.

CBCS: SYLLABUS - SEMESTER WISE (2015-16)
THIRD YEAR; SEMESTER – VI
B.A. POLITICAL SCIENCE
PAPER:VIII-A-3 (Cluster Elective): FEMINISM: THEORY AND PRACTICE

Unit- I: Approaches to Study Patriarchy

1. Understanding Sex/ Gender Distinction: Biologism versus Social Constructivism
2. Patriarchy; Private, Public and Power relations within the Family

Unit-II: History of Feminism

1. Origins of Feminism in the West: Britain and France
2. Liberal and Radical Feminist Trends

Unit-III: The Status of Women in India

1. The Position of Women in Indian Society
2. Gender relations in the Family
3. Legal Provisions for the protection of Women in India

Unit-IV: Contemporary Position of Women in Indian Society

1. Understanding Woman's Work and Labour
2. Representation of women in the Indian Parliament
3. Debates on the Reservation of Women in Legislature

Reference Books:

1. Geetha, V, Gender, Stree, Calcutta, 2002
2. Geetha, V, Patriarchy, Stree, Calcutta, 2007
3. Lerner Gerda, The creation of Patriarchy, New York, OUP,1986
4. Forbes, G., Women in Modern India, Cambridge, OUP,1998
5. Desai Neera and Thakkar, Usha, Women in Indian Society, New Delhi, National book Trust, 2001.
6. Rowbothan, Shiela, Women in Movements, London, Routledge, 1993.

CBCS: SYLLABUS - SEMESTER WISE (2015-16)
THIRD YEAR; SEMESTER – VI
B.A. POLITICAL SCIENCE
PAPER: VIII-B-1(Cluster Elective): COMPARATIVE CONSTITUTIONALISM; UK, USA

Unit- I: Constitutionalism

- Evolution of Constitutionalism in U K and USA

Unit-II: Legislature

- Parliament (U K): Structure and Powers
- Congress (USA): Structure and Powers

Unit-III: Executive

- Prime minister & Cabinet (UK): Powers and Functions
- President (USA) : Powers and Functions

Unit-IV: Judiciary

- Nature, Powers and Functions of Judiciary (UK &USA)

Unit-V: Constitutional Amendments

- Procedures for the Amendment of Constitutional Law (UK &USA)

Reference Books:

1. Almond, G et.al, Comparative Politics Today: A world view, 9th Edition, Pearson Education, Delhi, 2011
2. Birch, A.H, British System of Government 4th Edition, Lodon, George Allen and Unwin, 1980.
3. Finer, H., Theory and Practice of Modern Government, London, Methuen,1969
4. Bagehot, The English Constitution, London, Fontana,1963.
5. Kavanagh, D., British Politics, Continuity and Change, Oxford, OUP, 2006.
6. Bogdanor, V (Ed) (1988) Constitutions in Democratic Politics Aldershot, Gower.

CBCS: SYLLABUS - SEMESTER WISE (2015-16)
THIRD YEAR: SEMESTER – VI
B.A. POLITICAL SCIENCE
PAPER: VIII-B-2 (ELECTIVE): HUMAN RIGHTS IN COMPARATIVE PERSPECTIVE

UNIT - I: Human Rights; Theory and Institutionalization

1. Understanding Human Rights: Three Generations of Rights
2. Institutionalization: Universal Declaration of Human Rights
3. Rights in National Constitutions: South Africa and India

UNIT - II: Issues

1. Torture : USA and India
2. Terrorism and Insecurity of Minorities: USA and India

UNIT-III: Structural Violence

1. Caste and Race: Discrimination based on Birth: South Africa and India
2. Adivasis / Aborginals and the Land Question: Australia and India

UNIT-IV: Watchdogs of Human Rights Violation

1. Amnesty International
2. Human Rights Watch

Reference Books:

1. Byrne, Darren,O., Human Rights, An Introduction, Delhi, Pearson,2007.
2. R. Wolfrern, 'Discrimination, xenophobia and Racism' in Symonides, J, New Dimensions and challenges For Human Rights:JaipurRawat Publications, 1998.
3. Cadzon and Maynard, J (Eds), Aborginal studies; Nelson cengage learning, 2011.
4. Kannabiram, k., Tool of Justice: Non- Discrimination and the Indian Constitution, New Delhi, Routledge, 2012.
5. Ishay, M., The History of Human Rights: From Ancient Times to the Globalization Era, Delhi, Orient Blackswan.

Andrew Clapham, Human Rights: A Very Short Introduction, Oxford, OUP, 2007.

CBCS: SYLLABUS - SEMESTER WISE (2015-16)
THIRD YEAR; SEMESTER – VI
B.A. POLITICAL SCIENCE
PAPER: VIII-B-3(Cluster Elective): POLITICAL SOCIOLOGY

Unit- I: Sociology and Politics

1. Sociology of Politics and Political Sociology
2. Evolution of Political Sociology as an Academic Discipline

Unit-II: Political Modernization

1. The theory of Political Modernization: Transition from Tradition to Modernity; The European Experience
2. Nature of Transition ofTradition in Post-Colonial Countries

Unit-III: Political Culture

1. Meaning and role of Political Culture
2. Types of political culture: Parochial, Subjective and Participatory Political Cultures

Unit-IV: Political Socialization

1. Meaning and role of Political Socialization
2. Agencies of Socialization: Family, Media, Education etc.
3. Political Communication: Meaning

Reference Books:

1. Bottomore, T.B. Political Sociology, New Delhi, London, PLUTTO PRESS,1993
2. Dipankar Gupta, Political Sociology in India, New Delhi, Orient Longman 1996
3. Giddens, Anthony Sociology, London Wiley, 2013.

CBCS: SYLLABUS - SEMESTER WISE (2015-16)
THIRD YEAR; SEMESTER – VI
B.A. POLITICAL SCIENCE
PAPER: VIII-C-1 (Cluster Elective): INTERNATIONAL RELATIONS

Unit- I: Basic Concepts of International Relations

1. Meaning, Nature and Scope of International Relations
2. (a). Balance of power (b). National interests
   (c). Collective Security (d). Diplomacy

Unit-II: Approaches to the study of International Relations

1. Idealism – Woodrow Wilson
2. Classical Realism – Hans Morgenthau
3. Neo – realism – Kenneth Waltz

Unit-III: Phases of International Relations (1914-1945)

1. Causes for the First World War
2. Causes for the Second World War

Unit-IV: Phases of International Relations (1945 onwards)

1. Origins of First Cold War
2. Rise and Fall of Détente
3. Origins and the End of Second Cold War

Unit-V: International Organisation

1. The role of UNO in the protection of International Peace
2. Problems of the Third World : Struggle for New International Economic Order

Reference Books:

1. Jackson, R and Sorensan Y, Introduction to International Relations; Theories and approaches, New York, OUP, 2008.
2. Baylis, J and Smith, S (Eds), The Globalization of World Politics; An Introduction to International Relations, Oxford, OUP,2011
3. Aneek Chatterjee, International Relations Today; Concepts and Applications, New Delhi, Pearson Education, 2008.
4. E.H. Carr, International relations between the two world Wars, Lodon, Palgrave Macmillan, 2004.

CBCS: SYLLABUS - SEMESTER WISE (2015-16)
THIRD YEAR; SEMESTER –VI
B.A. POLITICAL SCIENCE
PAPER:VIII-C-2 (Cluster Elective): INDIAN FOREIGN POLICY

Unit- I: Evolution of Indian Foreign of Policy

1. Determinants of Indian Foreign of Policy
2. Continuity and change in Indian Foreign Policy

Unit-II: Non-Alignment and UNO

1. The role of India in the Non-Alignment Movement
2. Relevance of Non-Aligned Movement in the Contemporary World
3. Role of India in the UNO in protection of International Peace

Unit-III: India's Relation with USA and China

1. Indo- US Relations: Pre- Cold War Era, Post- Cold War Era
2. India – China Relations: Pre- Cold War Era, Post- Cold War Era

Unit-IV: India and her Neighbours

1. Indo- Pakistan Relations
2. India's role in South Asian Association of Regions Cooperation (SAARC)

Reference Books:

1. David Scott (Ed), Handbook of India's International Relations, London, Routledge,2011
2. Ganguly, S (Ed), India as an Emerging Power,Portland, Franck class, 2003
3. Pant, H, Contemporary Debates in Indian Foreign and Security Policy, London, Palgrave Macmillian,2008
4. Tellis, A and Mirski, S (Eds), Crux of Asia; China, India, and the Emerging global Order, Washington, Carnegie endowment for international peace,2013
5. Muni, S.D, India's Foreign Policy Delhi CUP, 2009
6. Alyssa Ayres and Raja Mohan, C (Eds), Power Realignment in Asia: China, India and the United States, New Delhi, Sage, 2002.
7. Appadorai, A, Domestic roots of Indian Foreign Policy, New Delhi, OUP,1971 Dutt, V.P, India's Foreign Policy in a Changing World, New Delhi,NBT,2011

CBCS: SYLLABUS - SEMESTER WISE (2015-16)
THIRD YEAR; SEMESTER – VI
B.A. POLITICAL SCIENCE
PAPER: VIII-C-3 (Cluster Elective): CONTEMPORARY GLOBAL ISSUES

Unit- I: Conceptions of Globalization

1. Economic Conception of Globalization
2. Political Conception of Globalization

Unit-II: Anchors of Global Political Economy

1. International Monetary Fund – Nature, Role and Functions
2. Work Bank-Nature, Role and Functions
3. World Trade Organization: Origin, Nature and role in the context of Globalization

Unit-III: Nation State and Globalization

1. The role of Nation State in the context of Globalization
2. Consequences of Globalization – Rise of Inequalities within and across Nations

Unit-IV: Contemporary Global issues

1. Ecological Issues: International Agreements On Climate Change
2. International Terrorism: Non- State Actors and State Terrorism

Reference Books:

1. Ritzer, G., Globalization: A Basic Text, Sussex: Wiley- Black well,2009
2. Streger, M., Globalization: A Very Short Introduction, Oxford, OUP,2013
3. Heywood, A., Global Politics, New York, Palgrave Macmillian,2011
4. Held, D et.al, Global Transformations; Politics, Economics and culture California, Stanford University Press,1999
5. J. Volger, 'Environmental Issues'in J. Baylis, S. Smith an owens, P(Eds) Globalization of world politics, New York, Palgrave,2011

A.P. State Council of Higher Education
Revised Common Framework of CBCS for B.Com (w.e.f.2015-16) in AP
B.Com - Semester –I

Sl. No.	Course	Name of the subject	Total Marks	Mid. Sem. Exam *	Sem. End Exam	Teaching Hours**	Credits
1.	First Language	English	100	25	75	4	3
2.	Second Language	(Tel/Hindi/Urdu/Sans)	100	25	75	4	3
3.	Foundation Course -1	HVPE (Human Values & Professional Ethics)*	50	---	50	2	2
4.	Foundation Course- 2	Environmental Studies	50	---	50	2	2
5.	DSC0000000000000000000000000000000000 1 A	Fundamentals of Accounting-I	100	25	75	5	4
6.	DSC 2 A	Business Organization	100	25	75	5	4
7.	DSC 3 A	Business Economics-I	100	25	75	5	4
Total			**600**	**125**	**475**	**27**	**22**

#The marks split between formal test and co-curricular activities may be decided by the University concerned
@ Syllabus size shall be in accordance with the No. of teaching hours.
*HVPE may be taught by Telugu teachers

B.Com - Semester – II

Sl. No.	Course	Name of the subject	Total Marks	Mid. Sem. Exam	Sem. End Exam	Teaching Hours**	Credits
1.	First Language	English	100	25	75	4	3
2.	Second Language	(Tel/Hindi/Urdu/Sans)	100	25	75	4	3
3.	Foundation Course -3	ICT-1 (Information & communication Technology)	50	---	50	2	2
4.	Foundation Course-4	Communication & Soft Skills-1	50	---	50	2	2
5.	DSC 1 B	Fundamentals of Accounting-II	100	25	75	5	4
6.	DSC 2 B	Business Environment	100	25	75	5	4
7.	DSC 3 B	Business Economics-II	100	25	75	5	4
Total			**600**	**125**	**475**	**27**	**22**

B.Com- Semester – III

Sl. No.	Course	Name of the subject	Total Marks	Mid. Sem. Exam	Sem. End Exam	Teaching Hours**	Credits
1.	First Language	English	100	25	75	4	3
2.	Second Language	(Tel/Hindi/Urdu/Sans)	100	25	75	4	3
3.	Foundation Course- 5	ICT-2 (Information & communication Technology)	50	---	50	2	2
4.	Foundation Course- 6	Communication & Soft Skills-2	50	---	50	2	2
5.	DSC 1 C	Corporate Accounting	100	25	75	5	4
6.	DSC 2 C	Business Statistics	100	25	75	5	4
7.	DSC 3 C	Banking Theory & Practice	100	25	75	5	4
Total			**600**	**125**	**475**	**27**	**22**

B.Com -Semester – IV

Sl. No.	Course	Name of the subject	Total Marks	Mid. Sem. Exam	Sem. End Exam	Teaching Hours**	Credits
1.	Foundation Course- 7	Communication & Soft Skills-3	50	---	50	2	2
2.	Foundation Course- 8	Analytical Skills*	50	---	50	2	2
3.	Foundation Course- 9	Entrepreneurship	50	---	50	2	2
4.	Foundation Course- 10	Leadership Education**	50	---	50	2	2
5.	DSC 1 D	Accounting for Service organizations	100	25	75	5	4
6.	DSC 2 D	Business Laws	100	25	75	5	4
7.	DSC 3 D	Income Tax	100	25	75	5	4
Total			**500**	**75**	**425**	**23**	**20**

* To be taught by Maths/Statistics Teachers (and partly by English teachers)
** To be taught by Telugu Teachers

Table-5: B.Com -Semester – V

Sl. No.	Course	Name of the subject	Total Marks	Mid. Sem. Exam	Sem. End Exam	Teaching Hours**	Credits
1	DSC 1 E	5.2 Cost Accounting	100	25	75	5	4
2.	DSC 2 E	5.3 Goods and Services Tax Fundamentals	100	25	75	5	4
3.	DSC 3 E	5.4 Commercial Geography	100	25	75	5	4
4.	Elective-DSC 1F/Inter-disp.	***Cluster Electives -1***	100	25	75	5	4
5.	Elective-DSC 2F /Inter-disp.	***1. E-Commerce*** 5.5 e-Commerce	100	25	75	5	4
6.	Elective-DSC 3F/Inter-disp.	5.6Business Networks 5.7 **Project Work:** Working with Organizations on e-Commerce activities, viz.,	100	25	75	5	4

ANDHRA PRADESH STATE COUNCIL OF HIGHER EDUCATION

BA Economics Syllabus under CBCS

w.e.f. 2015-16 (Revised in April 2016)

Structure of Syllabus

Table-1:

Semester	*Paper*	*Title*
Semester I (Core)	I	Micro Economics – Consumer Behavior
Semester II (Core)	II	Micro Economics - Production and Price theory
Semester III (Core)	III	Macro Economics - National Income, Employment and Money
Semester IV (Core)	IV	Macro Economics - Banking and International Trade
Semester V (Core)	V	Economic Development and Indian Economy
Semester V (Core)	VI	Indian and Andhra Pradesh Economy
Semester VI *Any one Paper from A,B,C,D,E F and G	VII – (A)	Agricultural Economics
	VII – (B)	Principles of Insurance
	VII – (C)	Financial Markets and Institutions
	VII – (D)	Rural Economics And Social Change
	VII – (E)	Entrepreneurship and Small Business Development
	VII – (F)	Public Finance
	VII – (G)	International Economics
Semester VI ** Any one Cluster from A, B, C, D and E	**Cluster Electives – (A) Agribusiness**	
	VIII	A-1: Agribusiness Environment in Andhra Pradesh
		A-2: Agricultural output Marketing
		A-3: Agricultural Input Marketing.
	Cluster Electives – (B) Insurance Practice	
	VIII	B-1. Practice of General Insurance
		B-2. Agricultural Insurance
		B.-3 Health Insurance
	Cluster Electives – (C) Financial Markets	
	VIII	C-1: Stock Market operations
		C:-2 Securities Market
		C: **-3**Commodities Market
	Cluster Electives – (D) Rural Economy	
	VIII	D.-1 Rural Economy
		D. -2 Rural Industrilisation
		D.-3 Rural Marketing
	Cluster Electives –(E) Entrepreneurship	
	VIII	E.-1 Industrial Economics
		E.**-2** Labour Economics
		E.-3 Industrial Management

*Student has to choose only one paper

** Stsudents are advised to choose Cluster (A) if they have chosen VII (A) and Choose Cluster (B) if they have chosen VII (B) etc. However, it is only suggestive.

Table – 2:

Sl. No	Paper	Name of Paper	Sem	Hours/ Week	Credits	Marks	
						Mid Sem	Sem End
1	I	Micro Economics – Consumer Behavior	I	**5**	**4**	**25**	**75**
2	II	Micro Economics - Production and Price theory	II	**5**	**4**	**25**	**75**
3	III	Macro Economics - National Income, Employment and Money	III	**5**	**4**	**25**	**75**
4	IV	Banking and International Trade	IV	**5**	**4**	**25**	**75**
5	V	Economic Development and Indian Economy	V	**5**	**4**	**25**	**75**
6	VI	Indian and Andhra Pradesh Economy	V	**5**	**4**	**25**	**75**
7	VII – (A)	Agricultural Economics	VI	**5**	**4**	**25**	**75**
	VII – (B)	Principles of Insurance					
	VII – (C)	Financial Markets and Institutions					
	VII – (D)	Rural Economy and Social Change					
	VII – (E)	Entrepreneurship and Small Business Development					
	VII – (F)	Public Finance					
	VII – (G)	International Economics					
8	**Cluster Elective – A: Agribusiness**		VI	**5**	**4**	**25**	**75**
	VIII	A-1. Agribusiness Environment in Andhra Pradesh					
		A-2. Agricultural Output Marketing	VI	**5**	**4**	**25**	**75**
		A-3. Agricultural Input Marketing.	VI	5	4	25	75
	Cluster Elective – B: Insurance Practice						
	VIII	B-1. Practice of General Insurance					
		B-2. Agricultural Insurance					
		B-3. Health Insurance					
	Cluster Elective - C: Financial Markets						
	VIII	C-1. Stock Market operations					
		C-2. Securities Market					
		C-3. Commodities Market					
	Cluster Elective – D: Rural Economy						
	VIII	D-1. Rural Economy					
		D-2. Rural Industrilisation					
		D-3. Rural Marketing					
	Cluster Elective – E: Entrepreneurship						
	VIII	E-1. Industrial Economics					
		E-2. Labour Economics					
		E-3. Industrial Management					

Note: Student Activities like Data/picture analysis, Seminars, Assignments, Group Discussions, Case studies, Fieldwork, Surveys, Study Projects, Models are Part of Curriculum in all papers. The teacher shall identify appropriate activities for each unit and assign them to all the students for improving domain skills.

ANDHRA PRADESH STATE COUNCIL OF HIGHER EDUCATION

BA Economics Syllabus under CBCS

w.e.f. 2015-16 (Revised in April 2016)

I Year B. A. Programme (UG) Courses – Under CBCS

Semester – I

Paper – I (Core Paper)

Micro Economics – Consumer Behavior

Module -1

Nature, definition and scope of Economics - Wealth, Welfare, Scarcity and modern definitions.

Module -2

Methodology in Economics - Micro & Macro; Static and Dynamic analysis; Normative and positive science, Inductive & Deductive methods; Partial and general Equilibrium.

Module - 3

Utility analysis**:** - cardinal approach-The Law of diminishing Marginal utility- The Law of Equi-Marginal Utility- concept of consumer's surplus

Module - 4

Demand analysis - Law of Demand - Elasticity of Demand - Measurement of Elasticity of Demand - Price, Income & Cross Elasticities of Demand**.**

Module - 5

Ordinal Approach**:** Indifference Curve analysis - Properties of Indifference curves - Price or budget line - Equilibrium of the Consumer with the help of Indifference curves – Samuelson's Revealed preference theory.

REFERENCES:

1. R.G. Lipsey and K.A.Chrystal - "Economics", Oxford University Press, 10/e, 2004.
2. P.A.Samuelson & W.D. Nordhaus-"Economics", Tata Mc.Graw Hill, 18/e, 2005.
3. N.Gregory Mankiw-"Principles of Economics", Thompson 2015 .
4. H.L.Ahuja-"Advanced Economic Theory"' S.Chand.
5. M.L.Seth-"Micro Economics", Laxmi Narayana Agarwal, 2015.
6. Bilas, A.-"Micro Economic Theory", International Student Edition, Mc.Graw Hill, 1971.

7. Telugu Academy Publications
8. D.M. Mithani & G.K. Murty - Business Economics, Himalaya Publishing, 2015.

B. A. ECONOMICS

I Year B. A. Programme (UG) Courses – Under CBCS

Semester – II

Paper – II (Core Paper)

Micro Economics - Production and Price Theory

Module - 1

Production function-Concept of homogeneous production function-Cobb- Douglas Production function- Law of variable proportions-Law of Returns to Scale - Different Concepts of Costs – Explicit & Implicit, Opportunity, Total – fixed and Variable Costs, Marginal & Average Costs & its Relationship. Concept of Revenue – Total, Marginal & Average Revenue and Break – Even Point

Module - 2

Analyse different types of Market structures - Perfect Competition - Price determination and equilibrium of firm and industry under perfect competition - Monopoly - Price determination - Price discrimination.

Module - 3

Monopolistic competition - price determination - Oligopoly - Kinked demand curve approach.

Module - 4

Marginal Productivity theory of distribution - Theories of wage determination Subsistence theory of wages, Standard of living theory of wages, Modern theory of wages Wages and collective bargaining - concept of minimum wage.

Module - 5

Theory of Rent: Ricardian theory of rent - Quasi rent concept of Alfred Marshall. Theories of Interest - Classical, Neo-classical and Keynes Liquidity Preference theory - Profit - dynamic, innovations, Risk and Uncertainty theories.

REFERENCES:

1. R.G. Lipsey and K.A.Chrystal - "Economics", Oxford University Press, 10/e, 2004.

2. P.A.Samuelson & W.D. Nordhaus-"Economics", Tata Mc.Graw Hill, 18/e, 2005.
3. N.Gregory Mankiw-"Principles of Economics", Thompson 2015.
4. H.L.Ahuja-"Advanced Economic Theory"' S.Chand, 2004.
5. M.L.Seth-"Micro Economics", Laxmi Narayana Agarwal, 2015.
6. Bilas, A.-"Micro Economic Theory", International Student Edition, Mc.Graw Hill, 1971.
7. Telugu Academy Publications
8. D.M. Mithani & G.K. Murty - Business Economics, Himalaya Publishing, 2015.
9. Bilas, A.-"Micro Economic Theory", International Student Edition, Mc.Graw Hill, 1971.

B. A. ECONOMICS

II Year B. A. Programme (UG) Courses – Under CBCS

Semester – III

Paper – III (Core Paper)

Macro Economics - National Income, Employment and Money

Module - 1

Meaning, definition of Macro Economics - Importance of Macro Economics- Difference between Micro and Macro Economics - Paradox of Macro Economics -Limitations

Module - 2

National Income - Definitions, Concepts of National Income - Measurement of National Income- Circular flow of Income in Two, Three and Four Sector Economy.

Module - 3

Classical theory of Employment - Say's Law of Markets.

Module - 4

Keynesian Theory of Employment - Consumption function – Investment Function - Marginal Efficiency of Capital (MEC)- Concepts of multiplier and accelerator

Module - 5

Meaning and Functions of Money - Classification of money - Gresham's Law - RBI classification of Money. Theories of Money - Fisher's Quantity theory of Money Cambridge approach (Marshall, Pigou, Robertson & Keynes).

REFERENCES:

1. G.Ackley - "Macro Economics Theory and Policy", Collier Macmillan, 1978.
2. E.Shapiro - "Macro Economic Analysis", Galgotia Publications, 1999.
3. Central Statistical Organisations - "National Accounts Statistics".
4. R.Dornbush, s.Fisher and R.Startz - "Macro Economics", Tata Mc.Graw Hill, 9/e, 2004.
5. M.L.Seth-"Macro Economics", Lakshmi Narayana Agarwal, 2015.
6. K.P.M. Sundaram - "Money, banking & International Trade", Sultan Chand, 2010.
7. Dillard, D - "The Economics of John Maynard Keynes", Crossby Lockwood & Sons.
8. M.N.Mish ra & S.B.Mishra - "Insurance Principles & Practice" S.Chand 2012.
9. Bharati V.Pathak "The Indian Financial System Markets. Institutions & Services". Pearson 2008.
10. Telugu Academy Publication

B. A. ECONOMICS

II Year B. A. Programme (UG) Courses – Under CBCS

Semester – IV

Paper – IV (Core Paper)

Banking and International Trade

Module - 1

Trade Cycles - meaning and definition - Phases of a Trade Cycle -Inflation - definition - types of inflation - causes and effects of inflation measures to control inflation.

Module - 2

Banking: Meaning and definition -Functions of Commercial Banks - Concept of Credit creation-Functions of RBI - Recent developments in banking sectors.

Module – 3

Non-Bank Financial Institutions – Types of NBFIs - Factors contributing to the Growth of NBFIs –-Money market – Defects of Indian money market

Module – 4

Concepts of Shares-Debentures - Stock Market - Functions - Primary and Secondary Markets - SEBI - - Insurance - Life Insurance and General Insurance.

Module - 5

Macro Economic Policy - Fiscal, Monetary and Exchange rate policies

Objectives and Significance - Importance of International Trade - Regional and International Trade – Defining Balance of Trade and Balance of Payment.

REFERENCES:

1. G.Ackley - "Macro Economics Theory and Policy", Collier Macmillan, 1978.
2. E.Shapiro - "Macro Economic Analysis", Galgotia Publications, 1999.
3. Central Statistical Organisations - "National Accounts Statistics".
4. R.Dornbush, s.Fisher and R.Startz - "Macro Economics", Tata Mc.Graw Hill, 9/e,2004.
5. M.L.Seth-"Macro Economics", Lakshmi Narayana Agarwal, 2015.
6. K.P.M. Sundaram - "Money, banking & International Trade", Sultan Chand, 2010.
7. Dillard, D - "The Economics of John Maynard Keynes", Crossby Lockwood & Sons.
8. M.N.Mish ra & S.B.Mishra - "Insurance Principles & Practice" S.Chand 2012.
9. Bharati V.Pathak "The Indian Financial System Markets. Institutions & Services".
10. Pearson.
11. D.M.Mithani & G.K.Murty - “Business Economics", Himalaya Publishing House, 2015.
12. M.L.Jhingan - Economic Development - Vikas, 2012.
13. G.Omkarnath - Economics - A Primer for India - Orient Blackswan, 2012.
14. Agarwal, V. (2010) Macroeconomics: theory and Policy, Dorling Kindersley (India)
15. Pvt. Ltd., New Delhi
16. Ahuja, H.L. (2012) Macro Economics, Theory and policy, S. Chand and Company Ltd.,
17. New Delhi

B. A. ECONOMICS

III Year B. A. Programme (UG) Courses – Under CBCS

Semester – V

Paper – V (Core Paper)

Economic Development and Indian Economy

Module - 1

Concept of Economic Growth - Distinction between economic growth and development - Measurement of economic development - Theories of Economic Growth: Adam Smith, Rostow, Karl Marx and Harrod & Domar Models.

Module - 2

Sustainable development - Balanced and unbalanced growth-choice of techniques Labour intensive and capital intensive methods.

Module - 3

Basic features of the Indian Economy - Natural Resources - Important Demographic features- Concept of Population Dividend - Population Policy.

Module - 4

National Income in India - trends and composition-poverty, inequalities and Unemployment - Measures taken by the Government. - MGNREGS

Module - 5

Economic reforms - liberalization, privatization and globalisation - concept of inclusive growth.

REFERENCES:

1. Dhingra, I.C - "Indian Economy", Sultan Chand, 2014.
2. Ruddar Dutt and K.P.M. Sundaram - "Indian Economy", S.Chand & Co., 2015.
3. G.M.Meier -"Leading Issues in Economic Development", Oxford University Press, New York,.
4. M.P.Todaro - "Economic Development", Longman, London 6/e, 1996.
5. Reserve Bank of India - Hand book of Statistics on Indian Economy (Latest).
6. S.K.Misra & V,K,Puri - "Indian Economy", Himalaya Publishing House, 2015.
7. R.S.Rao, V.Hanumantha Rao & N.Venu Gopal (Ed) - Fifty Years of Andhra Pradesh (1956-2006), Centre for Documentation, Research and Communications, Hyderabad, 2007.
8. G.Omkarnath - Economics - A Primer for India - Orient Blackswan, 2012.
9. Benjamin Higgins - Economic Development
10. Telugu Academy Publications.
11. Dr. Ch.S.G.K. Murthy, Indian Economy - Gitam University

B. A. ECONOMICS

III Year B. A. Programme (UG) Courses – Under CBCS

Semester – V

Paper – VI (Core Paper)

Indian and Andhra Pradesh Economy

Module - 1

Indian Agriculture - Importance of Agriculture in India - Agrarian structure and relations- Factors determining Productivity- Agricultural Infrastructure - Rural credit - Micro Finance - Self Help Groups (SHGs) - Agricultural Price policy- concept of Crop Insurance - Food Security.

Module - 2

Structure and growth of Indian Industry - Industrial policies of 1956 & 1991 Meaning of Micro small and Medium Enterprises (MSMEs)- Problems and Prospects of small scale Industries in India.

Module - 3

Disinvestment in India - FEMA - Foreign direct investment - Services Sector in India – Reforms in Banking and Insurance -, IT, Education and Health.

Module - 4

Planning in India Economy - Objectives of Five year plans - Review of Five year Plans - Current Five year plan- NITI Aayog

Module - 5

Andhra Pradesh Economy - Population - GSDP - Sector Contribution and trends - IT – Small Scale Industry - SEZs.

REFERENCES:

1. Dhingra, I.C - "Indian Economy", Sultan Chand, 2014.
2. Ruddar Dutt and K.P.M. Sundaram - "Indian Economy", S.Chand & Co., 2015.
3. G.M.Meier - "Leading Issues in Economic Development", Oxford University Press, New York, 3/e.
4. M.P.Todaro - "Economic Development", Longman, London 6/e, 1996.
5. Reserve Bank of India - Hand book of Statistics on Indian Economy (Latest).
6. S.K.Misra & V,K,Puri - "Indian Economy", Himalaya Publishing House, 2015.
7. R.S.Rao, V.Hanumantha Rao & N.Venu Gopal (Ed) - Fifty Years of Andhra Pradesh (1956-2006), Centre for Documentation, Research and Communications,Hyderabad, 2007.
8. G.Omkarnath - Economics - A Primer for India - Orient Blackswan, 2012.
9. Telugu Academy Publications.
10. Dr.Ch.S.G.K.Murthy, Indian Economy - Gitam University.

III Year B. A. Programme (UG) Courses – Under CBCS
Semester – VI
Paper – VII-(A) (Elective Paper VII-(A)
AGRICUTURAL ECONOMICS

Module-1
Nature and Scope of Agricultural Economics. Factors affecting agricultural development: technological, institutional and general. Interdependence between agriculture and industry.

Module-2
Concept of production function : input-output and product relationship in farm production.

Module-3
Growth and productivity trends in Indian agriculture with special reference to Andhra Pradesh. Agrarian reforms and their role in economic development.

Module-4
Systems of farming, farm size and productivity relationship in Indian agriculture with special reference to Andhra Pradesh- New agriculture strategy and Green revolution : and its Impact

Module-5
Emerging trends in production, processing, marketing and exports; policy controls and regulations relating to industrial sector with specific reference to agro-industries in agri-business enterprises.

RECOMMENDED / REFERENCE BOOKS

1. Sadhu An, Singh Amarjit and Singh Jasbir (2014), Fundamentals of Agricultural Economics, Himalaya Publishing House, Delhi
2. Lekhi RK and Singh Joginder, Agriculatural Economics, Kalyani Publishers
3. Bhaduri, A. (1984), The Economic Structure of Backward Agriculture, Macmillan, Delhi.
4. Bilgrami, S.A.R. (1996), Agricultural Economics, Himalayas publishing house, Delhi.
5. Dantwala, M.L. et.al (1991), Indian Agricultural Development Since Independence, Oxford & IBH, New Delhi.
6. Government of India (1976), Report of the National Commission on Agriculture, New Delhi. 5. Government of India, Economic Survey (Annual), New Delhi.
7. Gualti, A. and T. Kelly (1999), Trade Liberalisation and Indian Agriculture Oxford University Press, New Delhi

B. A. ECONOMICS
III Year B. A. Programme (UG) Courses – Under CBCS
Semester – VI
Paper – VII-(B) (Elective Paper VII(B)

Principles of Insurance

Module 1:

Risk Management: Provides an understanding of risk management – different types of risks – management of risks.

Module 2:

The Concept of Insurance and its Evolution: The basics and nature of insurance – evolution and nature of insurance – how insurance operates today.

Module 3:

Insurance Customers: Understanding insurance customers – different customer needs – importance of customers – customer mindsets.

Module 4:

The Insurance Contract: Terms of an insurance contract - disclosure of all relevant information – principle of utmost good faith – the relevance of proximate cause – the insurance contract.

Module 5:

Insurance Terminology and Development: Common terms used in insurance – terms common to both life and non – life insurance - role of insurance in economic development and social security – contribution of insurance to the society.

References :

1. General Insurance, John Magee & David Bicklhaupt.
2. Operational Transformation of General Insurance Industry during the period 1950 to 1990 & Beyond, R D Samarth.
3. Study on Distribution Functions in General Insurance & Role of Intermediaries, Arun Agarwal / P R Rao
4. General Insurance for Information Technology Professionals, Martin Frappoli.

B. A. ECONOMICS
III Year B. A. Programme (UG) Courses – Under CBCS
Semester – VI
Paper – VII(C) (Elective Paper VII(C)

Financial Markets and Institutions

Module I
Introduction to Financial Market – Types of Financial Markets – Meaning and Definitions of Stock Market, Derivative Market, Commodities Market, and Currency Market.

Module II
Stock Markets - Primary & Secondary Markets - Market Participants - Stock Exchanges - Market Index - Trading Mechanism - Broker/Sub-Brokers - Basic Accounting,

Activity: Practical Trading

Module III
Derivative Markets - Meaning & concept of Derivatives – Futures and Options - Trading Mechanism.

Activity: Practical Trading.

Module IV
Commodities Markets - Commodity Derivatives - Commodity Exchanges – Instruments - Pricing Techniques - Accounting & Taxation .

Activity: Practical Trading.

Module V
Currency Markets - Foreign Exchange Derivatives - Exchange Traded Futures - Regulatory Framework - Accounting & Taxation - Code of Conduct.

Activity: Practical Trading.

References:

1. Vasant Desai - The Indian financial system and Development-, Himalaya Publishing House.
2. Dr. S. Gurusamy - Financial Markets and Institutions-,Tata McGraw Hill.
3. Dr. Bharti Pathak - The Indian Financial System, Pearson.
4. M.Y.Khan - Indian Financial System, Mc.Graw Hill
5. C.Sudarsana Reddy - Financial Management-Principles and Practice, Himalaya Publishing House.
6. Thummuuri Siddaiah - Financial Services, Pearson.

B. A. ECONOMICS
III Year B. A. Programme (UG) Courses – Under CBCS
Semester – VI
Paper – VII(D) (Elective Paper VII(D)

RURAL ECONOMICS AND SOCIAL CHANGE

Module 1 :

Nature and scope of rural Economy, Importance of Agriculture in economic Development of India, Rural Economic problems of India; Nature of land Problems-Evolution of Policy-Land Reforms.

Module 2:

Agricultural Holdings, Fragmentation and Sub-division of Holdings, cooperative Farming-Rural Labour Problems-nature of Rural Unemployment- Employment and Wage Policy-Sources of Technological change and Green Revolution.

Module 3:

Rural Society-its Structure and Change; Village and its Social Organization-Indian Village and its types, Rural-Urban Continuum and Rural-Urban relationships.

Module 4:

Rural social Institutions-family, Property, caste, Class, Agarian structure, indebtedness and Poverty, Jajmani System, Religion, Village, Local Self Government, Panchayat Raj and Community Development Prgrommes.

Module 5:

Social Change in Rural India-Impact of Westernization, Secularization, Modernization of Indian Rural Society-Post Modernization and Globalization and Indian Villages.

References:

1. Carver, The Principles of Rural Economics.

2. Desai, A., Rural Sociology in India.

3. Dube, S.C., India's changing villages.

4. Nanavati & Anjala, rural problems in India.

5. Ruddar Dutt & K.P.M.Sundaram, Indian Economy.

6. Sachdeva, D.A.& Vidya Bhushan, An Introduction to Sociology.

B. A. ECONOMICS

III Year B. A. Programme (UG) Courses – Under CBCS
Semester – VI
Paper – VII (E) (Elective Paper VII (E)

Entrepreneurship and Small Business Development

Module -1:

Introduction - Entrepreneurship meaning, nature and Characteristics of entrepreneurship, Barriers to entrepreneurship

Module -2:

Establishing a small enterprise: The startup process, project identification, selection of the product -selection of site/location and legal considerations

Module -3:

Small Enterprises and Enterprise Launching Formalities: Definition of Small Scale; Rationale; Objective; Scope; SSI; Registration; NOC from Pollution Board; Machinery and Equipment Selection

Module -4:

Role of Support Institutions and Management of Small Business: Director of Industries; DIC; SIDO; SIDBI; Small Industries Development Corporation (SIDC); SISI; NSIC; NISBUD; State Financial Corporation SIC.

Module -5:

Project Preparation - project formulation, Project Report Preparation; Specimen of Project Report, assessment of project feasibility, analysis's of project, Project Planning and Scheduling using Networking Techniques of PERT / CPM preparation of project report,

Reference:

1. Desai, Vasant (2003). Small-Scale Industries and Entrepreneurship. Himalaya Publishing House, Delhi.
2. Kaulgud, Aruna (2003). Entrepreneurship Management. Vikas Publishing House, Delhi. 38
3. Cynthia, L. Greene (2004). Entrepreneurship Ideas in Action. Thomson Asia Pvt. Ltd., Singapore.

B. A. ECONOMICS

III Year B. A. Programme (UG) Courses – Under CBCS
Semester – VI
Paper – VII (F) (Elective Paper VII (F)

Public Finance

Module - 1

Meaning and scope of Public Finance - Distinction between Public and Private Finance. Principle of maximum social advantage

Module – 2

Source of Public Revenue - Taxes - administrative revenues - commercial Revenues - Gift and grants - Concept of VAT. Canons of taxation (Adam Smith's and Modern Economists).

Module

Meaning and classification of public expenditure - principles of public Expenditure Wagner's Law - Peacock - Wiseman Hypothesis.

Module - 4

Public debt - classification of public debt - methods of debt redemption

Module - 5

Budget - Meaning and Definition - Components of Budget - Concepts of Budget Deficits - Indian Union Budget.

References:

1. B.P.Tyagi - "Public Finance", Jai Prakash Nath, 2012.
2. H.D.Bhatia - "Public Finance"' Vikas Publishing House 2013.
3. Reserve Bank of India - Hand book of Statistics on Indian Economy (Latest).
4. S.K.Misra & V,K,Puri - "Indian Economy", Himalaya Publishing House, 2015.
5. Budget at a Glance
6. Economic and Functional Classification of the Budget
7. Telugu Academy Publications.

III Year B. A. Programme (UG) Courses – Under CBCS
Semester – VI
Paper – VII (G) (Elective Paper VII (G)

INTERNATIONAL ECONOMICS

Module – 1

Meaning and importance of International Trade - Inter - Regional and International Trade.

Module – 2

Theories of International Trade - theory of absolute advantage - theory of comparative cost and Hecksher - Ohlin theory.

Module – 3

International Trade and Economic growth - Terms of trade - Gross Barter and Net Barter and Income terms of trade.

Module - 4

Tariffs - meanings and definition - Types of tariffs - Concept of optimum tariff Balance of payments - Causes for disequilibrium in balance of payments.

Module - 5

India's Foreign Trade - composition and direction. Recent EXIM policy - changing role IMF, IBRD & WTO. Concept of outsourcing.

References:

1. B.O.Soderston - "International Economics", Macmillan, 1995.
2. C.P.Kindle Berger - "International Economics".
3. 3. J.Bhagawathi - "International Trade - Selected Readings", Cambridg University Press.
4. 4. D.M.Mithani & G.K.Murty - "Business Economics", Himalaya Publishing House, 2015.
5. Salvatore Dominick (2005) International Economics, John Wiley & Sons, Inc
6. Mithani D.M (2003) International Economics, Himalaya Publishing House, Mumbai
7. Mannur H.G (2003) International Economics Vikas publishing House Pvt Ltd, New Delhi
8. Telugu Academy Publications.

Paper – VIII-A; Cluster Elective–A: Agribusiness

Paper VIII-A-1: Agribusiness Environment in Andhra Pradesh

Module-1

Role of agriculture in development process in Andhra Pradesh vis-à-vis other developed states. Economy wide effects of agriculture in Andhra pradesh through trickle down effects. Backward and forward linkages of agriculture with rest of economy.

Module-2

Agricultural finance-importance in modern agriculture- performance of agricultural finance in Andhra Pradesh -problems of agricultural finance – Inter linkages of agricultural credit and other input markets and product markets.

Module-3

Dynamics of agriculture-crop (horticulture, field crops), sector-livestock (poultry dairy and fisheries) sector and inter linkages among the sectors. Agribusiness sector in Andhra Pradesh-salient futures, constraints, sub sectors of agribusiness-input sector, production sector, processing sector.

Module-4

Growth performance of major agricultural commodities in Andhra Pradesh-production and processing trends in exports and imports of major agricultural commodities.

Module-5

Marketing policy- structure of agri markets – regulated markets – need – activities – structure – APMC act – market legislations – Role of Farmer Groups in the marketing of Agricultural Produce.

References:

1. Adhikary M. 1986. Economic Environment of Business. S. Chand & Sons.
2. Aswathappa K. 1997. Essentials of Business Environment. Himalaya Publ.
3. Francis Cherunilam 2003. Business Environment. Himalaya Publ.
4. Agarwal Raj, 2001, Business Environment, Excel Books, New Delhi.

B. A. ECONOMICS

III Year B. A. Programme (UG) Courses – Under CBCS

Semester – VI

Paper – VIII-A; Cluster Elective – A: Agribusiness

Paper VIII-A-2: Agricultural Output Marketing

Module-1

Structure and Model of Agri-Marketing Organizations with functions: Functions of intermediaries, Marketing Practices in Primary and secondary and terminal market, Regulated markets, co-operative marketing.

Module-2

Marketing costs and margins, Marketing Finance. Marketing Structure of Major agricultural commodities, food grains: Rice, and Maize. Cash Crops; Cotton, Oil Seeds, Vegetables and Fruits, Milk, Meat and Poultry products.

Module-3:

Problems and Challenges in Agriculture Marketing - Market Yards - Support prices - Rural Warehousing.

Module-4:

State Intervention in Agricultural Marketing, Role of Various agencies (Andhra Pradesh Agro, MARKEED, State Department, and FCI, Tobacco Board, Cotton Corporation) and its impact on market efficiency. Agriculture Price Commission.

Module-5:

Inter-regional and international trade in agriculture; emerging scenario of international trade in agricultural commodities; concept of terms of trade and balance of payments,. WTO and Indian agriculture with special reference to Andhra Pradesh .

References:

1. C.S.G.Krishnamacharyulu & Lalitha Ramakrishnan, "Rural Marketing: Text and Cases", Pearson Education, New Delhi.
2. Awadhesh Kumar Singh & Satyaprakash Pandey, Rural Marketing: Indian Perspective, New Age International Publishers, New Delhi.
3. Mamoria, C.B. & Badri Vishal: Agriculture Problems in India
4. Arora, R.C., "Integrated Rural Development", S. Chand Limited, New Delhi.
5. Gopalaswamy, T.P., "Rural Marketing: Environment, Problems and Strategies, Vikas Publishing House Pvt. Ltd., New Delhi.
6. Bedi & Bedi, "Rural Marketing", Himalaya Publishing House, New Delhi.

B. A. ECONOMICS

III Year B. A. Programme (UG) Courses – Under CBCS

Semester – VI

Paper – VIII-A; Cluster Elective –A: Agribusiness

Paper VIII-A-3: Agricultural Input Marketing

Module-1

Agri input marketing – Meaning and importance – distinctive features of Agri. Input marketing – Distribution channels of agri. Inputs – Private, Government, Co-operative and Joint sector. Agri inputs promotional programme – concepts and techniques.

Module-2

.

Issues in seed marketing – determinants of seed demand – private sector contribution – public sector support to private sector - Distinctive features of Seed Marketing vis – a – vis other Input Marketing – strengths and weaknesses on Indian seed industry.

Module-3

Fertilizer industry scenario – public, private, co-operative and joint sector role – fertilizer production consumption, and imports – fertilizer marketing characteristics. Biofertilizers – its role and scope – major constraints involved – production level – market level – field level. Marketing network/ channels.

Module-4

Pesticide industry – an overview – nature of industry growth – consumption crop wise, area wise – demand and supply – market segmentation.-IPM concept development – biopesticides – its role and scope.

Module-5

Agricultural mechanization – benefits and importance and future priorities – scenario of farm implements and machinery sector – economic advantage of mechanization – contribution of agricultural mechanization – Need for the development of agricultural machinery and implements to suit the local resource endowments.

References:

1. Acharya SS & Agarwal NL 2004, Agricultural Marketing in India – Oxford & IBH.
2. Sharma Premjit 2008, Marketing of Seeds – gene Tech Books, New Delhi.
3. Marketing of the Agri. Inputs – IIMA publications.
4. State of the Indian Farmer - Input Management, Ministry of Agriculture, GOI, Academic Foundation, New Delhi-2004

B. A. ECONOMICS

III Year B. A. Programme (UG) Courses – Under CBCS

Semester – VI

Paper – VIII-B; Cluster Elective–B: Insurance Practice

Paper VIII-B-1: PRACTICE OF GENERAL INSURANCE

Module 1:

***Introduction to General Insurance*:** Introduction of Indian Insurance Market – Structure, Classification, Salient features of Indian general insurance market.

Module 2:

Policy Documents and forms: Insurance contract & elements – Components of an insurance policy - Interpretation of policies – Contents of insurance proposal form - Certificate of Insurance – Claim forms

Module 3:

Fire, Motor Liability and Personal Accident Insurance: *Fire* insurance Coverage – Exclusions – Conditions of fire insurance policy – Coverage under special polices - Motor insurance policy – Important documents – Types of policies – Liability – Motor claims & procedures - - Personal Accident insurance.

Module 4:

General insurance Products – Part 3 (Engineering & other Insurances): Classes of Engineering insurance - Burglary insurance – Baggage insurance – Fidelity Guarantee insurance – Jeweller's Block insurance – Crime insurance.

Module 5:

Claims: Preliminary procedure – Loss minimization – Procedure – Process of claim management – Arbitration - Modes of settlement – Recoveries - Identifying claim

References:

1. General Insurance, John Magee & David Bicklhaupt
2. Operational Transformation of General Insurance Industry during the period 1950 to 1990 & Beyond, R.D.Samarth
3. Study on Distribution Functions in General Insurance & Role of Intermediaries, ArunAgarwal / P R Rao
4. General Insurance for Information Technology Professionals, Martin Frappoli.

Semester – VI

Paper – VIII-B - Cluster Elective –B: Insurance Practice

Paper VIII-B-2: AGRICULTURAL INSURANCE

Module 1:

Risks in Agriculture: Agricultural Risks – Changing face of Agricultural Risks in India – Climate Change and Agriculture – Managing Agricultural Risks.

Module 2:

Evolution of Crop Insurance in India: Individual based crop insurance – Pilot Crop Insurance Scheme (PCIS) – Comprehensive Crop Insurance Scheme (CCIS) – Experimental Crop Insurance Scheme (ECIS) – National Agricultural Insurance Scheme (NAIS) – Farm Income Insurance Scheme (FIIS) – Types of Agricultural Insurance –Formation of Agriculture Insurance Co of India Ltd.

Module 3:

Module 4:

Crop Insurance - Yield Index based Underwriting and Claims: National Agricultural Insurance Scheme (NAIS) – Components – Nature, Coverage and Integrity – Underwriting – Claims – Yield Data – Yield Estimation Methodology – Actuarial premium rating – Proposed modifications in NAIS.

Module 5:

Weather Based Crop Insurance Model: Comparison between Area Yield and Weather based Crop insurance – Weather Insurance components – Weather data and Indexes – Product Design – Underwriting and Claims considerations – Understanding Crop Insurance Models.

Reference Books

1. Mayet, P - Agricultural Insurance, Forgotten Books,
2. Ray, P. K. – Agricultural Insurance (Theory and Pratice and Applications to Developing Countries), Elsevier,B.A.
3. Poonam Patwardhan, Bhise Vinayak, Narwade Sunil – An Evaluation of National Agricultural Insurance Scheme in Inida, Lambert
4. Raju S S and Ramesh Chand – Agricultural Risk and Insurance in Inida - Problems and Prospects, Academic Foundation

B. A. ECONOMICS

III Year B. A. Programme (UG) Courses – Under CBCS

Semester – VI

Paper – VIII-B; Cluster Elective-B: Insurance Practice

Paper VIII-B-3: HEALTH INSURANCE

Module 1:

Introduction to Health Insurance: What & Why of Health insurance – Evolution and growth of Health insurance in India – Understanding the Health System in India – Constitutional provisions in areas of Public

Module 2:

Health Insurance Products in India: Types of Health Insurance Products in India – Hospitalization Indemnity product – Personal Accident products – Critical Illness product – Daily Hospital Cash benefit – Disease management covers – Outpatient covers

Module 3:

Health Insurance policy forms and clauses: Health insurance contracts – Insurance contracts VS other contracts – Proposal forms used in health insurance – Comparison of proposal forms & questionnaires of health insurance with Personal Accident insurance, Life insurance & Group Insurance…

Module 4:

Regulatory and legal aspects of health insurance: Principles and practice of health insurance regulations – Need for regulations in health insurance – Various kinds of risks in health insurance –

Module 5:

Customer service in health insurance: Consumer protection & policy –holder's protection – Claim servicing – types of cashless claims – Grievance redressal– survey on grievance redressal.

Reference:

1. American Health Insurance Plans , Health Insurance Primer : Study guide Part A- - American Health Insurance Plans , Washington DC.

2. American Health Insurance Plans / Place, Health Insurance nuts and bolts : Study guide part B, American Health Insurance Plans

3. Davis . W. Gregg , Life and health insurance handbook , O.D. Dickerson , Health Insurance

B. A. ECONOMICS
III Year B. A. Programme (UG) Courses – Under CBCS
Semester – VI

VIII-C; Cluster Elective –C: Financial Markets

Paper VIII-C-1: STOCK MARKET OPERATIONS

Module – 1:
Meaning, Nature and Functions of Primary Market - Role of Primary Market– Methods of floatation of capital – Problems of New Issues Market –SEBI measures for primary market.

Module – 2:
Meaning, Nature, Functions of Secondary Market - Organisation and Regulatory framework for stock exchanges in India – Defects in working of Indian stock exchanges.

Module – 3:
Listing of Securities : Meaning – Merits and Demerits – Listing requirements, procedure, fee – Listing of rights issue, bonus issue, further issue – Listing conditions of BSE and NSE.

Module – 4:
Indian Stock Exchanges: BSE – Different trading systems – Share groups on BSE – BOLT System – Different types of settlements – Pay-in and Pay-out – Bad Delivery – Short delivery – Auction – NSE– Market segments.

Module - 5
Market types, Order types and books – De-mat settlement – Physical settlement – Institutional segment – Funds settlement – Valuation debit – Valuation price – Bad and short delivery – Auction.

Suggested Readings:
1.Punithavathy Pandian, Security Analysis and Portfolio Management Vikas Publishing House Pvt. Ltd.

2.V. A. Avadhani, Investment and Securities Market in India, Himalaya Publishing House.

3.Prasanna Chandra, Security Analysis and Portfolio Management, Tata McGraw-Hill.

4.Sanjeev Agarwal, A Guide to Indian Capital Market, Bharat Publishers

5. Ravi Puliani and Mahesh Puliani, Manual of SEBI, Bharat Publicatio

Semester – VI

VIII-C: Cluster Elective –C: Financial Markets

Paper VIII-C-2: Securities Market

Module 1
Securities Market in India - An Overview - Securities market and financial system - Products, participants and functions;

Module 2
Primary Market - Book building - Credit rating; Merchant banking; On-line IPOs; DEMAT issues; Private placement; Virtual debt portals; DRs/GDRs; Other regulations; Public issues;

Module 3
Secondary Market –Membership – Listing - Trading and settlement mechanism; Technology; Trading rules - Insider Trading; Unfair trade practices; Takeovers; Buyback.

Module 4
Government Securities Market Indian debt market; Primary market; Secondary market-NDS; NDS-OM; CCIL; Wholesale debt market (WDM) segment of NSE.

Module 5
Derivatives Market Products, Participants and functions; Trading mechanism; Membership; Contract specification; Clearing & Settlement.

References:

1. Sketch of Stock Market in India with Ref. of BSE 1961
2. Kar, Pratip., Capital Market in 1989 (Securities and Exchange Board of India)
3. Smith, B. Mark., A History Of Global Stock Market (Farrar, Straus And Giroux, Chicago, 2003).
4. Armstrong, F.E., The book of the stock exchange (Pitman Publishing Corporation, London)

III Year B. A. Programme (UG) Courses – Under CBCS

Semester – VI

VIII-C - Cluster Elective –C: Financial Markets

Paper VIII-C-3: Commodities Market

Module 1

Introduction to Derivatives – Types – Products and functions – Exchange – trades versus OTC derivatives.

Module 2

Application of features : Types of instruments (future, options) - Basics and Payoffs; Pricing commodity derivatives – Hedging, Speculation and Arbitrage.

Mould 3

Commodity Derivatives – Difference between Commodity and financial derivatives – Global and Indian commodities exchanges – Evaluation of commodity market in India

Module 4

NCDEX Platform: Structure of NCDEX: Exchange membership; Capital requirements – Commodities traded on NCDEX platform – Instruments available for trading.

Module 5

Regulatory Framework and Taxation: Rules governing commodity derivative exchanges – investor grievance and arbitration – Implications of Sales Tax.

Reference Books:

1. Cirvante, V.R., The Indian Capital Market (Geoffrey Cumberlege Oxford University Press, Bombay, 1956).
2. Salvi, P. G., Commodity Exchange (1947).
3. Markham, Jerry W. (1987). The History of Commodity Futures Trading and Its Regulation. Praeger. p. 305.
4. Niti Nandini : Commodity Markets, Tata McGraw Hill Education Private Limited, 7 West Chatnani Patel Nagar, New Delhi-110008 7.
5. Bharat Kulkarni : Commodity Markets and Derivatives, Excel Books, A-45, Naraina, Phase I, New Delhi-1100028

B. A. ECONOMICS

III Year B. A. Programme (UG) Courses – Under CBCS

Semester – VI

VIII-D - Cluster Elective –D: Rural Economy

Paper VIII-D-1: *Rural Economy*

Module-I
Concept and Nature of Rural Economy; characteristic of rural Economy; Factors affecting rural Economy.

Module- II
Basic Needs of Rural Economy; Housing; Health, education, Training, drinking water supply; Electricity, sanitation, rural Roads, transport and communation, rural statilisation, Utilization of Local Human & Natural Resources.

Module- III:
The Role of Rural Technology – need & important of rural Technology, appropriate rural Technology, Technology for Rural Women, difficulties in adoption of rural technology.

Module-IV
Rural roads and Rural Transport system (Bus, Railways):- Importance of rural roads and transportation problems, various schemes of rural road development. Rural Health and sanitation:- Need of rural health and sanitation, problems, remedies. Rural Electrification:- Sources of energy/ power, progress, problems, policy.

Module– V
Need, sources of rural communication, government policies. Rural Education:- Overview of the education system in India; need, solutions, future agenda. Training and Rural Development:- Meaning of training, types of training, need of rural development training, national training policy.

Reference Books:
Chaudhari, C.M. **Rural Economics**, Jaipur: Subline Publication, 2009

1. Datt, Rudra & Sundharam Indian Economy New Delhi: S. Chand, 2008.

2. Deogirikar, A. B. W.T.O and Indian Economy, Jaipur: ShriNiwas Publications, 2004
4) Acharya,S.S.& **Agricultural Marketing in India** N.L.Agarwal New Delhi: Oxford & IBH ltd.,2004.
5) Khanna,Sulbha & **Rural Development Strategies and Planning**
Upna Diwan New Delhi: Sonali Publications, 2003.
6) Prasad, B.K. **Rural Development Concept Approach and Strategy**
New Delhi: Sarup and Sons, 2003.

B. A. ECONOMICS
III Year B. A. Programme (UG) Courses – Under CBCS
Semester – VI
VIII-D: Cluster Elective –D: Rural Economy

Paper VIII-D-2: *Rural Industrialization*

Module– I:
Rural Industrilisation :- Need, rural Infrastructure and industrialization, progress and problem of rural industrialization in Andhra Pradesh Rural Approach. Potential areas for rural self-employment with special reference to agro industries. The role of co-operation in Rural Industrialization

Module–II:
The policies & programmes for rural industrial development during planning era.. Important progrmmes for Industrial development of rural areas, micro, small and medium industries in Andhra Pradesh.

Module–III
Rural Environment & Resources - Rural Environment in Andhra Pradesh(water, soil) :-Causes, effect, status of rural environment, rejuvenating rural environment. Rural Human Resources Utilization Programmes.

Module - IV
Industrial Development - Large and Small scale industries Andhra Pradesh - Agro-base Industries-Agro-processing industries:- Importance, problems, solutions. Rural technology:- Need, effect, advantages.

Module - V:
Rural Employment - Rural employment in Andhra Pradesh, characteristics of rural employment -Incidence and type of Unemployment in rural area. Need based education and training for rural youth -Development of Entrepreneurship abilities among rural students
Reference Books:
1. Desai, Vasant**. Rural Development in India.**
New Delhi: Himalaya, 2005.
2. IGNOU. **Rural Development: Indian Context.**
New Delhi: IGNOU, 2005.
3. Narwani, G. S. **Training for Rural Development**,
New Delhi: Rawat Publications, 2002.
4. Rao K. Hanumantha Rural Development Statics – 2007-08, National Institute of Rural Development Ministry of R. D., Govt. of India, Rajendra Nagar, Hyderabad – 30 July, 2008

B. A. ECONOMICS

III Year B. A. Programme (UG) Courses – Under CBCS

Semester – VI

Paper VIII-D: Cluster Elective –D: Rural Economy

Paper VIII-D-3: *Rural Marketing*

Module– I

Meaning, concept, definitions, objects, need of Rural Marketing, classification, Structure of Rural Marketing.

Module– II
Marketing Functions:- Meaning, classifications- Packaging, transport, grading, storage and warehousing, buying and selling. Demand and supply meaning, factors affecting demand and supply for farm products.

Module–III
Government intervention and role in rural marketing, characteristics of traditional marketing system. Directorate of Marketing and Inspection. Regulation of Agricultural Marketing:- Definition, objectives, history of Market regulation, progress, quality control, Government Sponsored National Organizations and their role.

Module– IV
Co-operative Marketing:- Meaning, function, history types, structure, membership, source of finance. NAFED :- Objectives, activities, other National co-operative organizations- National co-operative Development corporation (NCDC), Tribal co-operative marketing federation (TRIFED) state level co-operative marketing organization.

Module– V
.Data sources in Agricultural Marketing:- Coverages, Agencies, publications of market statistics. Dissemination of Market statistics, new emerging problems in Agricultural marketing in Andhra Pradesh

1. Acharya, S.S. **Agriculture Marketing in India**, New Delhi : Ford, IBH Publishing Co. Ltd., 2004
2. Chaudhari, C.M. **Rural Economics**, Jaipur: Subline Publication, 2009
3. Desai, Vasant **Rural Development in India,** New Delhi: Himalaya Publication House, 2005
4. Desai, Vasant **Fundamentals of Rural Development**, New Delhi: Rawat Publications, 1991
5. Narwani, G.S. **Training for Rural Development,** New Delhi: Rawat Publications, 2002

B. A. ECONOMICS

III Year B. A. Programme (UG) Courses – Under CBCS

Semester – VI

VIII-E; Cluster Elective –E: Entrepreneurship

Paper VIII-E-1: Industrial Economics

Module-1

Industry and economic development industry and sectoral linkages – industrial classification and data information.

Module-2

Public, private joint and co-operative sectors - private corporate sector- MNCs and their role.

Module-3

Industrial productivity - concept - measurement - productivity in Indian industries - industrial sickness - underutilization of capacity - factors accounting for it and its consequences.

Module - 4

Globalization and Indian industry - privatization and issues relating to disinvestment policy.

Module-5

Industrial development in India - industrial policy - Role of the Central and State - Industrial policy and economic reforms - Industrial growth and pattern.

BOOKS FOR REFERENCE:

1. Dhingra, I.c. Indian Industrial Economy

2. Gadgil, P.G. Indian Economy

3. Kuchhal, S.C. Industrial Economy of India

4. Sharma, N.K. Industrial Economics

B. A. ECONOMICS
III Year B. A. Programme (UG) Courses – Under CBCS
Semester – VI
VIII-E: Cluster Elective –E: Entrepreneurship

Paper VIII-E-2: Labour Economics

Module 1:

Introduction - Labour Economics – Concept and definition – Nature, Scope and Importance – Labour as a unique factor of production

Module 2:

Labour Market - Concept of labour Market and its features –Determinants of the supply and the demand for labour – Organized and unorganized labour

Module 3:

Wages - Wage Concept and Definitions – Wage and development – Collecting bargaining – Wage differentials – Wage Ploicy - Objectives and importance

Module 4:

Labour Productivity, State and labour - Concept of Labour Productivity – Measurement and Importance of Labour productivity – Determinants – Causes for Low Labour Productivity and Measures to Increase Labour Productivity – Technology and Labour Productivity

Module 5:

State and labour – Need for State intervention in Labour matters – methods of intervention – Labour Social Security and Labour Welfare Measures – Labour Ploicy, Objectives and Importance – Emerging perception on state intervention.

Reference:

1. Bhagoliwal T.N (2000), Economics of Labour and Industrial relations. Sahitya Bhavan, Agra.

2. McConnel C.R. and S.L. Brue (2002), Contemporary Labour Economics, McGraw Hill, NeYork.

3. Mittal and Sanjay Prakash Sharma (2000), labour Economics, RSBA Jaipur

B. A. ECONOMICS

III Year B. A. Programme (UG) Courses – Under CBCS

Semester – VI

Paper VIII-E: Cluster Elective–E: Entrepreneurship

Paper VIII-E-3: INDUSTRIAL MANAGEMENT

Module – 1

Basics of Management Introduction, Definition of management, characteristics of management, functions of management - Planning, Organising, Staffing, Directing, Co-ordination, Controlling,

Motivating, Communication, Decision Making - Administration and management, Nature of management, levels of management, managerial skills, managerial roles,

Module - 2

Forms of Organization- Line , Line –staff etc. Forms of ownerships – Partnership, Proprietorship, Joint stock, Co-operative society, Govt. Sector etc, concept of Globalisation

Module – 3

Strategic Management– Evolution - Concept and Characteristics of strategic management – Defining strategy –Strategic Management Process.

Module – 4

Quality Management Definition of quality, goalpost view of quality, continuous improvement definition of quality, types of quality – quality of design, conformance and performance, phases of quality management, - The ISO 9001:2000 Quality Management System Standard

Module – 5

Financial & Project Management -Capital Structure, Fixed & working capital -Introduction to capital budgeting, - Break even analysis - assumptions, importance - Cost-Benefit analysis.

Reference Books :

1. L.C.Jhamb , Savitri Jhamb , Industrial Management – I , Everest Publishing House .
2. Dinesh Seth and Subhash C. Rastogi, “Global Management Solutions”, Cengage Learning, Second Edition, USA.
3. B. Davis and Margrethe H. Olson, "Management Information Systems", Mc-Graw-Hill International Editions.
4. Azar Kazmi , “Strategic Management & Business Policy “, Tata McGraw Hill, New Delhi
5. Kenneth C. Laudon and Jane P. Laudon, “"Management Information Systems", Eighth Edition, Pearson Education
6. K.Shridhara Bhat, “Materials and Logistics Management”, Himalaya Publishing House, Mumbai
7. M.Y. Khan and P. K. Jain, “Financial Management”, Tata McGraw Hill, New Delhi
8. Ravi M. Kishore, “Project Management”, Tata McGraw Hill, New Delhi

Andhra Pradesh State Council of Higher Education
CBCS B.A./B.Sc. **Mathematics** Course Structure
w.e.f. 2015-16 (Revised in April, 2016)

Year	Seme-ster	Paper	Subject	Hrs.	Credits	IA	EA	Total
1	**I**	I	Differential Equations & Differential Equations Problem Solving Sessions	6	5	25	75	100
	II	II	Solid Geometry & Solid Geometry Problem Solving Sessions	6	5	25	75	100
2	**III**	III	Abstract Algebra & Abstract Algebra Problem Solving Sessions	6	5	25	75	100
	IV	IV	Real Analysis & Real Analysis Problem Solving Sessions	6	5	25	75	100
3	**V**	V	Ring Theory & Vector Calculus & Ring Theory & Vector Calculus Problem Solving Sessions	5	5	25	75	100
		VI	Linear Algebra & Linear Algebra Problem Solving Sessions	5	5	25	75	100
	VI	VII	**Electives: (any one)** VII-(A) Laplace Transforms VII-(B) Numerical Analysis VII-(C) Number Theory & Elective Problem Solving Sessions	5	5	25	75	100
		VIII	**Cluster Electives:** VIII-A-1: Integral Transforms	5	5	25	75	100
			VIII-A-2: Advanced Numerical Analysis VIII-A-3: *Project work* or	5	5	25	75	100
			VIII-B-1: Principles of Mechanics VIII-B-2: Fluid Mechanics VIII-B-3: *Project work* or	5	5	25	75	100
			VIII-C-1: Graph Theory VIII-C-2: Applied Graph Theory VIII-C-3: *Project work*					

Andhra Pradesh State Council of Higher Education
w.e.f. 2015-16 (Revised in April, 2016)
B.A./B.Sc. FIRST YEAR MATHEMATICS SYLLABUS

SEMESTER –I, PAPER - 1
DIFFERENTIAL EQUATIONS

60 Hrs

UNIT – I (12 Hours), Differential Equations of first order and first degree :

Linear Differential Equations; Differential Equations Reducible to Linear Form; Exact Differential Equations; Integrating Factors; Change of Variables.

***UNIT – II (12 Hours),* Orthogonal Trajectories.**

Differential Equations of first order but not of the first degree :

Equations solvable for p; Equations solvable for y; Equations solvable for x; Equations that do not contain. x (or y); Equations of the first degree in x and y – Clairaut's Equation.

UNIT – III (12 Hours), Higher order linear differential equations-I :

Solution of homogeneous linear differential equations of order n with constant coefficients; Solution of the non-homogeneous linear differential equations with constant coefficients by means of polynomial operators.

General Solution of f(D)y=0

General Solution of f(D)y=Q when Q is a function of x.

$\frac{1}{f(D)}$ is Expressed as partial fractions.

P.I. of f(D)y = Q when Q= be^{ax}

P.I. of f(D)y = Q when Q is b sin ax or b cos ax.

UNIT – IV (12 Hours), Higher order linear differential equations-II :

Solution of the non-homogeneous linear differential equations with constant coefficients.

P.I. of f(D)y = Q when Q= bx^k

P.I. of f(D)y = Q when Q= $e^{ax}V$

P.I. of f(D)y = Q when Q= xV

P.I. of f(D)y = Q when Q= x^mV

UNIT –V (12 Hours), Higher order linear differential equations-III :

Method of variation of parameters; Linear differential Equations with non-constant coefficients; The Cauchy-Euler Equation.

Reference Books :

1. Differential Equations and Their Applications by Zafar Ahsan, published by Prentice-Hall of India Learning Pvt. Ltd. New Delhi-Second edition.
2. A text book of mathematics for BA/BSc Vol I by N. Krishna Murthy & others, published by S. Chand & Company, New Delhi.
3. Ordinary and Partial Differential Equations Raisinghania, published by S. Chand & Company, New Delhi.
4. Differential Equations with applications and programs – S. Balachandra Rao & HR Anuradha-universities press.

Suggested Activities:

Seminar/ Quiz/ Assignments/ Project on Application of Differential Equations in Real life

B.A./B.Sc. FIRST YEAR MATHEMATICS SYLLABUS

SEMESTER – II, PAPER - 2

SOLID GEOMETRY

60 Hrs

UNIT – I (12 hrs) : The Plane :

Equation of plane in terms of its intercepts on the axis, Equations of the plane through the given points, Length of the perpendicular from a given point to a given plane, Bisectors of angles between two planes, Combined equation of two planes, Orthogonal projection on a plane.

UNIT – II (12 hrs) : The Line :

Equation of a line; Angle between a line and a plane; The condition that a given line may lie in a given plane; The condition that two given lines are coplanar; Number of arbitrary constants in the equations of straight line; Sets of conditions which determine a line; The shortest distance between two lines; The length and equations of the line of shortest distance between two straight lines; Length of the perpendicular from a given point to a given line;

UNIT – III (12 hrs) : Sphere :

Definition and equation of the sphere; Equation of the sphere through four given points; Plane sections of a sphere; Intersection of two spheres; Equation of a circle; Sphere through a given circle; Intersection of a sphere and a line; Power of a point; Tangent plane; Plane of contact; Polar plane; Pole of a Plane; Conjugate points; Conjugate planes;

UNIT – IV (12 hrs) : Sphere & Cones :

Angle of intersection of two spheres; Conditions for two spheres to be orthogonal; Radical plane; Coaxial system of spheres; Simplified from of the equation of two spheres.

Definitions of a cone; vertex; guiding curve; generators; Equation of the cone with a given vertex and guiding curve; Enveloping cone of a sphere; Equations of cones with vertex at origin are homogenous; Condition that the general equation of the second degree should represent a cone; Condition that a cone may have three mutually perpendicular generators;

UNIT – V (12 hrs) Cones & Cylinders :

Intersection of a line and a quadric cone; Tangent lines and tangent plane at a point; Condition that a plane may touch a cone; Reciprocal cones; Intersection of two cones with a common vertex; Right circular cone; Equation of the right circular cone with a given vertex; axis and semi-vertical angle.

Definition of a cylinder; Equation to the cylinder whose generators intersect a given conic and are parallel to a given line; Enveloping cylinder of a sphere; The right circular cylinder; Equation of the right circular cylinder with a given axis and radius.

Reference Books :

1. Analytical Solid Geometry by Shanti Narayan and P.K. Mittal, Published by S. Chand & Company Ltd. 7th Edition.
2. A text book of Mathematics for BA/B.Sc Vol I, by V Krishna Murthy & Others, Published by S. Chand & Company, New Delhi.
3. A text Book of Analytical Geometry of Three Dimensions, by P.K. Jain and Khaleel Ahmed, Published by Wiley Eastern Ltd., 1999.
4. Co-ordinate Geometry of two and three dimensions by P. Balasubrahmanyam, K.Y. Subrahmanyam, G.R. Venkataraman published by Tata-MC Gran-Hill Publishers Company Ltd., New Delhi.

Suggested Activities:

Seminar/ Quiz/ Assignments/ Project on Application of Solid Geometry in Engineering

B.A./B.Sc. SECOND YEAR MATHEMATICS SYLLABUS

SEMESTER – III, PAPER - 3

ABSTRACT ALGEBRA

60 Hrs

UNIT – 1 : (10 Hrs) GROUPS : -

Binary Operation – Algebraic structure – semi group-monoid – Group definition and elementary properties Finite and Infinite groups – examples – order of a group. Composition tables with examples.

UNIT – 2 : (14 Hrs) SUBGROUPS : -

Complex Definition – Multiplication of two complexes Inverse of a complex-Subgroup definition – examples-criterion for a complex to be a subgroups.

Criterion for the product of two subgroups to be a subgroup-union and Intersection of subgroups.

Co-sets and Lagrange's Theorem :-

Cosets Definition – properties of Cosets–Index of a subgroups of a finite groups–Lagrange's Theorem.

UNIT –3 : (12 Hrs) NORMAL SUBGROUPS : -

Definition of normal subgroup – proper and improper normal subgroup–Hamilton group – criterion for a subgroup to be a normal subgroup – intersection of two normal subgroups – Sub group of index 2 is a normal sub group – simple group – quotient group – criteria for the existence of a quotient group.

UNIT – 4 : (10 Hrs) HOMOMORPHISM : -

Definition of homomorphism – Image of homomorphism elementary properties of homomorphism – Isomorphism – aultomorphism definitions and elementary properties–kernel of a homomorphism – fundamental theorem on Homomorphism and applications.

UNIT – 5 : (14 Hrs) PERMUTATIONS AND CYCLIC GROUPS : -

Definition of permutation – permutation multiplication – Inverse of a permutation – cyclic permutations – transposition – even and odd permutations – Cayley's theorem.

Cyclic Groups :-

Definition of cyclic group – elementary properties – classification of cyclic groups.

Reference Books :

1. Abstract Algebra, by J.B. Fraleigh, Published by Narosa Publishing house.
2. A text book of Mathematics for B.A. / B.Sc. by B.V.S.S. SARMA and others, Published by S.Chand & Company, New Delhi.
3. Modern Algebra by M.L. Khanna.

Suggested Activities:

Seminar/ Quiz/ Assignments/ Project on Group theory and its applications in Graphics and Medical image Analysis

B.A./B.Sc. SECOND YEAR MATHEMATICS SYLLABUS

SEMESTER – IV, PAPER- 4

REAL ANALYSIS

60 Hrs

UNIT – I (12 hrs) : REAL NUMBERS :

The algebraic and order properties of R, Absolute value and Real line, Completeness property of R, Applications of supreme property; intervals. No. Question is to be set from this portion.

Real Sequences: Sequences and their limits, Range and Boundedness of Sequences, Limit of a sequence and Convergent sequence.

The Cauchy's criterion, properly divergent sequences, Monotone sequences, Necessary and Sufficient condition for Convergence of Monotone Sequence, Limit Point of Sequence, Subsequences and the Bolzano-weierstrass theorem – Cauchy Sequences – Cauchey's general principle of convergence theorem.

UNIT –II (12 hrs) : INFINITIE SERIES :

Series : Introduction to series, convergence of series. Cauchey's general principle of convergence for series tests for convergence of series, Series of Non-Negative Terms.

1. P-test
2. Cauchey's n^{th} root test or Root Test.
3. D'-Alemberts' Test or Ratio Test.
4. Alternating Series – Leibnitz Test.

Absolute convergence and conditional convergence, semi convergence.

UNIT – III (12 hrs) : CONTINUITY :

Limits : Real valued Functions, Boundedness of a function, Limits of functions. Some extensions of the limit concept, Infinite Limits. Limits at infinity. No. Question is to be set from this portion.

Continuous functions : Continuous functions, Combinations of continuous functions, Continuous Functions on intervals, uniform continuity.

UNIT – IV (12 hrs) : DIFFERENTIATION AND MEAN VALUE THEORMS :

The derivability of a function, on an interval, at a point, Derivability and continuity of a function, Graphical meaning of the Derivative, Mean value Theorems; Role's Theorem, Lagrange's Theorem, Cauchhy's Mean value Theorem

UNIT – V (12 hrs) : RIEMANN INTEGRATION :

Riemann Integral, Riemann integral functions, Darboux theorem. Necessary and sufficient condition for R – integrability, Properties of integrable functions, Fundamental theorem of integral calculus, integral as the limit of a sum, Mean value Theorems.

Reference Books :

1. Real Analysis by Rabert & Bartely and .D.R. Sherbart, Published by John Wiley.
2. A Text Book of B.Sc Mathematics by B.V.S.S. Sarma and others, Published by S. Chand & Company Pvt. Ltd., New Delhi.
3. Elements of Real Analysis as per UGC Syllabus by Shanthi Narayan and Dr. M.D. Raisingkania Published by S. Chand & Company Pvt. Ltd., New Delhi.

Suggested Activities:

Seminar/ Quiz/ Assignments/ Project on Real Analysis and its applications

B.A./B.Sc. THIRD YEAR MATHEMATICS SYLLABUS

SEMESTER – V, PAPER -5

RING THEORY & VECTOR CALCULUS

60 Hrs

UNIT – 1 (12 hrs) RINGS-I : -

Definition of Ring and basic properties, Boolean Rings, divisors of zero and cancellation laws Rings, Integral Domains, Division Ring and Fields, The characteristic of a ring - The characteristic of an Integral Domain, The characteristic of a Field. Sub Rings, Ideals

UNIT – 2 (12 hrs) RINGS-II : -

Definition of Homomorphism – Homorphic Image – Elementary Properties of Homomorphism – Kernel of a Homomorphism – Fundamental theorem of Homomorhphism – Maximal Ideals – Prime Ideals.

UNIT –3 (12 hrs) VECTOR DIFFERENTIATION : -

Vector Differentiation, Ordinary derivatives of vectors, Differentiability, Gradient, Divergence, Curl operators, Formulae Involving these operators.

UNIT – 4 (12 hrs) VECTOR INTEGRATION : -

Line Integral, Surface Integral, Volume integral with examples.

UNIT – 5 (12 hrs) VECTOR INTEGRATION APPLICATIONS : -

Theorems of Gauss and Stokes, Green's theorem in plane and applications of these theorems.

Reference Books :-

1. Abstract Algebra by J. Fralieh, Published by Narosa Publishing house.
2. Vector Calculus by Santhi Narayana, Published by S. Chand & Company Pvt. Ltd., New Delhi.
3. A text Book of B.Sc., Mathematics by B.V.S.S.Sarma and others, published by S. Chand & Company Pvt. Ltd., New Delhi.
4. Vector Calculus by R. Gupta, Published by Laxmi Publications.
5. Vector Calculus by P.C. Matthews, Published by Springer Verlag publicattions.
6. Rings and Linear Algebra by Pundir & Pundir, Published by Pragathi Prakashan.

Suggested Activities:

Seminar/ Quiz/ Assignments/ Project on Ring theory and its applications

B.A./B.Sc. THIRD YEAR MATHEMATICS SYLLABUS

SEMESTER – V, PAPER -6

LINEAR ALGEBRA

60 Hrs

UNIT – I (12 hrs) : Vector Spaces-I :

Vector Spaces, General properties of vector spaces, n-dimensional Vectors, addition and scalar multiplication of Vectors, internal and external composition, Null space, Vector subspaces, Algebra of subspaces, Linear Sum of two subspaces, linear combination of Vectors, Linear span Linear independence and Linear dependence of Vectors.

UNIT –II (12 hrs) : Vector Spaces-II :

Basis of Vector space, Finite dimensional Vector spaces, basis extension, co-ordinates, Dimension of a Vector space, Dimension of a subspace, Quotient space and Dimension of Quotientspace.

UNIT –III (12 hrs) : Linear Transformations :

Linear transformations, linear operators, Properties of L.T, sum and product of LTs, Algebra of Linear Operators, Range and null space of linear transformation, Rank and Nullity of linear transformations – Rank – Nullity Theorem.

UNIT –IV (12 hrs) : Matrix :

Matrices, Elementary Properties of Matrices, Inverse Matrices, Rank of Matrix, Linear Equations, Characteristic Roots, Characteristic Values & Vectors of square Matrix, Cayley – Hamilton Theorem.

UNIT –V (12 hrs) : Inner product space :

Inner product spaces, Euclidean and unitary spaces, Norm or length of a Vector, Schwartz inequality, Triangle in Inequality, Parallelogram law, Orthogonality, Orthonormal set, complete orthonormal set, Gram – Schmidt orthogonalisation process. Bessel's inequality and Parseval's Identity.

Reference Books :

1. Linear Algebra by J.N. Sharma and A.R. Vasista, published by Krishna Prakashan Mandir, Meerut-250002.
2. Matrices by Shanti Narayana, published by S.Chand Publications.
3. Linear Algebra by Kenneth Hoffman and Ray Kunze, published by Pearson Education (low priced edition), New Delhi.
4. Linear Algebra by Stephen H. Friedberg et al published by Prentice Hall of India Pvt. Ltd. 4th Edition 2007.

Suggested Activities:

Seminar/ Quiz/ Assignments/ Project on "Applications of Linear algebra Through Computer Sciences"

B.A./B.Sc. THIRD YEAR MATHEMATICS SYLLABUS
SEMESTER – VI, PAPER – VII-(B)
ELECTIVE–VII-(B); NUMERICAL ANALYSIS

60 Hrs

UNIT- I: (10 hours)

Errors in Numerical computations : Errors and their Accuracy, Mathematical Preliminaries, Errors and their Analysis, Absolute, Relative and Percentage Errors, A general error formula, Error in a series approximation.

UNIT – II: (12 hours)

Solution of Algebraic and Transcendental Equations: The bisection method, The iteration method, The method of false position, Newton Raphson method, Generalized Newton Raphson method. Muller's Method

UNIT – III: (12 hours) Interpolation - I

Interpolation : Errors in polynomial interpolation, Finite Differences, Forward differences, Backward differences, Central Differences, Symbolic relations, Detection of errors by use of Differences Tables, Differences of a polynomial

UNIT – IV: (12 hours) Interpolation - II

Newton's formulae for interpolation. Central Difference Interpolation Formulae, Gauss's central difference formulae, Stirling's central difference formula, Bessel's Formula, Everett's Formula.

UNIT – V : (14 hours) Interpolation - III

Interpolation with unevenly spaced points, Lagrange's formula, Error in Lagrange's formula, Divided differences and their properties, Relation between divided differences and forward differences, Relation between divided differences and backward differences, Relation between divided differences and central differences, Newton's general interpolation Formula, Inverse interpolation.

Reference Books :

1. Numerical Analysis by S.S.Sastry, published by Prentice Hall of India Pvt. Ltd., New Delhi. (Latest Edition)
2. Numerical Analysis by G. Sankar Rao published by New Age International Publishers, New – Hyderabad.
3. Finite Differences and Numerical Analysis by H.C Saxena published by S. Chand and Company, Pvt. Ltd., New Delhi.
4. Numerical methods for scientific and engineering computation by M.K.Jain, S.R.K.Iyengar, R.K. Jain.

Suggested Activities:

Seminar/ Quiz/ Assignments

B.A./B.Sc. THIRD YEAR MATHEMATICS SYLLABUS
SEMESTER – VI: PAPER – VIII-A-2
ELECTIVE – VIII-A-2: ADVANCED NUMERICAL ANALYSIS

60 Hrs

Unit – I (10 Hours)

Curve Fitting: Least – Squares curve fitting procedures, fitting a straight line, nonlinear curve fitting, Curve fitting by a sum of exponentials.

UNIT- II : (12 hours)

Numerical Differentiation: Derivatives using Newton's forward difference formula, Newton's backward difference formula, Derivatives using central difference formula, stirling's interpolation formula, Newton's divided difference formula, Maximum and minimum values of a tabulated function.

UNIT- III : (12 hours)

Numerical Integration: General quadrature formula on errors, Trapozoidal rule, Simpson's 1/3 – rule, Simpson's 3/8 – rule, and Weddle's rules, Euler – Maclaurin Formula of summation and quadrature, The Euler transformation.

UNIT – IV: (14 hours)

Solutions of simultaneous Linear Systems of Equations: Solution of linear systems – Direct methods, Matrix inversion method, Gaussian elimination methods, Gauss-Jordan Method ,Method of factorization, Solution of Tridiagonal Systems, Iterative methods. Jacobi's method, Gauss-siedal method.

UNIT – V (12 Hours)

Numerical solution of ordinary differential equations: Introduction, Solution by Taylor's Series, Picard's method of successive approximations, Euler's method, Modified Euler's method, Runge – Kutta methods.

Reference Books :

1. Numerical Analysis by S.S.Sastry, published by Prentice Hall India (Latest Edition).
2. Numerical Analysis by G. Sankar Rao, published by New Age International Publishers, New – Hyderabad.
3. Finite Differences and Numerical Analysis by H.C Saxena published by S. Chand and Company, Pvt. Ltd., New Delhi.
4. Numerical methods for scientific and engineering computation by M.K.Jain, S.R.K.Iyengar, R.K. Jain.

Suggested Activities:

Seminar/ Quiz/ Assignments

B.A./B.Sc. THIRD YEAR MATHEMATICS SYLLABUS, SEMESTER – VI, CLUSTER – A, PAPER – VIII-A-1

Cluster Elective- VIII-A-1: INTEGRAL TRANSFORMS

60 Hrs

UNIT – 1 (12 hrs) Application of Laplace Transform to solutions of Differential Equations : -

Solutions of ordinary Differential Equations.

Solutions of Differential Equations with constants co-efficient

Solutions of Differential Equations with Variable co-efficient

UNIT – 2 (12 hrs) Application of Laplace Transform : -

Solution of simultaneous ordinary Differential Equations.

Solutions of partial Differential Equations.

UNIT – 3 (12 hrs) Application of Laplace Transforms to Integral Equations : -

Definitions : Integral Equations-Abel's, Integral Equation-Integral Equation of Convolution Type, Integro Differential Equations.Application of L.T. to Integral Equations.

UNIT –4 (12 hrs) Fourier Transforms-I : -

Definition of Fourier Transform – Fourier's in Transform – Fourier cosine Transform – Linear Property of Fourier Transform – Change of Scale Property for Fourier Transform – sine Transform and cosine transform shifting property – modulation theorem.

UNIT – 5 (12 hrs) Fourier Transform-II : -

Convolution Definition – Convolution Theorem for Fourier transform – parseval's Indentify – Relationship between Fourier and Laplace transforms – problems related to Integral Equations.

Finte Fourier Transforms : -

Finte Fourier Sine Transform – Finte Fourier Cosine Transform – Inversion formula for sine and cosine Transforms only statement and related problems.

Reference Books :-

1. Integral Transforms by A.R. Vasistha and Dr. R.K. Gupta Published by Krishna Prakashan Media Pvt. Ltd. Meerut.
2. A Course of Mathematical Analysis by Shanthi Narayana and P.K. Mittal, Published by S. Chand and Company pvt. Ltd., New Delhi.
3. Fourier Series and Integral Transforms by Dr. S. Sreenadh Published by S.Chand and Company Pvt. Ltd., New Delhi.
4. Lapalce and Fourier Transforms by Dr. J.K. Goyal and K.P. Gupta, Published by Pragathi Prakashan, Meerut.
5. Integral Transforms by M.D. Raising hania, - H.C. Saxsena and H.K. Dass Published by S.Chand and Company pvt. Ltd., New Delhi.

Suggested Activities:

Seminar/ Quiz/ Assignments

Andhra Pradesh State Council of Higher Education

B.Sc. PHYSICSSYLLUBUS UNDER CBCS

w.e.f. 2015-16 (Revised in April 2016)

First Semester
Paper I : Mechanics& Properties of Matter
Practical I (Lab-1)

Second Semester
Paper II: Waves & Oscillations
Practical 2 (Lab2)

Third Semester
Paper III: Wave Optics
Practical 3.(Lab 3)

Fourth Semester
Paper IV: Thermodynamics & Radiation Physics
Practical 4.(Lab 4)

Fifth Semester
Paper V: Electricity, Magnetism& Electronics
Paper VI: Modern Physics
Practical 5.(Lab 5)
Practical 6.(Lab 6)

Sixth Semester
PaperVII:Elective (One)
Paper VIII:Cluster Electives (Three)
Practical 7(Lab 7)
Practical 8.(Lab 8)

Proposed Electives in Semester - VI

Paper – VII (one elective is to be chosen from the following0

Paper VII-(A): Analog and Digital Electronics
Paper VII-(B): Materials Science
Paper VII-(C): Renewable Energy

Paper – VIII (one cluster of electives (A-1,2,3 or B-1,2,3 or C-1,2,3) to be chosen *preferably*relating to the elective chosen under paper – VII (A or B or C)

Cluster 1.

Paper VIII-A-1. Introduction to Microprocessors and Microcontrollers
Paper VIII-A-2.Computational Physics and Programming
Paper VIII-A-3.Electronic Instrumentation

Cluster 2

Paper VIII-B-1.Fundamentals of Nanoscience
Paper VIII-B-2.Synthesis and Characterization of Nanomaterials
Paper VIII-B-3.Applications of Nanomaterials and Devices

Cluster 3

Paper VIII-C-1.Solar Thermal and Photovoltaic Aspects
Paper VIII-C-2.Wind, Hydro and Ocean Energies
Paper VIII-C-3.Energy Storage Devices

NOTE: Problems should be solved at the end of every chapter of all Units.

1. Each theory paper is of 100 marks and practical paper is also of 50 marks.
   Each theory paper is 75 marks University Exam (external) + 25 marks mid Semester Exam (internal). Each practical paper is 50 marks external
2. The teaching work load per week for semesters I to VIis 4 hours per paper for theory and2 hours for all laboratory (practical) work.
3. The duration of the examination for each theory paper is 3.00 hrs.
4. The duration of each practical examination is 3 hrs with 50 marks, which are to be distributed as30 marks for experiment
   10 marks for viva
   10 marks for record

Practicals	**50 marks**
Formula & Explanation	6
Tabular form +graph +circuit diagram	6
Observations	12
Calculation, graph, precautions & Result	6
Viva-Voce	10
Record	10

*****NOTE: Practical syllabus is same for both Mathematics and Non Mathematics combinations**

S. No	Semester	Title of the paper	Instruc-tion hrs/week	Duration of exam(hrs)	Max Marks (external)
Thoery					
1	First	Paper I: Mechanics& Properties of Matter	4	3	75
2	Second	Paper II: Waves & Oscillations	4	3	75
3	Third	Paper III: Wave Optics	4	3	75
4	Fourth	Paper IV: Thermodynamics & Radiation Physics	4	3	75
5	Fifth	Paper V:Electricity, Magnetism& Electronics Paper VI: Modern Physics	4 4	3 3	75 75
6	Sixth	PaperVII :Elective (One) Paper VIII: Cluster Electives (Three)	4 4	3 3	75 75
Practicals					
1	First	Practical 1	2	3	50
2	Second	Practical II	2	3	50
3	Third	Practical III	2	3	50
4	Fourth	Practical IV	2	3	50
5	Fifth	Practical V	2	3	50
6		Practical VI	2	3	50
7	Sixth	Practical VII	2	3	50
8		Practical VIII	2	3	50

Model question Paper for all theory papers

Time : 3 hrs **Max marks : 75**

Section-A (Essay type)

Answer All questions with internal choice from all units Marks :10x5 = 50

(Two questions are to be set from each unit with either or type)

Section-B (Short answer type)
Answer any three out of 5 questions from all units (I to V) Marks: 5 x3 = 15
At least one question should be set from each unit.

Section-C
Answer any two out of 5 questions set from all units Marks: 5x2 = 10

B.Sc. PHYSICS SYLLUBUS UNDER CBCS

w.e.f. 2015-16 (Revised in April 2016)

For Mathematics Combinations

B.Sc. 1st Semester Physics

Paper I: Mechanics& Properties of Matter

Work load:60 hrs per semester **4 hrs/week**

UNIT-I (10 hrs)

1. Vector Analysis

Scalar and vector fields, gradient of a scalar field and its physical significance. Divergence and curl of a vector field with derivations and physical interpretation. Vector integration (line, surface and volume), Statement and proof of Gauss and Stokes theorems.

UNIT-II (10 hrs)

2. Mechanics of particles

Laws of motion, motion of variable mass system, Equation of motion of a rocket. Conservation of energy and momentum, Collisions in two and three dimensions, Concept of impact parameter, scattering cross-section, Rutherford scattering-derivation.

UNIT-III (16 hrs)

3. Mechanics of Rigid bodies

Definition of rigid body, rotational kinematic relations, equation of motion for a rotating body, angular momentum, Euler equations and its applications, precession of a top, Gyroscope, precession of the equinoxes.

4. Mechanics of continuous media

Elastic constants of isotropic solids and their relations, Poisson's ratio and expression for Poisson's ratio in terms of y, n, k. Classification of beams, types of bending, point load, distributed load, shearing force and bending moment, sign conventions.

UNIT-IV (12Hrs)

5. Central forces

Central forces, definition and examples, characteristics of central forces, conservative nature of central forces, conservative force as a negative gradient of potential energy, equatglobal ion of motion under a central force.Derivation of Kepler's laws.Motion of satellites, idea of Global Positioning System (GPS).

UNIT-V (12 hrs)

6. Special theory of relativity

Galilean relativity, absolute frames.Michelson-Morley experiment, negative result.Postulates of special theory of relativity.Lorentz transformation, time dilation, length contraction, addition of velocities, mass-energy relation.Concept of four-vector formalism.

REFERENCE BOOKS:

1. B. Sc. Physics, Vol.1, Telugu Academy, Hyderabad
2. Fundamentals of Physics Vol. I - Resnick, Halliday, Krane ,Wiley India 2007
3. Unified Physics, Vol. 1, S.L. Gupata & S. Guptha, Jai Prakash Nath & Co, Meerut.
4. College Physics-I. T. Bhimasankaram and G. Prasad. Himalaya Publishing House.
5. University Physics-FW Sears, MW Zemansky& HD Young,Narosa Publications, Delhi
6. Mechanics, S.G.Venkatachalapathy, Margham Publication, 2003.

Practical paper 1: Mechanics & Properties of Matter

Work load: 30 hrs per semester **2 hrs/week**

Minimum of 6 experiments to be done and recorded

1. Viscosity of liquid by the flow method (Poiseuille's method)
2. Young's modulus of the material of a bar (scale) by uniform bending
3. Young's modulus of the material a bar (scale) by non- uniform bending
4. Surface tension of a liquid by capillary rise method
5. Determination of radius of capillary tube by Hg thread method
6. Viscosity of liquid by Searle'sviscometer method
7. Bifilar suspension –moment of inertia of a regular rectangular body.
8. Determination of moment of inertia using Fly-wheel
9. Determination of the height of a building using a sextant.
10. Rigidity modulus of material of a wire-dynamic method (torsional pendulum)

Suggested student activities

Student seminars, group discussions, assignments, field trips, study project and experimentation using virtual lab

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Examples

Seminars - A topic from any of the Units is given to the student and asked to give a brief seminar presentation.

Group discussion - A topic from one of the units is given to a group of students and asked to discuss and debate on it.

Assignment - Few problems may be given to the students from the different units and asked them to solve.

Field trip - Visit to Satish Dhawan Space Centre, Sriharikota / Thermal and hydroelectric power stations / Science Centres, any other such visit etc.
Study project - Web based study of different satellites and applications.

Domain skills:
Logical derivation, experimentation, problem solving, data collection and analysis, measurement skills

***** Documental evidence is to be maintained for the above activities.**

Paper II: Waves & Oscillations
(For Maths Combinations)
II SEMESTER

Work load: 60 hrs per semester **4 hrs/week**

UNIT-I (12 hrs)

1. Simple Harmonic oscillations

Simple harmonic oscillator and solution of the differential equation-Physical characteristics of SHM, torsion pendulum-measurements of rigidity modulus, compound pendulum-measurement of 'g', Principle of superposition,beats, combination of two mutually perpendicular simple harmonic vibrations of same frequency and different frequencies. Lissajous figures.

UNIT-II (12 hrs)

2. Damped and forced oscillations

Damped harmonic oscillator, solution of the differential equation of damped oscillator. Energy considerations, comparison with un-damped harmonic oscillator, logarithmic decrement, relaxation time, quality factor, differential equation of forced oscillator and its solution, amplitude resonance and velocity resonance.

UNIT-III (10 hrs)

3. Complex vibrations

Fourier theorem and evaluation of the Fourier coefficients, analysis of periodic wave functions-square wave, triangular wave, saw tooth wave, simple problems on evolution of Fourier coefficients.

UNIT-IV (17hrs)

4. Vibrating strings: 8 hrs

Transverse wave propagation along a stretched string, general solution of wave equation and its significance, modes of vibration of stretched string clamped at ends, overtones and harmonics. Energy transport and transverse impedance.

5. Vibrations of bars: 9 hrs

Longitudinal vibrations in bars-wave equation and its general solution. Special cases (i) bar fixed at both ends (ii) bar fixed at the midpoint (iii) bar fixed at one end. Tuning fork.

UNIT-V (9 hrs)

6. Ultrasonics: 9hrs

Ultrasonics, properties of ultrasonic waves, production of ultrasonics by piezoelectric and magnetostriction methods, detection of ultrasonics, determination of wavelength of ultrasonic waves.Applications of ultrasonic waves.

REFERENCE BOOKS:

1. BSc Physics Vol.1, Telugu Academy, Hyderabad.
2. Waves and Oscillations. N. Subramanyam and Brijlal, Vikas Pulications.
3. Unified Physics Vol., Mechanics, Waves and Oscillations, Jai Prakash Nath&Co.Ltd.
4. Fundamentals of Physics. Halliday/Resnick/Walker ,Wiley India Edition 2007.
5. Waves & Oscillations. S.Badami, V. Balasubramanian and K.R. Reddy,Orient Longman.
6. College Physics-I. T. Bhimasankaram and G. Prasad. Himalaya Publishing House.
7. Science and Technology of Ultrasonics- Baldevraj, Narosa, New Delhi,2004
8. Introduction to Physics for Scientists and Engineers. F.J. Buche. McGraw Hill.

Practical Paper II: Waves & Oscillations

Work load: 30 hrs per semester **2 hrs/week**

Minimum of 6 experiments to be done and recorded

1. Volume resonator experiment
2. Determination of 'g' by compound/bar pendulum
3. Simple pendulum normal distribution of errors-estimation of time period and the error of the mean by statistical analysis
4. Determination of the force constant of a spring by static and dynamic method.
5. Determination of the elastic constants of the material of a flat spiral spring.
6. Coupled oscillators
7. Verification of laws of vibrations of stretched string –sonometer
8. Determination of frequency of a bar –Melde's experiment.
9. Study of a damped oscillation using the torsional pendulum immersed in liquid-decay constant and damping correction of the amplitude.
10. Formation of Lissajous figures using CRO.

Suggested student activities

Student seminars, group discussions, assignments, field trips, study project and experimentation using virtual lab

.

Examples

Seminars - A topic from any of the Units is given to the student and asked to give a brief seminar presentation.

Group discussion - A topic from one of the units is given to a group of students and asked to discuss and debate on it.

Assignment - Few problems may be given to the students from the different units and asked them to solve.

Field trip - Visit to Satish Dhawan Space Centre, Sriharikota / Thermal and hydroelectric power stations / Science Centres, any other such visit etc.

Study project - Web based study of different satellites and applications.

Domain skills:

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Paper III: Wave Optics
(For Maths Combinations)
III SEMESTER

Work load:60 hrs per semester **4 hrs/week**

UNIT-I (8 hrs)

1. Aberrations:

Introduction – monochromatic aberrations, spherical aberration, methods of minimizing spherical aberration, coma, astigmatism and curvature of field, distortion. Chromatic aberration-the achromatic doublet.Achromatism for two lenses (i)in contact and (ii) separated by a distance.

UNIT-II (14hrs)

2. Interference

Principle of superposition – coherence-temporal coherence and spatial coherence-conditions for interference of light.Fresnel's biprism-determination of wavelength of light –change of phase on reflection.Oblique incidence of a plane wave on a thin film due to reflected and transmitted light (cosine law) –colors of thin films-

Interference by a film with two non-parallel reflecting surfaces (Wedge shaped film). Determination of diameter of wire, Newton's rings in reflected light. Michelson interferometer, Determination of wavelength of monochromatic light using Newton's rings and Michelson Interferometer.

UNIT-III (14hrs)

3. Diffraction

Introduction,distinction between Fresnel and Fraunhoffer diffraction, Fraunhoffer diffraction –Diffraction due to single slit-Fraunhoffer diffraction due to double slit-Fraunhoffer diffraction pattern with N slits (diffraction grating).Resolving power of grating, Determination

of wavelength of light in normal incidence and minimum deviation methods using diffraction grating,

Fresnel's half period zones-area of the half period zones-zone plate-comparison of zone plate with convex lens-difference between interference and diffraction.

UNIT-IV(10 hrs)

4.Polarisation:

Polarized light: methods of polarization polarization by reflection, refraction, double refraction, scattering of light-Brewster's law-Mauls law-Nicol prism polarizer and analyzer-Quarter wave plate, Half wave plate-optical activity, determination of specific rotation by Laurent's half shade polarimeter-Babinet's compensator - idea of elliptical and circular polarization

UNIT-V (14hrs)

5. Lasers and Holography

Lasers: introduction,spontaneous emission, stimulated emission. Population Inversion, Laser principle-Einstein coefficients-Types of lasers-He-Ne laser, Ruby laser- Applications of lasers.Holography: Basic principle of holography-Gabor hologram and its limitations, Applications of holography.

6. Fiber Optics

Introduction- different types of fibers, rays and modes in an optical fiber, fiber material,principles of fiber communication (qualitative treatment only), advantages of fiber optic communication.

REFERENCE BOOKS:

1. BSc Physics, Vol.2, Telugu Akademy, Hyderabad
2. A Text Book of Optics-N Subramanyam, L Brijlal, S.Chand& Co.
3. Unified Physics Vol.II Optics & Thermodynamics – Jai Prakash Nath&Co.Ltd., Meerut
4. Optics,F..A. Jenkins and H.G. White, Mc Graw-Hill
5. Optics, AjoyGhatak,Tata Mc Graw-Hill.
6. Introduction of Lasers – Avadhanulu, S.Chand& Co.
7. Principles of Optics- BK Mathur, Gopala Printing Press, 1995

Practical Paper III: Wave Optics

Work load:30 hrs **2 hrs/week**

Minimum of 6 experiments to be done and recorded

1. Determination of radius of curvature of a given convex lens-Newton's rings.
2. Resolving power of grating.
3. Study of optical rotation –polarimeter.
4. Dispersive power of a prism.
5. Determination of wavelength of light using diffraction grating-minimum deviation method.
6. Determination of wavelength of light using diffraction grating-normal incidence method.
7. Resolving power of a telescope.
8. Refractive index of a liquid-hallow prism

9. Determination of thickness of a thin wire by wedge method
10. Determination of refractive index of liquid-Boy's method.

Suggested student activities

Student seminars, group discussions, assignments, field trips, study project and experimentation using virtual lab

Examples

Seminars - A topic from any of the Units is given to the student and asked to give a brief seminar presentation.

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Assignment - Few problems may be given to the students from the different units and asked them to solve.

Field trip - Visit to Satish Dhawan Space Centre, Sriharikota / Thermal and hydroelectric power stations / Science Centres, any other such visit etc.

Study project - Web based study of different satellites and applications.

Domain skills:

Logical derivation, experimentation, problem solving, data collection and analysis, measurement skills

***** Documental evidence is to be maintained for the above activities.**

Paper IV: Thermodynamics &Radiation Physics
(For Maths Combinations)
IV SEMESTER

Work load: 60 hrs per semester **4 hrs/week**

UNIT-I (10 hrs)

1. Kinetic theory of gases

Introduction –Deduction of Maxwell's law of distribution of molecular speeds, experimental verification. Transport phenomena – Mean free path - Viscosity of gases-thermal conductivity-diffusion of gases.

UNIT-II(12 hrs)

2. Thermodynamics

Introduction- Isothermal and adiabatic process- Reversible and irreversible processes-Carnnot's engine and its efficiency-Carnot's theorem-Second law of thermodynamics. Kelvin's and Claussius statements-Entropy, physical significance –Change in entropy in reversible and irreversible processes-Entropy and disorder-Entropy of Universe–

Temperature-Entropy (T-S) diagram and its uses - Change of entropy of a perfect gas- change of entropy when ice changes into steam.

UNIT-III(12 hrs)

3. Thermodynamic potentials and Maxwell's equations

Thermodynamic potentials-Derivation of Maxwell's thermodynamic relations-Clausius-Clayperon's equation-Derivation for ratio of specific heats-Derivation for difference of two specific heats for perfect gas.Joule Kelvin effect-expression for Joule Kelvin coefficient for perfect and vander Waal's gas.

UNIT-IV(12 hrs)

4. Low temperature Physics

Introduction-Joule Kelvin effect-Porous plug experiment - Joule expansion-Distinction between adiabatic and Joule Thomson expansion-Expression for Joule Thomson cooling-Liquefaction of helium, Kapitza's method-Adiabatic demagnetization, Production of low temperatures -applications of substances at lowtemperature-effects of chloro and fluoro carbons on ozone layer.

UNIT-V(14 hrs)

5. Quantum theory of radiation

Blackbody-Ferry's black body-distribution of energy in the spectrum of black body-Wein's displacement law,Wein's law, Rayleigh-Jean's law-Quantum theory of radiation-Planck's law-Measurement of radiation-Types of pyrometers-Disappearing filament optical pyrometer-experimental determination – Angstrompyrheliometer-determination of solar constant, Temperature of Sun.

REFERENCE BOOKS:

1. BSc Physics, Vol.2, Telugu Akademy, Hyderabad
2. Thermodynamics, R.C.Srivastava, S.K.Saha& Abhay K.Jain, Eastern Economy Edition.
3. Unified Physics Vol.2, Optics & Thermodynamics, Jai Prakash Nath&Co.Ltd., Meerut
4. Fundamentals of Physics. Halliday/Resnick/Walker.C. Wiley India Edition 2007
5. Heat, Thermodynamics and Statistical Physics-N Brij Lal, P Subrahmanyam, PS Hemne, S.Chand& Co.,2012
6. Heat and Thermodynamics- MS Yadav, Anmol Publications Pvt. Ltd, 2000
7. University Physics, HD Young, MW Zemansky,FW Sears, Narosa Publishers, New Delhi

Practical Paper IV: Thermodynamics & Radiation Physics

Work load: 30 hrs **2 hrs/week**

Minimum of 6 experiments to be done and recorded

1. Specific heat of a liquid –Joule's calorimeter –Barton's radiation correction
2. Thermal conductivity of bad conductor-Lee's method
3. Thermal conductivity of rubber.
4. Measurement of Stefan's constant.
5. Specific heat of a liquid by applying Newton's law of cooling correction.
6. Heating efficiency of electrical kettle with varying voltages.
7. Thermoemf- thermo couple - potentiometer

8. Thermal behavior of an electric bulb (filament/torch light bulb)
9. Measurement of Stefan's constant- emissive method
10. Study of variation of resistance with temperature - thermistor.

Suggested student activities

Student seminars, group discussions, assignments, field trips, study project and experimentation using virtual lab

Examples

Seminars - A topic from any of the Units is given to the student and asked to give a brief seminar presentation.

Group discussion - A topic from one of the units is given to a group of students and asked to discuss and debate on it.

Assignment - Few problems may be given to the students from the different units and asked them to solve.

Field trip - Visit to Satish Dhawan Space Centre, Sriharikota / Thermal and hydroelectric power stations / Science Centres, any other such visit etc.

Study project - Web based study of different satellites and applications.

Domain skills:

Logical derivation, experimentation, problem solving, data collection and analysis, measurement skills

***** Documental evidence is to be maintained for the above activities.**

Paper V: Electricity, Magnetism& Electronics
(For Maths Combinations)
V Semester

Work load: 60 hrs per semester **4 hrs/week**

UNIT-I (12 hrs)

1. **Electric field intensity and potential:**
   Gauss's law statement and its proof- Electric field intensity due to (1) Uniformly charged sphere and (2) an infinite conducting sheet of charge. Electrical potential – equipotential surfaces- potential due to i) a point charge, ii)charged spherical shell and uniformly charged sphere.
2. **Dielectrics:**
   Electric dipolemoment and molecular polarizability- Electric displacement D, electric polarization P – relation between D, E and P- Dielectric constant and susceptibility. Boundary conditions at the dielectric surface.

UNIT-II (12 hrs)

3. Electric and magnetic fields

Biot-Savart's law, explanation and calculation of B due to long straight wire, a circular current loop and solenoid – Lorentz force – Hall effect – determination of Hall coefficient and applications.

4. Electromagnetic induction

Faraday's law-Lenz's law- Self and mutual inductance, coefficient of coupling, calculation of self inductance of a long solenoid, energy stored in magnetic field.Transformer - energy losses - efficiency.

UNIT-III (12 hrs)

5. Alternating currents and electromagnetic waves

Alternating current - Relation between current and voltage in LR and CR circuits,vector diagrams, LCR series and parallel resonant circuit, Q –factor, power in ac circuits.

6. Maxwell's equations

Idea of displacement current - Maxwell's equations (integral and differential forms) (no derivation), Maxwell's wave equation (with derivation), Transverse nature of electromagnetic waves.Poynting theorem (statement and proof), production of electromagnetic waves (Hertz experiment).

UNIT-IV (12 hrs)

7. Basic electronics:

PN juction diode, Zener diode, Tunnel diode, I-V characteristics, PNP and NPN transistors, CB, CE and CC configurations – Relation betweenα, β and γ - transistor (CE) characteristics -Determination of hybrid parameters, Transistor as an amplifier.

UNIT-V: (12 hrs)

8. Digital electronics

Number systems - Conversion of binary to decimal system and vice versa.Binary addition and subtraction (1's and 2's complement methods).Laws of Boolean algebra - De Morgan's laws-statement and proof, Basic logic gates, NAND and NOR as universal gates, exclusive-OR gate, Half adder and Full adder, Parallel adder circuits.

REFERENCE BOOKS

1. BSc Physics, Vol.3, Telugu Akademy, Hyderabad.
2. Electricity and Magnetism, D.N. Vasudeva. S. Chand & Co.
3. Electricity, Magnetism with Electronics, K.K.Tewari, R.Chand& Co.,
4. Principles of Electronics, V.K. Mehta, S.Chand& Co.,
5. Digital Principles and Applications, A.P. Malvino and D.P.Leach, Mc GrawHill Edition.

Practical Paper V:Electricity, Magnetism & Electronics

Work load: 30 hrs **2 hrs/week**

Minimum of 6 experiments to be done and recorded

1. Figure of merit of a moving coil galvonometer.
2. LCR circuit series/parallel resonance, Q factor.

3. Determination of ac-frequency –sonometer.
4. Verification of Kirchoff's laws and maximum power transfer theorem.
5. Field along the axis of a circular coil carrying current.
6. PN Junction Diode Characteristics
7. Zener Diode Characteristics
8. Transistor CE Characteristics- Determination of hybrid parameters
9. Logic Gates- OR,AND,NOT and NAND gates. Verification of Truth Tables.
10. Verification of De Morgan's Theorems.

Suggested student activities

Student seminars, group discussions, assignments, field trips, study project and experimentation using virtual lab

Examples

Seminars - A topic from any of the Units is given to the student and asked to give a brief seminar presentation.

Group discussion - A topic from one of the units is given to a group of students and asked to discuss and debate on it.

Assignment - Few problems may be given to the students from the different units and asked them to solve.

Field trip - Visit to Satish Dhawan Space Centre, Sriharikota / Thermal and hydroelectric power stations / Science Centres, any other such visit etc.

Study project - Web based study of different satellites and applications.

Domain skills:

Logical derivation, experimentation, problem solving, data collection and analysis, measurement skills

***** Documental evidence is to be maintained for the above activities.**

Paper VI: Modern Physics
(For Maths Combinations)
V Semester

Work load: 60 hrs per semester **4 hrs/week**

UNIT-I (12 hrs)

1. Atomic and molecular physics

Introduction –Drawbacks of Bohr's atomic model- Sommerfeld's elliptical orbits-relativistic correction (no derivation).Vector atom model and Stern-Gerlach experiment - quantum numbers associated with it. L-S and j- j coupling schemes.Zeeman effect and its experimental arrangement.

Raman effect, hypothesis, Stokes and Anti Stokes lines. Quantum theory of Raman effect. Experimental arrangement – Applications of Raman effect.

UNIT-II (12 hrs)

2. Matter waves & Uncertainty Principle

Matter waves, de Broglie's hypothesis - wavelength of matter waves, Properties of matter waves - Davisson and Germer experiment – Phase and group velocities.

Heisenberg's uncertainty principle for position and momentum (x and p), & energy and time (E and t). Experimental verification - Complementarity principle of Bohr.

UNIT-III (12 hrs)

3. Quantum (wave) mechanics

Basic postulates of quantum mechanics-Schrodinger time independent and time dependent wave equations-derivations. Physical interpretation of wave function. Eigen functions, Eigen values. Application of Schrodinger wave equation to particle in one dimensional infinite box.

UNIT-IV(12 hrs)

4. General Properties of Nuclei

Basic ideas of nucleus -size, mass, charge density (matter energy), binding energy, angular momentum, parity, magnetic moment, electric moments. Liquid drop model and Shell model (qualitative aspects only) - Magic numbers.

5. Radioactivity decay:

Alpha decay: basics of α-decay processes. Theory of α-decay, Gamow's theory, Geiger Nuttal law.β-decay, Energy kinematics for β-decay, positron emission, electron capture, neutrino hypothesis.

UNIT-V (12 hrs)

6. Crystal Structure

Amorphous and crystalline materials, unit cell, Miller indices, reciprocal lattice, types of lattices, diffraction of X-rays by crystals, Bragg's law, experimental techniques, Laue's method and powder diffraction method.

7. Superconductivity:

Introduction - experimental facts, critical temperature - critical field - Meissner effect – Isotope effect - Type I and type II superconductors - BCS theory (elementary ideas only) - applications of superconductors.

REFERENCE BOOKS

1. BSc Physics, Vol.4, Telugu Akademy, Hyderabad
2. Molecular Structure and Spectroscopy by G. Aruldhas. Prentice Hall of India, New Delhi.
3. Modern Physics by R. Murugeshan and Kiruthiga Siva Prasath. S. Chand & Co.
4. Modern Physics by G. Aruldhas & P. Rajagopal. Eastern Economy Edition.
5. Concepts of Modern Physics by Arthur Beiser. Tata McGraw-Hill Edition.
6. Quantum Mechanics, Mahesh C Jain, Eastern Economy Edition.
7. Nuclear Physics, Irving Kaplan, Narosa publishing House.
8. Nuclear Physics, D.C.Tayal, Himalaya Publishing House.
9. Elements of Solid State Physics, J.P.Srivastava, Prentice Hall of India Pvt., Ltd.
10. Solid State Physics, A.J. Dekker, McMillan India.

Practical Paper VI:Modern Physics

Work load: 30 hrs **2 hrs/week**

Minimum of 6 experiments to be done and recorded

1. e/m of an electron by Thomson method.
2. Determination of Planck's Constant (photocell).
3. Verification of inverse square law of light using photovoltaic cell.
4. Study of absorption of α-rays.
5. Study of absorption of β-rays.
6. Determination of Range of β-particles.
7. Determination of M & H.
8. Analysis of powder X-ray diffraction pattern to determine properties of crystals.
9. Energy gap of a semiconductor using junction diode.
10. Energy gap of a semiconductor using thermister.

Note: For all the above 8 practical papers the book "B.Sc Practical Physics" by C.L. Arora Published by S.Chand & Co, New – Delhi may be followed.

NOTE: Problems should be solved at the end of every chapter of all units.

Suggested student activities

Student seminars, group discussions, assignments, field trips, study project and experimentation using virtual lab

Examples

Seminars - A topic from any of the Units is given to the student and asked to give a brief seminar presentation.

Group discussion - A topic from one of the units is given to a group of students and asked to discuss and debate on it.

Assignment - Few problems may be given to the students from the different units and asked them to solve.

Field trip - Visit to Satish Dhawan Space Centre, Sriharikota / Thermal and hydroelectric power stations / Science Centres, any other such visit etc.

Study project - Web based study of different satellites and applications.

Domain skills:

Logical derivation, experimentation, problem solving, data collection and analysis, measurement skills

***** Documental evidence is to be maintained for the above activities.**

Paper–VII-(A)Elective(Electronics)

Semester –VI

Elective Paper –VII-(A):Analog and Digital Electronics

No. of Hours per week: 04 **Total Lectures:60**

Unit-I (14 Hours)

1. FET-Construction, Working, characteristics and uses; MOSFET-enhancement MOSFET, depletion MOSFET, construction and working , drain characteristics of MOSFET, applications of MOSFET
2. Photo electric devices: Structure and operation, characteristics, spectral response and application of LDR, LEDand LCD

Unit-II (10Hours)

3. Operational Amplifiers: Characteristics of ideal and practical Op-Amp (IC 741), Basic differential amplifiers, Op-Amp supply voltage, IC identification, Internal blocks of Op-Amp, its parameter off set voltages and currents, CMRR, slew rate, concept of virtualground.

Unit-III (10 Hours)

4. Applications of Op-Amp: Op-Amp as voltage amplifier, Inverting amplifier, Non-inverting amplifier, voltage follower, summing amplifier, difference amplifier, comparator, integrator, differentiator.

Unit-IV(14 Hours)

5. Data processing circuits: Multiplexers, De-multiplexers, encoders, decoders, Characteristics for Digital ICs -RTL, DTL, TTL, ECL CMOS (NAND & NOR Gates).
6. IC 555 Timer -Its pin diagram,internal architecture, Application as astablemultivibrator and mono stable multivibrator.

Unit-V (12 Hours)

7. Sequential digital circuits:Flip-flops, RS, Clocked SR, JK, D, T, Master-Slave, Flip- flop, Conversion of Flip flops.
8. Code Converters: Design of code converter, BCD to 7 segment, binary/BCD to gray, gray to binary/BCD ,design of counters using state machine.

Reference Books

1. Digital Electronics by G.K.Kharate Oxford University Press
2. Unified Electronics by Agarwal and Agarwal.
3. Op- Amp and Linear ICs by Ramakanth A Gayekwad, 4th edition PHI
4. Digital Principles and Applications by Malvino and Leach, TMH, 1996, 4th edition.
5. Digital Circuit design by Morris Mano,PHI
6. Switching Theory and Logic design by A.AnandKumar ,PHI
7. operations amplifier by SV Subramanyam.

Elective Paper-VII Practical: Analog and Digital Electronics
2hrs/Week

Minimum of 6 experiments to be done and recorded

1) Characteristics of FET
2) Characteristics of MOSFET
3) Characteristics of LDR
4) Characteristics of Op-amp.(IC741)
5)Op-Amp as amplifier/inverting amplifier
6) Op-Amp as integrator/differentiator
7) Op-Amp as summing amplifier/difference amplifier
8) IC 555 as astable multivibrator
9) IC 555 as monostable amplifier
10) Master slave flip-flop
11) JK flip-flop

Semester –VI
Cluster Electives VIII-A
Paper – VIII-A-1: Introduction to Microprocessors and Microcontrollers

No. of Hours per week: 04 **Total Lectures:60**

Unit – I (10Hours)

1. Introduction to microcontrollers:General purpose of computer systems,architecture of embedded system, classification, applications and purposes, challenges and designs, operational and non operational quality attributes, elemental description of embedded processors and micro controllers

Unit –II (10Hours)

2. Microprocessors:Organisation of microprocessorbased system, 8085 microprocessor,its pin diagram and architecture, concept of data bus, and address bus, 8085 programming, instruction classification, stacks and its implementation, hardware and software interrupts.

Unit– III (15Hours)

3. 8051 microcontroller:Introduction , block diagram, assembly language programming, programme counter, ROM memory, data types and directives, flag bits PSW register, jump, loop and call constructions

4. 8051 I/O Programming: Introduction to I/O port programming, pin out diagram, I/O port pin programming, bit manipulation, addressing modes, accessing memory, arithmetic and logic instructions.

Unit – IV (13 Hours)

5. Timers:Programming of 8051 timers, counter programming, interrupts, externalhardware interrupts**,** serial communication interrupts, interrupt priority.

6. Embedded system programming:Structure of programming, infinite loop, compiling, linking locating, down loading and debugging.

Unit –V (12Hours)

7. Embedded system design and development:Embedded system development environment, file type generated after cross compilation, dissembler, decompiler, simulator, emulator and debugging.

8. Embedded product life cycle:Embedded product development life cycle, trends in embedded industry.

Reference Books

1)Embedded Systems.. Architecture,programming and design, R Kamal, 2008, TMH

2) The 8051 micro controller and embedded systems using Assembly and C, M.A.Mazidi, J.G.Mazidi and R.D.McKinlay, second Ed., 2007 pearson Education India

3) Introduction to embedded systems K.V. Shibu, 1st edition, 2009 McGraw Hill

4) Micro Controllers in practice, I Susnea and Mitescu,2005,springer

Elective Paper-VIII-A-1 Practical: Introduction to Microprocessors and Microcontrollers 2hrs/Week

Minimum of 6 experiments to be done and recorded

1. To find that the given numbers is prime or not.
2. To find the factorial of a number.
3. Write a program to make the two numbers equal by increasing the smallest number and decreasing the largest number.
4. Use one of the four ports of 8051 for O/P interfaced to eight LED's. Simulate binary counter (8 bit) on LED's.
5. Program to glow first four LED then next four using TIMER application.
6. Program to rotate the contents of the accumulator first right and then left.
7. Program to run a countdown from 9-0 in the seven segment LED display.
8. To interface seven segment LED display with 8051 microcontroller and display 'HELP' in the seven segment LED display.
9. To toggle '1234' as '1324' in the seven segment LED.
10. Interface stepper motor with 8051 and write a program to move the motor through a given angle in clock wise or counter clockwise direction.
11. Application of embedded systems: Temperature measurement, some information on LCD display, interfacing a keyboard.

Semester –VI

Cluster Elective Paper VIII-A-2: Computational Methods and Programming

No. of Hours per week: 04 **Total Lectures:60**

UNIT-I (12hrs)

1. Fundamentals of C language: C character set-Identifiers and Keywords-Constants -Variables-Data types-Declarations of variables-Declaration of storage class-Defining symbolic constants-Assignment statement.
2. Operators: Arithmetic operators-Relational operators-Logic operators-Assignment operators-Increment and decrement operators-Conditional operators.

UNIT-II (12hrs)

3. Expressions and I/O Statements: Arithmetic expressions-Precedence of arithmetic operators-Type converters in expressions-Mathematical (Library) functions - Data input and output-The getchar and putchar functions-Scanf-Printf simple programs.
4. Control statements:If -Else statements -Switch statements - The operators - GO TO - While, Do - While, FOR statements - BREAK and CONTINUE statements.

UNIT-III (12hrs)

5. Arrays: One dimensional and two dimensional arrays - Initialization - Type declaration - Inputting and outputting of data for arrays - Programs of matrices addition, subtraction and multiplication
6. User defined functions: The form of C functions - Return values and their types - Calling a function - Category of functions. Nesting of functions.Recursion.ANSI C functions- Function declaration. Scope and life time of variables in functions.

UNIT-IV (12hrs)

7. Linear and Non - Linear equations: Solution of Algebra and transcendental equations-Bisection, Falsi position and Newton-Rhapson methods-Basic principles-Formulae-algorithms
8. Simultaneous equations: Solutions of simultaneous linear equations-Guass elimination and Gauss Seidel iterative methods-Basic principles-Formulae – Algorithms.

UNIT-V (12hrs)

9. Interpolations: Concept of linear interpolation-Finite differences-Newton's and Lagrange's interpolation formulae-principles and Algorithms
10. Numerical differentiation and integration: Numerical differentiation-algorithm for evaluation of first order derivatives using formulae based on Taylor's series-Numerical integration-Trapezoidal and Simpson's 1/3 rule- Formulae-Algorithms.

Reference books:

1. Introductory methods of Numerical Analysis: Sastry
2. Numerical Methods: Balaguruswamy
3. Programming in ANSI C (TMH) : Balaguruswamy
4. Programming with 'C'- Byron Gottafried, Tata Mc Graw Hill

Elective PaperVIII-A-2: Practical: Computational Methods and Programming
2hrs/Week

Minimum of 6 experiments to be done and recorded

1. Write a program that reads an alphabet from keyboard and display in the reverse order.
2. Write a program to read and display multiplication of tables.
3. Write a program for converting centigrade to Fahrenheit temperature and Fahrenheit temperature centigrade.
4. Write a program to find the largest element in an array.
5. Write a program based on percentage calculation, the grade by entering the subject marks. (If percentage > 60 I class, if percentage between 50&60 II class, if percentage between 35&50 III class, if percentage below 35 fail).
6. Write a program for generation of even and odd numbers up to 100 using while, do-while and for loop.
7. Write a program to solve the quadratic equation using Bisection method.
8. Write a program for integration of function using Trapezoidal rule.
9. Write a program for solving the differential equation using Simpson's $1/3^{rd}$ rule.

Semester –VI

Cluster Elective Paper –VIII-A-3 :Electronic Instrumentation

No. of Hours per week: 04 **Total Lectures:60**

Unit – I (12Hours)

1. Basic of measurements:Instruments accuracy , precision , sensitivity , resolution range, errors in measurement, Multimeter , principles of measurement of dc voltage and dc currents, ac current and resistance, specifications of multimeter and their significance.

Unit -11 (10 Hours)

2. Electronic Voltmeter:Advantage over conventional multimeter for voltage measurement with respect to input impedence and sensitivity, principles of voltage measurement (block diagram only), specification of an electronic voltmeter/multimeter and their significance.

Unit– III (14 Hours)

3. CRO :Block diagram of basic CRO, construction of CRT, electron gun, electrostatic focusing and acceleration(only explanation) , time base operation, synchronization, front panel controls, specifications of CRO and their significance.

Applications CRO: Measurement of voltage ,dc and ac frequency , time period, special features of dual trace, digital storage oscilloscope, block diagram and principle of working.

Unit – IV (12 Hours)

4. Digital Multimeter:Block diagram,working, frequency and period measurement using universal counter, frequency counter ,accuracy and resolution.

5. Digital instruments:Principle and working of digitalinstruments, characteristics of a digital meter, working principle of digital voltmeter.

Unit – V (12 Hours)

6. Signal generators:Block diagram explanation, specifications of low frequency signal generators, pulse generator, function generator-working, Brief idea for testing, specifications. Distortion factor meter, wave analysis.

7. Bridges:Block diagram, working of basic LCR bridge – specifications – block diagram and working.

Reference Books

1. A text book in electrical technology by B.L.Thereja (S.Chand&Co)
2. Digital circuits and systems by Venugopal 2011 (Tata Mcgraw Hill)
3. Digital Electronics by SubrathaGhoshal 2012 (Cengage Learning)

Elective Paper-VIII-A-3: Practical: Electronic Instrumentation
2hrs/Week

Minimum of 6 experiments to be done and recorded

1. Study the loading effect of a multimeter by measuring voltage across alow and high resistance.
2. Study the limitations of a multimeter for measuring high frequency voltageand currents.
3. Measurement of voltage, frequency, time period and phase angle using CRO.
4. Measurement of time period and frequency using universal counter/frequency counter.
5. Measurement of rise, fall and delay times using a CRO.
6. Measurement of distortion of a RF signal generator using distortion factor meter.
7. Measurement of R, L and C using a LCR bridge/ universal bridge.

Paper VII-(B)Elective (Materials Science)

Semester –VI
Elective Paper –VII-(B): Materials Science

No. of Hours per week: 04 **Total Lectures:60**

UNIT-I (12 hrs)

1.Materials and Crystal Bonding: Materials, Classification, Crystalline, Amorphous, Glasses; Metals, Alloys, Semiconductors, Polymers, Ceramics, Plastics, Bio-materials, Composites, Bulk and nanomaterials. Review of atomic structure – Interatomic forces – Different types of chemical bonds – Ioniccovalent bond or homopolar bond – Metallic bond – Dispersion bond – Dipole bond – Hydrogenbond – Binding energy of a crystal.

UNIT-II (12 hrs)

2. Defects and Diffusion in Materials: Introduction – Types of defects - Point defects- Line defects- Surface defects- Volume defects- Production and removal ofdefects- Deformation- irradiation- quenching- annealing- recovery - recrystallization andgrain growth. Diffusion in solids- Fick's laws of diffusion.

UNIT-III(12 hrs)

3. Mechanical Behavior of Materials: Different mechanical properties of engineering materials – Creep – Fracture – Technologicalproperties – Factors affecting mechanical properties of a material – Heat treatment - Cold andhot working – Types of mechanical tests – Metal forming process – Powder – Misaligning – Deformation of metals.

UNIT-IV (12 hrs)

4. Magnetic Materials:Dia-, Para-, Ferri- and Ferromagnetic materials, Classical Langevin theory of dia magnetism, Quantum mechanical treatment of paramagnetism. Curie's law, Weiss's theory of ferromagnetism, Ferromagnetic domains.Discussion of B-H Curve.Hysteresis and energy Loss.

UNIT-V (12 hrs)

5. Dielectric Materials:Dielectric constant, dielectric strength and dielectric loss, polarizability, mechanism of polarization,factors affecting polarization, polarization curve and hysteresis loop, types of dielectric materials, applications; ferroelectric, piezoelectric and pyroelectric materials, Clausius -Mosotti equation.

Reference books

1. Materials Science by M.Arumugam, Anuradha Publishers. 1990, Kumbakonam.
2.Materials Science and Engineering V.Raghavan, Printice Hall India Ed. V 2004. New Delhi.
3. Elementary Solid State Physics, 1/e M. Ali Omar, 1999, Pearson India
4. Solid State Physics, M.A. Wahab, 2011, Narosa Publications

Elective Paper-VII-B Practical: Materials Science
2hrs/Week

Minimum of 6 experiments to be done and recorded

1. Measurement of susceptibility of paramagnetic solution (Quinck`s Tube Method)
2. Measurement of magnetic susceptibility of solids.
3. Determination of coupling coefficient of a piezoelectric crystal.
4. Measurement of the dielectric constant of a dielectric Materials
5. Study the complex dielectric constant and plasma frequency of metal using surface plasmon resonance (SPR)
7. Study the hysteresis loop of a Ferroelectric Crystal.
8. Study the B-H curve of 'Fe' using solenoid and determine energy loss from hysteresis.

Semester –VI :Cluster Electives – VIII-B
Cluster Elective Paper VIII-B-1 :Fundamentals of Nanoscience

No. of Hours per week: 04 **Total Lectures:60**

UNIT-I (12hrs)

1. Background and history: Emergence of Nanoscience with special reference to Feynman and Drexler; Role of particle size; Spatial and temporal scale; Concept of confinement, strong and weak confinement with suitable example; Development of quantum structures, Basic concept of quantum well, quantum wire and quantum dot.

Finite size Zero, One and Two Dimensional Nanostructures, Concept of Surface and Interfacial Energies. Physics of the solid state – size dependence of properties, crystal structures, Lattice vibrations, Energy bands:- Insulators Semiconductors and conductors.

UNIT-II (12hrs)

2. Classification of Nanomaterials: Inorganic nanomaterials: carbon nanotubes and cones, Organic nanomaterials: dendrimers, micelles, liposomes, block copolymers; Bionanomaterials: Biomimtric, bioceramic and nanotherapeutics; Nanomaterials for molecular electronics and optoelectronics.

UNITS-III (12hrs)

3. Macromolecules: Classification of polymers, chemistry of polymerization, chain polymerization, step polymerization, coordination polymerization. Molecular weight of polymers-number average and weight average molecular weight, degree of polymerization, determination of molecular weight of polymers by viscometry, Osmometry and light scattering methods.Kinetics of free radical polymerization, derivation of rate law.Preparation and application of polyethylene, PVC, Teflon.

UNIT-IV (12hrs)

4. Molecular & Nanoelectronics: Semiconductors, Transition from crystal technology to nanotechnology. Tiny motors, Gyroscopes and accelerometers. Nano particle embedded wrinkle resistant cloth, Transparent Zinc Oxide sun screens.Bio-systems, Nanoscale processes in environment. Nanoscale structures, Novel phenomena and Quantum control and quantum computing. Single electron transistors, Quantum dots, Quantum wires.

UNIT-V (12hrs)

5. Biomaterials: Implant materials: Stainless steels and its alloys, Ti and Ti based alloys, Ceramic implant materials; Hydroxyapatite glass ceramics, Carbon Implant materials, Polymeric Implant materials, Soft tissue replacement implants, Sutures, Surgical tapes and adhesives, heart valve implants, Artificial organs, Hard Tissue replacement Implants, Internal Fracture Fixation Devices, Wires, Pins, and Screws, Fracture Plates.

Reference Books

1. T. Pradeep: Textbook of Nanoscience and Nanotechnology Chapter (McGraw-Hill Professional, 2012), Access Engineering.
2. C. N. R. Rao, A. Mu¨ller, A. K. Cheetham, "The Chemistry of Nanomaterials :Synthesis, Properties and Applications", Wiley-VCH, 2006.
3. C. Breachignac P. Houdy M. Lahmani, "Nanomaterials and Nanochemistry", Springer, 2006.
4. Guozhong Cao, "Nanostructures and Nanomaterials: Synthesis, Properties, and Applications", World Scientific Publishing Private, Ltd., 2011.
5. Zhong Lin Wang, "Characterization of Nanophase Materials", Wiley-VCH, 2004.

6. Carl C. Koch, "Nanostructured Materials: Processing, Properties and Potential Applications", William Andrew Publishing Norwich, 2006.

Elective Paper- VIII-B-1: Practical: Fundamentals of Nanoscience
2hrs/Week

Minimum of 6 experiments to be done and recorded
1. Determination of the Band Gap of Semiconductor Nanoparticles.
2. Surface Enhanced Raman Scattering Activity of Silver Nanoparticles
3. Conversion of Gold Nanorods into Gold Nanoparticles
4. Bimetallic Nanoparticles
5. Processing and Development of Nanoparticle gas sensor
6. Magnetic separation/identification studies of nanoparticles
7. Harvesting light using nano-solar cells
8. Nano-Forensic analysis to identify, individualize and evaluate evidence using nanophase materials
9. Comparison of the performance of nanoparticles based conductive adhesives and conventional non conductive adhesives.
10. Electrodeposition and corrosion behavior of nanostructured composite film
11. Photocatalytic activity of nanomaterials

Semester –VI
Cluster Elective Paper –VIII-B-2: Synthesis and Characterization of Nanomaterials

No. of Hours per week: 04 **Total Lectures:60**

Unit-I (12 hrs)
1. Nanomaterials synthesis: Synthesis and nanofabrication, Bottom-Up and Top-Down approach with examples. Chemical precipitation methods, sol-gel method, chemical reduction, hydrothermal, process. Physical Mehtods- ball milling, Physical Vapour deposition (PVD), Sputtering, ChemicalVapor deposition (CVD), pray pyrolysis, Biological methods- Synthesis using micro organisms and bacteria, Synthesis using plant extract, use of proteins and DNA templates.

Unit-II (12 hrs)
2. Classification of materials: Types of materials, Metals, Ceramics (Sand glasses) polymers, composites, semiconductors.Metals and alloys- Phase diagrams of single component, binary and ternary systems, diffusion, nucleation and growth. Diffusional and diffusionless transformations.Mechanical properties.Metallic glasses. Preparation, structure and properties like electrical, magnetic, thermal and mechanical, applications.

UNITS-III (12 hrs)

3. Glasses: The glass transition - theories for the glass transition, Factors that determine the glass-transition temperature. Glass forming systems and ease of glass formation, preparation of glass materials.Applications of Glasses: Introduction: Electronic applications, Electrochemical applications, optical applications, Magnetic applications.

UNITS-IV (12 hrs)

4. Liquid Crystals: Mesomorphism of anisotropic systems, Different liquid crystalline phase and phase transitions, Thermal and electrical properties of liquid crystals, Types Liquid Crystals displays, few applications of liquid crystals.

UNITS-V (12 hrs)

5. Characterization Methods: XRD, SEM, TEM, AFM, XPS and PL characterization techniques for nano materials.Electrical and mechanical properties, Optical properties by IR and Raman Spectroscopy.

References books

1. Encyclopedia of Nanotechnology by M.Balakrishna Rao and K.Krishna Reddy, Vol.I to X, Campus books.
2. Nano: The Essentials-Understanding Nanoscinece & Nanotechnology by T.Pradeep; Tata Mc. Graw Hill
3. Nanotechnology in Microelectronics & Optoelectronics, J.M Martine Duart, R.J Martin Palma, F. Agullo Rueda, Elsevier
4. Nanoelectronic Circuit Design, N.K Jha, D Chen, Springer
5. Handbook of Nanophysics- Nanoelectronics & Nanophotonics, K.D Sattler, CRC Press
6. Organic Electronics-Sensors & Biotechnology- R. Shinar & J. Shinar, McGraw-Hill

Cluster Elective Paper- VIII-B-2: Practical: Synthesis and Characterization of Nanomaterials 2hrs/Week

Minimum of 6 experiments to be done and recorded

1. Synthesis of nanocrystalline films of II-VI compounds doped with rare earths by chemical process.
2. Synthesis of Alkaline earth aluminates in nanocrystalline form by combustion synthesis.
3. Preparation of surface conducting glass plate by spray pyrolysis method
4. Preparation of surface conducting glass plate by chemical route
5. Fabrication of micro fluidic nanofilter by polymerisation reaction
6. Absorption studies on the nanocrystalline films and determination of absorption coefficient.
7. Determination of band gap from the absorption spectra using Tauc's plots.
8. Study of Hall effect in semiconductors and its application in nanotechnology.
9. Measurement of electrical conductivity of semiconductor film by Four Probe method and study of temperature variation of electrical conductivity.

Semester –VI

Cluster Elective Paper –VIII-B-3: Applications of Nanomaterials and Devices

No. of Hours per week: 04 **Total Lectures:60**

UNIT-I (12 hrs)

1. Optical properties: Coulomb interaction in nanostructures. Concept of dielectric constant for nanostructures and charging of nanostructure.Quasi-particles and excitons. Excitons in direct and indirect band gap semiconductor nanocrystals. Quantitative treatment of quasi-particles and excitons, charging effects. Radiative processes: General formalization-absorption, emission and luminescence. Optical properties of heterostrctures and nanostructures.

UNIT-II (12 hrs)

2. Electrical transport:

Carrier transport in nanostrcutures.Hall effect, etermination of carrier mobility and carrier concentration; Coulomb blockade effect, thermionic emission, tunneling and hoping conductivity. Defects and impurities: Deep level and surface defects.

UNIT-III (12 hrs)

3. Applications: Applications of nanoparticles, quantum dots, nanowires and thin films for photonic devices (LED, solar cells). Single electron transfer devices (no derivation). CNT based transistors. Nanomaterial Devices: Quantum dots heterostructures lasers, optical switching and optical data storage. Magnetic quantum well; magnetic dots - magnetic data storage.Micro Electromechanical Systems (MEMS), Nano Electromechanical Systems (NEMS).

UNIT-IV(12 hrs)

4. Nanoelectronics: Introduction, Electronic structure of Nanocrystals,Tuning the Band gap of Nanoscale semiconductors, Excitons, Quantumdot, Single electron devices, Nanostructured ferromagnetism,Effect of bulk nanostructuring of magnetic properties, Dynamics of nanomagnets, Nanocarbon ferromagnets, Giant and colossal magneto-resistance, Introduction of spintronics, Spintronics devices and applications.

UNIT-V (12 hrs)

5. Nanobiotechnology and Medical application: Introduction, Biological building blocks- size of building blocks and nanostructures, Peptide nanowires and protein nanoparticles, DNA double nanowires, Nanomaterials in drug delivery and therapy, Nanomedicine, Targeted gold nanoparticles for imaging and therapy.

Reference books:

1.C.P. Poole, Jr. Frank J. Owens, Introduction to Nanotechnology (Wiley India Pvt. Ltd.).

2.S.K. Kulkarni, Nanotechnology: Principles & Practices (Capital Publishing Company).

3. K.K. Chattopadhyay and A.N. Banerjee, Introduction to Nanoscience & Technology (PHI Learning Private Limited).

4. Richard Booker, Earl Boysen, Nanotechnology (John Wiley and Sons).

Cluster Elective Paper-VIII-B-3: Practical: Applications of Nanomaterials and Devices 2hrs/Week

Minimum of 6 experiments to be done and recorded
1. Synthesis of metal nanoparticles by chemical route.
2. Synthesis of semiconductor nanoparticles.
3. Surface Plasmon study of metal nanoparticles by UV-Visible spectrophotometer.
4. XRD pattern of nanomaterials and estimation of particle size.
5. To study the effect of size on color of nanomaterials.
6. Prepare a disc of ceramic of a compound using ball milling, pressing and sintering, and study its XRD.
7. Fabricate a thin film of nanoparticles by spin coating (or chemical route) and study transmittance spectra in UV-Visible region.
8. Fabricate a pn-diode by diffusing Al over the surface of n-type Si and study its I-V characteristics.

Paper-VII-(C) Elective (Renewable Energy)

Semester –VI
Elective Paper –VII-C: Renewable Energy

No. of Hours per week: 04 **Total Lectures:60**

UNIT-I (12 hrs)
1. Introduction to Energy: Definition and units of energy, power, Forms of energy, Conservation of energy, second law of thermodynamics, Energy flow diagram to the earth. Origin and time scale of fossil fuels, Conventional energy sources, Role of energy in economic development and social transformation.
2. Environmental Effects: Environmental degradation due to energy production and utilization, air and water pollution, depletion of ozone layer, global warming, biological damage due to environmental degradation. Effect of pollution due to thermal power station, nuclear power generation, hydroelectric power stations on ecology and environment.

UNIT-II (12 hrs)
3. Global Energy Scenario: Energy consumption in various sectors, projected energy consumption for the next century, exponential increase in energy consumption, energy resources, coal, oil, natural gas, nuclear and hydroelectric power, impact of exponential rise in energy usage on global economy.
4. Indian Energy Scene: Energy resources available in India, urban and rural energy consumption, energy consumption pattern and its variation as a function of time, nuclear energy - promise and future, energy as a factor limiting growth, need for use of new and renewable energy sources.

UNIT-III (12 hrs)

5.Solar energy: Solar energy, Spectral distribution of radiation, Flat plate collector, solar water heating system, Applications, Solar cooker. Solar cell, Types of solar cells, Solar module and array, Components of PV system, Applications of solar PV systems.

6. Wind Energy: Introduction, Principle of wind energy conversion, Components of wind turbines, Operation and characteristics of a wind turbine, Advantages and disadvantages of wind mills, Applications of wind energy.

UNIT-IV (12 hrs)

7. Ocean Energy: Introduction, Principle of ocean thermal energy conversion, Tidal power generation, Tidal energy technologies, Energy from waves, Wave energy conversion, Wave energy technologies, advantages and disadvantages.

8. Hydrogen Energy: History of hydrogen energy - Hydrogen production methods - Electrolysis of water, Hydrogen storage options – Compressed and liquefied gas tanks, Metal hydrides; Hydrogen safety - Problems of hydrogen transport and distribution - Uses of hydrogen as fuel.

UNIT-V (12 hrs)

9. Bio-Energy

Energy from biomass – Sources of biomass – Different species – Conversion of biomass into fuels – Energy through fermentation – Pyrolysis, gasification and combustion – Aerobic and anaerobic bio-conversion – Properties of biomass – Biogas plants – Types of plants – Design and operation – Properties and characteristics of biogas.

References:

1. Solar Energy Principles, Thermal Collection &Storage, S.P.Sukhatme: Tata McGraw Hill Pub., New Delhi.
2. Non-Conventional Energy Sources, G.D.Rai, New Delhi.
3. Renewable Energy, power for a sustainable future, Godfrey Boyle, 2004,
4. The Generation of electricity by wind, E.W. Golding.
5. Hydrogen and Fuel Cells: A comprehensive guide, Rebecca Busby, Pennwell corporation (2005)
6. Hydrogen and Fuel Cells: Emerging Technologies and Applications, B.Sorensen, Academic Press (2012).
7. Non-Conventional Energy Resources by B.H. Khan, Tata McGraw Hill Pub., 2009.
8. Fundamentals of Renewable Energy Resources byG.N.Tiwari, M.K.Ghosal, Narosa Pub., 2007.

Elective Paper-VII-C: Practical: Renewable Energy
2hrs/Week

Minimum of 6 experiments to be done and recorded

1. Preparation of copper oxide selective surface by chemical conversion method.
2. Performance testing of solar cooker.
3. Determination of solar constant using pyrheliometer.
4. Measurement of I-V characteristics of solar cell.
5. Study the effect of input light intensity on the performance of solar cell.

6. Study the characteristics of wind.

Semester –VI
Cluster Electives –VIII-C
Elective Paper –VIII-C-1: Solar Thermal and Photovoltaic Aspects

No. of Hours per week: 04 **Total Lectures:60**

UNIT-I (12 hrs)

1. Basics of Solar Radiation: Structure of Sun, Spectral distribution of extra terrestrial radiation, Solar constant, Concept of Zenith angle and air mass, Definition of declination, hour angle, solar and surface azimuth angles; Direct, diffuse and total solar radiation, Solar intensity measurement – Thermoelectric pyranometer and pyrheliometer.

2. Radiative Properties and Characteristics of Materials: Reflection, absorption and transmission of solar radiation throughsingle and multi covers; Kirchoff's law – Relation between absorptance, emittance and reflectance; Selective Surfaces - preparation and characterization, Types and applications; Anti-reflective coating.

UNIT-II (14 hrs)

3. Flat Plate Collectors (FPC) : Description of flat plate collector, Liquid heating type FPC, Energy balance equation,Efficiency, Temperature distribution in FPC, Definitions of fin efficiency and collector efficiency, Evacuated tubular collectors.

4. Concentrating Collectors: Classification, design and performance parameters; Definitions of aperture, rim-angle, concentration ratio and acceptance angle; Tracking systems; Parabolic trough concentrators; Concentrators with point focus.

Unit-III (14 hrs)

5. Solar photovoltaic (PV) cell: Physics of solar cell –Type of interfaces, homo, hetero andschottky interfaces, Photovoltaic Effect, Equivalent circuit of solar cell, Solar cell output parameters, Series and shunt resistances and its effect on cell efficiency; Variation of efficiency with band-gap and temperature.

6. Solar cell fabrication: Production of single crystal Silicon: Czokralski (CZ) and Float Zone (FZ) methods, Silicon wafer fabrication, Wafer to cell formation, Thin film solar cells, Advantages, CdTe/CdS cell formation, Multi-junction solar cell; Basic concept of Dye-sensitized solar cell, Quantum dot solar cell.

UNIT-IV (8 hrs)

Solar PV systems: Solar cell module assembly – Steps involved in the fabrication of solar module, Module performance, I-V characteristics, Modules in series and parallel, Module protection – use of Bypass and Blocking diodes, Solar PV system and its components, PV array, inverter, battery and load.

UNIT-V (12 hrs)

Solar thermal applications: Solar hot water system (SHWS), Types of SHWS, Standard method of testing the efficiency of SHWS; Passive space heating and cooling concepts, Solar desalinator and drier, Solar thermal power generation.
Solar PV applications: SPV systems; Stand alone, hybrid and grid connected systems, System installation, operation and maintenances; Field experience; PV market analysis and economics of SPV systems.

Reference Books:

1. Solar Energy Utilization, G. D. Rai, Khanna Publishers
2. Solar Energy- Fundamentals, design, modeling and applications, G.N. Tiwari, Narosa Pub., 2005.
3. Solar Energy-Principles of thermal energy collection & storage, S.P. Sukhatme, Tata Mc-Graw Hill Publishers, 1999.
4. Solar Photovoltaics- Fundamentals, technologies and applications, Chetan Singh Solanki, PHI Learning Pvt. Ltd.,
5. Science and Technology of Photovoltaics, P. Jayarama Reddy, BS Publications, 2004.

Cluster Elective Paper- VIII-C-1: Practical: Solar Thermal and Photovoltaic Aspects
2hrs/Week
Minimum of 6 experiments to be done and recorded
1. Measurement of direct solar radiation using pyrheliometer.
2. Measurement of global and diffuse solar radiation using pyranometer.
3. Measurement of emissivity, reflectivity and transsivity.
4. Measurement of efficiency of solar flat plate collector.
5. Performance testing of solar air dryer unit.
6. Effect of tilt angle on the efficiency of solar photovoltaic panel.
7. Study on solar photovoltaic panel in series and parallel combination.

Semester - VI
Cluster Elective Paper –VIII-C-2 :Wind, Hydro and Ocean Energies

No. of Hours per week: 04 **Total Lectures:60**

UNIT-I
1. Introduction: Wind generation, meteorology of wind, world distribution of wind, wind speed variation with height, wind speed statistics, Wind energy conversion principles; General introduction; Types and classification of WECS; Power, torque and speed characteristics.
2. Wind Measurements:Eolian features, biological indicators, rotational anemometers, other anemometers, wind measurements withballoons.

UNIT-II
3. Wind Energy Conversion System:Aerodynamic design principles; Aerodynamic theories; Axial momentum, blade element andcombine theory; Rotor characteristics; Maximum power coefficient; Prandlt's tip losscorrection.

4. Design of Wind Turbine: Wind turbine design considerations; Methodology; Theoretical simulation of wind turbinecharacteristics; Test methods.

UNIT-III

5. Wind Energy Application: Wind pumps: Performance analysis, design concept and testing; Principle of wind energy generation; Standalone, grid connected and hybrid applications of wind energy conversion systems, Economics of wind energyutilization; Wind energy in India; Environmental Impacts of Wind farms.

UNIT-IV

6. Small Hydropower Systems: Overview of micro, mini and small hydro systems; Hydrology; Elements of pumps andturbine; Selection and design criteria of pumps and turbines; Site selection;Speed and voltage regulation; Investment issues load management and tariff collection; potential of small hydro power in India.Wind and hydro based stand-alone hybrid power systems.

UNIT-V

7.Ocean Thermal, Tidal and Wave Energy Systems:Ocean Thermal - Introduction, Technology process, Working principle, Resource and site requirements, Location of OCET system, Electricity generation methods from OCET,Advantages and disadvantages, Applications of OTEC,

8. Tidal Energy - Introduction, Origin and nature of tidal energy, Merits and limitations, Tidal energy technology,Tidal range power, Basic modes of operation of tidal systems.Wave Energy – Introduction, Basics of wave motion, Power in waves, Wave energy conversion devices, Advantages anddisadvantages, Applications of wave energy.

Reference Books:

1. Dan Charis, Mick Sagrillo, LanWoofenden, “Power from the Wind”, New Society Pub., 2009.
2. Erich Hau, “Wind Turbines-Fundaments, Technologies, Applications, Economics”, 2ndEdition, Springer Verlag, BerlinHeidelberg, NY, 2006.
3. Joshue Earnest, Tore Wizelius, Wind Power and Project Developmen”, PHI Pub., 2011.
4. T. Burton, D. Sharpe, N. Jenkins, E. Bossanyi, Wind Energy Handbook, John Wiley Pub., 2001.
5. Paul Gipe, “Wind Energy Basics”, Chelsea Green Publications, 1999.
6. Khan, B.H., “Non-Conventional Energy Resources”, TMH, 2nd Edition, New Delhi, 2009.
7. Tiwari, G.N., and Ghosal, M.K, Renewable Energy Resources – Basic Principles and applications, Narosa Publishing House,2007.

Cluster Elective Paper- VIII-C-2 Practical: Wind, Hydro and Ocean Energies
2hrs/Week

Minimum of 6 experiments to be done and recorded

1. Estimation of wind speed using anemometer.
2. Determination of characteristics of a wind generator
3. Study the effect of number and size of blades of a wind turbine on electric power output.
4. Performance evaluation of vertical and horizontal axes wind turbine rotors.
5. Study the effect of density of water on the output power of hydroelectric generator.
6. Study the effect of wave amplitude and frequency on the wave energy generated.

Semester - VI
Cluster Elective Paper –VIII-C-3 :Energy Storage Devices

No. of Hours per week: 04 **Total Lectures:60**

UNIT-I (12 hr)

1. Energy Storage: Need of energy storage; Different modes of energy storage, Flywheel storage, Electrical and magnetic energy storage: Capacitors,electromagnets; Chemical Energy storage: Thermo-chemical, photo-chemical, bio-chemical,electro-chemical, fossil fuels and synthetic fuels. Hydrogen for energy storage.

UNIT-II (12 hrs)

2. Electrochemical Energy Storage Systems: Batteries: Primary, Secondary, Lithium, Solid-state and molten solvent batteries; Leadacid batteries; Nickel Cadmium Batteries; Advanced Batteries. Role of carbon nano-tubes inelectrodes.

UNIT-III (12 hrs)

3. Magnetic and Electric Energy Storage Systems: Superconducting Magnet Energy Storage(SMES) systems; Capacitor and battery:Comparison and application; Super capacitor: Electrochemical Double Layer Capacitor(EDLC), principle of working, structure, performance and application.

UNIT-IV (12 hrs)

4. Fuel Cell: Fuel cell definition, difference between batteries and fuel cells, fuel cell components, principle and working of fuel cell, performance characteristics,efficiency, fuel cell stack, fuel cell power plant: fuel processor, fuel cell powersection, power conditioner, Advantages and disadvantages.

UNIT-V (12 hrs)

5. Types of Fuel Cells: Alkaline fuel cell, polymer electrolyte fuel cell, phosphoric acid fuel cell,molten carbonate fuel cell; solid oxide fuel cell,proton exchange membrane fuel cell, problems with fuel cells, applications of fuel cells.

REFERENCE BOOKS

1. J. Jensen and B. Squrensen, Fundamentals of Energy Storage, John Wiley, NY, 1984.
2. M. Barak, Electrochemical Power Sources: Primary and Secondary Batteries by, P. Peregrinus,IEE,1980.
3.P.D.Dunn, Renewable Energies, Peter Peregrinus Ltd, London, 1986.
4. B.Viswanathan and M. A. Scibioh, Fuel Cells-Principles and Applications, University Press, 2006.
5. Hart, A.B and G.J.Womack, Fuel Cells: Theory and Application, Prentice Hall, NewYork, 1989.

Cluster Elective Paper –VIII-C-3: Practical: Energy Storage Devices
2hrs/Week

Minimum of 6 experiments to be done and recorded
1. Study of charge and discharge characteristics of storage battery.
2. Study of charging and discharging behavior of a capacitor.
3. Determination of efficiency of DC-AC inverter and DC-DC converters
4. Study of charging characteristics of a Ni-Cd battery using solar photovoltaic panel.
5. Performance estimation of a fuel cell.
6. Study of effect of temperature on the performance of fuel cell.

B.Sc. (Physics) (Non-Mathematics Combinations)
Scheme of instruction and examination to be followed w.e.f. 201-2017

S.No	Semester	Title of the paper	Instruction Hrs/week	Duration o f exam (hrs)	Max Marks (external)
Theory					
1	First	Paper I: Mechanics & Properties of Matter	4	3	75
2	Second	Paper II: Waves & Oscillations	4	3	75
3	Third	Paper III: Optics	4	3	75
4	Fourth	Paper IV: Thermodynamics & Radiation Physics	4	3	75
5	Fifth	Paper V: Electricity, Magnetism & electronics Paper VI: Modern Physics & Medical Physics	4 4	3 3	75 75
6	Sixth	PaperVII : Elective Paper VIII: Cluster Electives	4 4	3 3	75 75
Practical					
1	First	Practical 1	2	3	50
2	Second	Practical II	2	3	50
3	Third	Practical III	2	3	50
4	Fourth	Practical IV	2	3	50
5	Fifth	Practical V	2	3	50
6		Practical VI	2	3	50
7	Sixth	Practical VII	2	3	50
8		Practical VIII	2	3	50

B.Sc. Physics under CBCS for Non-Mathematics Combinations

w.e.f. 2015-16(Revised in April, 2016)

B.Sc. 1st Semester Physics

Paper I: Mechanics & Properties of Matter

Work load: 60 hrs per semester **4 hrs/week**

UNIT-I(16 hrs)

1. Mathematical Background

Scalars and vectors –vector addition-scalar and vector products of vector and their physical significance-vector calculus-gradient of a scalar point function-divergence and curl of vector-statements of Stokes and Gauss theorems -examples (no derivations).

2. Motion of system

Collisions- Elastic and inelastic collisions-Collisions in one and two dimension-Rocket propulsion-Center of mass-Motion of the centre of mass-Impact parameter-Scattering cross-section, Rutherford scattering (No derivation-Qualitative ideas only)

UNIT-II(12 hrs)

3. Mechanics of Rigid body

Rigid body, rotational kinematic relations Rotational kinetic energy and moment of inertia - moment of inertia in simple cases (Rod, disc, sphere and cylinder)- No derivations. Parallel& Perpendicular axes theorems-Torque-relation between torque and angular momentum.

Angular momentum of a particle-Torque and angular momentum for a system of particles-conservation of angular momentum-Translation and rotational motion of system-Elementary ideas about gyroscopic motion (No derivation – Qualitative ideas only)-Precession of the equinoxes.

UNIT-III(10 hrs)

4. Central forces

Central force- Definition& examples- General Characteristics of central forces-Conservative nature of central forces, Planetary motion-Kepler's laws (Statements & Explanation), Newton's law of gravitation from Kepler's law, Geostationary Satellite Motion.Uses of communication satellites.

UNIT-IV(10 hrs)

5. Fluid Flow

The flow of ideal fluids Stream line motion -Equation of continuity –Bernoulli's equation-Simple applications - Torricelli's theorem-The Venturimeter-Pitot's tube-Viscosity and the flow of real fluids- Poiseuille's equation.

UNIT-V (12 hrs)

6. Relativistic effects

Moving reference frames-Inertial and Non-inertial reference frames-Galilean relativity – Special theory of relativity-Statements of the two basic postulates- (Elementary treatment and application only) Lorentz transformation equations-length contraction-time dilation-addition of velocities-Momentum and relativistic mass- Mass –Energy equation, rest mass & momentum of a particle.

REFERENCE BOOKS:

1. BSc Physics, Vol.1 -Telugu Academy, Hyderabad
2. Physics for Biology and Premedical Students –D.N. Burns & SGG Mac Donald
3. Unified Physics Vol.I Mechanics,Waves and Oscillations – Jai Prakash Nath&Co.Ltd., Meerut.
4. Properties of Matter - D.S. Mathur, S.Chand& Co, New Delhi ,11thEdn., 2000
5. Properties of Matter - Brijlal&Subrmanyam ,S.Chand&Co. 1982

Practical paper 1: Mechanics & Properties of Matter

Work load: 30 hrs per semester **2 hrs/week**

Minimum of 6 experiments to be done and recorded

1. Viscosity of liquid by the flow method (Poiseuille's method)
2. Young's modulus of the material of a bar (scale) by uniform bending
3. Young's modulus of the material a bar (scale) by non- uniform bending
4. Surface tension of a liquid by capillary rise method
5. Determination of radius of capillary tube by Hg thread method
6. Viscosity of liquid by Searle'sviscometer method
7. Bifilar suspension –moment of inertia of a regular rectangular body.
8. Determination of moment of inertia using Fly-wheel
9. Determination of the height of a building using a sextant.
10. Rigidity modulus of material of a wire-dynamic method (torsional pendulum)

Suggested student activities

Student seminars, group discussions, assignments, field trips, study project and experimentation using virtual lab

Examples

Seminars - A topic from any of the Units is given to the student and asked to give a brief seminar presentation.

Group discussion - A topic from one of the units is given to a group of students and asked to discuss and debate on it.

Assignment - Few problems may be given to the students from the different units and asked them to solve.

Field trip - Visit to Satish Dhawan Space Centre, Sriharikota / Thermal and hydroelectric power stations / Science Centres, any other such visit etc.

Study project - Web based study of different satellites and applications.

Domain skills:
Logical derivation, experimentation, problem solving, data collection and analysis, measurement skills

***** Documental evidence is to be maintained for the above activities.**

Paper II: Waves & Oscillations
(For Non-Maths Combinations)
II SEMESTER

Work load:60 hrs per semester **4 hrs/week**

UNIT-I(15 hrs)

1. Oscillatory Motion

Simple harmonic motion-Equation of motion and solution-Simple harmonic motion from the standpoint of energy-The rotor diagram representation of simple harmonic motion-Compound pendulum-determination of g and k, torsional pendulum-determination of n, Combination of Simple harmonic motions along a line and perpendicular to each other-Lissajous figures-

UNIT-II(14 hrs)

2. Damped Oscillators

Damped vibrations - Explanation and examples - Forced vibrations – Explanation and examples, Resonance, examples -Sharpness of resonance Q-factor, Volume Resonator, Determination of frequency of a given tuning fork.

UNIT-III(11 hrs)

3. Wave Motion

Progressive waves-Equation of a progressive wave-sinusoidal waves-Velocity of waves in elastic media-Standing waves-Transverse vibrations of stretched strings, overtones and harmonics. Sonometer verification of laws of transverse vibrations in a stretched string, beats (qualitative analysis Only).

UNIT-IV(10 hrs)

4. Acoustics

Classification of sound, Characteristics of musical sound, Acoustics of Buildings, Reverberation, Sabine's formula (without derivation) Absorption coefficient, Factors affecting acoustics of buildings, Intensity of sound, Sound distribution in an auditorium.

UNIT-V(10 hrs)

5. Ultrasonics

Ultrasonics, properties of ultrasonic waves, production of ultrasonics by piezoelectric and magnetostriction methods, detection of ultrasonics, Applications of ultrasonic waves.

REFERENCE BOOKS

1. BSc Physics, Vol.1 -Telugu Academy, Hyderabad
2. Physics for Biology and Premedical Students –D.N. Burns & SGG Mac Donald

3. Unified Physics Vol.I, Mechanics,Waves and Oscillations – Jai Prakash Nath&Co.Ltd., Meerut.
4. Waves and Oscillations. S. Badami, V. Balasubramanian and K. Rama Reddy Orient Longman.
5. Waves and Oscillations. N. Subramaniyam and BrijlalVikas Publishing House Private Limited.
6. Acoustics – Waves and Oscillations, S.N.Sen, Wiley Estern Ltd.

Practical Paper II: Waves & Oscillations

Work load: 30 hrs per semester **2 hrs/week**

Minimum of 6 experiments to be done and recorded

1. Volume resonator experiment
2. Determination of 'g' by compound/bar pendulum
3. Simple pendulum normal distribution of errors-estimation of time period and the error of the mean by statistical analysis
4. Determination of the force constant of a spring by static and dynamic method.
5. Determination of the elastic constants of the material of a flat spiral spring.
6. Coupled oscillators
7. Verification of laws of vibrations of stretched string –sonometer
8. Determination of frequency of a bar –Melde's experiment.
9. Study of a damped oscillation using the torsional pendulum immersed in liquid-decay constant and damping correction of the amplitude.
10. Formation of Lissajous figures using CRO.

Suggested student activities

Student seminars, group discussions, assignments, field trips, study project and experimentation using virtual lab

Examples

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Group discussion - A topic from one of the units is given to a group of students and asked to discuss and debate on it.

Assignment - Few problems may be given to the students from the different units and asked them to solve.

Field trip - Visit to Satish Dhawan Space Centre, Sriharikota / Thermal and hydroelectric power stations / Science Centres, any other such visit etc.

Study project - Web based study of different satellites and applications.

Domain skills:

Logical derivation, experimentation, problem solving, data collection and analysis, measurement skills

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Paper III: Optics
(For Non- Maths Combinations)
III SEMESTER

Work load: 60 hrs per semester **4 hrs/week**

UNIT –I(10 hrs)

1. Geometric optics

Aberrations in lenses-Chromatic Aberration-Achromatic Combination of lenses-Monochromatic defects-Spherical aberration-Astigmatism-Coma-Curvature and Distortion-Minimizing aberration.

UNIT-II(13 hrs)

2. Interference

The superstition principle, Condition for Interference, Classification of Interferences methods-Young's double slit experiment-Theory. Interference with white light and appearance of Young's interference fringes-Intensity in interference pattern-Optical Path length, Lloyd's single mirror-Phase change on reflection, Interference due to plane parallel wedge shaped films, Colours in thin films-Newton rings, Determination of wavelength of light. Michelson's interferometer.

UNIT-III(12 hrs)

3. Diffraction

The Fresnel and Fraunhoffer diffraction phenomena-Fraunhoffer diffraction of single Slit normal incidence and oblique incidence – Resolving power –limits of resolution for telescopes and microscope- Fraunhoffer diffraction by double slit-Intensity-pattern- Diffraction grating-Wavelength determination (Normal incidence and Minimum deviation).

UNIT-IV(13hrs)

4. Polarization

Types of Polarized light-Polarization by reflection, Brewster's law-Dichroism the Polaroid-double refraction- the calcite crystal-the principal plane-O and E rays-the Nicol Prism, Polariserand Analyser, Law of Malus –the quarter wave plate and halfwave plate Plane, Circularly, elliptically polarized light-Production and analysis -Optical activity-Specific rotatory power –Polarimeter.

UNIT V: (12 hrs)

5. Holography & Fiber Optics

Holography: Basic principle of holography-Gabor hologram and its limitations, applications of holography. Introduction- different types of fibres, rays and modes in an optical fibre, fibre material, principles of fiber communication (qualitative treatment only), applications.

REFERENCE BOOKS

1. BSc Physics, Vol.2, Telugu Academy, Hyderabad
2. Physics for Biology and Premedical Students –D.N. Burns & SGG Mac Donald
3. Unified Physics Vol.II, Optics and Thermodynamics,*Jai Prakash Nath&Co.Ltd., Meerut*.
4. Optics, Ajoy Ghatak, Tata Mc Graw-Hill.
5. Fundamentals of Optics, H.R. Gulati and D.R. Khanna, 1991, R. Chand Publication
6. Introduction of Lasers – Avadhanulu, S.Chand& Co.
7. Principles of Optics- BK Mathur, Gopala Printing Press, 1995

Practical Paper III: Optics

Work load: 30 hrs **2 hrs/week**

Minimum of 6 experiments to be done and recorded

1. Determination of radius of curvature of a given convex lens-Newton's rings.
2. Resolving power of grating.
3. Study of optical rotation –polarimeter.
4. Dispersive power of a prism.
5. Determination of wavelength of light using diffraction grating- minimum deviation method.
6. Determination of wavelength of light using diffraction grating-normal incidence method.
7. Resolving power of a telescope.
8. Refractive index of a liquid-hallow prism
9. Determination of thickness of a thin fiber by wedge method
10. Determination of refractive index of liquid-Boy's method.

Suggested student activities

Student seminars, group discussions, assignments, field trips, study project and experimentation using virtual lab

Examples

Seminars - A topic from any of the Units is given to the student and asked to give a brief seminar presentation.

Group discussion - A topic from one of the units is given to a group of students and asked to discuss and debate on it.

Assignment - Few problems may be given to the students from the different units and asked them to solve.

Field trip - Visit to Satish Dhawan Space Centre, Sriharikota / Thermal and hydroelectric power stations / Science Centres, any other such visit etc.

Study project - Web based study of different satellites and applications.

Domain skills:

Logical derivation, experimentation, problem solving, data collection and analysis, measurement skills

***** Documental evidence is to be maintained for the above activities.**

Paper IV: Thermodynamics &Radiation Physics
(For Non- Mathematics Combinations)
IV SEMESTER

Work load:60 hrs per semester **4 hrs/week**

UNIT-I(12 hrs)

1. Kinetic theory of Gases

Zeroth law of thermodynamics,Measurment of temperature- resistance thermometry, thermoelectric theromometers-kinetic theory of gases- assumptions-pressure of an ideal gas-molecular interpretation of temperature- Maxwell's law of distribution of molecular speeds (no derivation)-experimental verification.

UNIT-II(12 hrs)

2. Thermodynamics

The first law of thermodynamics- work done in isothermal and adiabatic changes -Reversible and irreversible process-Carnot's cycle-Carnot's theorem - Second law of thermodynamics, Kelvin's and Claussius statements -Entropy, physical significance-Change in entropy in reversible and irreversible processes-Entropy and disorder-Entropy of universe.

UNIT-III(12 hrs)

3. Low temperature Physics

Introduction-Joule Kelvin effect-porous plug experiment. Joule's expansion-Distinction between adiabatic and Joule Thomson expansion-Liquefaction of helium Kapitza's method-Adiabatic demagnetization-Production of low temperatures-Principle of refrigeration. applications of substances at low-temperature.

UNIT-IV(12 hrs)

4. Measurement, laws and theories of radiation

Black body-Ferry's black body-distribution of energy in the spectrum of Black body- Wein's law- Planck's radiation formula (no derivation)-Measurement of radiation-Types of pyrometers-Disappearing filament optical pyrometer-experimental determination-Angstrom Pyroheliometer-determination of solar constant, effective temperature of Sun.

UNIT-V(12 hrs)

5. Thermoelectricity

Seebeck effect variation of thermo – emf with temperature.Thermo electric series - Measurement of thermoemf using potentiometer,Law of intermediate metals and intermediate temperatures - Peltier effect, Demonstration Peltier coefficient. Thomson effect demonstration Thomson coefficient, Thermoelectric diagrams and their uses, Thermoelectric power. Application of Thermoelectric effects.

REFERENCE BOOKS

1. BSc Physics, Vol.2, Telugu Academy, Hyderabad
2. Physics for Biology and Premedical Students –D.N. Burns & SGG Mac Donald
3. Unified Physics Vol.II, Optics and Thermodynamics,Jai Prakash Nath&Co.Ltd., Meerut.
4. Heat and Thermodynamics, N.Subramanyam and L.Brijlal, S.Chand& Co.
5. Electricity and Magnetism, N.Subramanyam and L.Brijlal, S.Chand& Co.
6. University Physics, HD Young, MW Zemansky,FW Sears, Narosa Publishers, New Delhi

Practical Paper IV: Thermodynamics& Radiation Physics

Work load: 30 hrs **2 hrs/week**

Minimum of 6 experiments to be done and recorded

1. Specific heat of a liquid –Joule's calorimeter –Barton's radiation correction
2. Thermal conductivity of bad conductor-Lee's method
3. Thermal conductivity of rubber.
4. Measurement of Stefan's constant.
5. Specific heat of a liquid by applying Newton's law of cooling correction.
6. Heating efficiency of electrical kettle with varying voltages.
7. Thermoemf- thermo couple potentiometer
8. Thermal behavior of an electric bulb (filament/torch light bulb)
9. Measurement of Stefan's constant- emissive method
10. Study of variation of resistance with temperature - thermistor.

Suggested student activities

Student seminars, group discussions, assignments, field trips, study project and experimentation using virtual lab

Examples

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Assignment - Few problems may be given to the students from the different units and asked them to solve.

Field trip - Visit to Satish Dhawan Space Centre, Sriharikota / Thermal and hydroelectric power stations / Science Centres, any other such visit etc.

Study project - Web based study of different satellites and applications.

Domain skills:

Logical derivation, experimentation, problem solving, data collection and analysis, measurement skills

***** Documental evidence is to be maintained for the above activities.**

Paper V : Electricity, Magnetism& Electronics
(For Non-Maths Combinations)
V Semester

Work load: 60 hrs per semester **4 hrs/week**

UNIT-1(15 hrs)

1. Electric field and potential

Coulomb's law – electric field and intensity of electric field –intensity of electric field due to i) a point charge–electric dipole and dipole moment. Electric lines of force, Electric flux.Gauss's law statement and its proof- applications of Gauss Law to (1) Uniformly charged sphere (2) an infinite conducting sheet of charge (No Derivation- qualitative ideas only). Electrical potential – equi-potential surfaces- potential due to i) a point charge, ii)charged spherical shell.Equi-potential surfaces with examples.

UNIT-II(10 hrs)

2. Capacitance and dielectrics

Derivation of expression for capacity due to i) a parallel plate capacitor with and without dielectric, ii) a spherical capacitor. Energy stored in a capacitor, electric capacitance. Electric dipole moment Di-electrics with examples, effect of electric field-electric displacement D, electric polarization P, permeability &susceptibility (Definitions only) – relation between D,E and P.Dipolemoment of heart.

UNIT-III (10 hrs)

3. Current electricity

Current and current density, drift velocity expression, Kirchhoff's laws –statement and explanation and application to Wheatstone bridge, sensitivity of Wheatstone bridge, Carey-Foster's bridge- experimentalmeasurement of temperature coefficient of resistance- strain gauge-piezoelectric transducers (applications only)

UNIT-IV (15 hrs)

5. Electromagnetism

Magnetic induction B, magnetic flux – Biot –Savart's law, magnetic induction due to (i) a long straight conductor carrying current (ii) on the axis of a circular coil carrying current (iii) solenoid, (No derivation-qualitative treatment only) Ampere's law – derivation of expression for the force on (i) charged particles and (ii) current carrying conductor in the magnetic field, Hall effect and its importance-electromagnetic pumping.

Faraday's law of electromagnetic induction, Lenz's law - Construction, theory and working of a Moving Coil Ballistic Galvanometer,application of B.G. damping correction, Self induction, Mutual induction and their units- Electromagnetic measurement of blood flow.

UNIT-V(12 hrs)

6. Basic Electronics

PN junction diode, Zener diode and its V-I characteristics, half and full wave rectifiers(semiconductor type) (working qualitative ideas only).Bridge type full wave rectifier.Action of filters- Land π type.PNP and NPN transistors and charactrestics,Configurations Transistor configurations – CE transistor characteristics – h-parameters – Transistor as an amplifier.

Number system, conversion of binary to decimal and vice versa, De Morgans's theorems statements - logic gates – verification of truth tables, NAND and NOR gates as universal gates, Half and Full adders.

REFERENCE BOOKS

1. B.Sc., Physics, Vol.3, Telugu Academy, Hyderabad
2. Modern Physics by R. Murugeshan and Kiruthiga Siva Prasath – S. Chand & Co.
3. Electricity and Magnetism, Brijlal and Subramanyam. RatanPrakashanMandir.
4. Physics for Biology & Premedical Students –DN Burns & SG MacDonald, Addison Wiley.
5. Principles of Electronics, V.K. Mehta, S.Chand & Co.,
6. Digital Principles and Applications, A.P. Malvino and D.P.Leach, Mc GrawHill Edition.

Practical Paper V: Electricity, Magnetism& Electronics

Work load: 30 hrs **2 hrs/week**

Minimum of 6 experiments to be done and recorded

1. Figure of merit of a moving coil galvonometer.
2. LCR circuit series/parallel resonance, Q factor.
3. Determination of ac-frequency –sonometer.
4. Verification of Kirchoff's laws and maximum power transfer theorem.
5. Field along the axis of a circular coil carrying current.
6. PN Junction Diode Characteristics
7. Zener Diode Characteristics
8. Transistor CE Characteristics- Determination of hybrid parameters
9. Logic Gates- OR, AND,NOT and NAND gates. Verification of Truth Tables.
10. Verification of De Morgan's Theorems.

Suggested student activities

Student seminars, group discussions, assignments, field trips, study project and experimentation using virtual lab

Examples

Seminars - A topic from any of the Units is given to the student and asked to give a brief seminar presentation.

Group discussion - A topic from one of the units is given to a group of students and asked to discuss and debate on it.

Assignment - Few problems may be given to the students from the different units and asked them to solve.

Field trip - Visit to Satish Dhawan Space Centre, Sriharikota / Thermal and

hydroelectric power stations / Science Centres, any other such visit etc.
Study project - Web based study of different satellites and applications.

Domain skills:
Logical derivation, experimentation, problem solving, data collection and analysis, measurement skills

***** Documental evidence is to be maintained for the above activities.**

Paper VI: Modern Physics& Medical Physics
(For Non-Maths Combinations)
V Semester

Work load: 60 hrs per semester **4 hrs/week**

UNIT-1(10 hrs)

1. Spectroscopy

Introduction - Zeeman effect - Experimental verification – Paschen Back effect – Stark effect – Explanations (elementary ideas only) - Raman effect, hypothesis, classical and quantum theory of Raman effect. Experimental arrangement for Raman effect and its application.

UNIT-II (12 hrs)

2. Fundamentals of quantum mechanics

Photoelectric effect – Explanation through demonstration, Einstein's Photoelectric equation – its verification by Millikan's experiment –theory of Compton effect (no derivation) and its experimental verification –Bohr's theory of Hydrogen atom – Derivation of expression for energy levels and spectral series of Hydrogen atom, atomic excitation, Frank Hertz experiment.

UNIT-III (10 hrs)

3. Matter Waves and uncertainty principle

Dual nature of radiation- de Broglie's theory of matter waves, expression for wavelength, properties of matter waves, Davisson and Germer experiment on electron diffraction – Discussion of results, Wave velocity and group velocity.

Heisenberg's uncertainty principle for position and momentum (x and p), energy and time (E and t).Experimental illustrations of uncertainty principal, Complementary principle of Bohr.

UNIT-IV: (12 hrs)

4. Radioactivity and radiation protection

The nature of radioactive emissions, the law of Radioactive decay, derivation, decay constant, Half life and mean life periods - derivations, units of radio activity, Carbon and Uranium dating (explanation) - Age of earth and rocks, Radioactive isotopes as tracers, radio cardiography. Principles of radiation protection– protective materials-radiation effects – somatic, genetic stochastic & deterministic effect, Natural radioactivity, Biological effects of radiation, Radiation monitors**.**

UNIT-V (16 hrs)

6. Crystal Structure

Amorphous and crystalline materials, unit cell, Miller indices, reciprocal lattice, types of lattices, diffraction of X-rays by crystals, Bragg's law, experimental techniques, Laue's method and powder diffraction method.

7. Superconductivity:

Introduction - experimental facts, critical temperature - critical field - Meissner effect – Isotope effect - Type I and type II superconductors - BCS theory (elementary ideas only) - applications of superconductors.

REFERENCE BOOKS

1. B.Sc Physics, Vol.4, Telugu Academy, Hyderabad.
2. Molecular Structure and Spectroscopy by G. Aruldhas. Prentice Hall of India, New Delhi.
3. Physics for Biology & Premedical Students –D.N. Burns & SG Mac Donald, Addison Wiley.
4. Modern Physics by R. Murugeshan and Kiruthiga Siva Prasath. S. Chand & Co.
5. Medical Physics, J.R. Cameron and J.G.Skofronick, Wiley (1978)
6. Basic Radiological Physics Dr. K. Thayalan - Jayapee Brothers Medical Publishing Pvt. Ltd. New Delhi (2003)
7. Physics of Radiation Therapy : F M Khan - Williams and Wilkins, Third edition (2003)
8. Physics of the human body, Irving P. Herman, Springer (2007).
9. The Physics of Radiology-H E Johns and Cunningham.

Practical Paper VI: Modern Physics& Medical Physics

Work load: 30 hrs **2 hrs/week**

Minimum of 6 experiments to be done and recorded

1. e/m of an electron by Thomson method.
2. Determination of Planck's Constant (photocell).
3. Verification of inverse square law of light using photovoltaic cell.
4. Study of absorption of α-rays.
5. Study of absorption of β-rays.
6. Determination of Range of β-particles.
7. Determination of M & H.
8. Analysis of powder X-ray diffraction pattern to determine properties of crystals.
9. Energy gap of a semiconductor using junction diode.
10. Energy gap of a semiconductor using thermister.

Suggested student activities

Student seminars, group discussions, assignments, field trips, study project and experimentation using virtual lab

Examples

Seminars - A topic from any of the Units is given to the student and asked to give a

brief seminar presentation.

Group discussion - A topic from one of the units is given to a group of students and asked to discuss and debate on it.

Assignment - Few problems may be given to the students from the different units and asked them to solve.

Field trip - Visit to Satish Dhawan Space Centre, Sriharikota / Thermal and hydroelectric power stations / Science Centres, any other such visit etc.

Study project - Web based study of different satellites and applications.

Domain skills:

Logical derivation, experimentation, problem solving, data collection and analysis, measurement skills

***** Documental evidence is to be maintained for the above activities.**

Note: For all the above 8 practical papers the book "B.Sc Practical Physics" by C.L.Arora Published by S.Chand& Co, New – Delhi may be followed.

NOTE: Problems should be solved at the end of every chapter of all units.

Elective VII (A): (Electronics)

Semester –VI

Elective Paper –VII-(A) :Analog and Digital Electronics

No. of Hours per week: 04 **Total Lectures:60**

Unit-I (14 Hours)

9. FET-Construction, Working, characteristics and uses; MOSFET-enhancement MOSFET, depletion MOSFET, construction and working , drain characteristics of MOSFET, applications of MOSFET

10. Photo electric devices: Structure and operation, characteristics, spectral response and application of LDR, LEDand LCD

Unit-II (10Hours)

11. Operational Amplifiers: Characteristics of ideal and practical Op-Amp (IC 741), Basic differential amplifiers, Op-Amp supply voltage, IC identification, Internal blocks of Op-Amp, its parameter off set voltages and currents, CMRR, slew rate, concept of virtualground.

Unit-III (10 Hours)

12. Applications of Op-Amp: Op-Amp as voltage amplifier, Inverting amplifier, Non-inverting amplifier, voltage follower, summing amplifier, difference amplifier, comparator, integrator, differentiator.

Unit-IV(14 Hours)

13. Data processing circuits: Multiplexers, De-multiplexers, encoders, decoders, Characteristics for Digital ICs -RTL, DTL, TTL, ECL CMOS (NAND & NOR Gates).

14. IC 555 Timer -Its pin diagram,internal architecture, Application as astablemultivibrator and mono stable multivibrator.

Unit-V (12 Hours)

15. Sequential digital circuits:Flip-flops, RS, Clocked SR, JK, D, T, Master-Slave, Flip- flop, Conversion of Flip flops.

16. Code Converters: Design of code converter, BCD to 7 segment, binary/BCD to gray, gray to binary/BCD,design of counters using state machine.

Reference Books

1. Digital Electronics by G.K.Kharate Oxford University Press
2. Unified Electronics by Agarwal and Agarwal.
3. Op- Amp and Linear ICs by Ramakanth A Gayekwad, 4th edition PHI
4. Digital Principles and Applications by Malvino and Leach, TMH, 1996, 4th edition.
5. Digital Circuit design by Morris Mano,PHI
6. Switching Theory and Logic design by A.AnandKumar ,PHI
7. operations amplifier by SV Subramanyam.

Elective Paper-VII-A : Practical: Analog and Digital Electronics
2hrs/Week

Minimum of 6 experiments to be done and recorded

1) Characteristics of FET
2) Characteristics of MOSFET
3) Characteristics of LDR
4) Characteristics of Op-amp.(IC741)
5)Op-Amp as amplifier/inverting amplifier
6) Op-Amp as integrator/differentiator
7) Op-Amp as summing amplifier/difference amplifier
8) IC 555 as astable multivibrator
9) IC 555 as monostable amplifier
10) Master slave flip-flop
11) JK flip-flop

Semester –VI
Cluster Electives VIII-A
Cluster Elective Paper –VIII-A-1: Introduction to Microprocessors and Microcontrollers

No. of Hours per week: 04 **Total Lectures:60**

Unit – I (10Hours)

1. Introduction to microcontrollers:General purpose of computer systems,architecture of embedded system, classification, applications and purposes, challenges and designs, operational and non operational quality attributes, elemental description of embedded processors and micro controllers

Unit –II (10Hours)

2. Microprocessors:Organisation of microprocessorbased system, 8085 microprocessor,its pin diagram and architecture, concept of data bus, and address bus, 8085 programming, instruction classification, stacks and its implementation, hardware and software interrupts.

Unit– III (15Hours)

3. 8051 microcontroller:Introduction , block diagram, assembly language programming, programme counter, ROM memory, data types and directives, flag bits PSW register, jump, loop and call constructions

4. 8051 I/O Programming: Introduction to I/O port programming, pin out diagram, I/O port pin programming, bit manipulation, addressing modes, accessing memory, arithmetic and logic instructions.

Unit – IV (13 Hours)

5. Timers:Programming of 8051 timers, counter programming, interrupts, externalhardware interrupts**,** serial communication interrupts, interrupt priority.

6. Embedded system programming:Structure of programming, infinite loop, compiling, linking locating, down loading and debugging.

Unit –V (12Hours)

7. Embedded system design and development:Embedded system development environment, file type generated after cross compilation, dissembler, decompiler, simulator, emulator and debugging.

8. Embedded product life cycle:Embedded product development life cycle, trends in embedded industry.

Reference Books

1)Embedded Systems.. Architecture,programming and design, R Kamal, 2008, TMH

2) The 8051 micro controller and embedded systems using Assembly and C, M.A.Mazidi, J.G.Mazidi and R.D.McKinlay, second Ed., 2007 pearson Education India

3) Introduction to embedded systems K.V. Shibu, 1st edition, 2009 McGraw Hill

4) Micro Controllers in practice, I Susnea and Mitescu,2005,springer

Cluster Elective Paper-VIII-A-1: Practical: Introduction to Microprocessors and Microcontrollers 2hrs/Week

Minimum of 6 experiments to be done and recorded

1. To find that the given numbers is prime or not.
2. To find the factorial of a number.
3. Write a program to make the two numbers equal by increasing the smallest number and decreasing the largest number.
4. Use one of the four ports of 8051 for O/P interfaced to eight LED's. Simulate binary counter (8 bit) on LED's.
5. Program to glow first four LED then next four using TIMER application.
6. Program to rotate the contents of the accumulator first right and then left.
7. Program to run a countdown from 9-0 in the seven segment LED display.
8. To interface seven segment LED display with 8051 microcontroller and display 'HELP' in the seven segment LED display.
9. To toggle '1234' as '1324' in the seven segment LED.
10. Interface stepper motor with 8051 and write a program to move the motor through a given angle in clock wise or counter clockwise direction.
11. Application of embedded systems: Temperature measurement, some information on LCD display, interfacing a keyboard.

Semester –VI

Cluster Elective Paper –VIII-A-2 : Computational Methods and Programming

No. of Hours per week: 04 **Total Lectures:60**

UNIT-I (12hrs)

1. Fundamentals of C language: C character set-Identifiers and Keywords-Constants -Variables-Data types-Declarations of variables-Declaration of storage class-Defining symbolic constants-Assignment statement.
2. Operators: Arithmetic operators-Relational operators-Logic operators-Assignment operators-Increment and decrement operators-Conditional operators.

UNIT-II (12hrs)

3. Expressions and I/O Statements: Arithmetic expressions-Precedence of arithmetic operators-Type converters in expressions-Mathematical (Library) functions - Data input and output-The getchar and putchar functions-Scanf-Printf simple programs.
4. Control statements:If -Else statements -Switch statements - The operators - GO TO - While, Do - While, FOR statements - BREAK and CONTINUE statements.

UNIT-III (12hrs)

5. Arrays: One dimensional and two dimensional arrays - Initialization - Type declaration - Inputting and outputting of data for arrays - Programs of matrices addition, subtraction and multiplication
6. User defined functions: The form of C functions - Return values and their types - Calling a function - Category of functions. Nesting of functions.Recursion.ANSI C functions- Function declaration. Scope and life time of variables in functions.

UNIT-IV (12hrs)

7. Linear and Non - Linear equations: Solution of Algebra and transcendental equations-Bisection, Falsi position and Newton-Rhapson methods-Basic principles-Formulae-algorithms
8. Simultaneous equations: Solutions of simultaneous linear equations-Guass elimination and Gauss Seidel iterative methods-Basic principles-Formulae – Algorithms.

UNIT-V (12hrs)
9. Interpolations: Concept of linear interpolation-Finite differences-Newton's and Lagrange's interpolation formulae-principles and Algorithms
10. Numerical differentiation and integration: Numerical differentiation-algorithm for evaluation of first order derivatives using formulae based on Taylor's series-Numerical integration-Trapezoidal and Simpson's 1/3 rule- Formulae-Algorithms.

Reference books:
1. Introductory methods of Numerical Analysis: Sastry
2. Numerical Methods: Balaguruswamy
3. Programming in ANSI C (TMH) : Balaguruswamy
4. Programming with 'C'- Byron Gottafried, Tata Mc Graw Hill

Cluster Elective Paper-VIII-A-2: Practical: Computational Methods and Programming 2hrs/Week

Minimum of 6 experiments to be done and recorded
10. Write a program that reads an alphabet from keyboard and display in the reverse order.
11. Write a program to read and display multiplication of tables.
12. Write a program for converting centigrade to Fahrenheit temperature and Fahrenheit temperature centigrade.
13. Write a program to find the largest element in an array.
14. Write a program based on percentage calculation, the grade by entering the subject marks. (If percentage > 60 I class, if percentage between 50&60 II class, if percentage between 35&50 III class, if percentage below 35 fail).
15. Write a program for generation of even and odd numbers up to 100 using while, do-while and for loop.
16. Write a program to solve the quadratic equation using Bisection method.
17. Write a program for integration of function using Trapezoidal rule.
18. Write a program for solving the differential equation using Simpson's $1/3^{rd}$ rule.

Semester –VI
Cluster Elective Paper –VIII-A-3 :Electronic Instrumentation
No. of Hours per week: 04 **Total Lectures:60**

Unit – I (12Hours)

1. Basic of measurements:Instruments accuracy , precision , sensitivity , resolution range, errors in measurement, Multimeter , principles of measurement of dc voltage and dc currents, ac current and resistance, specifications of multimeter and their significance.

Unit -11 (10 Hours)

2. Electronic Voltmeter:Advantage over conventional multimeter for voltage measurement with respect to input impedence and sensitivity, principles of voltage measurement (block diagram only), specification of an electronic voltmeter/multimeter and their significance.

Unit– III (14 Hours)

3. CRO :Block diagram of basic CRO, construction of CRT, electron gun, electrostatic focusing and acceleration(only explanation) , time base operation, synchronization, front panel controls, specifications of CRO and their significance.

Applications CRO: Measurement of voltage ,dc and ac frequency , time period, special features of dual trace, digital storage oscilloscope, block diagram and principle of working.

Unit – IV (12 Hours)

4. Digital Multimeter:Block diagram,working, frequency and period measurement using universal counter, frequency counter ,accuracy and resolution.

5. Digital instruments:Principle and working of digitalinstruments, characteristics of a digital meter, working principle of digital voltmeter.

Unit – V (12 Hours)

6. Signal generators:Block diagram explanation, specifications of low frequency signal generators, pulse generator, function generator-working, Brief idea for testing, specifications. Distortion factor meter, wave analysis.

7. Bridges:Block diagram, working of basic LCR bridge – specifications – block diagram and working.

Reference Books

4. A text book in electrical technology by B.L.Thereja (S.Chand&Co)
5. Digital circuits and systems by Venugopal 2011 (Tata Mcgraw Hill)
6. Digital Electronics by SubrathaGhoshal 2012 (Cengage Learning)

Cluster Elective Paper-VIII-A-3: Practical: Electronic Instrumentation
2hrs/Week

Minimum of 6 experiments to be done and recorded

1. Study the loading effect of a multimeter by measuring voltage across alow and high resistance.
2. Study the limitations of a multimeter for measuring high frequency voltageand currents.
3. Measurement of voltage, frequency, time period and phase angle using CRO.
4. Measurement of time period and frequency using universal counter/frequency counter.
5. Measurement of rise, fall and delay times using a CRO.
6. Measurement of distortion of a RF signal generator using distortion factor meter.
7. Measurement of R, L and C using a LCR bridge/ universal bridge.

Elective VII-(B): (Materials Science)

Semester –VI
Elective Paper – VII-(B): Materials Science

No. of Hours per week: 04 **Total Lectures:60**

UNIT-I (12 hrs)
1.Materials and Crystal Bonding: Materials, Classification, Crystalline, Amorphous, Glasses; Metals, Alloys, Semiconductors, Polymers, Ceramics, Plastics, Bio-materials, Composites, Bulk and nanomaterials. Review of atomic structure – Interatomic forces – Different types of chemical bonds – Ioniccovalent bond or homopolar bond – Metallic bond – Dispersion bond – Dipole bond – Hydrogenbond – Binding energy of a crystal.

UNIT-II (12 hrs)
2. Defects and Diffusion in Materials: Introduction – Types of defects - Point defects- Line defects- Surface defects- Volume defects- Production and removal ofdefects- Deformation- irradiation- quenching- annealing- recovery - recrystallization andgrain growth. Diffusion in solids- Fick's laws of diffusion.

UNIT-III(12 hrs)
3. Mechanical Behavior of Materials: Different mechanical properties of engineering materials – Creep – Fracture – Technologicalproperties – Factors affecting mechanical properties of a material – Heat treatment - Cold andhot working – Types of mechanical tests – Metal forming process – Powder – Misaligning – Deformation of metals.

UNIT-IV (12 hrs)
4. Magnetic Materials:Dia-, Para-, Ferri- and Ferromagnetic materials, Classical Langevin theory of dia magnetism, Quantum mechanical treatment of paramagnetism. Curie's law, Weiss's theory of ferromagnetism, Ferromagnetic domains.Discussion of B-H Curve.Hysteresis and energy Loss.

UNIT-V (12 hrs)
5. Dielectric Materials:Dielectric constant, dielectric strength and dielectric loss, polarizability, mechanism of polarization,factors affecting polarization, polarization curve and hysteresis loop, types of dielectric materials, applications; ferroelectric, piezoelectric and pyroelectric materials, Clausius -Mosotti equation.

Reference books
1. Materials Science by M.Arumugam, Anuradha Publishers. 1990, Kumbakonam.
2.Materials Science and Engineering V.Raghavan, Printice Hall India Ed. V 2004. New Delhi.
3. Elementary Solid State Physics, 1/e M. Ali Omar, 1999, Pearson India
4. Solid State Physics, M.A. Wahab, 2011, Narosa Publications

Elective Paper-VII-B: Practical: Materials Science
2hrs/Week

Minimum of 6 experiments to be done and recorded
1. Measurement of susceptibility of paramagnetic solution (Quinck`s Tube Method)
2. Measurement of magnetic susceptibility of solids.
3. Determination of coupling coefficient of a piezoelectric crystal.
4. Measurement of the dielectric constant of a dielectric Materials
5. Study the complex dielectric constant and plasma frequency of metal using surface plasmon resonance (SPR)
7. Study the hysteresis loop of a Ferroelectric Crystal.
8. Study the B-H curve of 'Fe' using solenoid and determine energy loss from hysteresis.

Semester –VI
Cluster Electives VIII-B
Cluster Elective Paper –VIII-B-1 :Fundamentals of Nanoscience

No. of Hours per week: 04 **Total Lectures:60**

UNIT-I (12hrs)
1. Background and history: Emergence of Nanoscience with special reference to Feynman and Drexler; Role of particle size; Spatial and temporal scale; Concept of confinement, strong and weak confinement with suitable example; Development of quantum structures, Basic concept of quantum well, quantum wire and quantum dot.
Finite size Zero, One and Two Dimensional Nanostructures, Concept of Surface and Interfacial Energies. Physics of the solid state – size dependence of properties, crystal structures, Lattice vibrations, Energy bands:- Insulators Semiconductors and conductors.

UNIT-II (12hrs)
2. Classification of Nanomaterials: Inorganic nanomaterials: carbon nanotubes and cones, Organic nanomaterials: dendrimers, micelles, liposomes, block copolymers; Bionanomaterials: Biomimtric, bioceramic and nanotherapeutics; Nanomaterials for molecular electronics and optoelectronics.

UNITS-III (12hrs)
3. Macromolecules: Classification of polymers, chemistry of polymerization, chain polymerization, step polymerization, coordination polymerization. Molecular weight of polymers-number average and weight average molecular weight, degree of polymerization, determination of molecular weight of polymers by viscometry, Osmometry and light scattering methods.Kinetics of free radical polymerization, derivation of rate law.Preparation and application of polyethylene, PVC, Teflon.

UNIT-IV (12hrs)

4. Molecular & Nanoelectronics: Semiconductors, Transition from crystal technology to nanotechnology. Tiny motors, Gyroscopes and accelerometers. Nano particle embedded wrinkle resistant cloth, Transparent Zinc Oxide sun screens.Bio-systems, Nanoscale processes in environment. Nanoscale structures, Novel phenomena and Quantum control and quantum computing. Single electron transistors, Quantum dots, Quantum wires.

UNIT-V (12hrs)

5. Biomaterials: Implant materials: Stainless steels and its alloys, Ti and Ti based alloys, Ceramic implant materials; Hydroxyapatite glass ceramics, Carbon Implant materials, Polymeric Implant materials, Soft tissue replacement implants, Sutures, Surgical tapes and adhesives, heart valve implants, Artificial organs, Hard Tissue replacement Implants, Internal Fracture Fixation Devices, Wires, Pins, and Screws, Fracture Plates.

Reference Books

1. T. Pradeep: Textbook of Nanoscience and Nanotechnology Chapter (McGraw-Hill Professional, 2012), Access Engineering.
2. C. N. R. Rao, A. Mu¨ller, A. K. Cheetham, "The Chemistry of Nanomaterials :Synthesis, Properties and Applications", Wiley-VCH, 2006.
3. C. Breachignac P. Houdy M. Lahmani, "Nanomaterials and Nanochemistry", Springer, 2006.
4. Guozhong Cao, "Nanostructures and Nanomaterials: Synthesis, Properties, and Applications", World Scientific Publishing Private, Ltd., 2011.
5. Zhong Lin Wang, "Characterization of Nanophase Materials", Wiley-VCH, 2004.
6. Carl C. Koch, "Nanostructured Materials: Processing, Properties and Potential Applications", William Andrew Publishing Norwich, 2006.

Elective Paper- VIII-B-1: Practical: Fundamentals of Nanoscience
2hrs/Week

Minimum of 6 experiments to be done and recorded

1. Determination of the Band Gap of Semiconductor Nanoparticles.
2. Surface Enhanced Raman Scattering Activity of Silver Nanoparticles
3. Conversion of Gold Nanorods into Gold Nanoparticles
4. Bimetallic Nanoparticles
5. Processing and Development of Nanoparticle gas sensor
6. Magnetic separation/identification studies of nanoparticles
7. Harvesting light using nano-solar cells
8. Nano-Forensic analysis to identify, individualize and evaluate evidence using nanophase materials
9. Comparison of the performance of nanoparticles based conductive adhesives and conventional non conductive adhesives.
10. Electrodeposition and corrosion behavior of nanostructured composite film
11. Photocatalytic activity of nanomaterials

Semester –VI

Cluster Elective Paper –VIII-B-2 :Synthesis and Characterization of Nanomaterials

No. of Hours per week: 04 **Total Lectures:60**

Unit-I (12 hrs)

1. Nanomaterials synthesis: Synthesis and nanofabrication, Bottom-Up and Top-Down approach with examples. Chemical precipitation methods, sol-gel method, chemical reduction, hydrothermal, process. Physical Mehtods- ball milling, Physical Vapour deposition (PVD), Sputtering, ChemicalVapor deposition (CVD), pray pyrolysis, Biological methods- Synthesis using micro organisms and bacteria, Synthesis using plant extract, use of proteins and DNA templates.

Unit-II (12 hrs)

2. Classification of materials: Types of materials, Metals, Ceramics (Sand glasses) polymers, composites, semiconductors.Metals and alloys- Phase diagrams of single component, binary and ternary systems, diffusion, nucleation and growth. Diffusional and diffusionless transformations.Mechanical properties.Metallic glasses. Preparation, structure and properties like electrical, magnetic, thermal and mechanical, applications.

UNITS-III (12 hrs)

3. Glasses: The glass transition - theories for the glass transition, Factors that determine the glass-transition temperature. Glass forming systems and ease of glass formation, preparation of glass materials.Applications of Glasses: Introduction: Electronic applications, Electrochemical applications, optical applications, Magnetic applications.

UNITS-IV (12 hrs)

4. Liquid Crystals: Mesomorphism of anisotropic systems, Different liquid crystalline phase and phase transitions, Thermal and electrical properties of liquid crystals, Types Liquid Crystals displays, few applications of liquid crystals.

UNITS-V (12 hrs)

5. Characterization Methods: XRD, SEM, TEM, AFM, XPS and PL characterization techniques for nano materials.Electrical and mechanical properties, Optical properties by IR and Raman Spectroscopy.

References books

1. Encyclopedia of Nanotechnology by M.Balakrishna Rao and K.Krishna Reddy, Vol.I to X, Campus books.
2. Nano: The Essentials-Understanding Nanoscinece & Nanotechnology by T.Pradeep; Tata Mc. Graw Hill

3. Nanotechnology in Microelectronics & Optoelectronics, J.M Martine Duart, R.J Martin Palma, F. Agullo Rueda, Elsevier
4. Nanoelectronic Circuit Design, N.K Jha, D Chen, Springer
5. Handbook of Nanophysics- Nanoelectronics & Nanophotonics, K.D Sattler, CRC Press
6. Organic Electronics-Sensors & Biotechnology- R. Shinar & J. Shinar, McGraw-Hill

Cluster Elective Paper-VIII-B-2: Practical: Synthesis and Characterization of Nanomaterials
2hrs/Week

Minimum of 6 experiments to be done and recorded
1. Synthesis of nanocrystalline films of II-VI compounds doped with rare earths by chemical process.
2. Synthesis of Alkaline earth aluminates in nanocrystalline form by combustion synthesis.
3. Preparation of surface conducting glass plate by spray pyrolysis method
4. Preparation of surface conducting glass plate by chemical route
5. Fabrication of micro fluidic nanofilter by polymerisation reaction
6. Absorption studies on the nanocrystalline films and determination of absorption coefficient.
7. Determination of band gap from the absorption spectra using Tauc's plots.
8. Study of Hall effect in semiconductors and its application in nanotechnology.
9. Measurement of electrical conductivity of semiconductor film by Four Probe method and study of temperature variation of electrical conductivity.

Semester –VI
Cluster Elective Paper –VIII-B-3 :Applications of Nanomaterials and Devices

No. of Hours per week: 04 **Total Lectures:60**

UNIT-I (12 hrs)
1. Optical properties: Coulomb interaction in nanostructures. Concept of dielectric constant for nanostructures and charging of nanostructure.Quasi-particles and excitons. Excitons in direct and indirect band gap semiconductor nanocrystals. Quantitative treatment of quasi-particles and excitons, charging effects. Radiative processes: General formalization-absorption, emission and luminescence. Optical properties of heterostrctures and nanostructures.

UNIT-II (12 hrs)
2. Electrical transport:
Carrier transport in nanostrcutures.Hall effect, etermination of carrier mobility and carrier concentration; Coulomb blockade effect, thermionic emission, tunneling and hoping conductivity. Defects and impurities: Deep level and surface defects.

UNIT-III (12 hrs)

3. Applications: Applications of nanoparticles, quantum dots, nanowires and thin films for photonic devices (LED, solar cells). Single electron transfer devices (no derivation). CNT based transistors. Nanomaterial Devices: Quantum dots heterostructures lasers, optical switching and optical data storage. Magnetic quantum well; magnetic dots - magnetic data storage.Micro Electromechanical Systems (MEMS), Nano Electromechanical Systems (NEMS).

UNIT-IV(12 hrs)

4. Nanoelectronics: Introduction, Electronic structure of Nanocrystals,Tuning the Band gap of Nanoscale semiconductors, Excitons, Quantumdot, Single electron devices, Nanostructured ferromagnetism,Effect of bulk nanostructuring of magnetic properties, Dynamics of nanomagnets, Nanocarbon ferromagnets, Giant and colossal magneto-resistance, Introduction of spintronics, Spintronics devices and applications.

UNIT-V (12 hrs)

5. Nanobiotechnology and Medical application: Introduction, Biological building blocks- size of building blocks and nanostructures, Peptide nanowires and protein nanoparticles, DNA double nanowires, Nanomaterials in drug delivery and therapy, Nanomedicine, Targeted gold nanoparticles for imaging and therapy.

Reference books:

1.C.P. Poole, Jr. Frank J. Owens, Introduction to Nanotechnology (Wiley India Pvt. Ltd.).
2.S.K. Kulkarni, Nanotechnology: Principles & Practices (Capital Publishing Company).
3. K.K. Chattopadhyay and A.N. Banerjee, Introduction to Nanoscience & Technology (PHI Learning Private Limited).
4. Richard Booker, Earl Boysen, Nanotechnology (John Wiley and Sons).

Elective Paper- VIII-B-3: Practical: Applications of Nanomaterials and Devices
2hrs/Week

Minimum of 6 experiments to be done and recorded

1. Synthesis of metal nanoparticles by chemical route.
2. Synthesis of semiconductor nanoparticles.
3. Surface Plasmon study of metal nanoparticles by UV-Visible spectrophotometer.
4. XRD pattern of nanomaterials and estimation of particle size.
5. To study the effect of size on color of nanomaterials.
6. Prepare a disc of ceramic of a compound using ball milling, pressing and sintering, and study its XRD.
7. Fabricate a thin film of nanoparticles by spin coating (or chemical route) and study transmittance spectra in UV-Visible region.
8. Fabricate a pn-diode by diffusing Al over the surface of n-type Si and study its I-V characteristics.

Elective VII-(C) :(Renewable Energy)

Semester –VI
Elective Paper –VII-(C) :Renewable Energy

No. of Hours per week: 04 **Total Lectures:60**

UNIT-I (12 hrs)

1. Introduction to Energy: Definition and units of energy, power, Forms of energy, Conservation of energy, second law of thermodynamics, Energy flow diagram to the earth. Origin and time scale of fossil fuels, Conventional energy sources, Role of energy in economic development and social transformation.

2. Environmental Effects: Environmental degradation due to energy production and utilization, air and water pollution, depletion of ozone layer, global warming, biological damage due to environmental degradation. Effect of pollution due to thermal power station, nuclear power generation, hydroelectric power stations on ecology and environment.

UNIT-II (12 hrs)

3. Global Energy Scenario: Energy consumption in various sectors, projected energy consumption for the next century, exponential increase in energy consumption, energy resources, coal, oil, natural gas, nuclear and hydroelectric power, impact of exponential rise in energy usage on global economy.

4. Indian Energy Scene: Energy resources available in India, urban and rural energy consumption, energy consumption pattern and its variation as a function of time, nuclear energy - promise and future, energy as a factor limiting growth, need for use of new and renewable energy sources.

UNIT-III (12 hrs)

5.Solar energy: Solar energy, Spectral distribution of radiation, Flat plate collector, solar water heating system, Applications, Solar cooker. Solar cell, Types of solar cells, Solar module and array, Components of PV system, Applications of solar PV systems.

6. Wind Energy: Introduction, Principle of wind energy conversion, Components of wind turbines, Operation and characteristics of a wind turbine, Advantages and disadvantages of wind mills, Applications of wind energy.

UNIT-IV (12 hrs)

7. Ocean Energy: Introduction, Principle of ocean thermal energy conversion, Tidal power generation, Tidal energy technologies, Energy from waves, Wave energy conversion, Wave energy technologies, advantages and disadvantages.

8. Hydrogen Energy: History of hydrogen energy - Hydrogen production methods - Electrolysis of water, Hydrogen storage options – Compressed and liquefied gas tanks, Metal hydrides; Hydrogen safety - Problems of hydrogen transport and distribution - Uses of hydrogen as fuel.

UNIT-V (12 hrs)

9. Bio-Energy

Energy from biomass – Sources of biomass – Different species – Conversion of biomass into fuels – Energy through fermentation – Pyrolysis, gasification and combustion – Aerobic and anaerobic

bio-conversion – Properties of biomass – Biogas plants – Types of plants – Design and operation – Properties and characteristics of biogas.

References:

1. Solar Energy Principles, Thermal Collection &Storage, S.P.Sukhatme: Tata McGraw Hill Pub., New Delhi.
2. Non-Conventional Energy Sources, G.D.Rai, New Delhi.
3. Renewable Energy, power for a sustainable future, Godfrey Boyle, 2004,
4. The Generation of electricity by wind, E.W. Golding.
5. Hydrogen and Fuel Cells: A comprehensive guide, Rebecca Busby, Pennwell corporation (2005)
6. Hydrogen and Fuel Cells: Emerging Technologies and Applications, B.Sorensen, Academic Press (2012).
7. Non-Conventional Energy Resources by B.H. Khan, Tata McGraw Hill Pub., 2009.
8. Fundamentals of Renewable Energy Resources byG.N.Tiwari, M.K.Ghosal, Narosa Pub., 2007.

Elective Paper-VII-C: Practical: Renewable Energy
2hrs/Week

Minimum of 6 experiments to be done and recorded
1. Preparation of copper oxide selective surface by chemical conversion method.
2. Performance testing of solar cooker.
3. Determination of solar constant using pyrheliometer.
4. Measurement of I-V characteristics of solar cell.
5. Study the effect of input light intensity on the performance of solar cell.
6. Study the characteristics of wind.

Semester –VI
Cluster Electives VIII-C
Cluster Elective Paper –VIII-C-1 :Solar Thermal and Photovoltaic Aspects

No. of Hours per week: 04 **Total Lectures:60**

UNIT-I (12 hrs)

1. Basics of Solar Radiation: Structure of Sun, Spectral distribution of extra terrestrial radiation, Solar constant, Concept of Zenith angle and air mass, Definition of declination, hour angle, solar and surface azimuth angles; Direct, diffuse and total solar radiation, Solar intensity measurement – Thermoelectric pyranometer and pyrheliometer.

2. Radiative Properties and Characteristics of Materials: Reflection, absorption and transmission of solar radiation throughsingle and multi covers; Kirchoff's law – Relation between absorptance, emittance and reflectance; Selective Surfaces - preparation and characterization, Types and applications; Anti-reflective coating.

UNIT-II (14 hrs)

3. Flat Plate Collectors (FPC) : Description of flat plate collector, Liquid heating type FPC, Energy balance equation,Efficiency, Temperature distribution in FPC, Definitions of fin efficiency and collector efficiency, Evacuated tubular collectors.
4. Concentrating Collectors: Classification, design and performance parameters; Definitions of aperture, rim-angle, concentration ratio and acceptance angle; Tracking systems; Parabolic trough concentrators; Concentrators with point focus.

Unit-III (14 hrs)
5. Solar photovoltaic (PV) cell: Physics of solar cell –Type of interfaces, homo, hetero andschottky interfaces, Photovoltaic Effect, Equivalent circuit of solar cell, Solar cell output parameters, Series and shunt resistances and its effect on cell efficiency; Variation of efficiency with band-gap and temperature.
6. Solar cell fabrication: Production of single crystal Silicon: Czokralski (CZ) and Float Zone (FZ) methods, Silicon wafer fabrication, Wafer to cell formation, Thin film solar cells, Advantages, CdTe/CdS cell formation, Multi-junction solar cell; Basic concept of Dye-sensitized solar cell, Quantum dot solar cell.

UNIT-IV (8 hrs)
Solar PV systems: Solar cell module assembly – Steps involved in the fabrication of solar module, Module performance, I-V characteristics, Modules in series and parallel, Module protection – use of Bypass and Blocking diodes, Solar PV system and its components, PV array, inverter, battery and load.

UNIT-V (12 hrs)
Solar thermal applications: Solar hot water system (SHWS), Types of SHWS, Standard method of testing the efficiency of SHWS; Passive space heating and cooling concepts, Solar desalinator and drier, Solar thermal power generation.
Solar PV applications: SPV systems; Stand alone, hybrid and grid connected systems, System installation, operation and maintenances; Field experience; PV market analysis and economics of SPV systems.

Reference Books:
1. Solar Energy Utilization, G. D. Rai, Khanna Publishers
2. Solar Energy- Fundamentals, design, modeling and applications, G.N. Tiwari, Narosa Pub., 2005.
3. Solar Energy-Principles of thermal energy collection & storage, S.P. Sukhatme, Tata Mc-Graw Hill Publishers, 1999.
4. Solar Photovoltaics- Fundamentals, technologies and applications, Chetan Singh Solanki, PHI Learning Pvt. Ltd.,
5. Science and Technology of Photovoltaics, P. Jayarama Reddy, BS Publications, 2004.

Cluster Elective Paper- VIII-C-1: Practical: Solar Thermal and Photovoltaic Aspects
2hrs/Week
Minimum of 6 experiments to be done and recorded
1. Measurement of direct solar radiation using pyrheliometer.
2. Measurement of global and diffuse solar radiation using pyranometer.

3. Measurement of emissivity, reflectivity and transsivity.
4. Measurement of efficiency of solar flat plate collector.
5. Performance testing of solar air dryer unit.
6. Effect of tilt angle on the efficiency of solar photovoltaic panel.
7. Study on solar photovoltaic panel in series and parallel combination.

Semester - VI
Cluster Elective Paper –VIII-C-2 :Wind, Hydro and Ocean Energies

No. of Hours per week: 04 **Total Lectures:60**

UNIT-I

1. Introduction: Wind generation, meteorology of wind, world distribution of wind, wind speed variation with height, wind speed statistics, Wind energy conversion principles; General introduction; Types and classification of WECS; Power, torque and speed characteristics.

2. Wind Measurements:Eolian features, biological indicators, rotational anemometers, other anemometers, wind measurements withballoons.

UNIT-II

3. Wind Energy Conversion System:Aerodynamic design principles; Aerodynamic theories; Axial momentum, blade element andcombine theory; Rotor characteristics; Maximum power coefficient; Prandlt's tip losscorrection.

4. Design of Wind Turbine: Wind turbine design considerations; Methodology; Theoretical simulation of wind turbinecharacteristics; Test methods.

UNIT-III

5. Wind Energy Application: Wind pumps: Performance analysis, design concept and testing; Principle of wind energy generation; Standalone, grid connected and hybrid applications of wind energy conversion systems, Economics of wind energyutilization; Wind energy in India; Environmental Impacts of Wind farms.

UNIT-IV

6. Small Hydropower Systems: Overview of micro, mini and small hydro systems; Hydrology; Elements of pumps andturbine; Selection and design criteria of pumps and turbines; Site selection;Speed and voltage regulation; Investment issues load management and tariff collection; potential of small hydro power in India.Wind and hydro based stand-alone hybrid power systems.

UNIT-V

7.Ocean Thermal, Tidal and Wave Energy Systems:Ocean Thermal - Introduction, Technology process, Working principle, Resource and site requirements, Location of OCET system, Electricity generation methods from OCET,Advantages and disadvantages, Applications of OTEC,

8. Tidal Energy - Introduction, Origin and nature of tidal energy, Merits and limitations, Tidal energy technology,Tidal range power, Basic modes of operation of tidal systems.Wave Energy – Introduction, Basics of wave motion, Power in waves, Wave energy conversion devices, Advantages anddisadvantages, Applications of wave energy.

Reference Books:

1. Dan Charis, Mick Sagrillo, LanWoofenden, "Power from the Wind", New Society Pub., 2009.
2. Erich Hau, "Wind Turbines-Fundaments, Technologies, Applications, Economics", 2ndEdition, Springer Verlag, BerlinHeidelberg, NY, 2006.
3. Joshue Earnest, Tore Wizelius, Wind Power and Project Developmen", PHI Pub., 2011.
4. T. Burton, D. Sharpe, N. Jenkins, E. Bossanyi, Wind Energy Handbook, John Wiley Pub., 2001.
5. Paul Gipe, "Wind Energy Basics", Chelsea Green Publications, 1999.
6. Khan, B.H., "Non-Conventional Energy Resources", TMH, 2nd Edition, New Delhi, 2009.
7. Tiwari, G.N., and Ghosal, M.K, Renewable Energy Resources – Basic Principles and applications, Narosa Publishing House,2007.

Cluster Elective Paper- VIII-C-2: Practical: Wind, Hydro and Ocean Energies
2hrs/Week

Minimum of 6 experiments to be done and recorded

1. Estimation of wind speed using anemometer.
2. Determination of characteristics of a wind generator
3. Study the effect of number and size of blades of a wind turbine on electric power output.
4. Performance evaluation of vertical and horizontal axes wind turbine rotors.
5. Study the effect of density of water on the output power of hydroelectric generator.
6. Study the effect of wave amplitude and frequency on the wave energy generated.

Semester - VI
Cluster Elective Paper –VIII-C-3 :Energy Storage Devices

No. of Hours per week: 04 **Total Lectures:60**

UNIT-I (12 hr)

1. Energy Storage: Need of energy storage; Different modes of energy storage, Flywheel storage, Electrical and magnetic energy storage: Capacitors,electromagnets; Chemical Energy storage: Thermo-chemical, photo-chemical, bio-chemical,electro-chemical, fossil fuels and synthetic fuels. Hydrogen for energy storage.

UNIT-II (12 hrs)

2. Electrochemical Energy Storage Systems: Batteries: Primary, Secondary, Lithium, Solid-state and molten solvent batteries; Leadacid batteries; Nickel Cadmium Batteries; Advanced Batteries. Role of carbon nano-tubes inelectrodes.

UNIT-III (12 hrs)

3. Magnetic and Electric Energy Storage Systems: Superconducting Magnet Energy Storage(SMES) systems; Capacitor and battery:Comparison and application; Super capacitor:

Electrochemical Double Layer Capacitor(EDLC), principle of working, structure, performance and application.

UNIT-IV (12 hrs)

4. Fuel Cell: Fuel cell definition, difference between batteries and fuel cells, fuel cell components, principle and working of fuel cell, performance characteristics,efficiency, fuel cell stack, fuel cell power plant: fuel processor, fuel cell powersection, power conditioner, Advantages and disadvantages.

UNIT-V (12 hrs)

5. Types of Fuel Cells: Alkaline fuel cell, polymer electrolyte fuel cell, phosphoric acid fuel cell,molten carbonate fuel cell; solid oxide fuel cell,proton exchange membrane fuel cell, problems with fuel cells, applications of fuel cells.

REFERENCE BOOKS

1. J. Jensen and B. Squrensen, Fundamentals of Energy Storage, John Wiley, NY, 1984.
2. M. Barak, Electrochemical Power Sources: Primary and Secondary Batteries by, P. Peregrinus,IEE,1980.
3.P.D.Dunn, Renewable Energies, Peter Peregrinus Ltd, London, 1986.
4. B.Viswanathan and M. A. Scibioh, Fuel Cells-Principles and Applications, University Press, 2006.
5. Hart, A.B and G.J.Womack, Fuel Cells: Theory and Application, Prentice Hall, NewYork, 1989.

Cluster Elective Paper –VIII-C-3: Practical: Energy Storage Devices
2hrs/Week

Minimum of 6 experiments to be done and recorded

1. Study of charge and discharge characteristics of storage battery.
2. Study of charging and discharging behavior of a capacitor.
3. Determination of efficiency of DC-AC inverter and DC-DC converters
4. Study of charging characteristics of a Ni-Cd battery using solar photovoltaic panel.
5. Performance estimation of a fuel cell.
6. Study of effect of temperature on the performance of fuel cell.

Andhra Pradesh State Council of Higher Education

B.Sc. Chemistry Syllabus under CBCS

w.e.f. 2015-16 (revised in April 2016)

Structure of Chemistry Syllabus Under CBCS

YEAR	SEMESTER	PAPER	TITLE	MARKS	CREDITS
I	I	I	Inorganic and Organic Chemistry	100	03
			Practical – I	50	02
	II	II	Physical and General Chemistry	100	03
			Practical – II	50	02
II	III	III	Inorganic and organic Chemistry	100	03
			Practical – III	50	02
	IV	IV	Spectroscopy and Physical Chemistry	100	03
			Practical – IV	50	02
III	V	V	Inorganic ,Organic and Physical Chemistry	100	03
			Practical – V	50	02
		VI	Inorganic ,Organic and Physical Chemistry	100	03
			Practical – VI	50	02
	* Any one Paper from VII A, B and C ** Any one cluster from VIII, A, B and C VI	VII (A)*	Elective	100	03
			Practical - VII A	50	02
		VII (B)*	Elective	100	03
			Practical - VII B	50	02
		VII (C)*	Elective	100	03
			Practical - VII C	50	02
		VIII (A)**	**Cluster Electives - I :** VIII-A-1 VIII-A-2 VIII-A-3	100 100 100 50 50 50	03 03 03 02 02 02
		VIII (B)**	**Cluster Electives - II ::** VIII-B-1 VIII- B-2 VIII-B-3	100 100 100 50 50 50	03 03 03 02 02 02
		VIII (C)**	**Cluster Electives - III ::** VIII-C-1 VIII-C-2 VIII-C-3	100 100 100 50 50 50	03 03 03 02 02 02

SEMESTER – I

Paper I - Inorganic & Organic Chemistry 60hrs (4h/w)

INORGANIC CHEMISTRY **30 hrs (2h / w)**

UNIT –I

p-block elements –I **15h**

Group-13: Synthesis and structure of diborane and higher boranes (B_4H_{10} and B_5H_9**),** boron-nitrogen compounds ($B_3N_3H_6$ and BN)

Group - 14: Preparation and applications of silanes and silicones.

Group - 15: Preparation and reactions of hydrazine, hydroxylamine.

UNIT-II

1. **p-block elements -II** **8h**

Group - 16: Classifications of oxides based on (i) Chemical behaviour and (ii) Oxygen content.

Group-17: Inter halogen compounds and pseudo halogens.

2. Organometallic Chemistry **7h**

Definition - classification of Organometallic compounds - nomenclature, preparation, properties and applications of alkyls of Li and Mg.

ORGANIC CHEMISTRY **30hrs (2h /w)**

UNIT-III

Structural theory in Organic Chemistry **10 h**

Types of bond fission and organic reagents (Electrophilic, Nucleophilic, and free radical reagents including neutral molecules like H_2O,NH_3& $AlCl_3$).

Bond polarization : Factors influencing the polarization of covalent bonds, electro negativity - inductive effect. Application of inductive effect (a) Basicity of amines (b) Acidity of carboxylic acids (c) Stability of carbonium ions. Resonance or Mesomeric effect, application to (a) acidity of phenol, and (b) acidity of carboxylic acids. Hyper conjugation and its application to stability of carbonium ions, Free radicals and alkenes, carbanions, carbenes and nitrenes.

Types of Organic reactions : Addition - electrophilic, nucleophilic and free radical. Substitution - electrophilic, nucleophilic and free radical. Elimination- Examples.

UNIT-IV

l. **Acyclic Hydrocarbons** **6 h**

Alkenes - Preparation of alkenes. Properties: Addition of hydrogen - heat of hydrogenation and stability of alkenes. Addition of halogen and its mechanism. Addition of HX, Markonikov's rule, addition of H_2O, HOX, H_2SO_4 with mechanism and addition of HBr in the presence of peroxide (anti - Markonikov's addition). Dienes - Types of dienes, reactions of conjugated dienes - 1,2 and 1,4 addition of HBr to 1,3 - butadiene and Diel's - Alder reaction.

Alkynes - Preparation by dehydrohalogenation of dihalides, dehalogenation of tetrahalides, Properties; Acidity of acetylenic hydrogen (formation of Metal acetylides). Preparation of higher acetylenes, Metal ammonia reductions, Physical properties. Chemical reactivity - electrophilic addition of X_2, HX, H_2O (Tautomerism), Oxidation with $KMnO_4$, OsO_4, reduction and Polymerisation reaction of acetylene.

2. **Alicyclic hydrocarbons (Cycloalkanes)** **4 h**

Nomenclature, Preparation by Freunds method, Wislicenus method. Properties - reactivity of cyclopropane and cyclobutane by comparing with alkanes, Stability of cycloalkanes - Baeyer's strain theory, Sachse and Mohr predictions and Pitzer's strain theory. Conformational structures of cyclobutane, cyclopentane, cyclohexane.

UNIT-V

Benzene and its reactivity **10h**

Concept of resonance, resonance energy. Heat of hydrogenation, heat of combustion of Benzene, mention of C-C bond lengths and orbital picture of Benzene. Concept of aromaticity - aromaticity (definition), Huckel's rule - application to Benzenoid (Benzene, Naphthalene) and Non - Benzenoid compounds (cyclopropenyl cation, cyclopentadienyl anion and tropylium cation)

Reactions - General mechanism of electrophilic substitution, mechanism of nitration, Friedel Craft's alkylation and acylation. Orientation of aromatic substitution - Definition of ortho, para and meta directing groups. Ring activating and deactivating groups with examples (Electronic interpretation of various groups like NO_2 and Phenolic). Orientation of (i) Amino, methoxy and methyl groups (ii) Carboxy, nitro, nitrile, carbonyl and sulphonic acid groups (iii) Halogens

(Explanation by taking minimum of one example from each type)

List of Reference Books

1. Inorganic Chemistry by J.E.Huheey
2. Basic Inorganic Chemistry by Cotton and Wilkinson
3.A textbook of qualitative inorganic analysis by A.I. Vogel
4. Organic Chemistry by Morrisson and Boyd
5. A Text Book of Organic chemistry by I L Finar Vol I
6. Concise Inorganic Chemistry by J.D.Lee

LABORATORY COURSE-I **30** hrs (2 h / w)

Practical-I Simple Salt Analysis

(At the end of Semester-I)

Qualitative inorganic analysis

Analysis of simple salt containing one anion and cation from the following

Anions: Carbonate, sulphate, chloride, bromide, acetate, nitrate, borate, phosphate.

cations: Lead, copper, iron, aluminum, zinc, manganese, nickel, calcium, strontium, barium, potassium and ammonium.

SEMESTER - II

Paper II (Physical & General Chemistry) 60 hrs. (4h/w)

PHYSICAL CHEMISTRY 30 hrs (2h / w)

UNIT-I

Solidstate l0h

Symmetry in crystals. Law of constancy of interfacial angles. The law of rationality of indices. The law of symmetry. Definition of lattice point, space lattice, unit cell. Bravis lattices and crystal systems. X-ray diffraction and crystal structure. Bragg's law. Defects in crystals. Stoichiometric and non-stoichiometric defects.

UNIT-II

1.Gaseous state 6 h

Compression factors, deviation of real gases from ideal behavior. Vander Waal's equation of state. P-V Isotherms of real gases, Andrew's isotherms of carbon dioxide, continuity of state. Critical phenomena. The vander Waal's equation and the critical state. Law of corresponding states.Relationship between critical constants and vander Waal's constants. Joule Thomson effect.

2.Liquid state 4 h

Structural differences between solids, liquids and gases. Liquid crystals, the mesomorphic state. Classification of liquid crystals into Smectic and Nematic. Differences between liquid crystal and solid/liquid. Application of liquid crystals as LCD devices.

UNIT-III

Solutions l0h

Liquid-liquid - ideal solutions, Raoult's law. Ideally dilute solutions, Henry's law. Non-ideal solutions. Vapour pressure - composition and vapour pressure- temperature curves. Azeotropes-HCl-H_2O, ethanol-water systems and fractional distillation. Partially miscible liquids-phenol-water, trimethylamine-water, nicotine-water systems. Effect of impurity on consulate temperature. Immiscible liquids and steam distillation.

Nernst distribution law. Calculation of the partition coefficient. Applications of distribution law.

GENERAL CHEMISTRY 30 hrs (2h / w)

UNIT-IV

l.Surface chemistry 8 h

Definition of colloids. Solids in liquids(sols), preparation, purification, properties - kinetic, optical, electrical. Stability of colloids, Hardy-Schulze law, protective colloid.

Liquids in liquids (emulsions) preparation, properties, uses. Liquids in solids (gels) preparation, uses.

Adsorption: Physical adsorption, chemisorption. Freundlisch, Langmuir adsorption isotherms. Applications of adsorption

2.Chemical Bonding **7h**

Valence bond theory, hybridization, VB theory as applied to ClF_3, $Ni(CO)_4$, Molecular orbital theory - LCAO method, construction of M.O. diagrams for homo-nuclear and hetero-nuclear diatomic molecules (N_2, O_2, CO and NO).

UNIT-V

Stereochemistry of carbon compounds **15 h**

Molecular representations- Wedge, Fischer, Newman and Saw-Horse formulae.

Optical isomerism: Optical activity- wave nature of light, plane polarised light, optical rotation and specific rotation.

Chiral molecules- definition and criteria(Symmetry elements)- Definition of enantiomers and diastereomers – Explanation of optical isomerism with examples Glyceraldehyde, Lactic acid, Alanine, Tartaric acid, 2,3-dibromopentane.

D,L and R,S configuration methods and E,Z- configuration with examples.

List of Reference Books

1. Principles of physical chemistry by Prutton and Marron
2. Solid State Chemistry and its applications by Anthony R. West
3. Text book of physical chemistry by K L Kapoor
4. Text book of physical chemistry by S Glasstone
5. Stereochemistry of Organic compounds by E L Eliel
6. Advanced Organic Chemistry by F A Carey and R J Sundberg
7. Stereochemistry by P.S.Kalsi
8. Stereochemistry of Organic compounds by D. Nasipuri
9. Advanced physical chemistry by Bahl and Tuli
10. Advanced Inorganic Chemistry Vol-I by Satyaprakash, Tuli, Basu and Madan

LABORATORY COURSE -II **30** hrs (2 h / w)

Practical-II Analysis of Mixture Salt

(At the end of Semester-II)

Qualitative inorganic analysis

Analysis of mixture salt containing two anions and two cations (From two different groups) from the following:

Anions: Carbonate, sulphate, chloride, bromide, acetate, nitrate, borate, phosphate.

Cations: Lead, copper, iron, aluminum, zinc, manganese, calcium, strontium, barium, potassium and ammonium.

SEMESTER - III
Paper III (INORGANIC & ORGANIC CHEMISTRY) 60 hrs (4 h / w)

INORGANIC CHEMISTRY 30 hrs (2h / w)

UNIT –I

1. Chemistry of d-block elements: 9h

Characteristics of d-block elements with special reference to electronic configuration, variable valence, magnetic properties, catalytic properties and ability to form complexes. Stability of various oxidation states

2. Theories of bonding in metals:

6h

Metallic properties and its limitations, Valence bond theory, Free electron theory, Explanation of thermal and electrical conductivity of metals, limitations, Band theory, formation of bands, explanation of conductors, semiconductors and insulators.

UNIT – II

3.Metal carbonyls : 7h

EAN rule, classification of metal carbonyls, structures and shapes of metal carbonyls of V, Cr, Mn, Fe, Co and Ni.

4. Chemistry of f-block elements: 8h

Chemistry of lanthanides - electronic structure, oxidation states, lanthanide contraction, consequences of lanthanide contraction, magnetic properties. Chemistry of actinides - electronic configuration, oxidation states, actinide contraction, comparison of lanthanides and actinides.

ORGANIC CHEMISTRY 30 h (2h/w)

UNIT – III

1. Halogen compounds 5 h

Nomenclature and classification of alkyl (into primary, secondary, tertiary), aryl, aryl alkyl, allyl, vinyl, benzyl halides.

Nucleophilic aliphatic substitution reaction- classification intoSN^1 andSN^2 – reaction mechanism with examples – Ethyl chloride, t-butyl chloride and optically active alkyl halide 2-bromobutane.

2. Hydroxy compounds 5 h

Nomenclature and classification of hydroxy compounds.
Alcohols: Preparation with hydroboration reaction, Grignard synthesis of alcohols. Phenols: Preparation i) from diazonium salt, ii) from aryl sulphonates, iii) from cumene. Physical properties- Hydrogen bonding (intermolecular and intramolecular). Effect of hydrogen bonding on boiling point and solubility in water.
Identification of alcohols by oxidation with $KMnO_4$, Ceric ammonium nitrate, Luca's reagent and phenols by reaction with $FeCl_3$.
Chemical properties:

a) Dehydration of alcohols.
b) Oxidation of alcohols by CrO_3, $KMnO_4$.
c) Special reaction of phenols: Bromination, Kolbe-Schmidt reaction, Riemer-Tiemann reaction, Fries rearrangement, azocoupling, Pinacol-Pinacolone rearrangement.

UNIT-IV

Carbonyl compounds 10 h

Nomenclature of aliphatic and aromatic carbonyl compounds, structure of the carbonyl group. Synthesis of aldehydes from acid chlorides, synthesis of aldehydes and ketones using 1,3-dithianes, synthesis of ketones from nitriles and from carboxylic acids. Physical properties: Reactivity of carbonyl group in aldehydes and ketones.
Nucleophilic addition reaction with a) $NaHSO_3$, b) HCN, c) RMgX, d) NH_2OH, e)$PhNHNH_2$, f) 2,4 DNPH, g) Alcohols-formation of hemiacetal and acetal. Base catalysed reactions: a) Aldol, b) Cannizzaro's reaction, c) Perkin reaction, d) Benzoin condensation, e) Haloform reaction, f) Knoevenagel reaction. Oxidation of aldehydes-Baeyer-Villiger oxidation of ketones.Reduction: Clemmensen reduction, Wolf-Kishner reduction, MPV reduction, reduction with $LiAlH_4$ and $NaBH_4$. Analysis of aldehydes and ketones with a) 2,4-DNPH test, b) Tollen's test, c) Fehling test, d) Schiff's test e) Haloform test (with equation)

UNIT-V

1. Carboxylic acids and derivatives 6 h

Nomenclature, classification and structure of carboxylic acids. Methods of preparation by a) Hydrolysis of nitriles, amides b) Hydrolysis of esters by acids and bases with mechanism c) Carbonation of Grignard reagents. Special methods of preparation of aromatic acids by a) Oxidation of side chain. b) Hydrolysis by benzotrichlorides. c) Kolbe reaction. **Physical properties**: Hydrogen bonding, dimeric association, acidity-strength of acids with examples of trimethyl acetic acid and trichloroacetic acid. Relative differences in the acidities of aromatic and aliphatic acids. **Chemical properties**: Reactions involving H, OH and COOH groups- salt formation, anhydride formation, acid chloride formation, amide formation and esterification (mechanism). Degradation of carboxylic acids by Huns-Diecker reaction, decarboxylation by Schimdt reaction, Arndt-Eistert synthesis, halogenation by Hell- Volhard- Zelinsky reaction.

2. Active methylene compounds **4 h**

Acetoacetic ester: keto-enol tautomerism, preparation by Claisen condensation, Acid hydrolysis and ketonic hydrolysis. Preparation of a) monocarboxylic acids. b) Dicarboxylic acids. c) Reaction with urea

Malonic ester: preparation from acetic acid. **Synthetic applications**: Preparation of a) monocarboxylic acids (propionic acid and n-butyric acid). b) Dicarboxylic acids (succinic acid and adipic acid) c) α,β-unsaturated carboxylic acids (crotonic acid).
d) Reaction with urea.

List of Reference Books

1. Selected topics in inorganic chemistry by W.D.Malik, G..D.Tuli,R.D.Madan
2. Inorganic Chemistry J E Huheey, E A Keiter and R L Keiter
3. A Text Book of Organic Chemistry by Bahl and Arun bahl
4. A Text Book of Organic chemistry by I L Finar Vol I
5. Organic chemistry by Bruice
6. Organic chemistry by Clayden
7. Advanced Inorganic chemistry by Gurudeep Raj
8. Basic Inorganic Chemistry by Cotton and Wilkinson
9. Concise Inorganic Chemistry by J.D.Lee

LABORATORY COURSE -III **30 hrs. (2 h / w)**

Practical Paper-III Titrimetric analysis and **Organic Functional Group Reactions**
(At the end of Semester-III)

Titrimetric analysis: **25M**

1. Determination of Fe (II) using $KMnO_4$ with oxalic acid as primary standard.
2. Determination of Cu(II) using $Na_2S_2O_3$ with $K_2Cr_2O_7$ as primary standard.

Organic Functional Group Reactions **25M**

3. Reactions of the following functional groups present in organic compounds (at least four) Alcohols, Phenols, Aldehydes, Ketones, Carboxylic acids and Amides

SEMESTER IV

Paper IV (SPECTROSCOPY & PHYSICAL CHEMISTRY)

60 hrs (4 h / w)

SPECTROSCOPY 30 hrs (2h / w)

UNIT-I 6h

General features of absorption - Beer-Lambert's law and its limitations, transmittance, Absorbance, and molar absorptivity. Single and double beam spectrophotometers. Application of Beer-Lambert law for quantitative analysis of 1. Chromium in $K_2Cr_2O_7$
2. Manganese in Manganous sulphate

Electronic spectroscopy: 8h

Interaction of electromagnetic radiation with molecules and types of molecular spectra. Energy levels of molecular orbitals (σ, π, n). Selection rules for electronic spectra. Types of electronic transitions in molecules effect of conjugation. Concept of chromophore and auxochrome.

UNIT-II

Infra red spectroscopy 8h

Different Regions in Infrared radiations. Modes of vibrations in diatomic and polyatomic molecules. Characteristic absorption bands of various functional groups. Interpretation of spectra-Alkanes, Aromatic, Alcohols carbonyls, and amines with one example to each.

Proton magnetic resonance spectroscopy (^{1}H-NMR) 8h

Principles of nuclear magnetic resonance, equivalent and non-equivalent protons, position of signals. Chemical shift, NMR splitting of signals - spin-spin coupling, coupling constants. Applications of NMR with suitable examples - ethyl bromide, ethanol, acetaldehyde, 1,1,2-tribromo ethane, ethyl acetate, toluene and acetophenone.

PHYSICAL CHEMISTRY 30 hrs (2h / w)

UNIT-III

Dilute solutions 10h

Colligative properties. Raoult's law, relative lowering of vapour pressure, its relation to molecular weight of non-volatile solute. Elevation of boiling point and depression of freezing point. Derivation of relation between molecular weight and elevation in boiling point and depression in freezing point. Experimental methods of determination. Osmosis, osmotic pressure, experimental determination. Theory of dilute solutions. Determination of molecular weight of non-volatile solute from osmotic pressure. Abnormal Colligative properties- Van't Hoff factor.

UNIT-IV

Electrochemistry-I **10h**

Specific conductance, equivalent conductance. Variation of equivalent conductance with dilution. Migration of ions, Kohlrausch's law. Arrhenius theory of electrolyte dissociation and its limitations. Ostwald's dilution law. Debye-Huckel-Onsagar's equation for strong electrolytes (elementary treatment only). Definition of transport number, determination by Hittorfs method. Application of conductivity measurements- conductometric titrations.

UNIT-V

1. Electrochemistry-II **4h**

Single electrode potential, sign convention, Reversible and irreversible cells Nernst Equation- Reference electrode, Standard Hydrogen electrode, calomel electrode, Indicator electrode, metal – metal ion electrode, Inert electrode, Determination of EMF of cell, Applications of EMF measurements - Potentiometric titrations.

2.Phase rule **6h**

Concept of phase, components, degrees of freedom. Thermodynamic Derivation of Gibbs phase rule. Phase equilibrium of one component system - water system. Phase equilibrium of two- component system, solid-liquid equilibrium. Simple eutectic diagram of Pb-Ag system, simple eutectic diagram, desilverisation of lead., NaCl-Water system, Freezing mixtures.

List of Reference Books

1. Spectroscopy by William Kemp

2. Spectroscopy by Pavia

3. Organic Spectroscopy by J. R. Dyer

4. Modern Electrochemistry by J.O. M. Bockris and A.K.N.Reddy

5. Advanced Physical Chemistry by Atkins

6.Introduction to Electrochemistry by S. Glasstone

7.Elementary organic spectroscopy by Y.R. Sharma

8. Spectroscopy by P.S.Kalsi

LABORATORY COURSE – IV

Practical Paper - IV Physical Chemisry and IR Spectral Analysis

(at the end of semester IV)

30 hrs (2 h / W)

Physical Chemistry **25M**

1.Critical Solution Temperature- Phenol-Water system

2. Effect of NaCl on critical solution temperature (Phenol-Water system)

3.Determination of concentration of HCl conductometrically using standard NaOH solution.

4.Determination of concentration of acetic acid conductometrically using standard NaOH Solution.

IR Spectral Analysis **25 M**

5. IR Spectral Analysis of the following functional groups with examples

a) Hydroxyl groups

b) Carbonyl groups

c) Amino groups

d) Aromatic groups

SEMESTER-V

Paper - V (INORGANIC, PHYSICAL & ORGANIC CHEMISTRY)
45 hrs (3 h / w)

INORGANIC CHEMISTRY

UNIT – I

Coordination Chemistry: 8h

IUPAC nomenclature - bonding theories - Review of Werner's theory and Sidgwick's concept of coordination - Valence bond theory - geometries of coordination numbers 4-tetrahedral and square planar and 6-octahedral and its limitations, crystal filed theory - splitting of d-orbitals in octahedral, tetrahedral and square-planar complexes - low spin and high spin complexes - factors affecting crystal-field splitting energy, merits and demerits of crystal-field theory. Isomerism in coordination compounds - structural isomerism and stereo isomerism, stereochemistry of complexes with 4 and 6 coordination numbers.

UNIT-II

1. Spectral and magnetic properties of metal complexes: 4h

Types of magnetic behavior, spin-only formula, calculation of magnetic moments, experimental determination of magnetic susceptibility-Gouymethod.

2. Stability of metal complexes: 3h

Thermodynamic stability and kinetic stability, factors affecting the stability of metal complexes, chelate effect, determination of composition of complex by Job's method and mole ratio method.

ORGANIC CHEMISTRY

UNIT- III

Nitro hydrocarbons: **3h**

Nomenclature and classification-nitro hydrocarbons, structure -Tautomerism of nitroalkanes leading to aci and keto form, Preparation of Nitroalkanes, reactivity - halogenation, reaction with HONO (Nitrous acid),Nef reaction and Mannich reaction leading to Micheal addition and reduction.

UNIT – IV

Nitrogen compounds: 12h

Amines (Aliphatic and Aromatic): Nomenclature, Classification into 1°, 2°, 3° Amines and Quarternary ammonium compounds. Preparative methods –

1. Ammonolysis of alkyl halides 2. Gabriel synthesis 3. Hoffman's bromamide reaction (mechanism).

Reduction of Amides and Schmidt reaction. Physical properties and basic character - Comparative basic strength of Ammonia, methyl amine, dimethyl amine, trimethyl amine and aniline - comparative basic strength of aniline, N-methylaniline and N,N-dimethyl aniline (in aqueous and non-aqueous medium), steric effects and substituent effects.

Chemical properties: a) Alkylation b) Acylation c) Carbylamine reaction d) Hinsberg separation e) Reaction with Nitrous acid of 1°, 2°, 3° (Aliphatic and aromatic amines). Electrophillic substitution of Aromatic amines – Bromination and Nitration. Oxidation of aryl and Tertiary amines, Diazotization.

PHYSICAL CHEMISTRY

UNIT- V

Thermodynamics **15h**

The first law of thermodynamics-statement, definition of internal energy and enthalpy. Heat capacities and their relationship. Joule-Thomson effect- coefficient. Calculation of w, for the expansion of perfect gas under isothermal and adiabatic conditions for reversible processes. State function. Temperature dependence of enthalpy of formation-Kirchoff s equation. Second law of thermodynamics. Different Statements of the law. Carnot cycle and its efficiency. Carnot theorem. Concept of entropy, entropy as a state function, entropy changes in reversible and irreversible processes. Entropy changes in spontaneous and equilibrium processes.

List of Reference Books

1. Concise coordination chemistry by Gopalan and Ramalingam
2. Coordination Chemistry by Basalo and Johnson
3. Organic Chemistry by G.Mare loudan, Purdue Univ
4. Advanced Physical Chemistry by
5.Text book of physical chemistry by S Glasstone
6.Concise Inorganic Chemistry by J.D.Lee
7. Advanced Inorganic Chemistry Vol-I by Satyaprakash, Tuli, Basu and Madan
8. A Text Book of Organic Chemistry by Bahl and Arun bahl
9.A Text Book of Organic chemistry by I L Finar Vol I
10.Advanced physical chemistry by Gurudeep Raj

SEMESTER-V

Paper - VI (INORGANIC, ORGANIC & PHYSICAL CHEMISTRY)

45 hrs (3 h / w)

INORGANIC CHEMISTRY

UNIT-I

1. Reactivity of metal complexes: 4h

Labile and inert complexes, ligand substitution reactions - SN^1 and SN^2,substitution reactions of square planar complexes - Trans effect and applications of trans effect.

2.Bioinorganic chemistry: 4h

Essential elements, biological significance of Na, K, Mg, Ca, Fe, Co, Ni, Cu, Zn and Cl^-. Metalloporphyrins – Structure and functions of hemoglobin, Myoglobin and Chlorophyll.

PHYSICAL CHEMISTRY

UNIT-II

1. Chemical kinetics 8h

Rate of reaction - Definition of order and molecularity. Derivation of rate constants for first, second, third and zero order reactions and examples. Derivation for time half change. Methods to determine the order of reactions. Effect of temperature on rate of reaction, Arrhenius equation, concept of activation energy.

2. Photochemistry 5h

Difference between thermal and photochemical processes. Laws of photochemistry- Grothus-Draper's law and Stark-Einstein's law of photochemical equivalence. Quantum yield-Photochemical reaction mechanism- hydrogen- chlorine, hydrogen- bromine reaction. Qualitative description of fluorescence, phosphorescence, Photosensitized reactions- energy transfer processes (simple example)

ORGANIC CHEMISTRY

UNIT- III

Heterocyclic Compounds 7h

Introduction and definition: Simple five membered ring compounds with one hetero atom Ex. Furan. Thiophene and pyrrole - Aromatic character – Preparation from 1,4,-dicarbonyl compounds, Paul-Knorr synthesis.

Properties : Acidic character of pyrrole - electrophillic substitution at 2 or 5 position, Halogenation, Nitration and Sulphonation under mild conditions - Diels Alder reaction in furan.

Pyridine – Structure - Basicity - Aromaticity - Comparison with pyrrole - one method of preparation and properties - Reactivity towards Nucleophilic substitution reaction.

UNIT-IV

Carbohydrates **8h**

Monosaccharides: (+) Glucose (aldo hexose) - Evidence for cyclic structure of glucose (some negative aldehydes tests and mutarotation) - Proof for the ring size (methylation, hydrolysis and oxidation reactions) - Pyranose structure (Haworth formula and chair conformational formula).

(-) Fructose (ketohexose) - Evidence of 2 - ketohexose structure (formation of pentaacetate, formation of cyanohydrin its hydrolysis and reduction by HI). Cyclic structure for fructose (Furanose structure and Haworth formula) - osazone formation from glucose and fructose – Definition of anomers with examples.

Interconversion of Monosaccharides: Aldopentose to Aldohexose (Arabinose to D- Glucose, D-Mannose) (Kiliani - Fischer method). Epimers, Epimerisation - Lobry de bruyn van Ekenstein rearrangement. Aldohexose to Aldopentose (D-Glucose to D- Arabinose) by Ruff degradation. Aldohexose to Ketohexose [(+) Glucose to (-) Fructose] and Ketohexose to Aldohexose (Fructose to Glucose)

UNIT- V

Amino acids and proteins **7h**

Introduction: Definition of Amino acids, classification of Amino acids into alpha, beta, and gamma amino acids. Natural and essential amino acids - definition and examples, classification of alpha amino acids into acidic, basic and neutral amino acids with examples. Methods of synthesis: General methods of synthesis of alpha amino acids (specific examples - Glycine, Alanine, valine and leucine) by following methods: a) from halogenated carboxylic acid b) Malonic ester synthesis c) strecker's synthesis.

Physical properties: Zwitter ion structure - salt like character - solubility, melting points, amphoteric character, definition of isoelectric point.

Chemical properties: General reactions due to amino and carboxyl groups - lactams from gamma and delta amino acids by heating peptide bond (amide linkage). Structure and nomenclature of peptides and proteins.

List of Reference Books

1. Concise coordination chemistry by Gopalan and Ramalingam
2. Coordination Chemistry by Basalo and Johnson
3. Organic Chemistry by G.Mare loudan, Purdue Univ
4. Advanced Physical Chemistry by Atkins
5. Text book of physical chemistry by S Glasstone
7. Instrumentation and Techniques by Chatwal and Anand
8. Essentials of nano chemistry by pradeep
9. A Textbook of Physical Chemistry by Puri and Sharma
10. Advanced physical chemistry by Gurudeep Raj

LABORATORY COURSE – V
Practical Paper – V Organic Chemistry
(at the end of semester V) 30 hrs (2 h / W)

Organic Qualitative Analysis: 50M

Analysis of an organic compound through systematic qualitative procedure for functional group identification including the determination of melting point and boiling point with suitable derivatives.

Alcohols, Phenols, Aldehydes, Ketones, Carboxylic acids, Aromatic Primary Amines, Amides and Simple sugars.

LABORATORY COURSE – VI
Practical Paper – VI Physical Chemistry
(at the end of semester V) 30 hrs (2 h/W)

1. Determination of rate constant for acid catalyzed ester hydrolysis.

2. Determination of molecular status and partition coefficient of benzoicacid in Benzene and water.

3. Determination of Surface tension of liquid

4. Determination of Viscosity of liquid.

5. Adsorption of acetic acid on animal charcoal, verification of Freundlisch isotherm.

SEMESTER-VI - Electives

ELECTIVE Paper – VII-(A) : ANALYTICAL METHODS IN CHEMISTRY **45hrs (3h / w)**

UNIT-I

Quantitative analysis: **10h**

a) Importance in various fields of science, steps involved in chemical analysis**.** Principles of volumetric analysis :. Theories of acid-base, redox, complexometric, iodometric and precipitation titrations - choice of indicators for these titrations.

b) Principles of gravimetric analysis: precipitation, coagulation, peptization, coprecipitation, post precipitation, digestion, filtration and washing of precipitate, drying and ignition.

UNIT-II

Treatment of analytical data: **7h**

Types of errors, significant figures and its importance, accuracy - methods of expressing accuracy, error analysis and minimization of errors, precision - methods of expressing precision, standard deviation and confidence limit.

UNIT-III

SEPARATION TECHNIQUES IN CHEMICAL ANALYSIS: **8h**

SOLVENT EXTRACTION : Introduction,principle,techniques,factors affecting solvent extraction, Batch extraction, continuous extraction and counter current extraction. Synergism., Application - Determination of Iron (III)

ION EXCHANGE :Introduction,action of ion exchange resins,separation of inorganic mixtuers,applications, Solvent extraction: Principle and process,

UNIT – IV **10h**

Chromatography: Classification of chromatography methods, principles of differential migration adsorption phenomenon, Nature of adsorbents, solvent systems, R_f values, factors effecting R_f values.

Paper Chromatography: Principles, R_f values, experimental procedures, choice of paper and solvent systems, developments of chromatogram - ascending, descending and radial. Two dimensional chromatography, applications.

UNIT -V **10h**

Thin layer Chromatography (TLC): Advantages. Principles, factors effecting R_f values. Experimental procedures. Adsorbents and solvents. Preparation of plates. Development of the chromatogram. Detection of the spots. Applications.

Column Chromatography: Principles, experimental procedures, Stationary and mobile Phases, Separation technique. Applications

HPLC : Basic principles and applications.

List of Reference Books

1. Analytical Chemistry by Skoog and Miller
2. A textbook of qualitative inorganic analysis by A.I. Vogel
3. Nanochemistry by Geoffrey Ozin and Andre Arsenault
4. Stereochemistry by D. Nasipuri
5. Organic Chemistry by Clayden

LABORATORY COURSE – VI

Practical Paper – VII-(A) (at the end of semester VI) 30hrs (2 h / W)

50M

1. Identification of aminoacids by paper chromatography.
2. Determination of Zn using EDTA
3. Determination of Mg using EDTA

SEMESTER-VI

ELECTIVE PAPER – VII-(B) : ENVIRONMENTAL CHEMISTRY

45 hrs (3 h / w)

UNIT-I

Introduction **9h**

Concept of Environmental chemistry-Scope and importance of environment in now adays – Nomenclature of environmental chemistry – Segments of environment - Natural resources – Renewable Resources – Solar and biomass energy and Nonrenewable resources – Thermal power and atomic energy – Reactions of atmospheric oxygen and Hydological cycle.

UNIT-II

Air Pollution **9h**

Definition – Sources of air pollution – Classification of air pollution – Acid rain – Photochemical smog – Green house effect – Formation and depletion of ozone – Bhopal gas disaster – Controlling methods of air pollution.

UNIT-III

Water pollution **9h**

Unique physical and chemical properties of water – water quality and criteria for finding of water quality – Dissolved oxygen – BOD, COD, Suspended solids, total dissolved solids, alkalinity – Hardness of water – Methods to convert temporary hard water into soft water – Methods to convert permanent hard water into soft water – eutrophication and its effects – principal wastage treatment – Industrial waste water treatment.

UNIT-IV

Chemical Toxicology **9h**

Toxic chemicals in the environment – effects of toxic chemicals – cyanide and its toxic effects – pesticides and its biochemical effects – toxicity of lead, mercury, arsenic and cadmium.

UNIT-V

Ecosystem and biodiversity

9h

Ecosystem

Concepts – structure – Functions and types of ecosystem – Abiotic and biotic components – Energy flow and Energy dynamics of ecosystem – Food chains – Food web – Tropic levels – Biogeochemical cycles (carbon, nitrogen and phosporus)

Biodiversity

Definition – level and types of biodiversity – concept - significance – magnitude and distribution of biodiversity – trends - biogeographical classification of india – biodiversity at national, global and regional level.

List of Reference books

1. Fundamentals of ecology by M.C.Dash

2. A Text book of Environmental chemistry by W. Moore and F.A. Moore

3. Environmental Chemistry by Samir k. Banerji

LABORATORY COURSE – VI

Practical Paper – Elective VII B (at the end of semester VI) 30 hrs (2 h / W)

1.Determination of carbonate and bicarbonate in water samples (acidity and alkalinity)

2. Determination of hardness of water using EDTA

   a) Permanent hardness

   b) Temporary hardness

3. Determination of Acidity

4. Determination of Alkalinity

5. Determination of chlorides in water samples

SEMESTER-VI

ELECTIVE PAPER – VII-(C) GREEN CHEMISTRY

45 hrs (3 h / w)

UNIT-I **10h**

Green Chemistry: Introduction- Definition of green Chemistry, need of green chemistry, basic principles of green chemistry. Green synthesis- Evalution of the type of the reaction i) Rearrangements (100% atom economic), ii) Addition reaction (100% atom economic). Organic reactions by Sonication method: apparatus required examples of sonochemical reactions (Heck, Hundsdiecker and Wittig reactions).

UNIT-II **10h**

Selection of solvent:i) Aqueous phase reactions ii) Reactions in ionic liquids, Heckreaction, Suzuki reactions, epoxidation. iii) Solid supported synthesis

Super critical CO_2: Preparation, properties and applications, (decaffeination, dry cleaning)

UNIT-III **10h**

Microwave and Ultrasound assisted green synthesis: Apparatus required, examples of MAOS (synthesis of fused anthro quinones, Leukart reductive amination of ketones) - Advantages and disadvantages of MAOS. Aldol condensation-Cannizzaro reaction-Diels-Alder reactions-Strecker's synthesis

UNIT-IV **5h**

Green catalysis: Heterogeneous catalysis, use of zeolites, silica, alumina, supported catalysis- biocatalysis: Enzymes, microbes Phase transfer catalysis (micellar/surfactant)

UNIT V **10h**

Examples of green synthesis / reactions and some real world cases: 1. Green synthesis of the following compounds: adipic acid , catechol , disodium imino di acetate (alternative Strecker's synthesis) 2. Microwave assisted reaction in water – Hoffmann elimination – methyl benzoate to benzoic acid – oxidation of toluene and alcohols – microwave assisted reactions in organic solvents. Diels-Alder reactions and decarboxylation reaction. 3. Ultrasound assisted reactions – sonochemical Simmons –Smith reaction(ultrasonic alternative to iodine)

Reference books:

1. Green Chemistry Theory and Practice. P.T.Anatas and J.C. Warner
2. Green Chemistry V.K. Ahluwalia Narosa, New Delhi.
3. Real world cases in Green Chemistry M.C. Cann and M.E. Connelly
4. Green Chemistry: Introductory Text M.Lancaster: Royal Society of Chemistry (London)
5. Green Chemistry: Introductory Text, M.Lancaster
6. Principles and practice of heterogeneous catalysis, Thomas J.M.,Thomas M.J., John Wiley
7. Green Chemistry: Environmental friendly alternatives R S Sanghli and M.M Srivastava, Narosa Publications

LABORATORY COURSE – VII

Practical Paper – Elective VII C (at the end of semester VI) 30 hrs (2 h/W)

1**.** Determination of specific reaction rate of hydrolysis for methyl acetate catalysed by hydrogen ion at room temperature**.**

2.Determination of molecular status and partition coefficient of benzoicacidin Benzene and water.

3. Surface tension and viscosity of liquids.

4**.** Adsorption of acetic acid on animal charcoal, verification of Freundlisch isotherm.

CLUSTER ELECTIVES: Cluster Elective – I
Analytical and Physical
SEMESTER-VI
PAPER – VIII-A-1: POLYMER CHEMISTRY

45 hrs (3 h / w)

UNIT-I **12h**

Introduction of polymers:

Basic definitions, degree of polymerization ,classification of polymers- Natural and Synthetic polymers, Organic and Inorganic polymers, Thermoplastic and Thermosetting polymers, Plastics, Elastomers , Fibers and Resins, Linear ,Branched and Cross Linked polymers, Addition polymers and Condensation Polymers, mechanism of polymerization. Free radical, ionic and Zeigler – Natta polymerization.

UNIT-II **10h**

Techniques of Polymerization : Bulk polymerization , solution polymerization , suspension and Emulsion polymerization.

Molecular weights of polymers: Number average and weight average molecular weights Determination of molecular weight of polymers by Viscometry , Osmometry and light scattering methods.

UNIT-III **6h**

Kinetics of Free radical polymerization, Glass Transition temperature(Tg) and Determination of Tg:

Free volume theory, WLF equation, factors affecting glass transition temperature (Tg).

UNIT-IV **9h**

Polymer additives:

Introduction to plastic additives – fillers, Plasticizers and Softeners , Lubricants and Flow Promoters, Anti aging additives , Flame Retardants , Colourants , Blowing agents , Cross linking agents ,Photo stabilizers , Nucleating agents.

UNIT-V **8h**

Polymers and their applications:

Preparation and industrial applications of Polyethylene, Polyvinyl chloride, Teflon, Polyacrylonitrile, Terelene , Nylon6.6 silicones.

Reference Books:

1. Seymour, R.B. & Carraher, C.E. *Polymer Chemistry: An Introduction*, Marcel Dekker, Inc. New York, 1981.
2. Odian, G. *Principles of Polymerization*, 4th Ed. Wiley, 2004.
3. Billmeyer, F.W. *Textbook of Polymer Science*, 2nd Ed. Wiley Interscience, 1971.
4. Ghosh, P. *Polymer Science & Technology*, Tata McGraw-Hill Education, 1991.34
5. Lenz, R.W. *Organic Chemistry of Synthetic High Polymers.* Interscience Publishers, NewYork, 1967.

SEMESTER-VI

PAPER – VIII-A-2: INSTRUMENTAL METHODS OF ANALYSIS

45 hrs (3 h / w)

UNIT – I

Introduction to spectroscopic methods of analysis: 4 h

Recap of the spectroscopic methods covered in detail in the core chemistry syllabus: Treatment of analytical data, including error analysis. Classification of analytical methods and the types of instrumental methods. Consideration of electromagnetic radiation.

UNIT – II

Molecular spectroscopy: 8h

Infrared spectroscopy:

Interactions with molecules: absorption and scattering. Means of excitation (light sources), separation of spectrum (wavelength dispersion, time resolution), detection of the signal (heat, differential detection), interpretation of spectrum (qualitative, mixtures, resolution), advantages of Fourier Transform (FTIR). Samples and results expected. Applications: Issues of quality assurance and quality control, Special problems for portable instrumentation and rapid detection.

UNIT – III 10h

UV-Visible/ Near IR – emission, absorption, fluorescence and photoaccoustic. Excitation sources (lasers, time resolution), wavelength dispersion (gratings, prisms, interference filters,laser, placement of sample relative to dispersion, resolution), Detection of signal (photocells, photomultipliers, diode arrays, sensitivity and S/N), Single and Double Beam instruments, Interpretation (quantification, mixtures, absorption vs. fluorescence and the use of time, photoaccoustic, fluorescent tags).

UNIT – IV

Separation techniques

Chromatography: Gas chromatography, liquid chromatography, supercritical fluids, Importance of column technology (packing, capillaries), Separation based on increasing number of factors (volatility, solubility, interactions with stationary phase, size, electrical field), Detection: simple vs. specific (gas and liquid), Detection as a means of further analysis (use of tags and coupling to IR and MS), Electrophoresis (plates and capillary) and use with DNA analysis. 46 *Immunoassays and DNA techniques* **8h**

Mass spectroscopy*:* Making the gaseous molecule into an ion (electron impact, chemical ionization), Making liquids and solids into ions (electrospray, electrical discharge, laser desorption, fast atom bombardment), Separation of ions on basis of mass to charge ratio, Magnetic, Time of flight, Electric quadrupole. Resolution, time and multiple separations, Detection and interpretation (how this is linked to excitation). **8h**

UNIT – V

Elemental analysis: 10h

Mass spectrometry (electrical discharges).

Atomic spectroscopy: Atomic absorption, Atomic emission, and Atomic fluorescence. Excitation and getting sample into gas phase (flames, electrical discharges, plasmas), Wavelength separation and resolution (dependence on technique), Detection of radiation (simultaneous/scanning, signal noise), Interpretation (errors due to molecular and ionic species, matrix effects, other interferences).

NMR spectroscopy: **P**rinciple, Instrumentation, Factors affecting chemical shift, Spin coupling, Applications. **4h**

Electroanalytical Methods: Potentiometry & Voltammetry **4h**

Radiochemical Methods 4h

X-ray analysis and electron spectroscopy (surface analysis)

Reference books:

1. Skoog, D.A. Holler F.J. & Nieman, T.A. *Principles of Instrumental Analysis*, Cengage Learning India Ed.
2. Willard, H.H., Merritt, L.L., Dean, J. & Settoe, F.A. *Instrumental Methods of Analysis*, 7th Ed. Wadsworth Publishing Company Ltd., Belmont, California, USA, 1988.
3. P.W. Atkins: Physical Chemistry.
4. G.W. Castellan: Physical Chemistry.
5. C.N. Banwell: Fundamentals of Molecular Spectroscopy.
6. Brian Smith: Infrared Spectral Interpretations: A Systematic Approach.
7. W.J. Moore: Physical Chemistry

SEMESTER-VI

PAPER – VIII-A-3 : ANALYSIS OF DRUGS, FOODS , DAIRY PRODUCTS & BIO-CHEMICAL ANALYSIS

45 hrs (3 h / w)

UNIT- I

Analysis of the following drugs and pharmaceuticals preparations:
(Knowledge of molecular formula, structure and analysis)
Analysis of anlgesics and antipyretics like aspirin and paracetamol
Analysis of antimalerials like choloroquine .
Analysis of drugs in the treatment of infections and infestations :Amoxycillin., chloramphenicol, metronidazole, penicillin, tetracycline, cephalexin(cefalexin).
Anti tuberculous drug- isoniazid.

UNIT - II

Analysis of the following drugs and pharmaceuticals preparations:
(Knowledge of molecular formula, structure and analysis)
Analysis of antihistamine drugs and sedatives like: allegra, zyrtec(citirizine), alprazolam, trazodone, lorazepem, ambien(zolpidem), diazepam,

UNIT - III

Analysis of anti epileptic and anti convulsant drugs like phenobarbital and phenacemide.
Analysis of drugs used in case of cardiovascular drugs:atenolol, norvasc(amlodipine),
Analysis of lipitor(atorvastatin) a drug for the preventin of productin of cholesterol.
Analysis of diuretics like: furosemide (Lasix), triamterene
Analysis of prevacid(lansoprazole) a drug used for the prevention of production of acids in stomach.

UNIT - IV

Analysis of Milk and milk products: Acidity, total solids, fat, total nitrogen, protenines,lactose, phosphate activity, casein, choride. Analysis of food materials- Preservatives: Sodium carbonate, sodium benzoate sorbic acid Coloring matters, - Briliant blue FCF, fast green FCF, tertrazine, erytrhosine , sunset yellow FCF.
Flavoring agents - Vanilla , diacetyl, isoamyl acetate, limonene, ethylpropionate , allyl hexanoate and Adulterants in rice and wheat, wheat floo0r, sago,coconut oil, coffee powder, tea powder, milk..

UNIT - V

Clinical analysis of blood:Composition of blood,clinical analysis,trace elements in the body.Estimation of blood chlolesterol,glucose,enzymes,RBC & WBC ,Blood gas analyser.

REFERENCE BOOKS :

1.F.J.Welcher-Standard methods of analysis,
2.A.I.Vogel-A text book of quantitative Inorganic analysis-ELBS,
3.F.D.Snell & F.M.Biffen-Commercial methods of analysis-D.B.Taraporavala & sons,
4.J.J.Elving and I.M.Kolthoff- Chemical analysis - A series of monographs on analytical chemistry and its applications -- Inter Science- Vol I to VII.,

5.Aanalytical Agricultrual Chemistry by S.L.Chopra & J.S.Kanwar -- Kalyani Publishers

6. Quantitative analysis of drugs in pharmaceutical formulations by P.D.Sethi, CBS Publishers and Distributors, New Delhi
7. G.Ingram- Methods of organic elemental micro analysis- Chapman and Hall.,
8. H.Wincciam and Bobbles (Henry J)- Instrumental methods of analysis of food additives.,
9. H.Edward-The Chemical analysis of foods;practical treatise on the examination of food stuffs and the detection of adulterants,
10. The quantitative analysis of drugs- D.C.Garratt-Chapman & Hall.,
11. A text book of pharmaceutical analysis by K.A.Connors-Wiley-International.,
12. Comprehensive medicinal chemistry-Ed Corwin Hansch Vol 5,Pergamon Press.,

I. LABORATORY COURSE – VIII

Practical Paper – VIII-A-1: (at the end of semester VI) 30 hrs (2 h / W)

1. Preparation of Aspirin
2. Preparation of Paracetamol
3. Preparation of Acetanilide
4. Preparation of Barbutiric Acid
5. Preparation of Phenyl Azo β-naphthol

II. LABORATORY COURSE – VIII

Practical Paper – VIII-A-2 (at the end of semester VI)

30 hrs (2 h / W)

1.Green procedure for organic qualitative analysis: Detection of N, S andhalogens

2.Acetylation of 1^0 amine by green method: Preparation of acetanilide

3. Rearrangement reaction in green conditions: Benzil-Benzilic acid rearrangement

4. Electrophilic aromatic substitution reaction: Nitration of phenol

5. Radical coupling reaction: Preparation of 1,1-bis -2-naphthol

6. Green oxidation reaction: Synthesis of adipic acid

7. Green procedure for Diels Alder reaction between furan and maleic anhydride

List of Reference Books

1. Green Chemistry Theory and Practice. P.T.Anatas and J.C. Warner
2. Green Chemistry V.K. Ahluwalia Narosa, New Delhi.
3. Real world cases in Green Chemistry M.C. Cann and M.E. Connelly
4. Green Chemistry: Introductory Text M.Lancaster: Royal Society of Chemistry (London)
5. Green Chemistry: Introductory Text, M.Lancaster
6. Principles and practice of heterogeneous catalysis, Thomas J.M.,Thomas M.J., John Wiley
7. Green Chemistry: Environmental friendly alternatives R S Sanghli and M.M Srivastava, Narosa Publications

VII-A-3 Practical:- Project Work

Cluster Elective –II

Fuels and Industrial Inorganic materials

PAPER – VIII-B-1 : FUEL CHEMISTRY AND BATTERIES

45 hrs (3 h / w)

UNIT –I **12h**

Review of energy sources (renewable and non-renewable) – classification of fuels and their calorific value. Coal: Uses of Coal (fuel and non fuel) in various industries , its composition , carbonization of coal - coal gas , producer gas and water gas – composition and uses – fractionation of coal tar – uses of coal tar based chemicals , requisites of a good metallurgical coke , coal gasification (Hydro gasification and catalytic gasification) coal liquefaction and solvent refining.

UNIT-II **6h**

Petroleum and petrol chemical industry:

Composition of crude petroleum , refining and different types of petroleum products and their applications.

UNIT-III **10h**

Fractional distillation (principle and process) , cracking (Thermal and catalytic cracking). Reforming petroleum and non petroleum fuels (LPG , CNG , LNG , biogas) ,fuels derived from biomass , fuel from waste , synthetic fuels (gaseous and liquids) , clear fuels , petro chemicals : vinyl acetate , propylene oxide , isoprene , butadiene , toluene and its derivative xylene.

UNIT-IV **10h**

Lubricants:

Classification of lubricants , lubricating oils(conducting and non conducting) , solid and semi solid lubricants , synthetic lubricants. Properties of lubricants (viscosity index , cloud point , pore point) and their determination.

UNIT-V **7h**

Batteries:

Primary and secondary batteries, battery components and their role, Characteristics of Battery. Working of following batteries: Pb acid, Li-Battery, Solid state electrolyte battery. Fuel cells, Solar cell and polymer cell.

Reference books:

1. E.Stochi : Industrial chemistry , Vol-1,Ellis Horwood Ltd.UK
2. P.C.Jain , M.Jain: Engineering chemistry, Dhanpat Rai &sons , Delhi.
3. B.K.Sharma: Industrial Chemistry , Goel Publishing house , Meerut.

SEMESTER-VI

PAPER – VIII-B-2: INORGANIC MATERIALS OF INDUSTRIAL IMPORTANCE

45 hrs (3 h / w)

UNIT - I

Recapitulation of *s*- and *p*-Block Elements **8h**

Periodicity in *s*- and *p*-block elements with respect to electronic configuration, atomic and ionic size, ionization enthalpy, electronegativity (Pauling, Mulliken, and Alfred - Rochow scales). Allotropy in C, S, and P. Oxidation states with reference to elements in unusual and rare oxidation states like carbides and nitrides), inert pair effect, diagonal relationship and anomalous behaviour of first member of each group.

UNIT – II **15h**

Silicate Industries

Glass: Glassy state and its properties, classification (silicate and non-silicate glasses). Manufacture and processing of glass. Composition and properties of the following types of glasses: Soda lime glass, lead glass, armoured glass, safety glass, borosilicate glass, fluorosilicate, coloured glass, photosensitive glass.

Ceramics: Important clays and feldspar, ceramic, their types and manufacture. High technology ceramics and their applications, superconducting and semiconducting oxides, fullerenes carbon nanotubes and carbon fibre.

Cements*:* Classification of cement, ingredients and their role, Manufacture of cement and the setting process, quick setting cements.

UNIT – III **8h**

Fertilizers:

Different types of fertilizers. Manufacture of the following fertilizers: Urea, ammonium nitrate, calcium ammonium nitrate, ammonium phosphates; polyphosphate, superphosphate, compound and mixed fertilizers, potassium chloride, potassium sulphate.

UNIT – IV **8h**

Surface Coatings:

Objectives of coatings surfaces, preliminary treatment of surface, classification of surface coatings. Paints and pigments-formulation, composition and related properties. Oil paint, Vehicle, modified oils, Pigments, toners and lakes pigments, Fillers, Thinners, Enamels, emulsifying agents. Special paints (Heat retardant, Fire retardant, Eco-friendly paint, Plastic paint), Dyes, Wax polishing, Water and Oil paints, additives, Metallic coatings (electrolytic and electroless), metal spraying and anodizing.

UNIT – V **6h**

Alloys:

Classification of alloys, ferrous and non-ferrous alloys, Specific properties of elements in alloys. Manufacture of Steel (removal of silicon decarbonization, demanganization, desulphurization dephosphorisation) and surface treatment (argon treatment, heat treatment, nitriding, carburizing). Composition and properties of different types of steels.

Chemical explosives:
Origin of explosive properties in organic compounds, preparation and explosive properties of lead azide, PETN, cyclonite (RDX). Introduction to rocket propellants.

Reference Books:

1. E. Stocchi: *Industrial Chemistry*, Vol-I, Ellis Horwood Ltd. UK.
2. R. M. Felder, R. W. Rousseau: *Elementary Principles of Chemical Processes*, Wiley Publishers, New Delhi.
3. W. D. Kingery, H. K. Bowen, D. R. Uhlmann: *Introduction to Ceramics*, Wiley Publishers, New Delhi.
4. J. A. Kent: Riegel's *Handbook of Industrial Chemistry*, CBS Publishers, New Delhi.
5. P. C. Jain & M. Jain: *Engineering Chemistry*, Dhanpat Rai & Sons, Delhi.
6. R. Gopalan, D. Venkappayya, S. Nagarajan: *Engineering Chemistry*, Vikas Publications, New Delhi.
7. B. K. Sharma: *Engineering Chemistry*, Goel Publishing House, Meerut

SEMESTER-VI

PAPER – VIII-B-3 : ANALYSIS OF APPLIED INDUSTRIAL PRODUCTS

45 hrs (3 h / w)

UNIT-I

Analysis of soaps: moisture and volatile matter,cobined alkali,total fatty matter, free alkali, total fatty acid, sodium silicate and chlorides.
Analysis of paints :Vehicle and pigments ,Barium Sulphate ,total lead, lead chromate,iron pigments, zinc chromate

UNIT- II

Analysis of oils:saponification value,iodine value,acid value,ester value, bromine value, acetyl value.
Analysis of industrial solvents like benzene,acetone,methanol and acetic acid.,
Determination of methoxyl and N-methyl groups.,

UNIT-III

Analysis of fertilizers: urea,NPK fertilizer,super phosphate,
Analysis of DDT,BHC,endrin,endosulfone,malathion,parathion.,
Analysis of starch,sugars,cellulose and paper,

UNIT -IV

Gas analysis: carbon dioxide, carbon monoxide, oxygen, hydrogen, saturated hydro carbon, unsaturated hydrocarbons, nitrogen, octane number, cetane number
Analysis of Fuel gases like: water gas,producer gas,kerosene (oil) gas.
Ultimate analysis :carbon, hydrogen,nitrogen,oxygen,phosphorus and sulfur.,

UNIT - V

Analysis of Complex materials:
Analysis of cement- loss on ignition, insoluble residu, total silica, sesqui oxides, lime, magnesia, ferric oxide, sulphuric anhydrid.
Analysis of glasses - Determinaiton of silica, sulphuur, barium, arsinic, antimony, total R_2O_3, calcium, magnesium, total alkalies,aluminium,chloride,floride

SUGGESTED BOOKS:

1.F.J.Welcher-Standard methods of analysis,
2.A.I.Vogel-A text book of quantitative Inorganic analysis-ELBS,
3.H.H.Willard and H.Deal- Advanced quantitative analysis- Van Nostrand Co,
4.F.D.Snell & F.M.Biffen-Commercial methods of analysis-D.B.Taraporavala & sons,
5.J.J.Elving and I.M.Kolthoff- Chemical analysis - A series of monographs on analytical chemistry and its applications -- Inter Science- Vol I to VII.,
6.G.Z.Weig - Analytical methods for pesticides,plant growth regulators and food additives - Vols I to VII,
7.Aanalytical Agricultrual Chemistry by S.L.Chopra & J.S.Kanwar -- Kalyani Publishers
8.Mannual of soil, plant, water and fertilizer analysis, R.M.Upadhyay and N.L Sharma,Kalyani Publishers

I. LABORATORY COURSE – VIII

Practical Paper – VIII-B-1: (at the end of semester VI) **30 hrs (2 h / W)**

1. Preparation of Aspirin
2. Preparation of Paracetamol
3. Preparation of Acetanilide
4. Preparation of Barbutiric Acid
5. Preparation of Phenyl Azo β-naphthol

II. LABORATORY COURSE – VIII

Practical Paper – VIII-B-2: (at the end of semester VI)

30 hrs (2 h / W)

1.Green procedure for organic qualitative analysis: Detection of N, S andhalogens

2.Acetylation of 1^0 amine by green method: Preparation of acetanilide

3. Rearrangement reaction in green conditions: Benzil-Benzilic acid rearrangement

4. Electrophilic aromatic substitution reaction: Nitration of phenol

5. Radical coupling reaction: Preparation of 1,1-bis -2-naphthol

6. Green oxidation reaction: Synthesis of adipic acid

7. Green procedure for Diels Alder reaction between furan and maleic anhydride

List of Reference Books

1. Green Chemistry Theory and Practice. P.T.Anatas and J.C. Warner
2. Green Chemistry V.K. Ahluwalia Narosa, New Delhi.
3. Real world cases in Green Chemistry M.C. Cann and M.E. Connelly
4. Green Chemistry: Introductory Text M.Lancaster: Royal Society of Chemistry (London)
5. Green Chemistry: Introductory Text, M.Lancaster
6. Principles and practice of heterogeneous catalysis, Thomas J.M.,Thomas M.J., John Wiley
7. Green Chemistry: Environmental friendly alternatives R S Sanghli and M.M Srivastava, Narosa Publications

VII-A-3 Practical:- Project Work / Intern Ship

Cluster Elective –III
ORGANIC
PAPER – VIII-C-1 : ORGANIC SPECTROSCOPIC TECHNIQUES
45 hrs (3 h / w)

UNIT-I **10h**

NUCLEAR MAGNETIC RESONANCE SPECTROSCOPY

Nuclear spin, Principles of NMR-Classical and Quantum Mechanical methods, Magnetic moment and Spin angular momentum. Larmour Frequency. Instrumentation. Relaxation-spin-spin & spin lattice relaxation. Shielding constants, Chemical shifts, Shielding and Deshielding mechanism-Factors influencing Chemical shift. Spin-Spin interactions-AX, AX_2 and AB types. Vicinal, Geminal and Long range coupling- Factors influencing coupling constants.

UNIT – II **5h**

Spin decoupling, Spin tickling, Deuterium exchange, Chemical shift reagents and Nuclear overhauser effect. Applications in Medical diagnostics, Reaction kinetics and Mechanically induced dynamic nuclear polarization. FT NMR and its Advantages.

UNIT-III **10h**

UV & VISIBLE SPECTROSCOPY

Electronic spectra of diatomic molecules. The Born-oppenheimer approximation. Vibrational coarse structure: Bond association and Bond sequence. Intensity of Vibrational-electronic spectra: The Franck-Condon principle. Rotational fine structure of electronic vibration transitions. Electronic structure of diatomic molecules.

Types of transitions, Chromophores, Conjugated dienes, trienes and polyenes, unsaturated carbonyl compounds-Woodward – Fieser rules.

UNIT-IV **5h**

Electronic spectra of polyatomic molecules. Chemical analysis by Electronic Spectroscopy – Beer-Lambert's Law. Deviation from Beer's law. Quantitative determination of metal ions (Mn^{+2}, Fe^{+2}, NO_2^-, Pb^{+2}). Simultaneous determination of Chromium and Manganese in a mixture.

UNIT-V **15h**

Electron Spin Resonance Spectroscopy

Basic Principles, Theory of ESR, Comparison of NMR & ESR. Instrumentaion, Factors affecting the 'g' value, determination of 'g' value. Isotropic and Anisotropic constants. Splitting hyper fine splitting coupling constants. Line width, Zero field splitting and Kramer degeneracy. Crystal field splitting, Crystal field effects.

Applications:- Detection of free radicals; ESR spectra of (a) Methyl radical ($CH_3^{\cdot}$), (b) Benzene anion ($C_6H_6^-$) (c) Isoquinine (d) $[Cu(H_2O)_6]^{+2}$ (e) $[Fe(CN)_5NO]^{-3}$ (f)

REFERENCE BOOKS:

1. Electron Spin Resonance Elementary Theory and Practical Applications- John E. Wertz and James R. Bolton, Chapman and Hall, 1986.
2. Spectroscopic Identification of organic compounds – Silverstein, Basseler and Morril.
3. Organic Spectroscopy- William Kemp.
4. Fundamentals of Molecular Spectroscopy- C.N.Banwell and E.A. Mc cash 4th Edition, Tata Mc Graw Hill Publishing Co., Ltd. 1994.
5. Physical Methods in Inorganic Chemistry – R.S.Drago, Saunders Publications.
6. Application of MÖssbauer Spectroscopy – Green Mood.
7. NMR, NQR, EPR and MÖssbauer Spectroscopy in inorganic chemistry – R.V Parish, Ellis, Harwood.
8. Instrumental Methods of Chemical Analysis- H.Kaur, Pragathi Prakashan, 2003.
9. Instrumental Methods of Analysis, 7th Edition – Willard, Merrit, Dean, Settle, CBS Publications, 1986.
10. Molecular Structure and Spectroscopy – G. Aruldhas, Prentice Hall of India Pvt.Ltd, New Delhi, 2001.
11. MÖssbauer Spectroscopy – N.N. Green Wood and T.C. Gibb, Chapman, and Hall, Landon 1971.
12. Coordination Chemistry: Experimental Methods- K. Burger, London Butter Worths, 1973.
13. Analytical spectroscopy – Kamlesh Bansal, Campus books, 2008.
14. Structural Inorganic Chemistry MÖssbauer Spectroscopy – Bhide.
15. Principle of MÖssbauer Spectroscopy – T.C. Gibb, Chapman, and Hall, Landon 1976.

Cluster Elective –III

ORGANIC

PAPER – VIII-C-2 : ADVANCED ORGANIC REACTIONS

45 hrs (3 h / w)

UNIT – I

ORGANIC PHOTOCHEMISTRY

Organic photochemistry : Molecular orbitals, carbonyl chromophore–triplet states, Jablonski diagram, inter–system crossing. Energy transfer. Energies properties and reaction of singlet and triplet states of and transitions.

Photochemical reactions : (a) Photoreduction, mechanism, influence of temperature, solvent, nature of hydrogen donors, structure of substrates on the course of photo reduction,.

UNIT – II

ORGNAIC PHOTOCHEMISTRY

Norrisch cleavages, type I : Mechanism, acyclic cyclicdiones, influence of sensitizer, photo Fries rearrangement. Norrisch type II cleavage : Mechanism and stereochemistry, type II reactions of esters : 1: 2 diketones, photo decarboxylation., Di - π methane rearrangement, Photochemistry – of conjugated dienes, Decomposition of nitrites – Barton reaction.

UNIT – III

PROTECTING GROUPS AND ORGANIC REACTIONS

Principles of (1) Protection of alcohols – ether formation including silyl ethers – ester formation, (2) Protection of diols – acetal,ketal and carbonate formation, (3) Protection of carboxylic acids – ester formation, benzyl and t–butyl esters, (4) Protection of amines – acetylation, benzoylation, benzyloxy carbonyl, triphenyl methyl groups and fmoc, (5) Protection of carbonyl groups – acetal, ketal, 1,2–glycols and 1,2–dithioglycols formation.

UNIT – IV

Synthetic reactions : Mannich reaction – Mannich bases – Robinson annulations. The Shapiro reaction, Stork–enamine reaction. Use of dithioacetals – Umpolung, phase transfercatalysis – mechanisms and use of benzyl trialkyl ammonium halides. Witting reaction.

UNIT –V : NEW SYNTHETIC REACTIONS

Baylis–Hillman reaction, RCM olefm metathesis, Grubb catalyst, Mukayama aldol reaction, Mitsunobu reaction, McMurrey reaction, Julia–Lythgoe olefination, and Peterson's stereoselective olefination, Heck reaction, Suziki coupling, Stille coupling and Sonogishira coupling, Buchwald–Hartwig coupling. Ugi reaction, Click reaction.

Recommended Books

1. Molecular reactions and Photochemistry by Charles Dupey and O.L. Chapman.
2. Molecular Photochemistry by Turru.
3. Importance of antibonding orbitals by Jaffe and Orchin.
4. Text Book of Organic Chemistry by Cram,. Hammand and Henrickson.
5. Some modern methods of organic synthesis by W. Carruthers.
6. Guide Book to Organic Synthesis by R.K. Meckie, D.M. Smith and R.A. Atken.
7. Organic Synthesis by O.House.
8. Organic synthesis by Michael B. Smith.
9. Organic Chemistry Claydon and others 2005.
10. Name Reactions by Jie Jack Li
11. Reagents in Organic synthesis by B.P. Mundy and others.
12. Tandem Organic Reactions by Tse–Lok Ho.

Cluster Elective –III
ORGANIC
PAPER – VIII-C-3 : PHARMACEUTICAL AND MEDICINAL CHEMISTRY
45 hrs (3 h / w)

UNIT-I **8h**

Pharmaceutical chemistry Terminology: Pharmacy, Pharmacology, Pharmacophore, Pharmacodynamics, Pharmacokinetics (ADME, Receptors - brief treartment) Metabolites and Anti metabolites.

UNIT-II

Drugs: **8h**

Nomenclature: Chemical name, Generic name and trade names with examples Classification: Classification based on structures and therapeutic activity with one example each, Administration of drugs

UNIT-III

Synthesis and therapeutic activity of the compounds: **12h**

a. Chemotheraputic Drugs

l.Sulphadrugs(Sulphamethoxazole) 2.Antibiotics - β-Lactam Antibiotics, Macrolide Antibiotics, 3. Anti malarial Drugs(chloroquine)

b. Psycho therapeutic Drugs:

1.Anti pyretics(Paracetamol) 2.Hypnotics, 3.Tranquilizers(Diazepam) 4.Levodopa

UNIT-IV

Pharmacodynamic Drugs: **8h**

1. Antiasthma Drugs (Solbutamol) 3. Antianginals (Glycerol Trinitrate)
4. Diuretics(Frusemide)

UNIT-V

HIV-AIDS: **9h**

Immunity - CD-4cells, CD-8cells, Retro virus, Replication in human body, Investigation available, prevention of AIDS, Drugs available - examples with structures: PIS: Indivanir (crixivan), Nelfinavir(Viracept).

List of Reference Books:

1.Medicinal Chemistry by Dr. B.V.Ramana

2.Synthetic Drugs by O.D.Tyagi & M.Yadav

3.Medicinal Chemistry by Ashutoshkar

4.Medicinal Chemistry by P.Parimoo

5.Pharmacology& Pharmacotherapeutics R.S Satoshkar & S.D.Bhandenkar

6.Medicinal Chemistry by Kadametal P-I & P.II

7.European Pharmacopoeia

MODEL PAPER

THREE YEAR B.Sc, DEGREE EXAMINATION
FIRST YEAR EXAMINATIONS
SEMESTER I
Paper –I: INORGANIC & ORGANIC CHEMISTRY - I

Time: 3 hours **Maximum Marks: 75**

PART- A

Answer any **FIVE** of the following questions
Each carries **FIVE** marks **5x5 = 25 Marks**

1. Define the electron deficient molecules and draw the structure of Borazole and Diborane.
2. Classify the Oxides based on the oxygen content with one example to each.
3. How the following are synthesized from Organo Lithium Compounds.

a) Acetic acid b) Ethyl alcohol

4. Define the Carbonium ion and explain the stability with no bond resonance.
5. Define the Markonikov's rule and explain the addition of 1- Propene with HBr.
6. Explain the acidity of the Acetylinic hydrogen with example.
7. Draw the conformational structures of Cyclohexane.
8. Define aromaticity and apply the Huckel's rule to benzene and naphthalene.

PART- B

Answer **ALL** the questions
Each carries **TEN** marks **5x10 = 50 Marks**

9. (a) Write note on Preparation, Structure and Properties of Silicones.

(OR)

(b) Explain the Preparation and Oxidation- Reduction reactions of Hydroxylamine.

10.(a) Give an account on different types of interhalogen compounds.

(OR)

(b) How the following are prepared from the Methyl Magnesium bromide and methyl lithium
1) Formaldehyde 2) Acetaldehyde3) Acetone 4) t- butyl alcohol

11. (a) Describe different types of Organic Reactions with one example to each.

(OR)

(b) Write notes on the following
1) Mesomeric effect 2) Hyper conjugation 3) Inductive effect

12.(a) Explain the addition of these reagents to alkenes with mechanism.
1) H_2O 2) HOX 3) H_2SO_4

(OR)

(b)Explain Baeyer's bond angle strain theory.

13. (a) Describe the Molecular Orbital structure of Benzene.

(OR)

(b) Explain the orientation in benzene with respect to alkyl and nitro groups.

Andhra Pradesh State Council of Higher Education

B.Sc. Computer Science/Information Technology (IT) Syllabus Under CBCS

w.e.f.2015-2016 (Modified in April 2016)

Structure of Computer Science/Information Technology (IT) Syllabus

Semester	Paper	Subject	Hrs.	Credits	IA	ES	Total
FIRST YEAR							
SEMESTER I	I	Computer Fundamentals and Photoshop	4	3	25	75	100
		Photo Shop Lab	2	2	0	50	50
SEMESTER II	II	Programming in C	4	3	25	75	100
		Programming in C Lab	2	2	0	50	50
SECOND YEAR							
SEMESTER III	III	Object Oriented Programming Using Java	4	3	25	75	100
		Object Oriented Programming Using Java Lab	2	2	0	50	50
SEMESTER IV	IV	Data Structures	4	3	25	75	100
		Data Structures using Java Lab	2	2	0	50	50
THIRD YEAR							
SEMESTER V	V	DBMS	3	3	25	75	100
		DBMS Lab	2	2	0	50	50
	VI	Software Engineering	3	3	25	75	100
		Project- 1	2	2	0	50	50
SEMESTER VI	VII (A/B/C)	**Elective-I**					
		A. Operating Systems	3	3	25	75	100
		Operating Systems Lab	3	2	0	50	50
		B. Computer Networks	3	3	25	75	100
		Computer Networks Lab	3	2	0	50	50
		C. Web Technologies	3	3	25	75	100
		Web Technologies Lab	3	2	0	50	50
	VIII Cluster –A-A1,A2 or Cluster-B-B1,B2 Or Cluster – C – C1,C2	**Elective-II(Cluster A)**					
		A1.Foundations of Data Science	3	3	25	75	100
		Foundations of Data Science Lab (through R)	3	2	0	50	50
		A2.Big Data Technology	3	3	25	75	100
		Big Data Technology Lab (Hadoop)	3	2	0	50	50
		Elective-II(Cluster B)					
		B1. Distributed Systems	3	3	25	75	100
		Distributed Systems Lab	3	2	0	50	50
		B2. Cloud Computing	3	3	25	75	100
		Cloud Computing Lab	3	2	0	50	50
		Elective-II(Cluster C)					
		C1. PHP – MySql & Wordpress	3	3	25	75	100
		PHP-MySql & Wordpress Lab	3	2	0	50	50
		C2. Advanced JavaScript : JQuery, Ajax, Angular JS & JSON	3	3	25	75	100
		Advanced JavaScript Lab	3	2	0	50	50
		Project – 2	5	5	25	75	100

Computer Fundamentals & Photoshop

Course Outcome

To explore basic knowledge on computers and Photoshop's beauty from the practical to the painterly artistic and to understand how Photoshop will help you create your own successful images

UNIT-I:

Introduction to computers, characteristics and limitations of computer, Block diagram of computer, types of computers, uses of computers, computer generations. Number systems :binary, hexa and octal numbering system

UNIT-II:

Input and output devices: Keyboard and mouse, inputting data in other ways, Types of Software: system software, Application software, commercial, open source, domain and free ware software, Memories: primary, secondary and cache memory. Windows basics: desktop, start menu, icons.

Unit –III

Introduction to Adobe Photoshop, Getting started with Photoshop, creating and saving a document in photoshop, page layout and back ground, photoshop program window-title bar,menu bar,option bar,image window,image title bar, status bar, ruler,paletts,tool box,screen modes,saving files,reverting files,closing files.

Unit –IV

Images: working with images, image size and resolution ,image editing,colour modes and adjustments , Zooming & Panning an Image,, , Rulers, Guides & Grids- Cropping & Straightening an Image,image backgrounds ,making selections.

Working with tool box: working with pen tool, save and load selection-working with erasers-working with text and brushes-Colour manipulations: colour modes- Levels – Curves - Seeing Colour accurately - Patch tool – Cropping-Reading your palettes - Dust and scratches- Advanced Retouching- smoothing skin

Unit-V

Layers: Working with layers- layer styles- opacity-adjustment layers

Filters: The filter menu, Working with filters- Editing your photo shoot, presentation –how to create adds ,artstic filter,blur filter,brush store filter,distort filters,noice filters,pixelate filters,light effects,difference clouds,sharpen filters,printing.

Reference Books:

1. Fundamentals of Computers by Reema Thareja from Oxford University Press
2. Adobe Photoshop Class Room in a Book by Adobe Creative Team.
3. Photoshop: Beginner's Guide for Photoshop - Digital Photography, Photo Editing, Color Grading & Graphic...19 February 2016 by David Maxwell

Student Activity:

1. **Design a poster for technical paper presentation.**
2. **Create a digital scrap book.**

Photo Shop Lab

1. Create your Visiting card
2. Create Cover page for any text book
3. Create a Paper ads for advertising of any commercial agency
4. Design a Passport photo
5. Create a Pamphlet for any program to be conducted by an organization
6. Create Broacher for you college
7. Create Titles for any forthcoming film
8. Custom shapes creation
9. Create a Web template for your college
10. Convert colour photo to black and white photo
11. Enhance and reduce the given Image size
12. Background changes
13. Design Box package cover
14. Design Texture and patterns
15. Filter effects & Eraser effects

Paper-II : PROGRAMMING IN C

Course Objectives

1. Learn how to solve common types of computing problems.
2. Learn data types and control structures of C
3. Learn to map problems to programming features of C.
4. Learn to write good portable C programs.

Course Outcomes

Upon successful completion of the course, a student will be able to:

1. Appreciate and understand the working of a digital computer
2. Analyze a given problem and develop an algorithm to solve the problem
3. Improve upon a solution to a problem
4. Use the 'C' language constructs in the right way
5. Design, develop and test programs written in 'C'

UNIT I

Introduction to Algorithms and Programming Languages: Algorithm – Key features of Algorithms – Some more Algorithms – Flow Charts – Pseudo code – Programming Languages – Generation of Programming Languages – Structured Programming Language-Design and Implementation of Correct, Efficient and Maintainable Programs.

Introduction to C: Introduction – Structure of C Program – Writing the first C Program – File used in C Program – Compiling and Executing C Programs – Using Comments – Keywords – Identifiers – Basic Data Types in C – Variables – Constants – I/O Statements in C- Operators in C- Programming Examples – Type Conversion and Type Casting

UNIT II

Decision Control and Looping Statements: Introduction to Decision Control Statements – Conditional Branching Statements – Iterative Statements – Nested Loops – Break and Continue Statement – Goto Statement

Functions: Introduction – using functions – Function declaration/ prototype – Function definition – function call – return statement – Passing parameters – Scope of variables – Storage Classes – Recursive functions – Type of recursion – Towers of Hanoi – Recursion vs Iteration

UNIT III

Arrays: Introduction – Declaration of Arrays – Accessing elements of the Array – Storing Values in Array – Calculating the length of the Array – Operations on Array – one dimensional array for inter-function communication – Two dimensional Arrays –Operations on Two Dimensional Arrays - Two Dimensional Arrays for inter-function communication – Multidimensional Arrays – Sparse Matrices

Strings: Introduction –Suppressive Input – String Taxonomy – String Operations – Miscellaneous String and Character functions

UNIT IV

Pointers: Understanding Computer Memory – Introduction to Pointers – declaring Pointer Variables – Pointer Expressions and Pointer Arithmetic – Null Pointers – Generic Pointers - Passing Arguments to Functions using Pointer – Pointer and Arrays – Passing Array to Function – Difference between Array Name and Pointer – Pointers and Strings – Array of pointers – Pointer and 2D Arrays – Pointer and 3D Arrays – Function Pointers – Array 0f Function Pointer – Pointers to Pointers – Memory Allocation in C Programs – Memory Usage – Dynamic Memory Allocation – Drawbacks of Pointers

Structure, Union, and Enumerated Data Types: Introduction – Nested Structures – Arrays of Structures – Structures and Functions – Self referential Structures – Union – Arrays of Unions Variables – Unions inside Structures – Enumerated Data Types

UNIT V

Files: Introduction to Files – Using Files in C – Reading Data from Files – Writing Data from Files – Detecting the End-of-file – Error Handling during File Operations – Accepting Command Line Arguments – Functions for Selecting a Record Randomly - Remove() – Renaming a File – Creating a Temporary File

REFERENCE BOOKS

1. Introduction to C programming by REEMA THAREJA from OXFORD UNIVERSITY PRESS
2. E Balagurusamy: ―COMPUTING FUNDAMENTALS & C PROGRAMMING – Tata McGraw-Hill, Second Reprint 2008, ISBN 978-0-07-066909-3.
3. Ashok N Kamthane: Programming with ANSI and Turbo C, Pearson Edition Publ, 2002.
4. Henry Mullish & Huubert L.Cooper: The Spirit of C An Introduction to modern Programming, Jaico Pub. House,1996.

Student Activity:

1. **Write a program for preparing the attendance particulars of students of your college at the end of semester according to following guidelines**
   a. **Above 75 % promoted**
   b. **Above 65% condoned**
   c. **Below 65% detained**
2. **Write a program for creating timetable or your class taking work load of faculty into consideration.**

PROGRAMMING IN C LAB

1. Find out the given number is perfect number or not using c program.
2. Write a C program to check whether the given number is Armstrong or not.
3. Write a C program to find the sum of individual digits of a positive integer.
4. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to print the Fibonacci series
5. Write a C program to generate the first n terms of the Fibonacci sequence.
6. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
7. Write a C program to find both the largest and smallest number in a list of integers.
8. Write a C program that uses functions to perform the following:
    a. Addition of Two Matrices
    b. Multiplication of Two Matrices
9. Write a program to perform various string operations
10. Write C program that implements searching of given item in a given list
11. Write a C program to sort a given list of integers in ascending order

Paper-III : OBJECT ORIENTED PROGRAMMING USING JAVA

Course Objectives

As the business environment becomes more sophisticated, the software development (software engineering is about managing complexity) is becoming increasingly complex. As of the best programming paradigm which helps to eliminate complexity of large projects, Object Oriented Programming (OOP) has become the predominant technique for writing software in the past decade. Many other important software development techniques are based upon the fundamental ideas captured by object-oriented programming.

Course Outcomes

At the end of this course student will:

1. Understand the concept and underlying principles of Object-Oriented Programming
2. Understand how object-oriented concepts are incorporated into the Java programming language
3. Develop problem-solving and programming skills using OOP concept
4. Understand the benefits of a well structured program
5. Develop the ability to solve real-world problems through software development in high-level programming language like Java
6. Develop efficient Java applets and applications using OOP concept
7. Become familiar with the fundamentals and acquire programming skills in the Java language.

UNIT-1

FUNDAMENTALS OF OBJECT – ORIENTED PROGRAMMING : Introduction, Object Oriented paradigm, Basic Concepts of OOP, Benefits of OOP, Applications of OOP, Java features: **OVERVIEW OF JAVA LANGUAGE**: Introduction, Simple Java program structure, Java tokens, Java Statements, , Java Virtual Machine, Command line arguments. **CONSTANTS, VARIABLES & DATA TYPES:** Introduction, Constants, Variables, Data Types, Declaration of Variables, Giving Value to Variables, Scope of variables, Symbolic Constants, Type casting, Getting Value of Variables, Standard Default values; **OPERATORS & EXPRESSIONS**.

UNIT-II

DECISION MAKING & BRANCHING: Introduction, Decision making with if statement, Simple if statement, if. Else statement, Nesting of if. else statements, the else if ladder, the switch statement, the conditional operator. **LOOPING**: Introduction, The While statement, the do-while statement, the for statement, Jumps in loops.

CLASSES, OBJECTS & METHODS: Introduction, Defining a class, Adding variables, Adding methods, Creating objects, Accessing class members, Constructors, Method overloading, Static members, Nesting of methods;

UNIT-III

INHERITANCE: Extending a class, Overloading methods, Final variables and methods, Final classes, Abstract methods and classes;

ARRAYS, STRINGS AND VECTORS: Arrays, One-dimensional arrays, Creating an array, Two – dimensional arrays, Strings, Vectors, Wrapper classes;

INTERFACES: MULTIPLE INHERITANCE: Introduction, Defining interfaces, Extending interfaces, Implementing interfaces, Assessing interface variables;

UNIT-IV

MULTITHREADED PROGRAMMING: Introduction, Creating Threads, Extending the Threads, Stopping and Blocking a Thread, Lifecycle of a Thread, Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization, Implementing the 'Runnable' Interface.

MANAGING ERRORS AND EXCEPTIONS: Types of errors : Compile-time errors, Run-time errors, Exceptions, Exception handling, Multiple Catch Statements, Using finally statement,

UNIT-V

APPLET PROGRAMMING: local and remote applets, Applets and Applications, Building Applet code, Applet Life cycle: Initialization state, Running state, Idle or stopped state, Dead state, Display state.

PACKAGES: Introduction, Java API Packages, Using System Packages, Naming conventions, Creating Packages, Accessing a Package, using a Package.

MANAGING INPUT/OUTPUT FILES IN JAVA: Introduction, Concept of Streams, Stream classes, Byte Stream Classes, Input Stream Classes, Output Stream Classes, Character Stream classes: Reader stream classes, Writer Stream classes, Using Streams, Reading and writing files.

Reference Books:

1. E.Balaguruswamy, Programming with JAVA, A primer, 3e, TATA McGraw-Hill Company.

2. John R. Hubbard, Programming with Java, Second Edition, Schaum's outline Series, TATA McGraw-Hill Company.
3. Deitel &Deitel. Java TM: How to Program, PHI (2007)
4. Java Programming: From Problem Analysis to Program Design- D.S Mallik
5. Object Oriented Programming Through Java by P. Radha Krishna, Universities Press (2008)

Student Activity:
1. Create a front end using JAVA for the student database created
2. Learn the difference between ODBC and JDBC

OBJECT ORIENTED PROGRAMMING USING JAVA LAB

1. Write a program to perform various String Operations
2. Write a program on class and object in java
3. Write a program to illustrate Function Overloading & Function Overriding methods in Java
4. Write a program to illustrate the implementation of abstract class
5. Write a program to implement Exception handling
6. Write a program to create packages in Java
7. Write a program on interface in java
8. Write a program to Create Multiple Threads in Java
9. Write a program to Write Applets to draw the various polygons
10. Write a program which illustrates the implementation of multiple Inheritance using interfaces in Java
11. Write a program to assign priorities to threads in java

Paper-IV : DATA STRUCTURES

Course Objectives

To introduce the fundamental concept of data structures and to emphasize the importance of data structures in developing and implementing efficient algorithms..

Course Outcomes

1. Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms
2. Describe common applications for arrays, records, linked structures, stacks, queues, trees, and graphs.
3. Write programs that use arrays, records, linked structures, stacks, queues, trees, and graphs
4. Demonstrate different methods for traversing trees
5. Compare alternative implementations of data structures with respect to performance
6. Compare and contrast the benefits of dynamic and static data structures implementations
7. Describe the concept of recursion, give examples of its use, describe how it can be implemented using a stack .
8. Discuss the computational efficiency of the principal algorithms for sorting, searching, and hashing.

UNIT I

Concept of Abstract Data Types (ADTs)- Data Types, Data Structures, Storage Structures, and File Structures, Primitive and Non-primitive Data Structures, Linear and Non-linear Data Structures.

Linear Lists – ADT, Array and Linked representations, Pointers.

Arrays – ADT, Mappings, Representations, Sparse Matrices, Sets – ADT, Operations

Linked Lists: Single Linked List, Double Linked List, Circular Linked List , applications

UNIT II

Stacks: Definition, ADT, Array and Linked representations, Implementations and Applications

Queues: Definition, ADT, Array and Linked representations, Circular Queues, Dequeues, Priority Queues, Implementations and Applications.

UNIT III

Trees: Binary Tree, Definition, Properties, ADT, Array and Linked representations, Implementations and Applications. Binary Search Trees (BST) – Definition, ADT, Operations and Implementations, BST Applications. Threaded Binary Trees, Heap trees.

UNIT IV

Graphs – Graph and its Representation, Graph Traversals, Connected Components, Basic Searching Techniques, Minimal Spanning Trees

UNIT- V

Sorting and Searching: Selection, Insertion, Bubble, Merge, Quick, Heap sort, Sequential and Binary Searching.

REFERENCE BOOKS

1. D S Malik, Data Structures Using C++, Thomson, India Edition 2006.
2. Sahni S, Data Structures, Algorithms and Applications in C++, McGraw-Hill, 2002.
3. SamantaD, Classic Data Structures, Prentice-Hall of India, 2001.
4. Heilman G I,. Data Structures and Algorithms with Object-Oriented Programming, Tata McGraw-l lill. 2002. (Chapters I and 14).
5. Tremblay P, and Sorenson P G, Introduction to Data Structures with Applications, Tata McGraw-Hill,

Student activity:

1. **Create a visible stack using C-graphics**
2. **Create a visible Queue using C-graphics**

DATA STRUCTURES USING JAVA LAB

1. Write a Program to implement the Linked List operations
2. Write a Program to implement the Stack operations using an array.
3. Write Programs to implement the Queue operations using an array.
4. Write Programs to implement the Stack operations using a singly linked list.
5. Write Programs to implement the Queue operations using a singly linked list.
6. Write a program for arithmetic expression evaluation
7. Write a program to implement Double Ended Queue using a doubly linked list.
8. Write a program to search an item in a given list using Linear Search and Binary Search
9. Write a program for Quick Sort
10. Write a program for Merge Sort
11. Write a program on Binary Search Tree operations(insertion, deletion and traversals)
12. Write a program for Graph traversals

Structure of Computer Science/Information Technology (IT) Syllabus

III YEAR V SEMESTER

Paper-V: Data Base Management System

Course Objective:

Design & develop database for large volumes & varieties of data with optimized data processing techniques.

Course Outcomes

On completing the subject, students will be able to:

1. Design and model of data in database.
2. Store, Retrieve data in database.

UNIT I

Overview of Database Management System: Introduction, file-based system, Drawbacks of file-Based System ,Data and information, Database, Database management System, Objectives of DBMS, Evaluation of Database management System, Classification of Database Management System, DBMS Approach, advantages of DBMS, Anis/spark Data Model, data models, Components and Interfaces of Database Management System. Database Architecture, Situations where DBMS is not Necessary, DBMS Vendors and Their Products.

UNIT II

Entity-Relationship Model: Introduction, the building blocks of an entity relationship diagram, classification of entity sets, attribute classification, relationship degree, relationship classification, reducing ER diagram to tables, enhanced entity-relationship model (EER model), generalization and specialization, **IS A** relationship and attribute inheritance, multiple inheritance, constraints on specialization and generalization, aggregation and composition, entity clusters, connection types, advantages of ER modelling.

UNIT III

Relational Model: Introduction, CODD Rules, relational data model, concept of key, relational integrity, relational algebra, relational algebra operations, advantages of relational algebra, limitations of relational algebra, relational calculus, tuple relational calculus, domain relational Calculus (DRC). QBE

UNIT IV

Structured Query Language: Introduction, History of SQL Standard, Commands in SQL, Data Types in SQL, Data Definition Language, Selection Operation, Projection Operation, Aggregate functions, Data Manipulation Language, Table Modification Commands, Table Truncation, Imposition of Constraints, Join Operation, Set Operation,
View, Sub Query, Embedded SQL,

UNIT V

PL/SQL: Introduction, Shortcoming in SQL, Structure of PL/SQL, PL/SQL Language Elements, Data Types, Operators Precedence, Control Structure, Steps to Create a PL/SQL, Program, Iterative Control, Cursors, Steps to create a Cursors, Procedure, Function, Packages, Exceptions Handling, Database Triggers, Types of Triggers.

Reference Books

1. "Database System Concepts" by Abraham Silberschatz, Henry Korth, and S. Sudarshan, McGrawhill, 2010, 9780073523323
2. "Database Management Systems" by Raghu Ramakrishnan, McGrawhill, 2002,
3. Fundamentals of Relational Database Management Systems by S. Sumathi, S. Esakkirajan, Springer Publications
4. "An Introduction to Database Systems" by Bipin C Desai
5. "Principles of Database Systems" by J. D. Ullman
6. "Fundamentals of Database Systems" by R. Elmasri and S. Navathe

Student Activity:

1. Create your college database for placement purpose.
2. Create faculty database of your college with their academic performance scores

III YEAR V SEMESTER

DATABASE MANAGEMENT SYSTEMS LAB

1. Draw ER diagrams for train services in a railway station
2. Draw ER diagram for hospital administration
3. Creation of college database and establish relationships between tables
4. Write a view to extract details from two or more tables
5. Write a stored procedure to process students results
6. Write a program to demonstrate a function
7. Write a program to demonstrate blocks, cursors & database triggers.
8. Write a program to demonstrate Joins
9. Write a program d
10. Write a program to demonstrate of Aggregate functions
11. Creation of Reports based on different queries
12. Usage of file locking table locking, facilities in applications.

III YEAR V SEMESTER
Paper VI : Software Engineering

Course Objectives

The Objective of the course is to assist the student in understanding the basic theory of software engineering, and to apply these basic theoretical principles to a group software development project.

Course outcomes

1. Ability to gather and specify requirements of the software projects.
2. Ability to analyze software requirements with existing tools
3. Able to differentiate different testing methodologies
4. Able to understand and apply the basic project management practices in real life projects
5. Ability to work in a team as well as independently on software projects

UNIT I

INTRODUCTION: Software Engineering Process paradigms - Project management - Process and Project Metrics – software estimation - Empirical estimation models - Planning - Risk analysis - Software project scheduling.

UNIT II

REQUIREMENTS ANALYSIS : Requirement Engineering Processes – Feasibility Study – Problem of Requirements – Software Requirement Analysis – Analysis Concepts and Principles – Analysis Process – Analysis Model

UNIT III

SOFTWARE DESIGN: Software design - Abstraction - Modularity - Software Architecture - Effective modular design - Cohesion and Coupling - Architectural design and Procedural design - Data flow oriented design.

UNIT IV

USER INTERFACE DESIGN AND REAL TIME SYSTEMS : User interface design - Human factors - Human computer interaction - Human - Computer Interface design - Interface design - Interface standards.

UNIT V

SOFTWARE QUALITY AND TESTING : Software Quality Assurance - Quality metrics - Software Reliability - Software testing - Path testing – Control Structures testing - Black Box testing - Integration, Validation and system testing - Reverse Engineering and Re-engineering.

CASE tools –projects management, tools - analysis and design tools – programming tools - integration and testing tool - Case studies.

REFERENCE BOOKS:

1. Roger Pressman S., "Software Engineering: A Practitioner's Approach", 7th Edition, McGraw Hill, 2010.
2. Software Engineering Principles and Practice by Deepak Jain Oxford University Press
2. Sommerville, "Software Engineering", Eighth Edition, Pearson Education, 2007
3. Pfleeger, "Software Engineering: Theory & Practice", 3rd Edition, Pearson Education, 2009
4. Carlo Ghazi, Mehdi Jazayari, Dino Mandrioli, "Fundamentals of Software Engineering", Pearson Education, 2003

Student Activity:

1. **Visit any financial organization nearby and prepare requirement analysis report**
2. **Visit any industrial organization and prepare risk chart.**

III YEAR V SEMESTER

Project-1

Follow SDLC process for real time applications and develop real time application project

The objective of the project is to motivate them to work in emerging/latest technologies, help the students to develop ability, to apply theoretical and practical tools/techniques to solve real life problems related to industry, academic institutions and research laboratories.

The project is of 2 hours/week for one (semester V) semester duration and a student is expected to do planning, analyzing, designing, coding, and implementing the project. The initiation of project should be with the project proposal. The synopsis approval will be given by the project guides.

The project proposal should include the following:

- Title
- Objectives
- Input and output
- Details of modules and process logic
- Limitations of the project
- Tools/platforms, Languages to be used
- Scope of future application

The Project work should be either an individual one or a group of not more than three members and submit a project report at the end of the semester. The students shall defend their dissertation in front of experts during viva-voce examinations.

III YEAR VI SEMESTER

Paper-VII: Elective-A

Operating Systems

Course Objectives

1. To understand the services provided by and the design of an operating system.
2. To understand the structure and organization of the file system.
3. To understand what a process is and how processes are synchronized and scheduled.
4. To understand different approaches to memory management.
5. Students should be able to use system calls for managing processes, memory and the file system.

Course Outcomes

1. Analyze the concepts of processes in operating system and illustration of the scheduling of processor for a given problem instance.
2. Identify the dead lock situation and provide appropriate solution so that protection and security of the operating system is also maintained.
3. Analyze memory management techniques, concepts of virtual memory and disk scheduling.
4. Understand the implementation of file systems and directories along with the interfacing of IO devices with the operating system.

UNIT - I

Operating System Introduction: Operating Systems Objectives and functions, Computer System Architecture, OS Structure, OS Operations, Evolution of Operating Systems - Simple Batch, Multi programmed, time shared, Parallel, Distributed Systems, Real-Time Systems, Operating System services.

UNIT - II

Process and CPU Scheduling - Process concepts - The Process, Process State, Process Control Block, Threads, Process Scheduling - Scheduling Queues, Schedulers, Context Switch, Preemptive Scheduling, Dispatcher, Scheduling Criteria, Scheduling algorithms, Case studies: Linux, Windows.

Process Coordination - Process Synchronization, The Critical section Problem, Synchronization Hardware, Semaphores, and Classic Problems of Synchronization, Monitors, Case Studies: Linux, Windows.

UNIT - III

Memory Management and Virtual Memory - Logical & physical Address Space, Swapping, Contiguous Allocation, Paging, Structure of Page Table. Segmentation, Segmentation with Paging, Virtual Memory, Demand Paging, Performance of Demanding Paging, Page Replacement Page Replacement Algorithms, Allocation of Frames.

UNIT - IV

File System Interface - The Concept of a File, Access methods, Directory Structure, File System Mounting, File Sharing, Protection, File System Structure,

Mass Storage Structure - Overview of Mass Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling.

UNIT - V

Deadlocks - System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery from Deadlock.

REFERENCES BOOKS:

1. Operating System Principles, Abraham Silberchatz, Peter B. Galvin, Greg Gagne 8th Edition, Wiley Student Edition.
2. Principles of Operating Systems by Naresh Chauhan, OXFORD University Press
3. Operating systems - Internals and Design Principles, W. Stallings, 6th Edition, Pearson.
4. Modern Operating Systems, Andrew S Tanenbaum 3rd Edition PHI.
5. Operating Systems A concept - based Approach, 2nd Edition, D. M. Dhamdhere, TMH.
6. Principles of Operating Systems, B. L. Stuart, Cengage learning, India Edition.
7. Operating Systems, A. S. Godbole, 2nd Edition, TMH

Student Activity:

1. Load any new operating system into your computer.

2. Partition the memory in your system

3. Create a semaphore for process synchronization

III YEAR VI SEMESTER

Paper-VII: Elective-A

Operating Systems Lab

Objectives:

- To use linux operating system for study of operating system concepts.
- To write the code to implement and modify various concepts in operating systems

Outcomes:

- The course objectives ensure the development of students applied skills in operating systems related areas.
- Students will gain knowledge in writing software routines modules or implementing various concepts of operating system.

List of Experiments:

1. 1.Usage of following commands
   Ls,pwd,tty,cat,who,who am I,rm, mkdir,rmdir,touch,cd.
2. Usage of following commands
   Cal,cat(append),cat(concatenate),mv,cp,man,date.
3. Usage of following commands
   Chmod,grep,tput(clear,highlight),bc.
4. Write a shell script to check if the number entered at the command line is Prime or not.
5. Write a shell script to modify “cal” command to display calendars of the specified months.
6. Write a shell script to modify “cal” command to display calendars of the specified range of months.
7. Write a shell script to accept a login name. If not a valid login name display message “entered login name is invalid”
8. Write a shell script to display date in the mm/dd/yy format.
9. To implement the FCFS Algorithm.
10. To implement the shortest job First Algorithm.
11. To implement the priority algorithm.
12. To implement the round robin Algorithm.
13. To implement the FIFO page replacement algorithm
14.

14. To implement the LRU page replacement Algorithm.
15. To implement the Resource request Algorithm.
16. To implement the First-Fit, Best-Fit, Worst-Fit Algorithm.
17. To implement the sequential file organization.
18. To implement the Random file organization
19. Simulate Page Replacement Algorithms FIFO
20. Simulate Page Replacement Algorithms LRU
21. Simulate Page Replacement Algorithms OPTIMAL
22. Simulate Algorithm For Deadlock Prevention

III YEAR VI SEMESTER

Paper-VII: Elective-B

COMPUTER NETWORKS

Course Objectives

1. To provide an introduction to the fundamental concepts on data communication and the design of computer networks.
2. To get familiarized with the basic protocols of computer networks.

Course Outcomes

After this course, the student will be able to
1. Identify the different components in a Communication System and their respective roles.
2. Describe the technical issues related to the local Area Networks
3. Identify the common technologies available in establishing LAN infrastructure.

UNIT – I

Introduction: Uses of Computer Networks, Network Hardware, Network Software, Reference Models, Example Networks.

The Physical Layer: The Theoretical Basis for Data Communication, Guided Transmission Media, Wireless transmission, the public switched telephone network

UNIT – II

The Data Link Layer: Data Link Layer Design Issues, Error Detection and Correction, Sliding Window Protocols.

The Medium Access Control Sub-layer: The channel allocation problem, **Multiple Access Protocols**, **Ethernet,** Data Link Layer Switching.

UNIT – III

The Network Layer: Network Layer Design Issues, Routing Algorithms, Congestion control algorithms, Quality of Service.

Internet Working, The Network Layer in the Internet

UNIT – IV:

The Transport Layer: The Transport Service, Elements of Transport Protocols, Congestion Control Algorithms, The Internet Transport Protocols, The Internet Transport Protocols: TCP, Delay Tolerant Networks.

UNIT – V:

The Application Layer: DNS – The Domain Name System, Electronic Mail, The World Wide Web, Real Time Audio & Video, Content Delivery & Peer-to-Peer.

Reference Books:

1. Andrew S. Tanenbaum, "Computer Networks", Fifth Edition, Pearson Education.
2. Bhushan Trivedi, Computer Networks , Oxford University Press
3. James F.Kurose, Keith W.Ross, "Computer Networking", Third Edition, Pearson Education
4. Behrouz A Forouzan, "Data Communications and Networking", Fourth Edition, TMH (2007).
5. Kurose & Ross, "***COMPUTER NETWORKS***" – A Top-down approach featuring the Internet", Pearson Education – Alberto Leon – Garciak.

Student Activity:

1. **Study the functioning of network devices available in your organization .**
2. **Prepare a pictorial chart of LAN connections in your organization**

III YEAR VI SEMESTER

Paper-VII: Elective-B

COMPUTER NETWORKS LAB

OBJECTIVES:

1. Analyze the different layers in networks.
2. Define, use, and differentiate such concepts as OSI-ISO,TCP/IP.
3. How to send bits from physical layer to data link layer
4. Sending frames from data link layer to Network layer
5. They can understand how the data transferred from source to destination
6. They can come to know that how the routing algorithms worked out in network layer

List of Experiments:

1. Analyze the different layers in networks.
2. Define, use, and differentiate such concepts as OSI-ISO,TCP/IP.

List of Experiments:

1. Write a program to implement data link layer framing method bit stuffing.

2. Write a program to implement data link layer framing method character stuffing.

3. Write a program to implement data link layer framing method character count.

4. Write a program to implement Cyclic Redundancy Check (CRC 12, CRC 16 and CRC CCIR) on a data set of characters.

5. Write a program to implement Dijkstra's algorithm to compute the shortest path through a graph.

6. Write a program to implement subnet graph with weights indicating delay between

7. Write a program to implement subnet

Structure of Computer Science/Information Technology (IT) Syllabus
III YEAR VI SEMESTER

Paper-VII : Elective-C
Web Technologies

Course Objective

To provide knowledge on web architecture, web services, client side and server side scripting technologies to focus on the development of web-based information systems and web services.

To provide skills to design interactive and dynamic web sites.

Course Outcome

1. To understand the web architecture and web services.
2. To practice latest web technologies and tools by conducting experiments.
3. To design interactive web pages using HTML and Style sheets.
4. To study the framework and building blocks of .NET Integrated Development Environment.
5. To provide solutions by identifying and formulating IT related problems.

UNIT – I

HTML: Basic HTML, Document body, Text, Hyper links, adding more formatting, Lists, Tables using images. More HTML: Multimedia objects, Frames, Forms towards interactive, HTML document heading detail

UNIT – II

Cascading Style Sheets: Introduction, using Styles, simple examples, your own styles, properties and values in styles, style sheet, formatting blocks of information, layers.

UNIT – III

Introduction to JavaScript: What is DHTML, JavaScript, basics, variables, string manipulations, mathematical functions, statements, operators, arrays, functions. Objects in JavaScript: Data and objects in JavaScript, regular expressions, exception handling

UNIT – IV

DHTML with JavaScript: Data validation, opening a new window, messages and confirmations, the status bar, different frames, rollover buttons, moving images,

UNIT – V

XML: defining data for web applications, basic XML, document type definition, presenting XML, document object model. Web Services

References:

1. Harvey M. Deitel and Paul J. Deitel, **"Internet & World Wide Web How to Program", 4/e,** Pearson Education.
2. Uttam Kumar Roy, Web Technologies from Oxford University Press

Student Activities:

1. **Prepare a web site for your college**
2. **Prepare your personal website**

Paper-VII : Elective-C
Web Technologies Lab

1. Write a HTML program illustrating text formatting.

2. Illustrate font variations in your HTML code.

3. Prepare a sample code to illustrate links between different sections of the page.

4. Create a simple HTML program to illustrate three types of lists.

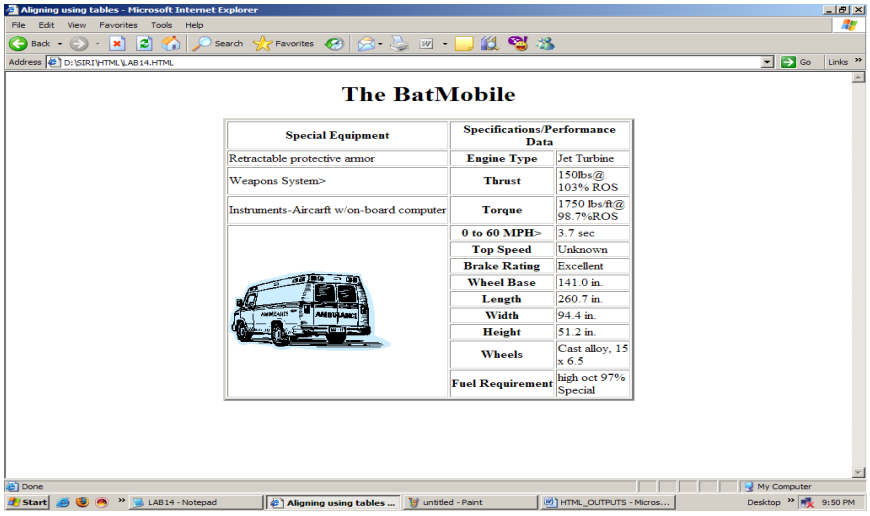
5. Embed a calendar object in your web page.

6. Create an applet that accepts two numbers and perform all the arithmetic operations on them.

7. Create nested table to store your curriculum.

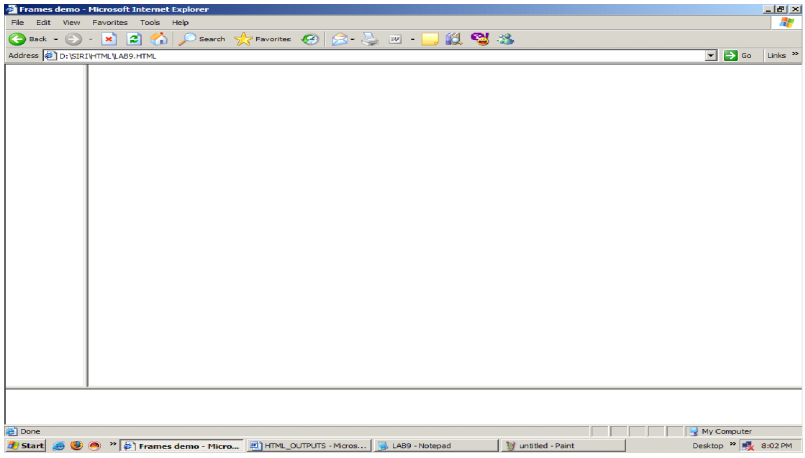
8. Create a form that accepts the information from the subscriber of a mailing system.

9. Design the page as follows:

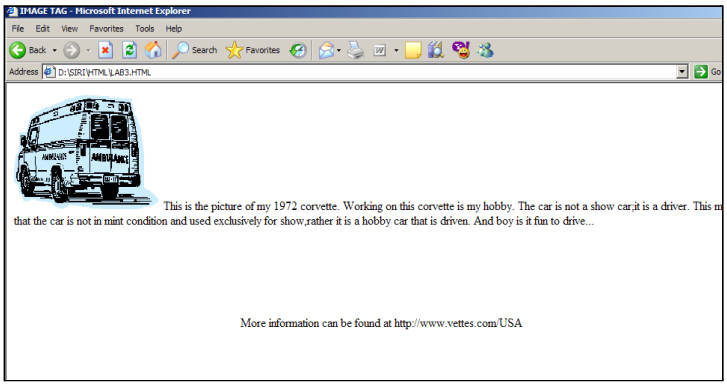


11. Using “table” tag, align the images as follows:

12. Divide the web page as follows:

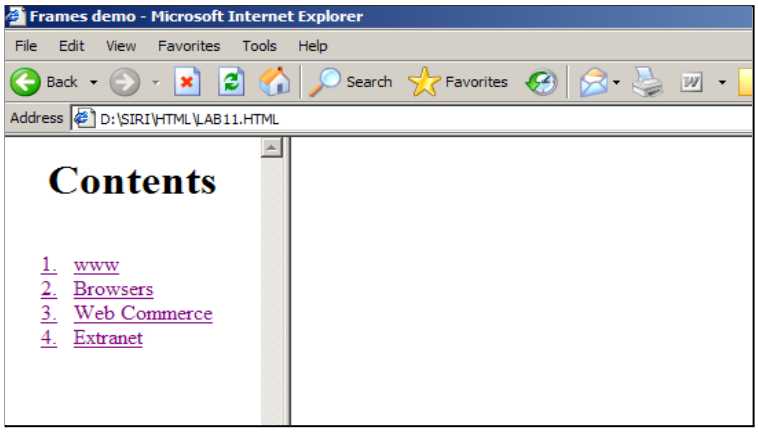


13. Design the page as follows:



14. Illustrate the horizontal rulers in your page.

15. Create a help file as follows:



16. Create a form using form tags(assume the form and fields).
17. Create a webpage containing your biodata(assume the form and fields).
18. Write a html program including style sheets.
20. Write a html program to layers of information in web page.
21. Create a static webpage.

III YEAR VI SEMESTER
(Cluster 1) Paper-VIII: Elective –A-1
Foundations of Data Science

Course Objectives

Modern scientific, engineering, and business applications are increasingly dependent on data, existing traditional data analysis technologies were not designed for the complexity of the modern world. Data Science has emerged as a new, exciting, and fast-paced discipline that explores novel statistical, algorithmic, and implementation challenges that emerge in processing, storing, and extracting knowledge from Big Data.

Course Outcomes

1. Able to apply fundamental algorithmic ideas to process data.
2. Learn to apply hypotheses and data into actionable predictions.
3. Document and transfer the results and effectively communicate the findings using visualization techniques.

UNIT I

INTRODUCTION TO DATA SCIENCE : Data science process – roles, stages in data science project – working with data from files – working with relational databases – exploring data – managing data – cleaning and sampling for modelling and validation – introduction to NoSQL.

UNIT II

MODELING METHODS : Choosing and evaluating models – mapping problems to machine learning, evaluating clustering models, validating models – cluster analysis – K-means algorithm, Naïve Bayes – Memorization Methods – Linear and logistic regression – unsupervised methods.

UNIT III

INTRODUCTION TO R Language: Reading and getting data into R – ordered and unordered factors – arrays and matrices – lists and data frames – reading data from files.

UNIT IV

PROBABILITY DISTRIBUTIONS in R - Binomial, Poisson, Normal distributions. - Manipulating objects - data distribution.

UNIT V

DELIVERING RESULTS : Documentation and deployment – producing effective presentations– Introduction to graphical analysis – plot() function – displaying multivariate data – matrix plots – multiple plots in one window - exporting graph - using graphics parameters in R Language. Case studies.

Reference Books

1.Nina Zumel, John Mount, "Practical Data Science with R", Manning Publications, 2014.
2.Jure Leskovec, Anand Rajaraman, Jeffrey D.Ullman, "Mining of Massive Datasets", Cambridge University Press, 2014.
3.Mark Gardener, "Beginning R - The Statistical Programming Language", John Wiley & Sons, Inc., 2012.
4.W. N. Venables, D. M. Smith and the R Core Team, "An Introduction to R", 2013.
5.Tony Ojeda, Sean Patrick Murphy, Benjamin Bengfort, Abhijit Dasgupta, "Practical Data Science Cookbook", Packt Publishing Ltd., 2014.
6.Nathan Yau, "Visualize This: The FlowingData Guide to Design, Visualization, and Statistics", Wiley, 2011.
7.Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, "Professional Hadoop Solutions", Wiley, ISBN: 9788126551071, 2015.

Student Activity:

1. **Collect data from any real time system and create clusters using any clustering algorithm**
2. **Read the student exam data in R perform statistical analysis on data and print results.**

III YEAR VI SEMESTER
(Cluster 1) Paper-VIII: Elective –A-1
Foundations of Data Science Lab

Objectives :

- R is a well-developed, simple and effective programming language which includes conditionals, loops, user defined recursive functions and input and output facilities.
- R has an effective data handling and storage facility,
- R provides a suite of operators for calculations on arrays, lists, vectors and matrices.
- R provides a large, coherent and integrated collection of tools for data analysis.

Outcomes:

1) At end student will learn to handle the data through R.
2) Student will familiar with loading and unloading of packages.

I. Installing R and R studio

II. Basic Operations in r

1. Arthematic Operations
2. Comments and spacing
3. Logical Operators - <, <=, >, >=, = , !=, &&, 1

III.
1. Getting data into R, Basic data manipulation
2. Vectors, Materials, operation on vectors and matrices.

IV.
1. Basic Plotting
2. Quantitative data
3. Frequency plots
4. Box plots
5. Scatter plot
6.Categorial data
7. Bar charts
8. Pie charts

V. Loops and functions

1. if, if else, while, for break, next, repeat.
2. Basic functions- Print(), exp( ), Log( ), sqrt( ), abs( ), sin( ), Cos( ), tan( ), factorial( ), rand ().

III YEAR VI SEMESTER
(Cluster 1) Paper-VIII : Elective –A-2

BIG DATA TECHNOLOGY

Course Objective

The Objective of this course is to provide practical foundation level training that enables immediate and effective participation in big data projects. The course provides grounding in basic and advanced methods to big data technology and tools, including MapReduce and Hadoop and its ecosystem.

Course Outcome

1. Learn tips and tricks for Big Data use cases and solutions.

2. Learn to build and maintain reliable, scalable, distributed systems with Apache Hadoop.

3. Able to apply Hadoop ecosystem components.

UNIT I

INTRODUCTION TO BIG DATA: Introduction – distributed file system – Big Data and its importance, Four V's in bigdata, Drivers for Big data, Big data analytics, Big data applications. Algorithms using map reduce, Matrix-Vector Multiplication by Map Reduce.

UNIT II

INTRODUCTION HADOOP : Big Data – Apache Hadoop & Hadoop EcoSystem – Moving Data in and out of Hadoop – Understanding inputs and outputs of MapReduce - Data Serialization.

UNIT- III

HADOOP ARCHITECTURE: Hadoop Architecture, Hadoop Storage: HDFS, Common Hadoop Shell commands , Anatomy of File Write and Read., NameNode, Secondary NameNode, and DataNode, Hadoop MapReduce paradigm, Map and Reduce tasks, Job, Tasktrackers - Cluster Setup – SSH & Hadoop Configuration – HDFS Administering – Monitoring & Maintenance.

UNIT-IV

HIVE AND HIVEQL, HBASE:-Hive Architecture and Installation, Comparison with Traditional Database, HiveQL - Querying Data - Sorting And Aggregating, Map Reduce Scripts, Joins & Subqueries,

UNIT-V

HBase concepts- Advanced Usage, Schema Design, Advance Indexing - Zookeeper - how it helps in monitoring a cluster, HBase uses Zookeeper and how to Build Applications with Zookeeper.

Reference Books

1. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, "Professional Hadoop Solutions", Wiley, ISBN: 9788126551071, 2015.
2 .Big Data Black Book(Covers Hadoop 2, Map Reduce, Hive, Yarn, Pig & Data Visualization)- Dream Tech Publications
3.Chris Eaton, Dirk deroos et al. , "Understanding Big data ", McGraw Hill, 2012.
4. Tom White, "HADOOP: The definitive Guide" , O Reilly 2012.
5. Vignesh Prajapati, "Big Data Analytics with R and Haoop", Packet Publishing 2013.
6. Tom Plunkett, Brian Macdonald et al, "Oracle Big Data Handbook", Oracle Press, 2014.
7. Jy Liebowitz, "Big Data and Business analytics",CRC press, 2013.

Student Activity:

1. Collect real time data and justify how it has become Big Data
2. Reduce the dimensionality of a big data using your own map reducer

III YEAR VI SEMESTER
(Cluster 1) Paper-VIII : Elective –A-2

BIG DATA TECHNOLOGY LAB

Objectives :

- Understand what Hadoop is
- Understand what Big Data is
- Learn about other open source software related to Hadoop

Outcomes:

i) Get help on the various Hadoop commands
ii) Observe a Map-Reduce job in action

1. Implement the following Data Structures in Java
a) Linked Lists
b) Stacks
c) Queues
d) Set
e) Map

2. (i) Perform setting up and Installing Hadoop in its three operating modes: Standalone
Pseudo distributed
Fully distributed
(ii) Use the web based tools to monitor your Hadoop setup.

3. Implement the following file management tasks in Haddop.
Adding files and directories
Retrieving files
Deleting files

III YEAR VI SEMESTER
(Cluster 2) Paper-VIII : Elective –B-1

Distributed Systems

Course Objectives

To expose the fundamentals of distributed computer systems, assuming the availability of facilities for data transmission.

To discuss multiple levels of distributed algorithms, distributed file systems, distributed databases, security and protection.

Course Outcomes

Create models for distributed systems.
Apply different techniques learned in the distributed system.

UNIT I

Introduction to Distributed Computing Systems, System Models, and Issues in Designing a Distributed Operating System, Examples of distributed systems.

UNIT II

Features of Message Passing System, Synchronization and Buffering, Introduction to RPC and its models, Transparency of RPC, Implementation Mechanism, Stub Generation and RPC Messages, Server Management, Call Semantics, Communication Protocols and Client Server Binding.

UNIT III

Introduction, Design and implementation of DSM system, Granularity and Consistency Model, Advantages of DSM, Clock Synchronization, Event Ordering, Mutual exclusion, Deadlock, Election Algorithms.

UNIT IV

Task Assignment Approach, Load Balancing Approach, Load Sharing Approach, Process Migration and Threads.

UNIT V

File Models, File Accessing Models, File Sharing Semantics, File Caching Schemes, File Replication, Atomic Transactions, Cryptography, Authentication, Access control and Digital Signatures.

Reference Books

1.Pradeep. K. Sinha: " Distributed Operating Systems: Concepts and Design " , PHI, 2007.
2 .George Coulouris, Jean Dollimore, Tim Kindberg: " Distributed Systems" , Concept and Design, 3rd Edition, Pearson Education, 2005.

Student Activity

1. Implementation of Distributed Mutual Exclusion Algorithm.
2. Create a Distributed Simulation Environment.

III YEAR VI SEMESTER
(Cluster 2) Paper-VIII : Elective –B-1

Distributed Systems Lab

Objective:
It covers all the aspects of distributed system. It introduce its readers to basic concepts of middleware, states of art middleware technology

Outcomes:

1. Students will get the concepts of Inter-process communication
2. Students will get the concepts of Distributed Mutual Exclusion and Distributed Deadlock Detection algorithm.

1. To study client server based program using RPC.

2. To study Client server based program using RMI.

3. To study Implementation of Clock Synchronization (Logical/Psysical)

4. To study Implementation of Election algorithm.

5. To study Implementation of Mutual Exclusion algorithms.

6. To write program multi-threaded client/server processes.

7. To write program to demonstrate process/code migration.

III YEAR VI SEMESTER
(Cluster 2) Paper-VIII : Elective –B-2

Cloud Computing

Course Objectives:

The student will learn about the cloud environment, building software systems and components that scale to millions of users in modern internet, cloud concepts capabilities across the various cloud service models including Iaas, Paas, Saas, and developing cloud based software applications on top of cloud platforms.

Course Outcomes

1. Compare the strengths and limitations of cloud computing
2. Identify the architecture, infrastructure and delivery models of cloud computing
3. Apply suitable virtualization concept.
4. Choose the appropriate cloud player , Programming Models and approach.
5. Address the core issues of cloud computing such as security, privacy and interoperability
6. Design Cloud Services and Set a private cloud

Unit 1

Cloud Computing Overview – Origins of Cloud computing – Cloud components - Essential characteristics – On-demand self-service , Broad network access , Location independent resource pooling , Rapid elasticity , Measured service

Unit II

Cloud scenarios – Benefits: scalability , simplicity , vendors ,security. Limitations – Sensitive information - Application development – Security concerns - privacy concern with a third party - security level of third party - security benefits Regularity issues: Government policies

Unit III

Cloud architecture: Cloud delivery model – SPI framework , SPI evolution , SPI vs. traditional IT Model

Software as a Service (SaaS): SaaS service providers – Google App Engine, Salesforce.com and google platfrom – Benefits – Operational benefits - Economic benefits – Evaluating SaaS **Platform as a Service** (PaaS): PaaS service providers – Right Scale – Salesforce.com – Rackspace – Force.com – Services and Benefits

Unit IV

Infrastructure as a Service (IaaS): IaaS service providers – Amazon EC2 , GoGrid – Microsoft soft implementation and support – Amazon EC service level agreement – Recent developments – Benefits

Cloud deployment model : Public clouds – Private clouds – Community clouds - Hybrid clouds - Advantages of Cloud computing

Unit V

Virtualization: Virtualization and cloud computing - Need of virtualization – cost , administration , fast deployment , reduce infrastructure cost - limitations

Types of hardware virtualization: Full virtualization - partial virtualization - para virtualization

Desktop virtualization: Software virtualization – Memory virtualization - Storage virtualization – Data virtualization – Network virtualization **Microsoft Implementation**: Microsoft Hyper V – Vmware features and infrastructure – Virtual Box - Thin client

Reference Books

1. Cloud computing a practical approach - Anthony T.Velte , Toby J. Velte Robert Elsenpeter TATA McGraw- Hill , New Delhi - 2010
2. Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online - Michael Miller - Que 2008
3. Cloud Computing, Theory and Practice, Dan C Marinescu, MK Elsevier.
4. Cloud Computing, A Hands on approach, Arshadeep Bahga, Vijay Madisetti, University Press
5. Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christenvecctiola, S Tammarai selvi, TMH

Student Activity:

1. Prepare the list of companies providing cloud services category wise.
2. Create a private cloud using local server

III YEAR VI SEMESTER
(Cluster 2) Paper-VIII : Elective –B-2

Cloud Computing Lab

Outcomes: Learner will be able to…
1. Appreciate cloud architecture
2. Create and run virtual machines on open source OS
3. implement Infrastructure , storage as a Service.

Use Eucalyptus or Open Nebula or equivalent to set up the cloud and demonstrate.
1. Find procedure to run the virtual machine of different configuration. Check how many virtual machines can be utilized at particular time.
2. Find procedure to attach virtual block to the virtual machine and check whether it holds the
data even after the release of the virtual machine.
3. Install a C compiler in the virtual machine and execute a sample program.
4. Show the virtual machine migration based on the certain condition from one node to the other.
5. Find procedure to install storage controller and interact with it.

1. Introduction to cloud computing.
2. Creating a Warehouse Application in Sales Force.com.
3. Creating an Application in Sales Force.com using Apex programming Language.
4. Implementation of SOAP web services in C#/ JAVA Applications.
5. Implementation of Para- Virtualization using VM ware's workstation/ Oracle's Virtual Box and Guest O.S.
6. Case study: PAAS (Face book, Google App Engine)
7. Case Study: Amazon web services.

Structure of Computer Science/Information Technology (IT) Syllabus
III YEAR VI SEMESTER

(Cluster C) Paper-VIII : Elective –C-1
Paper-VIII : PHP & MySql, Wordpress

Course Objectives

To introduce the concept of PHP and to give basic Knowledge of PHP. Learn about PHP Syntax., Arrays, PHP Loops, PHP and MySQL connectivity, PHP form validation, PHP form handling. Overview of MySQL and PHPMyAdmin, Understand basic concepts of how a database stores information via tables, Understanding of SQL syntax used with MySQL, Learn how to retrieve and manipulate data from one or more tables, Know how to filter data based upon multiple conditions, Updating and inserting data into existing tables, Learning how the relationships between tables will affect the SQL, The advantages of store procedures with storing data using variables and functions, How SQL can be used with programming languages like PHP to create dynamic websites for visitors, Review of some sample PHP projects interacting with MySQL.

Course Outcomes

After completing this course satisfactorily, a student will be able to:

1. Introduction to web development with PHP
2. How to code a PHP application
3. Introduction to relational databases and MySQL
4. How to use PHP with a MySQL database
5. How to use the MVC pattern to organize your code
6. How to test and debug a PHP application
7. How to work with form data
8. How to code control statements
9. How to work with strings and numbers
10. How to work with dates
11. How to create and use arrays
12. How to work with cookies and sessions
13. How to create and use functions
14. How to use regular expressions, handle exceptions, and validate data

UNIT I

Installing and Configuring MySQL: Current and Future Versions of MySQl, How to Get MySQL, Installing MySQL on Linux, Windows, Trouble Shooting your Installation, Basic Security Guidelines, Introducing MySQL Privilege System, Working with User Privileges. Installing and Configuring Apache: Current and future versions of Apache, Choosing the Appropriate Installation Method, Installing Apache on Linux, Windows, Apache Configuration File Structure, Apache Log Files, Apache Related Commands, Trouble Shooting. Installing and Configuring PHP: Building PHP on Linux with Apache, Windows, php.ini.Basics, The Basics of PHP scripts. The Building blocks of PHP: Variables, Data Types, Operators and Expressions, Constants. Flow Control Functions in PHP: Switching Flow, Loops, Code Blocks and Browser Output.

UNIT II

Working with Functions: What is function?, Calling functions, Defining Functions, Returning the values from User-Defined Functions, Variable Scope, Saving state between Function calls with the static statement, more about arguments. Working with Arrays: What are Arrays?, Creating Arrays, Some Array-Related Functions.

Working with Objects: Creating Objects, Object Instance

Working with Strings, Dates and Time: Formatting strings with PHP, Investigating Strings with PHP, Manipulating Strings with PHP, Using Date and Time Functions in PHP.

UNIT III

Working with Forms: Creating Forms, Accessing Form Input with User defined Arrays, Combining HTML and PHP code on a single Page, Using Hidden Fields to save state, Redirecting the user, Sending Mail on Form Submission, Working with File Uploads. Working with Cookies and User Sessions: Introducing Cookies, Setting a Cookie with PHP, Session Function Overview, Starting a Session, Working with session variables, passing session IDs in the Query String, Destroying Sessions and Unsetting Variables, Using Sessions in an Environment with Registered Users. Working with Files and Directories: Including Files with inclue(), Validating Files, Creating and Deleting Files, Opening a File for Writing, Reading or Appending, Reading from Files, Writing or Appending to a File, Working with Directories, Open Pipes to and from Process Using popen(), Running Commands with exec(), Running Commands with system() or passthru(). Working with Images: Understanding the Image-Creation Process, Necessary Modifications to PHP, Drawing a New Image, Getting Fancy with Pie Charts, Modifying Existing Images, Image Creation from User Input.

UNIT IV

Introduction to MySQL and Interfacing with Databases through PHP

Understanding the database design process: The Importance of Good Database Design, Types of Table Relationships, Understanding Normalization. Learning basic SQL Commands: Learning the MySQL Data types, Learning the Table Creation Syntax, Using Insert Command, Using SELECT Command, Using WHERE in your Queries, Selecting from Multiple Tables, Using the UPDATE command to modify records, Using RELACE Command, Using the DELETE Command, Frequently used string functions in MySQL, Using Date and Time Functions in MySQL. Using Transaction and stored procedures in MySQL: What is Transaction?, What are Stored Procedures? Interacting with MySQL using PHP: MySQL Versus MySQLi Functions, Connecting to MySQL with PHP, Working with MySQL Data. Creating an Online Address Book: Planning and Creating Database Tables, Creating Menu, Creating Record Addition Mechanism, Viewing Records, Creating the Record Deletion Mechanism, Adding Sub-entities to a Record.

UNIT V

Word press: Introduction to word press, servers like wamp, bitnami e.tc, installing and configuring word press, understanding admin panel, working with posts and pages, using editor, text formatting with shortcuts, working with media-Adding, editing, deleting media elements, working with widgets, menus. Working with themes-parent and child themes, using featured images, configuring settings, user and user roles and profiles, adding external links, extending word press with plug-ins. Customizing the site, changing the appearance of site using css .

REFERENCE BOOKS

1. Julie C. Meloni, PHP MySQL and Apache, SAMS Teach yourself, Pearson Education (2007).
2. Xue Bai Michael Ekedahl, The web warrior guide to Web Programming, Thomson (2006).

Student activity:

1. **Creation of a webpage using wordpress**
2. **Creation of student database of the college**

PHP, MySql & Wordpress LAB

MySQL Lab Cycle
Cycle -1
An Enterprise wishes to maintain the details about his suppliers and other corresponding details. For that he uses the following details.
Suppliers (sid: Integer, sname: string, address: string)
Parts (pid: Integer, pname: string, color: string)
Catalog (sid: integer, pid: integer, cost: real)
The catalog relation lists the prices charged for parts by suppliers.

Write the following queries in SQL:

1. Find the pnames of parts for which there is some supplier.
2. Find the snames of suppliers who supply every part.
3. Find the snames of supplier who supply every red part.
4. Find the pnames of parts supplied by London Supplier abd by no one else.
5. Find the sid's of suppliers who charge more for some part than the average cost of that part.
6. For each part, find the sname of the supplier who charges the most for that part.
7. Find the sid's of suppliers who supply only red parts.
8. Find the sid's of suppliers who supply a red and a green part.
9. Find the sid's of suppliers who supply a red or green part.
10. Find the total amount has to pay for that suppler by part located from London.

Cycle – 2
An organisation wishes to maintain the status about the working hours made by his employees. For that he uses the following tables.

Emp (eid: integer, ename: string, age: integer, salary: real)
Works (eid: integer, did: integer, pct_time: integer)
Dept (did: integer, budget: real, managerid: integer)
An employee can work in more than one department; the pct_time field of the works relation shows the percentage of time that a given employee works in a given department.

Resolve the following queries.

1. Print the names and ages of each employee who works in both Hardware and Software departments.
2. For each department with more than 20 full time equivalent employees (i.e., where the part-time and full-time employees add up to at least that many full-time employees), print the did's together with the number of employees that work in that department.
3. Print the name of each employee whose salary exceeds the budget of all of the departments that he or she work in.
4. Find the managerid's of managers who manage only departments with budgets greater than 1,000,000.
5. Find the enames of managers who manage the departments with largest budget.
6. If a manager manages more than one department, he or she controls the sum of all the budgets for those departments. Find the managerid's of managers who control more than 5,000,000.
7. Find the managerid's of managers who control the highest amount.
8. Find the average manager salary.

PHP Lab Cycle

1. Write a PHP program to Display "Hello"
2. Write a PHP Program to display the today's date.
3. Write a PHP Program to read the employee details.
4. Write a PHP Program to display the
5. Write a PHP program to prepare the student marks list.
6. Write a PHP program to generate the multiplication of two matrices.
7. Write a PHP Application to perform demonstrate the college website.
8. Write a PHP application to add new Rows in a Table.
9. Write a PHP application to modify the Rows in a Table.
10. Write a PHP application to delete the Rows from a Table.
11. Write a PHP application to fetch the Rows in a Table.
12. Develop an PHP application to make following Operations
    i. Registration of Users.
    ii. Insert the details of the Users.
    iii. Modify the Details.
    iv. Transaction Maintenance.
        a) No of times Logged in
        b) Time Spent on each login.
        c) Restrict the user for three trials only.
        d) Delete the user if he spent more than 100 Hrs of transaction.

Wordpress Lab

1. Installation and configuration of word press.
2. Create a site and add a theme to it.

Paper-VIII: Advanced Java Script
JQUERY /AJAX / JSON / Angular JS

Course Objective:

To impart knowledge in designing a webpage in a structured way by using advanced java script ie., using different scripting languages.

Course Outcomes

On completing the subject, students will be able to: create a dynamic website using advanced features of JavaScript and create a website with good and attractive design

UNIT I

JQuery – Basics: String, Numbers, Boolean, Objects, Arrays, Functions, Arguments, Scope, Built-in Functions. jQuery – Selectors: CSS Element Selector, CSS Element ID Selector, CSS Element Class Selector, CSS Universal Selector, Multiple Elements E, F, G Selector, Callback Functions. jQuery – DOM Attributes: Get Attribute Value, Set Attribute Value. jQuery – DOM Traversing : Find Elements by index, Filtering out Elements, Locating Descendent Elements, JQuery DOM Traversing Methods.

UNIT II

jQuery – CSS Methods : Apply CSS Properties, Apply Multiple CSS Properties, Setting Element Width & Height, JQuery CSS Methods. jQuery – DOM Manipulation Methods: Content Manipulation, DOM Element Replacement, Removing DOM Elements, Inserting DOM elements, DOM Manipulation Methods. jQuery – Events Handling: Binding event handlers, Removing event handlers, Event Types, The Event Object, The Event Attributes. jQuery – Effects: JQuery Effect Methods, jQuery Hide and Show, jQuery Toggle, jQuery Slide – slideDown, slideUp, slideToggle, jQuery Fade – fadeIn, fadeOut, fadeTo, jQuery Custom Animations

UNIT III

Intro to **jQuery UI**, Need of jQuery UI in real web sites, Downloading jQuery UI, Importing jQuery UI, Draggable, Droppable, Resizable, Selectable, Sortable, Accordion, Auto Complete, Button Setϖ, Date Picker, Dialog, Menu, Progress Bar, Slider, Spinner, Tabs, Tooltip, Color Animation, Easing Effects, addClass, removeClass, Effects, jQuery UI themes, Customizing jQuery UI widgets / plug-ins, jQuery UI with CDN, Consuming jQuery Plug-ins from 3rd party web sites jQuery Validations, Intro to jQuery validation plug-in, Using jQuery validation plug-in, Regular expressions.

UNIT IV

Intro to AJAX, Need of AJAX in real web sites, Getting database data using jQuery-AJAX, Inserting, Updating, Deleting database data using jQuery-AJAX Grid Development using jQuery-AJAX

Intro to **JSON** JSON syntax, Need of JSON in real web sites, JSON object, JSON array, Complex JSON objects, Reading JSON objects using jQuery.

UNIT V

Intro to **AngularJS,** Need of AngularJS in real web sites, Downloading AngularJS, AngularJS first example, AngularJS built-in directives, AngularJS expressions, AngularJS modules, AngularJS controllers, AngularJS scope AngularJS dependency injection AngularJS, bootstrapping AngularJS data bindings, AngularJS $watch, AngularJS filters, AngularJS events, AngularJS AJAX, Ng-repeat, AngularJS with json arrays, AngularJS registration form and login form, AngularJS CRUD operations, AngularJS Animations, AngularJS validationsϖ AngularJS $q, AngularJS custom values, AngularJS custom factories, AngularJS custom services, AngularJS custom directives, AngularJS custom providers, AngularJS Routing, AngularUI Routing.

Reference Books

1. jQuery UI 1.8: The User Interface Library for jQuery by Dan Wellman
2. jQuery Fundamentals by Rebecca Murphey
3. Ajax: The Complete Reference by Thomas A. Powell
4. Pro AngularJS by Adam Freeman Kindle Edition

Student Activity:

1. Creation of website for a small scale company
2. Creation of website for a student database

III YEAR V SEMESTER

Advanced Java Script
JQUERY /AJAX / JSON / Angular JS

1. Using jQuery find all textareas, and makes a border. Then adds all paragraphs to the jQuery object to set their borders red.

2. Using jQuery add the class "w3r_font_color" and w3r_background to the last paragraph element.

3. Using jQuery add a new class to an element that already has a class.

4. Using jQuery insert some HTML after all paragraphs.

5. Using jQuery insert a DOM element after all paragraphs.

6. Convert three headers and content panels into an accordion. Initialize the accordion and specify the animate option

7. Convert three headers and content panels into an accordion. Initialize the accordion and specify the height.

8. Create a pre-populated list of values and delay in milliseconds between a keystroke occurs and a search is performed.

9. Initialize the button and specify the disable option.

10. Initialize the button and specify an icon on the button.

11. Initialize the button and do not show the label.

12. Create a simple jQuery UI Datepicker. Now pick a date and store it in a textbox.

13. Initialize the datepicker and specify a text to display for the week of the year column heading.

III YEAR VI SEMESTER

PROJECT-2

Follow SDLC process for real time applications and develop real time application project

The objective of the project is to motivate them to work in emerging/latest technologies, help the students to develop ability, to apply theoretical and practical tools/techniques to solve real life problems related to industry, academic institutions and research laboratories.

The project is of 5 hours/week for one (semester VI) semester duration and a student is expected to do planning, analyzing, designing, coding, and implementing the project. The initiation of project should be with the project proposal. The synopsis approval will be given by the project guides.

The project proposal should include the following:

- Title
- Objectives
- Input and output
- Details of modules and process logic
- Limitations of the project
- Tools/platforms, Languages to be used
- Scope of future application

The Project work should be either an individual one or a group of not more than three members and submit a project report at the end of the semester. The students shall defend their dissertation in front of experts during viva-voce examinations.

B.Sc., BOTANY SEMESTER-WISE SYLLABUS
THEORY, PRACTICALS AND MODEL QUESTION PAPERS
(AS PER CBCS AND SEMESTER SYSTEM)

I, II & III YEARS

w.e.f. 2015-16
(REVISED IN APRIL, 2016)

AP STATE COUNCIL OF HIGHER EDUCATION
CBCS - PATTERN FOR BOTANY

Andhra Pradesh State Council of Higher Education

Structure of B.Sc Botany under CBCS

w.e.f. 2015-16 (Revised in April, 2016)

Year	*Semester*	*Paper*	*Title*	*Hours*	*Marks*	*Credits*
I	**I**	**I**	Microbial Diversity , Algae and Fungi	**4**	**100**	**03**
			Practical –I	**2**	**50**	**02**
	II	**II**	Diversity Of Archaegoniates & Anatomy	**4**	**100**	**03**
			Practical –II	**2**	**50**	**02**
II	**III**	**III**	Plant taxonomy &Embryology	**4**	**100**	**03**
			Practical –III	**2**	**50**	**02**
	IV	**IV**	Plant physiology & Metabolism	**4**	**100**	**03**
			Practical –IV	**2**	**50**	**02**
III	**V**	**V**	Cell Biology, Genetics &Plant breeding	**3**	**100**	**03**
			Practical –V	**2**	**50**	**02**
		VI	Plant Ecology & Phytogeography	**3**	**100**	**03**
			Practical –VI	**2**	**50**	**02**
	*Any one paper from (A), (B) and (C) can be selected **VI** **Any one cluster (Set of Three Papers) from VIII-A or VIII-B can be selected	**VII (A)***	Elective	**3**	**100**	**03**
			Lab	**2**	**50**	**02**
		VII (B)*	Elective			
			Lab			
		VII (C)*	Elective			
			Lab			
		** **VIII-A**	**Cluster Elective-A** **VIII-A-1** **VIII-A-2** **VIII-A-3** **Or**	**3** **3** **3** **2** **2** **2**	**100** **100** **100** **50** **50** **50**	**03** **03** **03** **02** **02** **02**
		** **VIII-B**	**Cluster Elective-B** **VIII-B-1** **VIII-B-2** **VIII-B-3**			

Andhra Pradesh State Council of Higher Education

I B.Sc - SEMESTER- I: BOTANY SYLLABUS

w.e.f. 2015-16 (Revised in April, 2016)

Paper- I : Microbial Diversity, Algae and Fungi

Total hours of teaching 60hrs @ 4 hrs per week

UNIT- I: MICROBIAL WORLD (Origin and Evolution of Life, Microbial diversity (12hrs)

1. Discovery of microorganisms, origin of life, spontaneous, biogenesis, Pasteur experiments, germ theory of disease.
2. Classification of microorganisms – R.H. Whittaker's five kingdom concept, Carl Woese's- Domain system.
3. Brief account of special groups of bacteria- Archaebacteria, Mycoplasma, Chlamydia, Actinomycetes, Rickettsias and Cyanobacteria.

UNIT- II: VIRUSES (12hrs)

1. Viruses- Discovery, general account, structure& replication of –T4 Phage (Lytic, Lysogenic) and TMV, Viroids, Prions.
2. Plant diseasescaused by viruses– Symptoms, transmission and control measures (Brief account only).
3. Study of Tobacco Mosaic, Bhendi Vein clearing and Papaya leaf curl diseases.

UNIT III: BACTERIA (12hrs)

1. Bacteria: Discovery, General characteristics, cell structure andnutrition.
2. Reproduction- Asexual and bacterial recombination (Conjugation, Transformation, Transduction).
3. Economic importance of Bacteria.

UNIT –IV Algae (12hrs)

1. General account - thallus organization and reproduction in Algae.
2. Fritsch classification of Algae (up to classes only) and economic importance.
3. Structure, reproduction and life history of *Oedogonium, Ectocarpus* and *Polysiphonia.*

UNIT V: FUNGI (12hrs)

1. General characteristics and outline classification (Ainsworth).
2. Structure, reproduction and life history of *Rhizopus* (Zygomycota),*Penicillium* (Ascomycota), and *Puccinia* (Basidiomycota).
3. Lichens-Structure and reproduction; ecological and economic importance.

Suggested activity: Seminar, Quiz, debate, collection of diseased plant parts –studying symptoms and identification of pathogen, collection and study of fresh and marine Algae available in local area.

Books for Reference:

1. Oladele Ogunseitan (2008) Microbial Diversity: Form and Function in Prokaryotes Wiley- Blackwell.
2. Pelczar, M.J. (2001) Microbiology, 5th edition, Tata Mc Graw-Hill Co, New Delhi.
3. Presscott, L. Harley, J. and Klein, D. (2005) Microbiology, 6th edition, Tata Mc Graw- Hill Co. New Delhi.
4. Fritsch F.E. (1935 The Structure & Reproduction of Algae 1945): Cambridge University Press Cambridge, U.K. Vol. I, Vol. II.
5. Smith, G.M (1955) :Cryptogamic Botany(Vol. I Algae, Fungi, & Lichens) McGraw-Hill Book Co., New York .
6. Ian Morris (1967): An Introduction to the Algae, Hutchinson, London.
7. Alexopoulos,C.J.., Mims, C.W. & Blackwell, M. (1996): Introductory Mycology John Wiley& Sons., Inc., N.Y., Chicester, Berisbane, Toronto, Singapore.
8. Webster, J (1999) : Introduction to Fungi(2nd edition) Cambridge University Press.

**Student Activities like Seminars, Assignments, Fieldwork, Study Projects, Models etc. are Part of Curriculum for all units in all papers.

I B.Sc – SEMESTER –I: BOTANY PRACTICAL SYLLABUS

Paper-I: Microbial Diversity, Algae and Fungi

Total hours of laboratory Exercises 30 hrs @ 2 per week

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1. Knowledge of Equipment used in Microbiology: Spirit lamp, Inoculation loop, Hot-air oven, Autoclave/Pressure cooker, laminar air flow chamber and Incubator.
2. Preparation of liquid and solid media for culturing of microbes (Demonstration).
3. Study of viruses and bacteria using electron photo micrographs (TMV, Bacteriophage, HIV, Cocci, Bacillus, Spirillum bacteria).
4. Gram staining technique.
5. Study of Plant disease symptoms caused by Bacteria (Citrus canker, leaf blight of rice, Angular leaf spot of Cotton) and viruses (TMV, Bhendi vein clearing and Leaf curl of Papaya),Fungi (Late blight of potato, Red rot of Sugarcane and Paddy blast).
6. Study of vegetative and reproductive structures of the following :
   a) **Cyanobacteria:** *Nostoc and Scytonema*.
   b) Algae: *Oedogonium, Ectocarpus, Polysiphonia,*
   c) Fungi: *Rhizopus, Penicillium and Puccinia* .
7. Study of plant materialinfected by Fungi (Rot of tomatoes,blue and greenmoulds of Ciitrus fruits and wheat rust(Section cutting of diseased parts of Wheat and Barberry -identification of different spores).
8. Lichens: Morphology and of anatomy of different thalli.
9. Field Visit.

B.Sc - SEMESTER –I
BOTANY PRACTICAL PAPER –I
Paper-1 P: Microbial Diversity, Algae and Fungi

Time: 3hrs. Max. Marks: 50

1. Identify giving reasons two of the given **Algal mixture" A**". Leave your preparation for evaluation. Draw labeled diagrams. (Slide--1mark, Diagrams--1mark, Identification--1mark)
   3x 2 = 6 Marks

2. Make suitable stained preparation of the **material "B"** to bring out the details of internal structure--identify giving reasons. Draw labeled diagrams and leave your preparations for evaluation. (Slide-4 marks, diagrams-3 marks, Identification-3marks)
   10 Marks

3. Perform Gram staining of the given Bacterial culture 9 Marks

4. Write critical notes and Identify D, E, F, G and H (5X3)= 15 Marks

5. Record(submission is compulsory) 10 Marks

Total: 50 Marks

Key:

A. Algal material
B. Fungi material
C. Bacterial culture
D. One of the instruments of Micro biology laboratory.
E. Whole specimen or a permanent slide of Algae.
F. Whole specimen or a permanent slide of Fungi.
G. Whole specimen or a permanent slide of Plant disease studied.
H. Whole specimen or a permanent slide of Lichens.

I B. Sc - SEMESTER- II: BOTANY THEORY SYLLABUS

Paper –II : Diversity of Archaegoniates &Plant Anatomy

Total hours of teaching 60hrs @ 4 hrs per week

UNIT – I: BRYOPHYTES

(12hrs)

1. Bryophytes: General characters, Classification (up to classes)
2. Structure, reproduction and Life history of *Marchantia,* and *Funaria*.
3. Evolution of Sporophyte in Bryophytes.

UNIT - II: PTERIDOPHYTES

(12hrs)

1**.** Pteridophytes**:** General characters, classification (up to Classes)
2. Structure, reproduction and life history of *Lycopodium,* and *Marsilea*.
3. Heterospory and seed habit.
4. Evolution of stele in Pteridophytes.

UNIT – III: GYMNOSPERMS

(12hrs)

1. Gymnosperms: General characters, classification (up to classes)
2. Morphology, anatomy**,** reproduction and life history of *Pinus and Gnetum*
3. Economic importance with reference to wood, essential oils and drugs

UNIT –I V: Tissues and Tissue systems

(12hrs)

1. Meristems - Root and Shoot apical meristems and their histological organization.
2. Tissues – Meristematic and permanent tissues (simple, complex, secretory)
3. Tissue systems**–**Epidermal, ground and vascular.

UNIT – V**. Secondary growth**

(12hrs)

1. Anomalous secondary growth in *Achyranthes, Boerhaavia* and *Dracaena*.
2. Study of local timbers of economic importance-Teak, Rosewood, Red sanders and Arjun (Tella maddi).

Suggested activity: Collection of *Marsilea* sporocarp, *Pinus* needles, male and female cones, study of *Pinus* pollen grains, collection of locally available economically useful timbers.

Books for Reference:

1. Cavers, Frank ( ): The inter-relationships of the Bryophytes New Phytologist, Indian Reprint.
2. Smith, G.M. (1955): Cryptogamic Botany Vol. II. (2nd Edition) (Bryophytes & Pteridophytes) Tata McGraw Hill Publishing Co., New Delhi.
3. Parihar, N.S. ( ): An Introduction to embryophyta – Vol.II. Bryophyta Central Book Depot, Allahabad.
4. Watson, E.V. (1968): British Mosses & Liverworts Cambridge University Press, U.K
5. Eames, A.J. (1936) : Morphology of Vascular Plants (Lower Groups) McGraw Hill, N.Y.
6. Parihar, N.S. (19) : An Introduction to Embryophyta Vol.II Pteridophyta Central Book Depot., Allahabad.
7. Smith, G.M. (1955) : Cryptogamic Botany Vol.II (2nd Edn.,) (Bryophytes & Pteridophytes) Tata McGraw Hill Publishing Co., New Delhi.
8. Sporne, K.R. (1970) : The Morphology of Pteridophytes (The Structure of Ferns and Allied Plants) Hutchinson University Library, London
9. Bierhorst, D.W. (1971) : Morphology of Vascular Plants, The MacMillan Co., N.Y. & Collier- MacMillan Ltd., London.
10. Coulter, J.M.& C.J. Chamberlain (1964) : Morphology of Gymnosperms Central Book Depot, Allahabad.
11. Sporne, K.R. (1971): The Morphology of Gymnosperms (The Structure and Evolution of Primitive seed Plants) Hutchinson University Library, London.
12. Esau, K. (1965) : Vascular Differentiation in Plants. Holt, Rinehart & Winston, N.Y., Chicago, San Fransisco, Toronto, London.
13. Eames, A.J., & Mc Daniels, L.H.(1979) : An Introduction to Plant anatomy Tata-McGraw-Hill Publishing Co., (P) Ltd. Bombay, New Delhi.
14. Esau. K.(1980) : Plant Anatomy, (2nd Edition) Wiley Eastern Ltd., New Delhi.

I B.Sc SEMESTER -II
BOTANY PRACTICAL SYLLABUS
Paper-II: Diversity of Archaegoniates & Plant Anatomy

Total hours of laboratory Exercises 30 hrs @ 2 per week

1. Morphology (vegetative and reproductive structures) , anatomy of the following :

   Marchantia, Funaria, Lycopodium and *Pinus.*

2. Anatomy:

   a) Demonstration of double staining technique.

   b) Tissue organization in root and shoot apices using permanent slides

   c) Preparation of double staining slides

   d) Anomalous secondary structure of *Achyranthes, Boerhavia* and *Dracaena*.

   e) Anatomical study of wood in T.S., T.L.S. and R.L.S.

3. Field visits to local timber depots.

I B.Sc., SEMESTER –II: BOTANY PRACTICAL MODEL PAPER II
II P: Diversity of Archaegoniates & plant Anatomy

1. Section cutting of material **-A** 9 Marks
   (Slide 3 marks, diagrams-3 marks, Identification-3 marks)

2. Section cutting of material **-B** 9 Marks
   (Slide 3 marks, diagrams-3 marks, Identification-3 marks)

3. Section cutting of material **-C** 10 Marks
   (Slide 4 marks, diagrams-3 marks, Identification-3 marks)

4. Identification of spotters -D, E, and F 3x4 =12 marks

5. Record (submission compulsory) 10 marks

Total : 50 Marks

Key:

A. Bryophyta/ Pteridophyta material
B. Gymnosperm material.
C. Anatomy material.
D. Whole specimen or permanent slide of Bryophyta/ Pteridophyta
E. Whole specimen or permanent slide of Gymnosperm.
F. Whole specimen or permanent slide of wood.

II B. Sc - SEMESTER –III: BOTANY THEORY PAPER –III

Paper-III : Plant Taxonomy and Embryology)

Total hours of teaching 60hrs @ 4 hrs per week

UNIT – I: INTRODUCTION TO PLANT TAXONOMY

(12hrs)

1.Fundamental components of taxonomy (identification, nomenclature, classification)
2. Taxonomic resources: Herbarium- functions& important herbaria, Botanical gardens, Flora, Keys- single access and multi-access.
3. Botanical Nomenclature- Principles and rules of ICBN (ranks and names; principle of priority, binomial system; type method, author citation, valid-publication).

UNIT – II: CLASSIFICATION (12 hrs)

1. Types of classification- Artificial, Natural and Phylogenetic.
2. Bentham & Hooker's system of classification- merits and demerits.
3. Engler & Prantle's system of classification- merits and demerits
4. Phylogeny – origin and evolution of Angiosperms

UNIT –III: SYSTEMATIC TAXONOMY-I

(12hrs)

1. Systematic study and economic importance of the following families: Annonaceae, Brassicaceae, Rutaceae, Curcurbitaceae, and Apiaceae.

UNIT –IV: SYSTEMATIC TAXONOMY-II (12hrs)

1. Systematic study and economic importance of plants belonging to the following families: Asteraceae, Asclepiadaceae, Lamiaceae, Ephorbiaceae,Arecaceae,and Poaceae.

UNIT – V: EMBRYOLOGY (12hrs)

1. Anther structure, microsporogenesis and development of male gametophyte.
2. Ovule structure and types; Megasporogenesis, development of Monosporic, Bisporic and Tetrasporic types (*Peperomia ,Drusa, Adoxa*) of embryo sacs.
3. Pollination and Fertilization (out lines) Endosperm development and types.
4. Development of Dicot and Monocot embryos, Polyembryony.

Suggested activity: Collection of locally available plants of medicinal importance, observing pollen grains in honey, Aero palynology-collection of pollen from air using glycerin strips in different seasons.

Books for Reference:

1. Porter, C.L. ( ): Taxonomy of flowering Plants, Eurasia Publishing House, New Delhi.

2. Lawrence, G.H.M. (1953): Taxonomy of Vascular Plants, Oxford & IBH Publishers, New Delhi, Calcutta.

3. Jefferey, C.(1968) : An Introduction to Plant Taxonomy J.A. Churchill, London.

4. Mathur, R.C.(1970) : Systematic Botany (Angiosperms) Agra Book Stores- Lucknow, Ajmer, Allahabad, Delhi.

5. Maheswari,P(1963) :Recent Advances in the Embryology of Angiosperms(Ed.,) International Society of Plant Morphologists- University of Delhi.

6. Swamy. B.G.L. & Krishnamoorthy. K.V.(1980):From flower to fruit Tata McGraw Hill Publishing Co., Ltd., New Delhi.

6. Maheswari, P.(1985):An Introduction to the Embryology of Angiosperms Tata McGraw Hill Publishing Co.,Ltd., New Delhi.

8. Bhojwani, S.S. & Bhatnagar, S.P. (2000) : The Embryology of Angiosperms (4th Edition) Vikas Publishing House(P)Ltd., UBS Publisher's Distributors, New Delhi.

II B.Sc BOTANY - SEMESTER-III
Paper-III: PRACTICAL
Plant Taxonomy and Embryology

Total hours of laboratory Exercises 30hrs @ 2 per week

Suggested Laboratory Exercises:

1. Systematic study of locally available plants belonging to the families prescribed in theory syllabus.
2. Demonstration of herbarium techniques.
3. Structure of pollen grains using whole mounts (*Catharanthus, Hibiscus, Acacia*, Grass).
4. Demonstration of Pollen viability test using *in- vitro* germination (*Catharanthus*).
5. Study of ovule types and developmental stages of embryo sac using permanent slides /Photographs.
6. Structure of endosperm (nuclear and cellular); Developmental stages of dicot and monocot Embryos using permanent slides / Photographs
7. Isolation and mounting of embryo (using *Symopsis / Senna* / *Crotalaria*)
8. Field visits .
9. Study of local flora and submission of Field Note Book.

II B.Sc., BOTANY- SEMESTER -III
PRACTICAL MODEL PAPER III Plant Taxonomy and Embryology

1. Describe the given Plant specimens (A & B) in technical terms. Draw neat labeled diagrams of twig with inflorescence, L.S. of Flower, T.s. of Ovary and floral Diagram. Give floral formula. Identify the family.

   2x 10 = 20 Marks

   (Description- vegetative - 2 marks, floral – 4 marks; diagrams-3 marks, Identification-1 marks)

2. Derive the plant specimens C & D to their respective families- 2x4 = 08 marks

3. Identification of spotters -D, E ,and F (Embryology) 3x4 =12 marks

4. Record & Herbarium (submission compulsory) 10 marks

Total : 50 Marks

II B.Sc. BOTANY, SEMESTER- IV, Paper-IV: THEORY SYLLABUS

PAPER –IV: Plant Physiology and Metabolism

Total hours of teaching 60hrs @ 4 hrs per week

UNIT – I: Plant – Water relations (12 hrs)

1. Physical properties of water, Importance of water to plant life.
2. Diffusion, imbibition and osmosis; concept & components of Water potential.
3. Absorption and transport of water and ascent of sap.
4. Transpiration –Definition, types of transpiration, structure and opening and closing mechanism of stomata.

UNIT –II: Mineral nutrition & Enzymes (12hrs)

1. Mineral Nutrition**:** Essential elements (macro and micronutrients) and their role in plant metabolism, deficiency symptoms.
2. Mineral ion uptake (active and passive transport).
3. Nitrogen metabolism- biological nitrogen fixation in *Rhizobium*, outlines of protein synthesis (transcription and translation).
4. Enzymes**:** General characteristics, mechanism of enzyme action and factors regulating enzyme action.

UNIT –III: PHOTOSYNTHESIS (12 hrs)

1. Photosynthesis: Photosynthetic pigments, photosynthetic light reactions, photo-phosphorylation, carbon assimilation pathways: C_3, C_4, and CAM (brief account)
2. Photorespiration and its significance.
3. Translocation of organic solutes: mechanism of phloem transport, source-sink relationships.

UNIT – IV: PLANT METABOLISM (12 hrs)

1. Respiration: Glycolysis, anaerobic respiration, TCA cycle, electron transport system. Mechanism of oxidative phosphorylation.
2. Lipid Metabolism**:** Types of lipids, Beta-oxidation.

UNIT –V: GROWTH AND DEVELOPMENT

(12hrs)

1. Growth and development: definition, phases and kinetics of growth.
2. Physiological effects of phytohormones - Auxins, Gibberellins, Cytokinins, ABA, Ethylene and Brassinosteroids.
3. Physiology of flowering -photoperiodism, role of phytochrome in flowering; Vernalization.
4. Physiology of Scenescence and Ageing.

Suggested activity: Seminars, Quiz, Debate, Question and Answer sessions, observing animations of protein biosynthesis in you tube.

Books for Reference:

1. Steward. F.C (1964): Plants at Work (A summary of Plant Physiology) Addison-Wesley Publishing Co., Inc. Reading, Massachusetts, Palo alto, London.

2. Devlin, R.M. (1969) : Plant Physiology, Holt, Rinehart & Winston & Affiliated East West Press (P) Ltd., New Delhi .

3. Noggle, R.& Fritz (1989):Introductory Plant Physiology Prentice Hall of India.

4. Lawlor.D.W. (1989): Photosynthesis, metabolism, Control & Physiology ELBS/Longmans-London.

5. Mayer, Anderson & Bonning(1965): Introduction to Plant Physiology D.Van Nostrand . Publishing Co., N.Y.

6. Mukherjee, S. A.K. Ghosh(1998) Plant Physiology ,Tata McGraw Hill Publishers(P) Ltd., New Delhi.

7. Salisbury, F.B & C.W. Ross (1999): Plant Physiology CBS Publishers and Printers, New Delhi.

7. Plummer, D.(1989) Biochemistry–the Chemistry of life ,McGraw Hill Book Co., London, N.Y. New Delhi, Paris, Singapore, Tokyo.

9. Day, P.M.& Harborne, J.B. (Eds.,) (2000): Plant Biochemistry. . Harcourt Asia (P) Ltd., India & Academic Press, Singapore.

II B. Sc BOTANY SEMESTRE- IV, Paper–IV: PRACTICAL SYLLABUS
PAPER-IV: Plant Physiology and Metabolism

Total hours of laboratory Exercises 30 hrs @ 2 per week

Suggested Laboratory Exercises:

1. Osmosis – by potato osmoscope experiment
2. Determination of osmotic potential of plant cell sap by plasmolytic method using leaves of *Rhoeo / Tradescantia*.
3. Structure of stomata (dicot & monocot)
4. Determination of rate of transpiration using cobalt chloride method.
5. Demonstration of transpiration by Ganongs' photometer
6. Demonstration of ascent of sap/Transpiration pull.
6. Effect of Temperature on membrane permeability by colorimetric method.
7. Study of mineral deficiency symptoms using plant material/photographs.
8. Separation of chloroplast pigments using paper chromatography technique.
9. Rate of photosynthesis under varying Co_2 concentrations.
10. Effect of light intensity on oxygen evolution in photosynthesis using Wilmott' bubbler.

II B. Sc – SEMESTER- IV, BOTANY PRACTICAL MODEL PAPER
PAPER- IV - Plant Physiology and Metabolism

1. Perform the Experiments A & B. Give the aim, principle, procedure and observation. Tabulate the results if any. Draw labeled diagram. 2 x 15 = 30 marks
2. Give the protocol of the experiments C & D 2 x 5 -= 10 marks
3. Record & Viva

10 marks

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50 marks

III B. Sc - SEMESTER- V: BOTANY SYLLABUS
THEORY PAPER – V
Paper-V: Cell Biology, Genetics and Plant Breeding

Total hours of teaching 60 hrs @ 3 hrs per week

UNIT – I Cell Biology: **(12hrs)**

1. Cell, the unit of life- Cell theory, Prokaryotic and eukaryotic cells; Eukaryotic cell components.
2. Ultra structure and functions of cell wall and cell membranes.
3. Chromosomes**:** morphology, organization of DNA in a chromosome (nucleosome model), Euchromatin and heterochromatin.

UNIT – II Genetic Material: **(12hrs)**

1. DNA as the genetic material: Griffith's and Avery's transformation experiment, Hershey – Chase bacteriophage experiment.
2. DNA structure (Watson & Crick model) and replication of DNA (semi-conservative)
3. Types of RNA (mRNA, tRNA, rRNA), their structure and function.

UNIT – III Mendelian Inheritance: (12 hrs)

1. Mendel's laws of Inheritance (Mono- and Di- hybrid crosses); backcross and test cross.
2. Chromosome theory of Inheritance.
3. Linkage: concept, complete and incomplete linkage, coupling and repulsion; linkage maps based on two and three factor crosses.
4. Crossing Over: concept & significance.

UNIT – IV Plant Breeding: (12 hrs)

1. Introduction and Objectives of plant breeding.
2. Methods of crop improvement: Procedure, advantages and limitations of Introduction, Selection, and Hybridization (outlines only).

UNIT – V Breeding, Crop Improvement and Biotechnology: (12 hrs)

1. Role of mutations in crop improvement.
2. Role of somaclonal variations in crop improvement.
3. Molecular breeding – use of DNA markers in plant breeding and crop improvement (RAPD, RFLP).

Suggested activity: Seminar, Debate, Quiz, observation of live cells and nucleus in Onion peels, observation of Meiotic nuclei in Maize pollen. Solving Genetics problems.

Books for Reference:

1. Old, R.W. and Primrose S.B. 1994, Principles of Gene Manipulation Blackwell Science,

London 2. Grierson, D. and Convey S.N. 1989, Plant Molecular Biology, Blackie Publishers, New York.

2. Lea, P.J. and Leegood R.C. 1999, Plant Biochemistry and Molecular Biology, John Wiley and Sons, London.

3. Power C.B., 1984, Cell Biology, Himalaya Publishing Co. Mumbai

4. De. Robertis and De Robertis, 1998, Cell and Moleceular Biology, K.M. Verghese and Company .

5. Sinnott, E.W., L.C. Dunn & J. Dobshansky (1958) : Principles of Genetics (5th Edition) McGraw Hill Publishing Co., N.Y. Toronto, London.

6. Winchester, A.M. (1958) : Genetics(3rd Edition) Oxford & IBH Publishing House, Calcutta, Bombay, New Delhi.

7. Singleton, R.(1963) : Elementary Genetics, D. Van Nostrand Co., Ltd., Inc., N.Y. & Affiliated East West Press (P) Ltd., New Delhi.

8. Strickberger, M.W. (1976): Genetics(2nd Edition) MacMillan Publishing Co., Inc., N.Y., London

9. Watson, J.D. (1977): Molecular Biology of the Gene, W.A. Benjamin, Inc., Menlo Park-California, Reading-Massachusetts, London, Amsterdam, Don Mills, Ontario, Sydney.

10. Gardner,E.J & Snusted, D.P.(1984): Principles of Genetics (7thedition) John Wiley & Sons, N.Y. Chichester, Brisbane, Toronto, Singapore.

11. Lewin, B. (1985) Genes VII Wiley Eastern Ltd., New Delhi, Bombay, Calcutta, Madras, Hydrabad.

12. Allard R.W(1999): The Principles of Plant Breeding, John & Wiley and Sons.

13. Poelman J.M: Breeding Field Crops, Springer.

14. George Acquaah(2012):Principles of Plant Genetics & Breeding: Wiley-Blackwell.

III B. Sc - BOTANY SYLLABUS SEMESTER- V

Practical Paper-V: CELL BIOLOGY, GENETICS AND PLANT BREEDING

Total hours of teaching 30hrs @ 2hrs per week

Suggested Laboratory Exercises:

1. Study of the structure of cell organelles through photomicrographs.
2. Study of structure of plant cell through temporary mounts.
3. Study of various stages of mitosis using cytological preparation of Onion root tips.
4. Study of DNA packing by micrographs.

5. Study of effect of temperature & organic solvent on permeability of cell membrane.
6. Numerical problems solving Mendel' Laws of inheritance
7. Chromosome mapping using 3 point test cross data.
8. Hybridization techniques – emasculation, bagging (for demonstration only).
9. Field visit to a plant breeding research station.
10. Calorimetric estimation of DNA by diphenylamine method.

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III B. Sc – SEMESTER- V, BOTANY PRACTICAL MODEL PAPER
PAPER-V: CELL BIOLOGY, GENETICS AND PLANT BREEDING

1. Perform the Experiment **A** .Perform squash on onion root tip, prepare the slide, identify at least one division stage. Write the procedure and draw the diagram of reported stage. 1 x 15 = 15marks

2. Give the experimental protocol of the experiments **B** 1 x 10 = 10 marks

3. Solving numerical problems on Mendelian in heritance **C,D** 2x 7 1/2 =15 marks

4. Record & Viva = 10 marks

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50 marks

A-Onion root squash technique
B- Estimation of DNA by diphenylamine method
C&D Numerical problems on Mendelian Inheritance.

III B. Sc - SEMESTER- V: BOTANY THEORY SYLLABUS
PAPER-VI: PLANT ECOLOGY& PHYTOGEOGRAPHY

Total hours of teaching 60 hrs @ 3 hrs per week

UNIT – I. Elements of Ecology **(12 hrs)**

1. Ecology: definition, branches and significance of ecology.
2. Climatic Factors: Light, Temperature, precipitation.
3. Edaphic Factor: Origin, formation, composition and soil profile.
4. Biotic Factor: Interactions between plants and animals.

UNIT– II. Ecosystem Ecology **(12 hrs)**

1. Ecosystem: Concept and components, energy flow, Food chain, Food web, Ecological pyramids.
2. Productivity of ecosystem-Primary, Secondary and Net productivity.
3. Biogeochemical cycles- Carbon, Nitrogen and Phosphorous.

UNIT – II Population &Community Ecology **(12 hrs)**

1. Population -definition, characteristics and importance, outlines –ecotypes.
2. Plant communities- characters of a community, outlines – Frequency, density, cover, life forms, competition.
3. Interaction between plants growing in a community.

UNIT – IV Phytogeography **(12 hrs)**

1. Principles of Phytogeography, Distribution (wides, endemic, discontinuous species)
2. Phytogeographic regions of India.
3. Phytogeographic regions of World.
4. Endemism – types and causes

UNIT- V: Plant Biodiversity and its importance **(12 hrs)**

1. Definition, levels of biodiversity-genetic, species and ecosystem.
2. Biodiversity hotspots- Criteria, Biodiversity hotspots of India.
3. Loss of biodiversity – causes and conservation (*In-situ* and *ex-situ* methods).
4. Seed banks - conservation of genetic resources and their importance

Suggested activity :Collection of different soils, studying their texture, observing polluted water bodies, student study projects, debates on man's activity on ecosystem and biodiversity conservation methods, visiting a nearest natural vegetation area. Visit to NGO, working in the field of biodiversity and report writing; to study Honey Bees and plants yielding honey.

Books for Reference:

1. Daubenmire, R.F. ( ): Plants & Environment (2nd Edn.,) John Wiley & Sons., New York

2. Puri, .G.S. (1960): Indian Forest Ecology (Vol.I & II) Oxford Book Co., New Delhi & Calcutta.
3. Billings, W.B. (1965): Plants and the Ecosystem Wadsworth Publishing Co., Inc., Belmont.
4. Misra, R. (1968): The Ecology work Book Oxford & INH Publishing Co., Calcutta
5. Odum E.P. (1971): Fundamentals of Ecology (2nd Edn.,) Saunders & Co., Philadelphia & Natraj Publishers, Dehradun.
6. Odum E.P. (1975): Ecology By Holt, Rinert & Winston.
7. Oosting, H.G. (1978): Plants and Ecosystem Wadworth Belmont.
8. Kochhar, P.L. (1975): Plant Ecology. (9th Edn.,) New Delhi, Bombay, Calcutta-226pp.,
9. Kumar, H.D. (1992): Modern Concepts of Ecology (7th Edn.,) Vikas Publishing Co., New Delhi.
10. Kumar H.D. (2000): Biodiversity & Sustainable Conservation Oxford & IBH Publishing
10. Co Ltd. New Delhi.
11. Newman, E.I. (2000): Applied Ecology Blackwell Scientific Publisher, U.K.
12. Chapman, J.L&M.J. Reiss (1992): ecology (Principles & Applications). Cambridge University Press, U.K.
13. Cain, S.A . (1944): Foundations of Plant Geography Harper & Brothers, N.Y.
14. Mani, M.S (1974): Ecology & Biogeography of India Dr. W. Junk Publishers, The Haque
15. Good, R. (1997): The Geography of flowering Plants (2nd Edn.) Longmans, Green & Co., Inc., London & Allied Science Publishers, New Delhi

III B. Sc - SEMESTER- V: BOTANY PRACTICAL
PRACTICAL PAPER-VI: PLANT ECOLOGY& PHYTOGEOGRAPHY

Total hours of teaching 30 hrs @ 3 hrs per week

1. Study of instruments used to measure microclimatic variables; soil thermometer, maximum and minimum thermometer, anemometer, psychrometer, rain gauze, and lux meter.
2. Permeability (percolation; total capacity as well as rate of movement) of different soil samples.
3. Determination of soil pH
4. Study of morphological and anatomical adaptations of hydrophytes and xerophytes (4 each)

5. Determination of minimal quadrat size for the study of herbaceous vegetation in the college campus by species area curve method
6. Study of Phytoplankton and macrophytes from water bodies.
6. Study of species diversity index of vegetation.
7. Estimation of Primary Productivity of an ecosystem
8. To study field vegetation with respect to stratification, canopy cover and composition.
9. Study of plants included in agro forestry and social forestry.
10. To locate the hotspots, phyto geographical regions and distribution of endemic plants in the map of India.
11. The following practical should be conducted in the Field/lab with the help of photographs, herbarium, Floras, Red data book- Study of endangered plants species, critically endangered plants species, vulnerable plant species and monotypic endemic genera of India.

III B. Sc - SEMESTER- VI: BOTANY PRACTICAL MODEL PAPER
PAPER–VI: PLANT ECOLOGY & PHYTOGEOGRAPHY

1. Study Project under supervision	= 15 Marks
2. Record & Viva-Voce	= 10 Marks
3. Experiment **A**	= 10 Marks
4. Anatomical adaptations of **B** (Section cutting)	= 10 Marks
5. Spotters **C&D** (2x2 1/2)	= 5 Marks
	Total = 50 Marks

1. Study Project of a surrounding Ecosystem (terrestrial or aquatic)(plant diversity, animal diversity, human activity, pollution levels, restoration efforts under supervision.
2. Presentation of the project work in Q & A session.
3. **A** -determination of soil porosity/PH/percolation/retaining capacity.
4. **B**- Xerophyte/Hydrophyte anatomical adaptations.
5. **C & D**-anemometer/rain gauze/lux meter.

SEMESTER-VI: Electives

Andhra Pradesh State Council of Higher Education

w.e.f. 2015-16 (Revised in April 2016)

III B. Sc - BOTANY SYLLABUS SEMESTER- VI

PAPER – VII – ELECTIVE [(A) or (B) or (C)]

Paper VII-(A): ORGANIC FARMING & SUSTAINABLE AGRICULTURE

Total hours of teaching 60hrs @ 3hrs per week

Unit - I: Concept of organic farming: (12hrs)

1. Introduction: Farming, organic farming, concept and development of organic farming.

2. Principles of organic farming, types of organic farming, biodynamic farming.

3. Benefits of organic farming, need for organic farming, conventional farming v/sorganic farming

4. Scope of organic farming; Andhra Pradesh, National and International status.

5. Agencies and institutions related to organic agriculture.

6. Requirements for organic farming, farm components for an organic farm.

Unit - II: Organic plant nutrient management: (12hrs)

1. Organic farming systems, soil tillage, land preparation and mulching.

2. Choice of varieties.

3. Propagation-seed, planting materials and seed treatments, water management

4. Green manuring, composting- principles, stages, types and factors, composting methods, Vermi composting

5. Bulky organic manures, concentrated organic manures, organic preparations, organic amendments and sludges.

6. Bio-fertilizers- types, methods of application, advantages and disadvantages, standards for organic inputs- fertilizers

Unit-III: Organic plant protection: (12hrs)

1. Plant protection- cultural, mechanical, botanical pesticides, control agents

2. Weed management

3. Standards for organic inputs- plant protection.

Unit- IV: Organic crop production practices: (12hrs)

1. Organic crop production methods- rice, coconut.

2. Organic crop production methods- vegetables- okra, amaranthus, cucurbits.

3. Livestock component in organic farming.

4. Sustainable Agriculture-Apiculture, Mushroom cultivation.

Unit- V: Organic Certification (12hrs)

1. Farm economy: Basic concept of economics- demand &supply, economic viability of a farm.

2. Basic production principles, reducing expenses, ways to increase returns, cost of production system. Benefit/ cost ratio, marketing, imports and exports.

3. Policies and incentives of organic production.

4. Farm inspection and certification.

5. Terrace farming.

Books for Reference:

1. Palaniappan SP &Anandurai K. 1999. Organic Farming–Theory and Practice. Scientific Publishers, Jodhpur
2. Joshi, M. 2014. New Vistas of Organic Farming 2nd Ed. Scientific Publishers, Jodhpur.
3. Farming system : Theory and Practice - S.A.Solaimalai
4. Organic Farming: Theory and Practice- S.P.Palaniappan and K.A. Annadurai
5. A hand book of Organic Farming by A.K.Sharma

Suggested Activities: Preparation of Vermicompost in small scale, observing sewage sludge disposal mechanisms in urban/semi urban areas, studying the usage, of green manures, neem oil, neem cake, pongamia oil in organic farming, livestock component in various farming methods, visiting an Apiculture center, drawing various terrace farming models

Paper-VII-A : Practical

Semester – VI, Paper-VII-A : Organic Farming and Sustainable Agriculture

Total hours of teaching 30 hrs @ 2 hrs per week

1. Study of different bio pesticides, weedicides, inorganic and organic fertilizers
2. Deficiency symptoms of nutrient deficiency symptoms (photographs)
3. Soil testing, liming, and fertilizing
4. Preparation of enriched Farm Yard Manure.
5. Study of composting methods.
6. Preparation of vermicompost.
7. Study of recycling of farm waste.
8. Study of methods of green manuring.
9. Study of steps in mushroom cultivation
10. Visit to urban waste recycling unit.
11. Study project report under supervision of lecturer – farm manure preparation/vermi-compost// /waste management// green manures/ mushroom cultivation / nutrient requirements of vegetables

Expected domain skills to be achieved: Performing Soil analysis, soil enrichment methods, composting procedure, recycling of wastes, use of waste materials in mushroom cultivation, understanding nutrient requirement of various crops, identifying various methods of keeping soil health

PRACTICAL MODEL PAPER

Paper-VII-(A) : Organic Farming and Sustainable Agriculture

Q1. Project report (A) **- 15 marks**

Viva-voce on study project **-05 marks**

Q2. Identify and write notes on B, C, D, and E (4x5) **-20 marks**

B- inorganic manures/bio-weedicides/bio-pesticides (photograph/ specimen)

C- Compost preparation method (photograph/instrument)

D- Green manure type (plant specimen/photograph)

E- Waste recycling method (photograph/live specimen/institute/organization)

Q4. Field report - 05 marks

Q5. Record - 05 marks

TOTAL: 50 marks

III B. Sc - BOTANY SYLLABUS SEMESTER- VI
PAPER – VII – ELECTIVE
Paper VII-(B): Nursery, Gardening and Floriculture.
Total hours of teaching 60hrs @ 3hrs per week

Unit I: Nursery: **(12 hrs.)**

1. Definition, objectives, scope and building up of infrastructure for nursery.
2. Planning and seasonal activities - Planting - direct seeding and transplants.
3. Nursery Management and Routine Garden Operations.

Unit III: Gardening (12 hrs.)

1. Definition, objectives and scope - different types of gardening.
2. Landscape and home gardening - parks and its components, plant materials and design .
3. Computer applications in landscaping.
4. Gardening operations: soil laying, manuring, watering.
5. Landscaping Places of Public Importance: Landscaping highways and Educational Institutions)
6. Some Famous gardens of India.

Unit III: Propagation methods (12 **hrs.)**

1 Sowing/raising of seeds and seedlings, transplanting of seedlings. 2.Air-layering, cutting, selection of cutting ,propagule collecting season, treatment of cutting rooting medium and planting of cuttings - Hardening of plants.

3. Propagation of ornamental plants by rhizomes, corms tubers, bulbs and bulbils.

4. .Green house - mist chamber, shed root, shade house and glass house for propagation.

Unit IV: Floriculture: (12 hrs.)

1. Ornamental Plants: Flowering annuals; herbaceous, perennials; Divine vines; Shade and ornamental trees.
2. Ornamental bulbous and foliage plants; Cacti and succulents.
3. Ornamentals-palms.
4. Cultivation of plants in pots; Indoor gardening; Bonsai.

Unit V: Commercial Floriculture (12 hrs.)

1. Factors affecting flower production; Production and packaging of cut flowers; Flower arrangements; Methods to prolong vase life of flowers
2. Cultivation of Important cut flowers (Carnation, Aster, Dahlia, Gerbera, Anthuriams, Gladiolous, Marigold, Rose, Lilium)
3. Management of pests, diseases and harvesting.
4. Methods of harvesting.

Books for Reference:

1. Bose T.K. & Mukherjee, D., 1972, Gardening in India, Oxford & IBH Publishing Co., New Delhi.
2. Sandhu, M.K., 1989, Plant Propagation, Wile Eastern Ltd., Bangalore, Madras.
3. Kumar, N., 1997, Introduction to Horticulture, Rajalakshmi Publications, Nagercoil. institution)
4.Randhawa, G.S. and Mukhopadhyay, A. 1986. Floriculture in India. Allied Publishers.

Suggested Activities: Raising a nursery, managing it, studying and drawing various land scaping designs, practicing layering methods, using shade nets to protect horticultural crops, practicing indoor gardening techniques, visiting florists and recording their methods of prolonging vase life of commercial cut flowers.

III B. Sc - BOTANY SYLLABUS SEMESTER- VI (Elective)
Practical Syllabus, Paper VII-(B): Nursery, Gardening and Floriculture
Total hours of teaching 30hrs @ 2hrs per week

1. Tools, implements and containers used for propagation and nursery techniques.
2. Propagation by cutting, layering, budding and grafting
3. Seed propagation- preparation of portable trays, seed treatments, sowing and seedling production.
4. Identification and description of annuals, herbaceous perennials, climbers, creepers, foliage and flowering shrubs, trees, palms, ferns, ornamental grasses; cacti and succulents..
5. Planning and designing of gardens, functional uses of plants in the landscape
6. Preparation of land for lawn and planting.
7. Identification of commercially important flower crops and their varieties.
8. Propagation practices in flower crops, sowing of seeds and raising of seedlings of annuals.
9. Use of chemicals and other compounds for prolonging the vase life of cut flowers.
10. Grading, packing and marketing of cut flowers.
11. Visit to commercial nurseries and commercial tissue culture laboratory
12. Study project under supervision of lecturer – nursery/ornamental flowers/ plants/lawn designing/ landscape designing

Expected domain skills to be achieved: Ability to use a variety of garden tools and implements, proficiency in layering and grafting techniques (cleft grafting and bud grafting), land scape drawings using computers, raising of healthy nurseries of flowering plants, managing vase life of cut flowers etc.

PRACTICAL MODEL PAPER

Paper-VII-(B): Nursery, Gardening and Floriculture

Q1. Project report (A) **- 15 marks**

Viva-voce on study project **-05 marks**

Q2. Identify and write notes on B, C, D, and E (4x5) **-20 marks**

B- Tool/instrument/container used in nursery

C-Seed propagation technique

D- Plant used in lawn (plant specimen/photograph)

E-ornamental flower (photograph/live specimen)

Q4. Field report **- 05 marks**

Q5. Record **- 05 marks**

50 marks

III B. Sc - BOTANY SYLLABUS SEMESTER- VI
PAPER – VII – ELECTIVE
Paper VII-(C): Plant tissue culture and its biotechnological applications
Total hours of teaching 60hrs @ 3hrs per week

Unit I: PLANT TISSUE CULTURE – 1 **(12hrs)**

1. History of plant tissue culture research - basic principles of plant tissue callus culture, meristem culture, organ culture, Totipotency of cells, differentiation and dedifferentiation.
2. Methodology - sterilization (physical and chemical methods), culture media, Murashige and Skoog's (MS medium), phytohormones, medium for micro-propagation/clonal propagation of ornamental and horticulturally important plants.

3. Callus subculture maintenance, growth measurements, morphogenesis in callus culture – organogenesis, somatic embryogenesis.

UNIT-II: Plant Tissue culture -2 **(12hrs)**

1. Endosperm culture – Embryo culture -culture requirements – applications, embryo rescue technique.

2. Production of secondary metabolites.

3. Cryopreservation; Germ plasm conservation.

Unit III: Recombinant DNA technology (12**hrs)**

1. Restriction Endonucleases (history, types I-IV, biological role and application); concepts of restriction mapping.
2. Cloning Vectors: Prokaryotic(pUC 18, pBR322,Ti plasmid and Lambda phage, Eukaryotic Vectors (YAC and briefly PAC)
3. Gene cloning (Bacterial Transformation and selection of recombinant clones, PCR mediated gene cloning)

4. Construction of genomic and cDNA libraries, screening DNA libraries to obtain gene of interest by complementation technique, colony hybridization.

Unit IV: Methods of gene transfer (12hrs)

1. Methods of gene transfer- Agrobacterium-mediated, direct gene transfer by Electroporation, Microinjection, Micro projectile bombardment.

2. Selection of transgenics– selectable marker and reporter genes (Luciferase, GUS, GFP).

Unit V: Applications of Biotechnology (12 hrs)

1. Applications of Plant Genetic Engineering – crop improvement, herbicide resistance, insect resistance, virus resistance.

2. Genetic modification – transgenic plants for pest resistant (Bt-cotton); herbicide resistance (Round Up Ready soybean); improved agronomic traits - flavrSavr tomato, Golden rice); Improved horticultural varieties (Moon dust carnations)

Books for Reference:

1. Pullaiah. T. and M.V.Subba Rao. 2009. Plant Tissue culture. Scientific Publishers, New Delhi.
2. Bhojwani, S.S. and Razdan, M.K., (1996). Plant Tissue Culture: Theory and Practice. Elsevier Science Amsterdam. The Netherlands.
3. Glick, B.R., Pasternak, J.J. (2003). Molecular Biotechnology- Principles and Applications ofrecombinant DNA. ASM Press, Washington.
4. Bhojwani, S.S. and Bhatnagar, S.P. (2011). The Embryology of Angiosperms. VikasPublicationHouse Pvt. Ltd., New Delhi. 5th edition.
5. Snustad, D.P. and Simmons, M.J. (2010). Principles of Genetics. John Wiley and Sons, U.K. 5th edition.

6. Stewart, C.N. Jr. (2008). Plant Biotechnology & Genetics: Principles, Techniques and Applications. John Wiley & Sons Inc. U.S.A.

Suggested Activities: In vitro initiation of callus on artificial medium, seminars on utilization of rDNA technology, debates on applications of Biotechnology (whether it is a boon or bane to the society) studying growth patterns, vegetative characteristics of Bt.cotton and identifying the features of its pest resistance

III B. Sc - BOTANY SYLLABUS SEMESTER- VI
PAPER – VII-(C) Elective
Practical Paper VII-(C): Plant Tissue Culture &Plant Biotechnology
Total hours of teaching 30hrs @ 2hrs per week

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1. (a) Preparation of MS medium.

(b) Demonstration of in vitro sterilization methods and inoculation methods using leaf and nodal explants of Tobacco/ Datura/ Brassica etc.

2. Study of embryo and culture, micro propagation of Banana, somatic embryogenesis, artificial seeds through photographs.
3. Construction of restriction map of circular and linear DNA from the data provided.
4. Study of methods of gene transfer through photographs: Agrobacterium-mediated, direct gene transfer by electroporation, microinjection, and micro projectile bombardment.
5. Different steps involved in genetic engineering for production of Bt. cotton, Golden rice, Flavr Savr tomato through photographs.
7. Isolation of plasmid DNA.
8. Restriction digestion and gel electrophoresis of plasmid DNA (optional)
9. Field visit to a lab involved in tissue culture
10. Study project under supervision of lecturer – tissue culture/ genetic engineering

Expected domain skills to be achieved: Ability to prepare artificial nutrient media, preparing independently, applying various sterilization procedures for media, glassware and biological materials, in vitro propagation of Banana callus, morphogenesis--s, clonal propagation methods, isolation of plasmid DNA individually and as a group.

PRACTICAL MODEL PAPER

Paper-VII-(C) : Plant Tissue Culture &Plant Biotechnology

Q1. Project report (A) - 15 marks

Viva-voce on study project -05 marks

Q2. Identify and write notes on B, C and D (3x4) -12 marks

B- Tool/instrument/container used in sterilization

C- Tool/instrument/container used in gene transfer

D- GM crops (Photographs)

Q3. Construct restriction map of circular and/ or linear DNA from the data provided – 08 marks

Q4. Field report - 05 marks

Q5. Record - 05 marks

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50 marks

CLUSTER ELECTIVES (Cluster–A or Cluster-B)

III B.Sc.: BOTANY SYLLABUS SEMESTER- VI

Paper VIII, CLUSTER ELECTIVE, Cluster-A,

Paper VIII-A-1 : PLANT DIVERSITY AND HUMAN WELFARE

Total hours of teaching 60hrs @ 3hrs per week

Unit- I: Plant diversity and its scope: **(12hrs)**

i. Genetic diversity, Species diversity, Plant diversity at the ecosystem level, Agro biodiversity and cultivated plant taxa, wild taxa.

ii. Values and uses of biodiversity: Ethical and aesthetic values, iii. Methodologies for valuation, Uses of plants.

Unit -II: Loss of biodiversity: **(12hrs)**

i. Loss of genetic diversity, Loss of species diversity, Loss of ecosystem diversity, Loss of agro biodiversity, projected scenario for biodiversity loss

ii. Management of plant biodiversity: Organizations associated with biodiversity management-Methodology for execution-IUCN, UNEP, UNESCO, WWF, NBPGR; Biodiversity legislation and conservations, Biodiversity information management and communication.

Unit-III: Contemporary practices in resource management: **(12hrs)**

i. Environmental Impact Assessment (EIA), Geographical Information System GIS, Participatory resource appraisal, Ecological footprint with emphasis on carbon footprint, Resource accounting;

ii. Solid and liquid waste management

Unit -IV: Conservation of biodiversity (12hrs)

i. Conservation of genetic diversity, species diversity and ecosystem diversity, *In situ* and *ex situ* conservation,

ii. Social approaches to conservation, Biodiversity awareness programmes, Sustainable development.

Unit- V: Role of plants in relation to Human Welfare (12hrs)

i. Importance of forestry, their utilization and commercial aspects-

a) Avenue trees, b) ornamental plants of India. c) Alcoholic beverages through ages.

ii. Fruits and nuts: Important fruit crops their commercial importance. Wood, fiber and their uses.

Suggested Readings:

1. Krishnamurthy, K.V. (2004). An Advanced Text Book of Biodiversity - Principles and Practices. Oxford and IBH Publications Co. Pvt. Ltd. New Delhi.
2. Singh, J. S., Singh, S.P. and Gupta, S. (2006). Ecology, Environment and Resource Conservation. Anamaya Publications, New Delhi.
3. Rogers, P.P., Jalal, K.F. and Boyd, J.A. (2008). An Introduction to Sustainable Development. Prentice Hall of India Private Limited, New Delhi.

Suggested activities: Study of flora and its diversity in the college campus or local area,enumerating wild and exotic species(*Parthenium*,Water hyacinth etc.)

Project work on any one of the International organizations striving for preservation of biodiversity, study of conservation efforts of local people, and civic bodies, study of locally available fruits in different seasons, enumerating the avenue plantations and their diversity in your town/city

Paper – VIII-A-1 : Practicals: PLANT DIVERSITY AND HUMAN WELFARE

1) Study of plant diversity (flowering plants).

2) Study of exotic species- Identification and morphological characteristics.

3) Identification of forest trees through bark, wood, flowers, leaves and fruits.

4) Maceration, Study of wood (Tracheary elements, fibres).

5) Methods of preservation and canning of fruits.

6) Visit to the local ecosystem to study the plants.

7) Write up on the conservation efforts of International organizations.

8) Study of Solid and Liquid waste management systems in rural/urban areas.

Domain skills expected to achieve: Identification of exotic plant species, identification of forest trees based on the characteristics of bark, flowers and fruits, understanding the preservation methods of fresh and dry fruits, understanding the methods of safe disposal of biodegradable and non-biodegradable wastes

SCHEME OF PRACTICAL EXAMINATION

PRACTICAL- VIII-A-1 : Cluster Elective (MODEL QUESTION PAPER)
PLANT DIVERSITY AND HUMAN WELFARE

Time: 3hrs Max. Marks: 50

I. Assign the plants **A, B and C** to their respective families, giving reasons, family name and classification-2 marks, important diagrams- 3 marks.
15 marks

II. Give the protocol of **D** **10 marks**

III. Comment on specimens **E, F and G** **3x3 = 9 marks**

IV. Report on Field visit **6 marks**
To study sources of firewood (10 plants), timber-yielding trees (10trees) and bamboos.

V. Viva-Voce **5 marks**

VI. Practical Record **5 marks**

KEY

A-Cultivated Plant
B- Wild Plant
C –Exotic plant
D- Preservation and canning of fruits, solid and liquid waste management systems in rural/urban areas
E. Bark/wood/fruit yielding plant
F. Nuts/ Alcoholic beverage plant
G. wood /Fibre yielding plant

III B. Sc - BOTANY SYLLABUS

SEMESTER- VIII : CLUSTER ELECTIVE -A

Paper VIII-A-2 : ETHNOBOTANY AND MEDICINAL BOTANY
Total hours of teaching 60hrs @ 3hrs per week

Unit –I: **Ethnobotany** **(12hrs)**

i. Introduction, concept, scope and objectives; Ethnobotany as an interdisciplinary science. The relevance of ethnobotany in the present context
ii. Major and minor ethnic groups or Tribals of India, and their life styles.
iii. Plants used by the tribal populations: a) Food plants, b) intoxicants and beverages, c) Resins and oils and miscellaneous uses.

Unit -II: **Role of ethnobotany in modern Medicine**: **(12hrs)**

i. Role of ethnobotany in modern medicine with special example *Rauvolfia sepentina, Trichopus zeylanicus, Artemisia annua, Withania somnifera.*
ii. Medico-ethnobotanical sources in India

iii. Significance of the following plants in ethno botanical practices (along with their habitat and morphology)

a) *Azadirachta indica*, b*) Ocimum sanctum*, c) *Vitex negundo*, d) *Gloriosa superba*, e) *Tribulus terrestris,* f) *Phyllanthus niruri* , g) *Cassia auriculata*, h) *Indigofera tinctoria* , i) *Senna auriculata* j).*Curcuma longa*.

iv. Role of ethnic groups in the conservation of plant genetic resources.

Unit-III: Ethnobotany as a tool to protect interests of ethnic groups (12hrs)

i. Sharing of wealth concept with few examples from India.
ii. Biopiracy, Intellectual Property Rights and Traditional Knowledge.

Unit -IV: History, Scope and Importance of Medicinal Plants. indigenous Medicinal Sciences (12hrs)

i. Definition and Scope-**Ayurveda**: History, origin, panchamahabhutas, saptadhatu and tridosha concepts, Rasayana, plants used in ayurvedic treatments.
ii. **Siddha**: Origin of Siddha medicinal systems, Basis of Siddha system, plants used in Siddha medicine.
iii. **Unani**: History, concept: Umoor-e- tabiya, tumors treatments/ therapy, polyherbal formulations (in brief).

Unit -V: Conservation of endangered and endemic medicinal plants: **(12hrs)**

i. Definition: endemic and endangered medicinal plants,
ii. Red list criteria
iii. In situ conservation: Biosphere reserves, sacred groves, National Parks
iv. *Ex situ* conservation: Botanical Gardens.

Suggested Activities: Studying plant utilization methods by tribal/rural/migrant populations for their beverages, food,medicinal and uses, seminars on role of ethnic groups in conservation of plant genetic resources, project work on traditional knowledge about plant medicines, study of indigenous medicinal sciences and their efficacy.

Suggested Readings:

1) S.K. Jain, Manual of Ethnobotany, Scientific Publishers, Jodhpur, 1995.
2) Glimpses of Indian. Ethnobotny, Oxford and I B H, New Delhi – 1981.
3) S.K. Jain (ed.) 1989. Methods and approaches in ethnobotany. Society of ethnobotanists, Lucknow, India.
4) S.K. Jain, 1990. Contributions of Indian ethnobotny.Scientific publishers, Jodhpur.
5) Colton C.M. 1997. Ethnobotany – Principles and applications. John Wiley and sons – Chichester
6) Rama Ro, N and A.N. Henry (1996). The Ethnobotany of Eastern Ghats in Andhra Pradesh, India.Botanical Survey of India. Howrah.
7. Trivedi P C, 2006. Medicinal Plants: Ethnobotanical Approach, Agrobios, India.
8. Purohit and Vyas, 2008. Medicinal Plant Cultivation: A Scientific Approach, 2nd edn. Agrobios, India.
9. Pal, D.C. & Jain, S.K., 1998. Tribal Medicine. Naya Prakash Publishers, Calcutta
10. Raychudhuri, S.P., 1991. (Ed.) Recent advances in Medicinal aromatic and spice crops. Vol.1, Today& Tomorrow's printers and publishers, New Delhi

Cluster Elective VIII-A-2: Practical:

ETHNOBOTANY AND MEDICINAL BOTANY

1. Ethnobotanical specimens as prescribed in theory syllabus
2. Detailed morphological and anatomical study of medicinally important part(s) of locally available plants (Minimum 8 plants) used in traditional medicine.
3. Field visits to identify and collect ethno medicinal plants used by local tribes/folklore.

Domain skills expected to achieve: Identification of various plant parts used as medicines by ethnic groups, understanding the difference between ancient wisdom and modern system of medicine, traditional medicine at the rescue of curing drug resistant maladies like malaria and viral diseases, understanding the role of spices in Indian kitchens, their therapeutic role

PRACTICAL- VIII-A-2 Cluster Elective : MODEL QUESTION PAPER

Paper VIII-A-2: ETHNOBOTANY AND MEDICINAL BOTANY

Time: 3 Hours **Max. Marks- 50**

I. Identify the specimen A- Give reasons (morphological and anatomical) and draw labeled sketches 15marks

II. Identify and write about the medicinal uses of B-and C- 2x5= 10 marks.

III. Comment on D and E. 2x 4=8 marks

IV. Report on Field visit: 7 marks

List to be prepared mentioning special features of plants used by tribal populations as Medicinal Plants & Spices. Write their botanical and common names, parts used and diseases/disorders for which they are prescribed.

V. Viva-voce 5 marks

VI. Record 5 marks

Total = 50 marks

KEY

A-Plants given in unit II (i)

B-Plants used in Ayurvedic prearations (Amla in Chyavanprash, Senna in Laxatives)

C - - Do -

D. Photographs of National parks, Biosphere reserves and Botanical gardens.

E. Photograph of famous personalities in Ayurveda/Siddha medicine.

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III B. Sc - BOTANY SYLLABUS SEMESTER- VIII
CLUSTER ELECTIVE, Paper VIII-A-3

Paper VIII-A-3: Pharmacognosy and Phytochemistry

Total hours of teaching 60hrs @ 3hrs per week

Unit-I: Pharmacognosy (12hrs)

Definition, Importance, Classification of drugs - Chemical and Pharmacological, Drug evaluation methods

Unit –II: Organoleptic and microscopic studies: (12hrs)

Organoleptic and microscopic studies with reference to nature of active principles and common adulterants of *Alstonia scholaris* (bark), *Adhatoda vasica*(leaf), *Strychnos nuxvomica* (seed), R*auwolfia serpentina*(root) and *Zinziber officinalis* C*atharanthus roseus.*

Unit-III: Secondary Metabolites: (12hrs)

i. Definition of primary and secondary metabolites and their differences, major types - terpenes, phenolics, alkaloids, terpenoids, steroids.

ii. A brief idea about extraction of alkaloids.Origin of secondary metabolites – detailed account of acetate pathway, mevalonate pathway, shikimate pathway.

UNIT-IV: Phytochemistry: (12hrs)

Biosynthesis and sources of drugs:

(i) Phenols and phenolic glycosides : structural types, biosynthesis, importance of simple phenolic compounds, tannins, anthraquinones, coumarins and furanocoumarins, flavones and related flavonoid glycosides, anthocyanins, betacyanins, stilbenes, lignins and lignans).

(ii) Steroids, sterols, saponins, withanolides, ecdysones, cucurbitacins: Biosynthesis, commercial importance.

(iii) Alkaloids: Different groups, biosynthesis, bioactivity.

(v) Volatile oils, aromatherapy.

UNIT-V: Enzymes, proteins and amino acids as drugs: **(12hrs)**

i. Vaccines, toxins and toxoids, antitoxins, immune globulins, antiserums,

ii. Vitamins, Antibiotics – chemical nature, mode of action.

iii. Pharmacological action of plant drugs – tumor inhibitors, PAF antagonists, antioxidants, phytoestrogens and others.

iv. Role of different enzyme inhibitors.

Suggested Activities: Isolation techniques of active principles from various parts of popular medicinal plants, debates on the efficacy of plant medicines and palliative cure, volatile oils from plants-extraction methods, project work on crude drugs

BOOKS FOR REFERENCE:

1. Wallis, T. E. 1946. Text book of Pharmacognosy, J & A Churchill Ltd. 2. Roseline, A. 2011. Pharmacognosy. MJP Publishers, Chennai.

2. Gurdeep Chatwal, 1980. Organic chemistry of natural productis.

Vol.I.Himalaya Publishing house.

3. Kalsi, P. S. and Jagtap, S., 2012. Pharmaceutical medicinal and natural product chemistry N.K. Mehra . Narosa Publishing House Pvt. Ltd. New Delhi.

4. Agarwal, O. P. 2002. Organic chemistry–Chemistry of organic natural products. Vol. II. Goel publishing house , Meerut.
5. Harborne, J. B. 1998. Phytochemical methods –a guide to modern techniques of plant analysis 3 rd edition, Chapman and Hall
6. Datta & Mukerji, 1952. Pharmacognosy of Indian roots of Rhizome drugs. Bulletin No.1 Ministry of Health, Govt. of India.

VIII-A-3: Pharmacognosy and Phytochemistry: PRACTICALS

1. Physical and chemical tests for evaluation of unorganized drugs- Asaphoetida. Honey, Castor oil. Acacia

2. Identification of bark drugs – cinchona, cinnamom

3. Identification of fruit drugs – Cardamom, Coriander

4. Identification of root and rhizome drugs- Ginger, Garlic, Turmeric

5. Identification of whole plant – Aloes,Vinca, Punarnava

6. Herbarium of medicinal plants (minimum of 20 platns)

7. Collection of locally available crude drugs from local venders (minimum of 20)

Domain skills expected to achieve: Identification of various plant parts used as medicines, extraction of active principles from them, isolation by chromatographic techniques, learning callus culture techniques for secondary metabolite enrichment and understanding ethno-pharmacological principles

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PRACTICAL: VIII-A-3 Cluster Elective: MODEL QUESTION PAPER
Pharmacognosy and Phytochemistry

Time: 3hrs. Max. Marks=50

I. Identify the given crude drugs **A& B** by morphological study and chemical tests. **10 marks**

II. Perform suitable chemical test and identify the given phytochemical **C** **10 marks**

III. Comment on D and E **2x5=10 marks**

IV. Herbarium and submission of drugs **-10 marks**
IV. Viva-Voce **5 marks**
V. Practical Record **5 marks**

Total = 50 marks

KEY

A-Flower/fruit drugs

B-Rhizome/whole plant drugs

C- Tannins/ phenolics/steroids/ isoprenoids /Asaphoetida/ Honey/ Castor oil/ Acacia

D. Column Chromatography/ Gas Chromatogram/HPLC (photograph/ instrument used for chemical analysis of drugs

E. photograh/instrument used for tissue culture

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III B.Sc.: BOTANY SYLLABUS SEMESTER- VI

Cluster Electives, CLUSTER–B

CLUSTER ELECTIVE, PAPER–VIII-B-1

Paper VIII-B-1: Biological instrumentation and Methodology

Total hours of teaching 60hrs @ 3hrs per week

Unit -I: Imaging and related techniques: **(12hrs)**

Principles of microscopy; Light microscopy; Fluorescence microscopy; Electron Microscopy (a) Flow cytometry (b) Applications of fluorescence microscopy: Chromosome banding, FISH, chromosome painting; Transmission and Scanning electron microscopy – sample preparation for electron microscopy, cryofixation, negative staining, shadow casting, freeze fracture, freeze etching.

Unit- II: pH and Centrifugation: **(12 hrs)**

pH meter: Principles and instrumentation, Centrifugation: Principles, types of centrifuges, types of rotors, differential and density gradient centrifugation, application. Sonication, Freeze drying.

Unit- III: Spectrophotometry: **(12hrs)**

Principle involved in Spectrophotometer; Spectrophotometric techniques, Instrumentation: ultraviolet and visible spectrophotometry (single anddouble beam, double wavelength spectrophotometers), Infrared spectrometers - Luminometry and densitometry – principles and their applications - Mass Spectroscopy-principlesof analysis, application in Biology.

Unit- IV: Chromatography: **(12hrs)**

Chromatographic techniques: Principle and applications – Column - thin layer –paper, affinity and gaschromatography - Gel filtration - Ion exchange and High performance liquid chromatography techniques– Examplesof application for each chromatographic system - Basic principles of electrophoresis.

Unit-V:Preparation of molar, molal and normal solutions, buffers, the art of scientific writing **(12hrs)**

Understanding the details on the label of reagent bottles.Molarity and normality of common acids and bases.Preparation of solutions.Dilutions.Percentage solutions.Molar, molal and normal solutions. Technique of handling micropipettes; Knowledge about common toxic chemicals and safety measures in their handling.

The art of scientific writing and presentation of scientific matter.Scientific writing and ethics.Writing references.Powerpoint presentation.Poster presentation.
Introduction to copyright-academic misconduct/plagiarism in scientific writing.

Suggested Readings:

1. Bajpai, P.K. 2006. Biological Instrumentation and methodology. S. Chand & Co. Ltd.
2. K. Wilson and J. Walker Eds. 2005. Biochemistry and Molecular Biology. Cambridge University Press.
3. K. Wilson andKHGoulding. 1986. Principles and techniques of Practical Biochemistry. (3 edn) Edward Arnold, London.

4. Dawson, C. (2002). Practical research methods.UBS Publishers, New Delhi.

5. Stapleton, P., Yondeowei, A., Mukanyange, J., Houten, H. (1995). Scientific writing for agricultural research scientists – a training reference manual. West Africa Rice Development Association, Hong Kong.

6. Ruzin, S.E. (1999). Plant micro technique and microscopy. Oxford University Press, New York, U.S.A.

Suggested activities: Preparing various laboratory reagents, operating laboratory instruments, noting instrument readings, calculating results accurately, Skills on writing scientific articles, presentation of scientific resultsthrough tables, graphs, poster presentations and practicing power point presentations.

Paper VIII-B-1: PRACTICAL SYLLABUS

1. Microscopy – Light microscopy: principles, parts & function
2. Micrometry- principle and measurement of microscopic objects: Low power and high power.
3. Camera Lucida drawing with magnification and scale.
4. Principle and working of phase contrast microscope
5. Principle & operation of Centrifuge
6. Preparation of standard acid and alkali and their standardization.

b) Preparation of various solutions (normal, molar, and percent) and ppm/ppb by serial dilutions

7. Study of principle and working of pH meter and Measurement of pH of Milk, Pepsi, Lemon juice etc. using pH paper and pH meter
8. Study of principle of Chromatography and separation of amino acids mixture By ascending Paper Chromatography
7. Principle & operation of Colorimeter
8. Principle & operation of Spectrophotometer

9. Chromosome banding, FISH, chromosome painting

9. Principle and technique of TLC (demonstration)

10. TLC separation of Amino acids from purified samples and biological materials (demonstration)

11 PCR - The Polymerase Chain Reaction (protocol) -demonstration

13. Study visit to an institute /laboratory

Domain skills expected to achieve:

Skill in operating laboratory equipment, their upkeep, and adept at various biological techniques. Ability to prepare molar, molal, normal solutions and solutions of different dilutions.Interpreting scientific results, and ability to present results in a scientific way through graphs, photographs, poster presentations and power point presentations.

Paper VIII-B-1: Theory: Biological instrumentation and Methodology

PRACTICAL MODEL PAPER

1. Perform the experiment (A). Write the protocol of the experiment - 15 marks

2. Measure the pH of given sample (B) using pH paper and pH meter. Write the procedure and observation. 10 marks

3. Identify C, D, and E. Write the principle and use of them. 3X5 -15 marks

4. Viva voce on Field visit 05 marks

5. Record 05 marks

Key

A. Amino acid separation by paper chromatography

B. Milk, Pepsi, Lemon juice etc

C. Camera Lucida/ Micrometer/phase contrast microscope

D. Colorimeter/ Spectrophotometer

E. Chromosome banding, FISH, chromosome painting

(Cluster Electives –B)

III B.Sc.: BOTANY SYLLABUS SEMESTER- VI, CLUSTER ELECTIVE -2-B

PAPER – VIII-B-2

Paper VIII-B-2: Mushroom Culture and Technology

Total hours of teaching 60hrs @ 3hrs per week

Unit I: Introduction, history: (12hrs)

Introduction - history - scope of edible mushroom cultivation, Types of edible mushrooms available in India –*Volvariellavolvacea, Pleurotuscitrinopileatus, Agaricusbisporus.* Nutritional and medicinal value of edible mushrooms; Poisonous mushrooms.

UNIT II:Pure culture-spawn preparation: (12hrs)

Pure culture - preparation of medium (PDA and Oatmeal agar medium)sterilization - preparation of test tube slants to store mother culture – culturingof*Pleurotus* mycelium on Petriplates, preparation of mother spawn in salinebottle and polypropylene bag and their multiplication.

Unit III: Cultivation Technology: **(12hrs)**

Infrastructure: Substrates (locally available) Polythene bags, vessels, Inoculation hook, inoculation loop, low cost stove, sieves, culture rack, mushroom unit (Thatched house) water sprayer, tray, small polythene bag. Mushroom bed preparation - paddy straw, sugarcane trash, maize straw, banana leaves. Factors affecting the mushroom bed preparation - Low cost technology, composting technology in mushroom production.

Unit IV:Storage and nutrition : (12hrs)

Short-term storage (Refrigeration - up to 24 hours) Long term Storage (canning, pickels, papads), drying, storage in saltsolutions. Nutrition - Proteins - amino acids, mineral elements nutrition - Carbohydrates, Crude fibre content – Vitamins.

Unit V:FoodPreparation: (12hrs)

Types of foods prepared from mushrooms;soup,cutlet omlette,samosa,pickles and curry .ResearchCentres - National level and Regional level. Cost benefit ratio - Marketing in India and abroad, Export Value.

Suggested Readings:

1. Marimuthu, T. Krishnamoorthy, A.S. Sivaprakasam, K. and Jayarajan. R (1991) Oyster Mushrooms, Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore.

2. Swaminathan, M. (1990) Food and Nutrition. Bappco, The Bangalore Printing and Publishing Co. Ltd., No. 88, Mysore Road, Bangalore - 560018.

3. Tewari, Pankaj Kapoor, S.C., (1988). Mushroom cultivation, Mittal Publications, Delhi.

4. Nita Bahl (1984-1988) Hand book of Mushrooms, II Edition, Vol. I & Vol. II.

5.Biswas, S., M. Datta and S.V. Ngachan. 2011. Mushrooms: A Manual For Cultivation. PHI learning private Ltd., New Delhi, India.

6. Chang, S. and P.G. Miles. 2004. Mushrooms: cultivation, nutritional value, medicinal effect, and environmental impact. CRC Press. USA.

7. Miles, P.G. and S. Chang. 1997. Mushroom Biology:

Concise basics and current developments. World Scientific

Publishing Co. Pte.Ltd. Singapore.

Suggested activities: Growing spawn on laboratory prepared medium in petriplates and maintaining, preparing compost and compost beds, packing of beds, spawning, maintaining moisture, picking, blanching and packing. Collecting naturally growing mushrooms and identifying them properly,visits to mushroom houses.

Paper VIII-B-2: PRACTRICAL SYLLABUS

1. Identification of different edible and poisonous mushrooms.

2. Microscopic and anatomical observations of different mushroom species.

3. Pure culture - preparation of medium (PDA and Oatmeal agar medium) sterilization.

4. Isolation and preparation of spawn under controlled conditions(preparation of mother spawn in saline bottle and polypropylene bag and their multiplication).

5. Types of Compost preparation and sterilization.

6. Mushroom bed preparation - paddy straw, sugarcane trash, maize straw, banana leaves/waste.

7. Inoculation and spawning of compost.

6. Incubation and harvesting of mushrooms (collection, drying and preservation).

7. Diseases of mushrooms (photographs).

8. Post-harvest technology steps (photographs).

9. Study tour to mushroom cultivation farms

11. Project work – cultivation of paddy straw/ oyster/white button mushrooms.

Domain skills expected to achieve: Identification of different edible species, skill in media and substrate preparation, isolation of pure culture for spawn, compost preparation, and practices in growing methods of different cultivated mushrooms,Postharvest handling and packing

SCHEME OF PRACTICAL EXAMINATION

PAPER – VIII-B-2 (Cluster Elective): Mushroom Culture and Technology

PRACTICAL- VIII-B-2: Cluster Elective (MODEL QUESTION PAPER)

Time: 3hrs Max. Marks: 50

I. Prepare the culture medium for isolation of spawn and make the slants. Write the protocol for preparation of the medium (A)

20 marks

II.Write the protocol for preparation of compost (B)

08 marks

III. Comment on given specimens C, D and E

3x4 = 12 marks

IV. Report on Field visit 05 marks

V. Practical Record 05 marks

Total = 50 marks

KEY

A-PDA /Oatmeal agar medium
B- Paddy straw compost
C – Edible mushroom (Photograph)
D- Poisonous mushroom (Photograph)
E. Preservation technique (Photograph)

Cluster Electives - B

III B.Sc.: Botany Syllabus Semester- VI, Theory: Cluster Elective –B-3

PAPER – VIII-B-3 (Cluster Elective)

Paper VIII-B-3: Internship/ Project Work preferably either in an Institute or Industry

B.Sc - BOTANY
SEMESTER-V/VI: THEORY MODEL PAPER
(*General Model Paper*)

Time: 3 Hours **Max. Marks:75**

SECTION-A (Short Answer Questions)

(Instructions to the paper setter: Set minimum ONE question from each unit, maximum Eight from all.)

Answer any five of the following question **5x5=25M**

1.
2.
3.
4.
5.
6.
7.
8.

SECTION-B (Essay Questions)

(Instructions to the paper setter: Set minimum two questions from each unit, either or internal choice)

Answer All of the following questions **5x10=50M**

9. **a)**
Or **from unit I**
b)

10. a)
Or **from unit II**
b)

11. a)
Or **from unit III**
b)

12. a)
Or **from unit IV**
b)

13. a)
Or **from unit V**
b)

INTERNAL EXAMS **- 25Marks**

(15 marks for unit tests, **5** marks for assignments and remaining **5** marks for seminar etc.)

A.P. State Council of Higher Education

Revised Common Framework of CBCS for Colleges in Andhra Pradesh

w.e.f. 2015-16, Revised in April, 2016

Table-7: B.Sc., SEMESTER – I

Sno	Course	Total Marks	Mid Sem Exam*	Sem End Exam	Teaching Hours	Credits
1	First Language (Tel/Hin/Urdu/Sans…)	100	25	75	4	3
2	Second Language English	100	25	75	4	3
3	*Foundation Course - 1* Human Values & Professional Ethics	50	0	50	2	2
4	*Foundation course -2* Environmental Studies	50	0	50	2	2
5	DSC-1 Paper-1 (Core)	100	25	75	4	3
6	DSC 1 Lab Practical	50	0	50	2	2
7	DSC 2 Paper-1 (Core)	100	25	75	4	3
8	DSC 2 Lab Practical	50	0	50	2	2
9	DSC 3 Paper-1 (Core)	100	25	75	4	3
10	DSC 3 A Lab Practical	50	0	50	2	2
	Total	750	-	-	30	25

#DSC: Domain (Subject) Specific Course (Paper)

Foundation Course: value or skill based

Note: For Science Domain Subjects which had no lab practical component earlier (eg. Mathematics) the following format is applicable. They, however, will have co-curricular activities (eg. Problem solving sessions etc.). The total marks will change accordingly for such combinations. For example for Maths, Physics and Chemistry the total marks will be 700.

	DSC (without Lab Practical)	100	25	75	6	5

*Mid sem exam at the college (The marks split between Formal Test and Co-curricular activities may be decided by the University concerned). End Sem Exam by the Univ.

*Practical component will not be applicable to those science subjects which had no such component earlier (ex. Mathematics)

**Syllabus size shall be in accordance with the number of teaching hours

Table-8: B.Sc., SEMESTER – II

Sno	Course	Total Marks	Mid Sem Exam	Sem End Exam	Teaching Hours	Credits
1	First Language (Tel/Hin/Urdu/Sans…)	100	25	75	4	3
2	Second Language English	100	25	75	4	3
3	*Foundation course – 3* ICT – I	50	0	50	2	2
4	*Foundation course – 4* CSS – I	50	0	50	2	2
5	DSC 1 Paper-2 (Core)	100	25	75	4	3
6	DSC 1 Lab Practical	50	0	50	2	2
7	DSC 2 Paper-2 (Core)	100	25	75	4	3
8	DSC 2 Lab Practical	50	0	50	2	2
9	DSC 3 Paper-2 (Core)	100	25	75	4	3
10	DSC 3 Lab Practical	50	0	50	2	2
	Total	750	-	-	30	25

B.Sc. Table-9: B.Sc., SEMESTER – III

SEMESTER – III

Sno	Course	Total Marks	Mid Sem Exam	Sem End Exam	Teaching Hours	Credits
1	First Language (Tel/Hin/Urdu/Sans…)	100	25	75	4	3
2	Second Language English	100	25	75	4	3
3	*Foundation Course - 5* ICT – II	50	0	50	2	2
4	*Foundation course – 6* CSS – II	50	0	50	2	2
5	DSC 1 Paper-3 (Core)	100	25	75	4	3
6	DSC 1 Practical	50	0	50	2	2
7	DSC 2 Paper-3 (Core)	100	25	75	4	3
8	DSC 2 Practical	50	0	50	2	2
9	DSC 3 Paper-3 (Core)	100	25	75	4	3
10	DSC 3 Practical	50	0	50	2	2
	Total	750	-	-	30	25

Table-10: B.Sc., SEMESTER – IV

SEMESTER – IV

Sno	Course	Total Marks	Mid Sem Exam*	Sem End Exam	Teaching Hours**	Credits
1	*Foundation Course – 7* CSS – 2	50	0	50	2	2
2	*Foundation Course – 8* Analytical Skills	50	0	50	2	2
3	*Foundation Course - 9* Entrepreneurship	50	0	50	2	2
4	*Foundation course – 10* Leadership Education	50	0	50	2	2
5	DSC 1 Paper-4 (Core)	100	25	75	4	3
6	DSC 1 Lab Practical	50	0	50	2	2
7	DSC 2 Paper-4 (Core)	100	25	75	4	3
8	DSC 2 Lab Practical	50	0	50	2	2
9	DSC 3 Paper-4 (Core)	100	25	75	4	3
10	DSC 3 Lab Practical	50	0	50	2	2
	Total	750	-	-	30	23

*Analytical Skills: To be taught by Maths/Stat Teachers (may be partly by English Teachers)
Entrepreneurship: To be taught by Commerce Teachers
Leadership Education: To be taught by Telugu Teachers

Table-11: B.Sc., SEMESTER – V

Sno	Course	Total Marks	Mid Sem Exam	Sem End Exam	Teaching Hours	Credits
1	DSC 1 Paper-5 (Core)	100	25	75	3	3
2	DSC 1 Lab Practical	50	0	50	2	2
3	DSC 2 Paper-5 (Core)	100	25	75	3	3
4	DSC 2 Lab Practical	50	0	50	2	2
5	DSC 3 Paper-5 (Core)	100	25	75	3	3
6	DSC 3 Lab Practical	50	0	50	2	2
7	DSC 1 Paper-6 (Core)	100	25	75	3	3
8	DSC 1 Lab Practical	50	0	50	2	2
9	DSC 2 Paper -6 (Core)	100	25	75	3	3
10	DSC 2 Lab Practical	50	0	50	2	2
11	DSC 3 Paper-6 (Core)	100	25	75	3	3
12	DSC 3 Lab Practical	50	0	50	2	2
	Total	900	-	-	30	30

Table-12: B.Sc., SEMESTER – VI

Sno	Course	Total Marks	Mid Sem Exam	Sem End Exam	Teaching Hours	Credits
1	Elective 1: DSC 1, Paper -7 (applied/adv)	100	25	75	3	3
2	Elective-1 Lab Practical	50	0	50	2	2
3	Elective-1: DSC 2, Paper -7 (applied/adv)	100	25	75	3	3
4	Elective-2 Lab Practical	50	0	50	2	2
5	Elective-1: DSC 3, Paper -7 (applied/adv)	100	25	75	3	3
6	Elective-3 Lab Practical	50	0	50	2	2
7	Elective -2: DSC 1, Paper -8 App/Inter-domain/Gen El	100	25	75	3	3
8	Elective-2 Lab Practical	50	0	50	2	2
9	Elective -2: DSC 2, Paper -8 App/Inter-domain/Gen El	100	25	75	3	3
10	Elective-2 Lab Practical	50	0	50	2	2
11	Elective -2: DSC 3, Paper -8 App/Inter-domain/Gen El	100	25	75	3	3
12	Elective-2 Lab Practical	50	0	50	2	2
	Total	900	-	-	30	30

*$\mathbf{7^{th}}$ paper of each of the domain specific subjects (1^{st} paper of semester VI) will be a domain related Elective. More than one Elective may be offered giving choice to students. The Electives may be of Domain specific applied or advanced (specialization) in nature. The number of Electives may be decided (along with the syllabus) by the University concerned keeping the feasibility of conduct of University examinations in view.

** Applied Elective: It is desirable that around 25% of syllabus is taught by field experts. The college has to make such an arrangement.

*$\mathbf{8^{th}}$ paper of each of the domain specific subjects (2^{nd} paper of semester VI) will also be an Elective. The Electives may be of Inter-domain Clusters**- each Cluster having three papers with or without project work. or General in nature. The number of Clusters may be decided (along with the syllabus) by the University concerned keeping the feasibility of conduct of University examinations in view. It is desirable that around 25% of syllabus is taught by field experts.

***Cluster:**: In the last semester, for paper-8, each domain subject has one elective totaling three papers for each student. Electives may be given as Clusters of three papers each for each subject. A student can opt for all the three papers of the same subject (cluster or stream) including or excluding project work for a wider learning experience. The student will not study the other two domain subjects for paper-8.*

Total Credits for a B.Sc. Course: 158

ANDHRA UNIVERSITY

B.Sc MICROBIOLOGY

MODEL PAPER FOR SEMESTER END EXAMINATION

I SEMESTER

MBT 101: INTRODUCTION TO MICROBIOLOGY AND MICROBIAL DIVERSITY

TIME: 3HRS

MAX MAR:75

SECTION – A

I. Answer any FIVE of the following **5X5=25**

Draw diagrams wherever necessary

1. Whittaker's five kingdom concept
2. Louis Pasteur
3. TMV
4. Gram staining
5. Lyophilization
6. Light microscope
7. Autoclave
8. Mycoplasma

II. Answer Any Five Of The Following **5x10=50**

Draw labeled diagrams wherever necessary

(One from each unit)

UNIT I

9. a) Explain structure, morphology and replication of HIV

(or)

b) Explain ultra structure of prokaryotic cell

UNIT II

10. a) write the contributions of Anton Von Leeuwenhock and Robert Koch

(or)

b) Explain the characters studied for the classification of bacteria

UNIT III

11. a) Explain general characteristics and outline classification of fungi

(or)

b) Explain the principle and working mechanism of Electron microscopy

UNIT IV

12. a) Describe staining methods evolved in identification of bacteria

(or)

b) Explain about chemical methods of sterilization

UNIT V

13. a) explain about pure culture techniques

(or)

b) Describe various methods involved in preservation of microbial cultures

ANDHRA UNIVERSITY

B.Sc MICROBIOLOGY

MODEL PAPER FOR SEMESTER END EXAMINATION

II SEMESTER

MBT 201: MICROBIAL CHEMISTRY AND METABOLISM

TIME: 3HRS

MAX MAR:75

SECTION – A

I. Answer any FIVE of the following **5X5=25**

Draw diagrams wherever necessary

1. Polysaccharides
2. Paper Chromatography
3. Coenzymes
4. Enrichment and Differential media
5. Synchronus culture
6. ED pathway
7. Anoxygenic photosynthesis in bacteria
8. Nucleotides and Nuclesides

II. Answer Any Five Of The Following **5x10=50**

Draw labeled diagrams wherever necessary

(one from each unit)

UNIT I

9. A) explain about general characteristics and classification of Carbohydrates.

(or)

b) Describe spingolipids and phospholipids.

UNIT II

10. a) Write the principle and applications of UV & Visible spectrophotometry.

(or)

b) Describe properties and classification of enzymes

UNIT III

11. a) Explain types of enzyme inhibitions.

(or)

b) Describe properties and classification of enzymes.

UNIT IV

12. a) define medium? Explain about various growth media available for cultivation of bacteria.

(or)

b) Define growth? Explain about batch cultures and continuous cultures

UNIT V

13. a) Describe glycolysis path way

(or)

b) Define fermentation? Explain about lactic acid fermentation

ANDHRA UNIVERSITY

B.Sc MICROBIOLOGY

MODEL PAPER FOR SEMESTER END EXAMINATION

III SEMESTER

MBT 301: MICROBIAL GENETICS AND MOLICULAR BIOLOGY

TIME: 3HRS

MAX MAR:75

SECTION – A

I. Answer any FIVE of the following **5X5=25**

Draw diagrams wherever necessary

1. Plasmids
2. Transposons
3. Transduction
4. Mutations
5. Ribosomes
6. One gene one enzyme concept
7. Lac operon
8. cDNA libraries

II. **Answer Any Five Of The Following** **5x10=50**

Draw labeled diagrams wherever necessary

(one from each unit)

UNIT I

9. a) write about the structure and organization of prokaryotic DNA

(or)

b) explain the semi conservative mechanism of DNA replication

UNIT II

10. a) write about physical and chemical mutagens

(or)

b) explain about types of genetic recombination in bacteria

UNIT III

11. a) explain about one gene one polypeptide hypothesis

(or)

b) write about the types of RNA and their functions

UNIT IV

12. a) Describe the transcription and translation process in prokaryotes

(or)

b) Explain regulation of gene mechanism in bacteria

UNIT V

13. a) Explain outlines of gene coding methods

(or)

b) Write about applications of genetic engineering in agriculture and medicine.

ANDHRA UNIVERSITY

B.Sc MICROBIOLOGY

MODEL PAPER FOR SEMESTER END EXAMINATION

IV SEMESTER

MBT 401: IMMUNOLOGY AND MEDICAL MICROBIOLOGY

TIME: 3HRS

MAX MAR:75

SECTION – A

I. **Answer any FIVE of the following** **5X5=25**

Draw diagrams wherever necessary

1. Immunity
2. Macrophages
3. Haptens
4. Polyclonal antibody
5. Nosocomial infection
6. Amphotericin
7. Tuberculosis
8. Hepatitis

II. **Answer Any Five Of The Following** **5x10=50**

Draw labeled diagrams wherever necessary

(one from each unit)

UNIT I

9. A) Explain about the types of immunity

(or)

b) Explain in detail about cells of immune system

UNIT II

10. a) Write about the types of Antigen – Antibody reactions

(or)

b) Describe hyper sensitive reactions

UNIT III

11. a) Give an account on various diagnostic methods available for bacterial diseases

(or)

b) Describe the general methods of laboratory diagnosis for microbial infections

UNIT IV

12. a) Explain about methods for microbiological assay of antibiotics

(or)

b) Define vaccine? Explain about types of vaccines?

UNIT V

13. a) Give an account on microbial diseases?

(or)

b) Explain about viral diseases Hepatitis – A and AIDS.

ANDHRA UNIVERSITY

B.Sc MICROBIOLOGY

MODEL PAPER FOR SEMESTER END EXAMINATION

V SEMESTER

MBT 501: ENVIRONMENTAL & AGRICULTURAL MICROBIOLOGY

TIME: 3HRS

MAX MAR:75

SECTION – A

I. Answer any FIVE of the following **5X5=25**

Draw diagrams wherever necessary

1. Osmotic pressure
2. MPN test
3. Commensalism
4. Sanitary land fill
5. Trickling filter
6. Biofertilizers
7. Mycorrhizae
8. Citrus Canker

II. **Answer Any Five Of The Following** **5x10=50**

Draw labeled diagrams wherever necessary

(one from each unit)

UNIT I

9. **A)** write about the microflora of fresh water and marine habitatas

(or)

b) Describe the process of extream habitatas – extremophiles

UNIT II

10. a) Explain about the phosphorous cycle

(or)

b) Describe the methods to detect potability of water samples.

UNIT III

11. a) Explain in detail the process of sewage treatment

(or)

b) Describe the methods of solid waste disposal

UNIT IV

12. a) Explain about the role of microorganisms in plant growth promotion

(or)

b) Write in detail about biological nitrogen fixation

UNIT V

13. a) Write about plant diseases caused by fungi

(or)

b) Explain different methods employed to control plant diseases

ANDHRA UNIVERSITY

B.Sc MICROBIOLOGY

MODEL PAPER FOR SEMESTER END EXAMINATION

V SEMESTER

MBT 601: MICROBIAL DIAGNOSIS IN HEALTH CLINICS

TIME: 3HRS

MAX MAR:75

SECTION – A

I. Answer any FIVE of the following **5X5=25**

Draw diagrams wherever necessary

1. Protozoan diseases
2. CSF
3. Ziehl – Nelson Staining
4. Lowenstein – Jensen medium
5. ELISA
6. Swine flu
7. MIC
8. Disc diffusion method

II. **Answer Any Five Of The Following** **5x10=50**

Draw labeled diagrams wherever necessary

(one from each unit)

UNIT I

9. A) Explain about the human body symptoms of various bacterial diseases

(or)

b) Discuss the disease associated clinical symptoms for diagnosis of diseases

UNIT II

10. a) Explain the detailed process in collection of clinical symptoms with precautions

(or)

b) Discuss the methods of transport of clinical samples to laboratory and storage methods

UNIT III

11. a) Explain preparation and use of culture media in diagnosis of diseases

(or)

b) Write about the distinct colony properties of various bacterial pathogens

UNIT IV

12. a) Describe in detail about ELISA

(or)

b) Explain about HIV

UNIT V

13. a) Explain disc diffusion method to identify the sensitivity of bacteria.

(or)

b) Describe determination of Minimum Inhibitory Concentration (MIC) of an antibiotic for its use

AP STATE COUNCIL OF HIGHER EDUCATION

CBCS PATTERN FOR MICROBIOLOGY

YEAR	SEMESTER	PAPER	TITLE	MARKS	CREDICTS
I	I	MBT 101	Introduction to microbiology and microbial diversity	100	
		MBP 101	Introduction to microbiology and microbial diversity	50	
	II	MBT 201	Microbial biochemistry and metabolism	100	
		MBP 201	Microbial biochemistry and metabolism	50	
II	III	MBT 301	Microbial genetics and Molecular biology	100	
		MBP 301	Microbial genetics and Molecular biology	50	
	IV	MBT 401	Immunology and Medical Microbiology	100	
		MBP 401	Immunology and Medical Microbiology	50	
III	V	MBT 501	Environment and Agriculture Microbiology	100	

		MBP 501	Environment and Agriculture Microbiology	50	
		MBP 601	Microbial Diagnosis in Health Clinics	100	
		MBP 601	Microbial Diagnosis in Health Clinics	50	
	VI * Any one from 701, 702 & 703	*MBT 701	Food and Industrial Microbiology	100	
		*MBP 701	Food and Industrial Microbiology	50	
		*MBT 702	Microbial biotechnology	100	
		*MBP 702	Microbial biotechnology	50	
		*MBT 703	Microbial quality control, Instrumentation and biotechniques	100	
		*MBP 703	Microbial quality control, Instrumentation and biotechniques	50	
	** Any one cluster from 801, 802 & 803	**MBT 801	1. Industrial Microbiology 2. Food microbiology 3. Management of human microbial diseases	100 100 100	
		**MBP 801	Industrial Microbiology: Practical 1 Food microbiology :Practical 2 Management of human microbial diseases :Practical 3	50 50 50	
		**MBT 802	1. r – DNA technology 2. Microbes in sustainable agriculture 3. Bio fertilizers and Bio pesticides	100 100 100	
		**MBP 802	r – DNA technology: Practical 1	50 50	

			Microbes in sustainable agriculture: Practical 2 Bio fertilizers and Bio pesticides: Practical 3	50	
		**MBT 803 **MBP 803	1. Biostatistics and Bioinformatics 2. Bio safety and Intellectual Property Right (IPR) 3. Drug design and discovery Biostatistics and Bioinformatics :Practical 1 Bio safety and Intellectual Property Right (IPR): Practical 2 Drug design and discovery: Practical 3	100 100 100 50 50 50	

AP STATE COUNCIL OF HIGHER EDUCATION

CBCS PATTERN FOR MICROBIOLOGY

B.Sc MICROBIOLOGY (CBCS) SYLLABUS

FIRST YEAR SEMESTER- I

MBT- 101 INTRODUCTION TO MICROBIOLOGY AND MICROBIAL DIVERSITY

TOTAL HOURS: 48 **CREDITS: 4**

UNIT-I **No. of hours: 12**

History and mile stones in microbiology. Contributions of Anton von Leeuwenhoek, Edward Jenner, Louis Pasteur, Robert Koch, Ivanowsky. Importance and applications of microbiology.Classification of microorganisms. Haeckel's three Kingdom concept, Whittaker's five kingdom concept, three domain concept of Carl Woese. Outline

classification of bacteria as per the second edition of Bergey's Manual of Systematic Bacteriology.

UNITII **No. of hours:10**

General characteristics of Bacteria, Archaea, Mycoplasmas and Cyanobacteria.

Ultra structure of Prokaryotic cell- Variant components and invariant components.

General characteristics of viruses.

Morphology, Structure and replication of TMV and HIV.

UNIT-III **No. of hours: 10**

General characteristics and outline classification of Fungi, Algae and Protozoa.

Principles of microscopy - Bright field and Electron microscopy (SEM and TEM).

UNIT-IV **No. of hours: 8**

Staining Techniques - Simple and Differential (Gram Staining and Spore Staining).

Sterilization and disinfection techniques - Physical methods autoclave, hot- air oven, pressure cooker, laminar air flow, filter sterilization, Radiation methods UV rays, Gamma rays. Chemical methods alcohols, aldehydes, fumigants, phenols, halogens and hypochlorites.

UNIT - V **No. of hours: 8**

Isolation of Microorganisms from natural habitats.

Pure culture techniques: dilution-plating, Streak-plate, Spread-plate, Pour-Plate and micromanipulator. Enrichment culturing.

Preservation of microbial cultures: subculturing, overlaying cultures with mineral oils, lyophilization, and cultures, storage at low temperature.

MBP- 101 INTRODUCTION TO MICROBIOLOGY AND MICROBIAL DIVERSITY

TOTAL HOURS: 48 **CREDITS: 2**

1. Microbiology Good Laboratory Practices and Biosafety.
2. Preparation of culture media for cultivation of bacteria
3. Preparation of culture media for cultivation of fungi
4. Sterilization of medium using Autoclave
5. Sterilization of glassware using Hot Air Oven
6. Light compound microscope and its handling
7. Microscopic observation of bacteria (Gram +ve bacilli and cocci, Gram -ve bacilli), Cyanobacteria, Algae and Fungi.
8. Simple staining
9. Gram's staining
10. Hanging-drop method.
11. Isolation of pure cultures of bacteria by streaking method.
12. Preservation of bacterial cultures by various techniques.
13. Diagramatic or Electron photomicrographic observation of TMV, HIV, T4 phage and Adino virus

SUGGESTED READING

Alexopoulos, C.J., Mims, C.W. and Blackwell, M. (1996). Introductory Mycology, Wiley, New York.

Atlas, R.A. and Bartha, R. (2000). Microbial Ecology . Fundamentals and Application, Benjamin Cummings, New York.

Dimmock, N.J., Easton, A.J. and Leppard, K.N. (2001). Introduction to Modern Virology, Blackwell Science Ltd, U.K.

Dube, R.C. and Maheswari, D.K. (2000) General Microbiology. S Chand, New Delhi. Edition), Himalaya Publishing House, Mumbai.

Frobisher, H., Hinsdil, R.D., Crabtree, K.T. and Goodhert, D.R. (2005). Fundamentals of Microbiology, Saunder and Company, London.

Jaya Babu (2006). Practical Manual on Microbial Metabolisms and General

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Madigan, M.T., Martinkl, J.M. and Parker, J. (2010). Brock Biology of Microorganisms, 9th Edition, MacMillan Press, England.

Moore . Landecker, E. (1996). Fundamentals of Fungi, Prentice-Hall, NJ, USA.
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Pelczar, M.J., Chan, E.C.S. and Kreig, N.R. (1993). Microbiology. 5th Edition, Tata Mc Graw Hill Publishing Co., Ltd., New Delhi.

Gopal Reddy et al Laboratory Experiments in Microbiology

Power, C.B. and Daginawala, H.F. (1986). General Microbiology Vol I & II (2nd
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Rao, A.S. (1997). Introduction to Microbiology. Prentice-Hall of India Pvt Ltd., Nerw Delhi.Black, J.G. (2005).

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Stanier, R.Y., Adelberg, E.A. and Ingram, J.L. (1991). General Microbiology, 5th Ed., Prentice Hall of India Pvt. Ltd., New Delhi.

Sullia, S.B. and Shantaram, S. (1998). General Microbiology, Oxford & IBH Publishing Pvt. Ltd., New Delhi.

Talaro, K. and Talaro, A. (1996). Foundations in Microbiology. 2nd Edition. UMC Brown Publications.

Webster, J. (1980). Introduction to Fungi, Cambridge University Press, Cambridge,
Wilson, K. and Walker, J. (1994). Practical Biochemistry. 4 th Edition, Cambridge University Press, England.

Zubay, G. (1998). Biochemistry WCB. Mc GrawHill, Iowa.

B.Sc MICROBIOLOGY (CBCS) SYLLABUS
FIRST YEAR SEMESTER- II

MBT- 201 : MICROBIAL BIOCHEMISTRY & METABOLISM

TOTAL HOURS: 48 **CREDITS: 4**

UNIT-I **No. of hours: 10**

Outline classification and general characteristics of carbohydrates (monosaccharides, disaccharides and polysaccharides).
General characteristics of amino acids and proteins.
Structure of nitrogenous bases, nucleotides, nucleic acids.
Fatty acids (saturated and unsaturated) lipids (spingolipds, sterols and phospholipids).

UNIT-II **No. of hours: 8**

Principle and applications of - Colorimerty
Chromatography (paper, thin-layer and column),
Spectrophotometry (UV & visible),
Centrifugation and Gel Electrophoresis.

UNIT-III **No. of hours: 10**

Properties and classification of Enzymes.
Biocatalysis- induced fit and lock and key models.
Coenzymes and Cofactors.
Factors affecting catalytic activity.
Inhibition of enzyme activity- competitive, noncompetitive, uncompetitive and allosteric.

UNIT-IV **No. of hours: 10**

Microbial Nutrition: Nutritional requirements and uptake of nutrients by cells.
Nutritional groups of microcroorganisms- autotrophs, heterotrophs, mixotrophs.
Growth media- synthetic, complex, selective, enrichment and differential media.
Microbial Growth- different phases of growth in batch cultures, Synchronous, continuous, biphasic growth.
Factors influencing microbial growth.
Methods for measuring microbial growth Direct microscopy, viable count estimates, turbiodometry and biomass.

UNIT-V **No. of hours: 10**

Aerobic respiration -Glycolysis, HMP path way, ED path way, TCA cycle, Electron transport, oxidative and substrate level phosphorylation.
Anaerobic respiration (Nitrate).
Fermentation - Alcohol and lactic acid fermentations.
Outlines of oxygenic and anoxygenic photosynthesis in bacteria.

MBP- 201: MICROBIAL BIOCHEMISTRY & METABOLISM

TOTAL HOURS: 48 **CREDITS: 2**

1. Qualitative Analysis of Carbohydrates
2. Qualitative Analysis of Aminoacids
3. Colorimetric estimation DNA by diphenylamine method
4. Colorimetric estimation of proteins by Biuret/Lowry method
5. Paper chromatographic separation of sugars and amino acids
6. Preparation of different media- Synthetic and Complex Media
7. Setting and observation of Winogradsky column.
8. Estimation of CFU count by spread plate method/pour plate method.
9. Bacterial growth curve.
10. Factors affecting bacterial growth - pH.
11. Factors affecting bacterial growth - Temperature.
12. Factors affecting bacterial growth – Salts

SUGGESTED READING

Berg JM, Tymoczko JL and Stryer L (2011) Biochemistry, W.H.Freeman and Company
Caldwell, D.R. (1995). Microbial Physiology and Metabolism, W.C. Brown Publications, Iowa, USA.

Campbell, PN and Smith AD (2011) Biochemistry Illustrated, 4th ed., Published by Churchill Livingstone

Elliot, W.H. and Elliot, D.C. (2001). Biochemistry and Molecular Biology, 2 nd Edition, Oxford University Press, U.S.A.

Gottschalk, G. (1986). Bacterial Metabolism, SpringerVerlag, NewYork.

Lehninger, A.L., Nelson, D.L. and Cox, M.M. (1993). Principles of Biochemistry, 2 nd Edition, CBS Publishers and Distributors, New Delhi.

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Moat, A.G. and Foster, J.W. (1995). Microbial Physiology, JohnWiley, New York.
Nelson DL and Cox MM (2008) Lehninger Principles of Biochemistry, 5th Edition., W.H. Freeman and Company.
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GrawHill, New York.

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Sashidhara Rao, B. and Deshpande, V. (2007). Experimental Biochemistry: A student Companion. I.K. International Pvt. Ltd.

Stanier, R.Y., Adelberg, E.A. and Ingram, J.L. (1991). General Microbiology, 5th Ed.,Prentice Hall of India Pvt. Ltd., New Delhi.

Tymoczko JL, Berg JM and Stryer L (2012) Biochemistry: A short course, 2nd ed., W.H.Freeman

Voet,D. and Voet J.G (2004) Biochemistry 3rd edition, John Wiley and Sons
White, D. (1995). The Physiology and Biochemistry of Prokaryotes, Oxford University Press, New York.

Willey MJ, Sherwood, LM & Woolverton C J (2013) Prescott, Harley and Klein's Microbiology by. 9th Ed., McGrawHill

B.Sc MICROBIOLOGY (CBCS) SYLLABUS

SECOND YEAR SEMESTER- III.

MBT- 301 MICROBIAL GENETICS AND MOLECULAR BIOLOGY

TOTAL HOURS:48 **CREDITS: 4**

UNIT-I **No. of hours:10**

DNA and RNA as genetic material.

Structure and organization of prokaryotic DNA.

Extrachromosomal genetic elements - Plasmids and transposons.

Replication of DNA Semi conservative mechanism, Enzymes involved in replication.

UNIT-II **No. of hours: 10**

Mutations - spontaneous and induced, base pair changes, frame shifts, deletions, inversions, tandem duplications, insertions.

Mutagens - Physical and Chemical mutagens.

Outlines of DNA damage and repair mechanisms.

Genetic recombination in bacteria Conjugation, Transformation and Transduction.

UNIT-III **No. of hours: 10**

Concept of gene Muton, Recon and Cistron. One gene one enzyme and one gene one polypeptide hypotheses.

Types of RNA and their functions.

Genetic code.

Structure of ribosomes.

UNIT-IV **No. of hours: 8**

Types of genes - structural, constitutive, regulatory

Protein synthesis - Transcription and translation.

Regulation of gene expression in bacteria - lac operon.

UNIT-V **No. of hours:10**

Basic principles of genetic engineering.

Restriction endonucleases, DNA polymerases and ligases.

Vectors.

Outlines of gene cloning methods.

Polymerase chain reaction. Genomic and cDNA libraries.

General account on application of genetic engineering in industry, agriculture and medicine.

MBP- 301 MICROBIAL GENETICS AND MOLECULAR BIOLOGY

TOTAL HOURS: 48 **CREDITS: 2**

1. Study of different types of DNA and RNA using micrographs and model / schematic representations
2. Study of semi-conservative replication of DNA through micrographs / schematic representations
3. Isolation of genomic DNA from E. coli
4. Estimation of DNA using UV spectrophotometer.
5. Resolution and visualization of DNA by Agarose Gel Electrophoresis.
6. Resolution and visualization of proteins by Polyacrylamide Gel Electrophoresis (SDS-PAGE).
7. Problems related to DNA and RNA characteristics, Transcription and Translation.
8. Induction of mutations in bacteria by UV light.
9. Instrumentation in molecular biology Ultra centrifuge, Transilluminator, PCR

SUGGESTED READING

Crueger, W. and Crueger, A. (2000). Biotechnology: A Text Book of Industrial Microbiology, PrenticeHall of India Pvt. Ltd., New Delhi.

Freifelder, D. (1990). Microbial Genetics. Narosa Publishing House, New Delhi.

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Glazer, A.N. and Nikaido, H. (1995). Microbial Biotechnology - Fundamentals of Applied Microbiology, W.H. Freeman and company, New York.

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Nicholl, D.S.T. (2004). An Introduction to Genetic Engineering. 2 nd Edition. Cambridge University Press, London.

Old, R.W. and Primrose, S.B. (1994) Principles of Gene Manipulation, Blackwell Science Publication, New York.

Ram Reddy, S., Venkateshwarlu, K. and Krishna Reddy, V. (2007) A text Book of Molecular Biotechnology. Himalaya Publishers, Hyderabad.

Sinnot E.W., L.C. Dunn and T. Dobzhansky. (1958). Principles of Genetics. 5 th Edition. McGraw Hill, New York.

Smith, J.E. (1996). Biotechnology, Cambridge University Press.

Snyder, L. and Champness, W. (1997). Molecular Genetics of Bacteria. ASM press,
Strickberger, M.W. (1967). Genetics. Oxford & IBH, New Delhi.

Turner, P.C., Mclennan, A.G., Bates, A.D. and White, M.R.H. (1998). Instant Notes in Molecular Biology, Viva Books Pvt., Ltd., New Delhi.

Twynan, R.M. (2003). Advanced Molecular Biology. Viva books Pvt. Ltd. New Delhi.

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Washington, D.C., USA.

B.Sc MICROBIOLOGY (CBCS) SYLLABUS

SECOND YEAR SEMESTER- IV

MBT- 401 IMMUNOLOGY AND MEDICAL MICROBIOLOGY

TOTAL HOURS: 48 **CREDITS: 4**

UNIT-I **No. of hours: 10**

Types of immunity - innate and acquired; active and passive; humoral and cell-mediated immunity.

Primary and secondary organs of immune system thymus, bursa fabricus, bone marrow,

spleen and lymph nodes.

Cells of immune system.

Identiification and function of B and T lymphocytes, null cells, monocytes, macrophages, neutrophils, basophils and eosinophils.

UNIT-II **No. of hours: 10**

Antigens - types, chemical nature, antigenic determinants, haptens.

Factors affecting antigenicity.

Antibodies - basic structure, types, properties and functions of immunoglobulins.

Types of antigen-antibody reactions - Agglutinations, Precipitation, Neutralization, complement fixation, blood groups.

Labeled antibody based techniques - ELISA, RIA and Immunofluroscence. Polyclonal and monoclonal antibodies - production and applications.

Concept of hypersensitivity and Autoimmunity.

UNIT-III **No. of hours: 10**

Normal flora of human body.

Host pathogen interactions: infection, invasion, pathogen, pathogenicity, virulence and opportunistic infection.

General account on nosocomial infection.

General principles of diagnostic microbiology- collection, transport and processing of clinical samples.

General methods of laboratory diagnosis - cultural, biochemical, serological and molecular methods.

UNIT-IV **No. of hours: 8**

Antibacterial Agents- Penicillin, Streptomycin and Tetracycline.

Antifungal agents - Amphotericin B, Griseofulvin

Antiviral substances - Amantadine and Acyclovir

Tests for antimicrobial susceptibility.

Brief account on antibiotic resistance in bacteria - Methicillin-resistant Staphylococcus aureus (MRSA).

Vaccines - Natural and recombinant.

UNIT-V **No. of hours:10**

General account on microbial diseases - causal organism, pathogenesis, epidemiology, diagnosis, prevention and control

Bacterial diseases - Tuberculosis and Typhoid

Fungal diseases - Candidiasis.

Protozoal diseases - Malaria.

Viral Diseases - Hepatitis- A and AIDS

MBP- 401 IMMUNOLOGY AND MEDICAL MICROBIOLOGY

TOTAL HOURS: 48 **CREDITS: 2**

1. Identification of human blood groups.
2. Separate serum from the blood sample (demonstration).
3. Estimation of blood haemoglobin.
4. Total Leukocyte Count of the given blood sample.
5. Differential Leukocyte Count of the given blood sample.
6. Immunodiffusion by Ouchterlony method.
7. Identify bacteria (E. coli, Pseudomonas, Staphylococcus, Bacillus) using
8. laboratory strains on the basis of cultural, morphological and biochemical characteristics: IMViC, urease production and catalase tests
9. Isolation of bacterial flora of skin by swab method.
10. Antibacterial sensitivity by Kirby-Bauer method
11. Study symptoms of the diseases with the help of photographs: Anthrax, Polio, Herpes, chicken pox, HPV warts, Dermatomycoses (ring worms)
12. Study of various stages of malarial parasite in RBCs using permanent mounts.

SUGESTED READING

Abbas AK, Lichtman AH, Pillai S. (2007). Cellular and Molecular Immunology. 6th edition Saunders Publication, Philadelphia.

Ananthanarayan R. and Paniker C.K.J. (2009) Textbook of Microbiology. 8th edition, University Press Publication

Brooks G.F., Carroll K.C., Butel J.S., Morse S.A. and Mietzner, T.A. (2013) Jawetz, Melnick and Adelberg's Medical Microbiology. 26th edition. McGraw Hill

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Delves P, Martin S, Burton D, Roitt IM. (2006). Roitt's Essential Immunology.11th edition Wiley-Blackwell Scientific Publication, Oxford.
Goering R., Dockrell H., Zuckerman M. and Wakelin D. (2007) Mims' Medical Microbiology. 4th edition. Elsevier

Goldsby RA, Kindt TJ, Osborne BA. (2007). Kuby's Immunology. 6th edition W.H. Freeman and Company, New York.

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Richard C and Geiffrey S. (2009). Immunology. 6th edition. Wiley Blackwell Publication.

Willey JM, Sherwood LM, and Woolverton CJ. (2013) Prescott, Harley and Klein's Microbiology. 9th edition. McGraw Hill Higher Education

B.Sc MICROBIOLOGY (CBCS) SYLLABUS

THIRD YEAR SEMESTER- V

MBT- 501 ENVIRONMENTAL & AGRICULTURAL MICROBIOLOGY

TOTAL HOURS: 36 **CREDITS: 3**

UNIT - I **No. of hours:8**

Terrestrial Environment: Soil profile and soil microflora

Aquatic Environment: Microflora of fresh water and marine habitats

Atmosphere: Aeromicroflora and dispersal of microbes

Extreme Habitats: Extremophiles: Microbes thriving at high & low temperatures, pH, high hydrostatic & osmotic pressures, salinity, & low nutrient levels.

UNIT - II **No. of hours: 8**

Role of microorganisms in nutrient cycling (Carbon, nitrogen, phosphorus).

Treatment and safety of drinking (potable) water, methods to detect potability of water samples:

(a) standard qualitative procedure: presumptive test/MPN test, confirmed and completed tests for faecal coliforms

(b) Membrane filter technique.Microbial interactions - mutualism, commensalism,antagonism, competition, parasitism, predation.

UNIT - III **No. of hours: 6**

Outlines of Solid Waste management: Sources and types of solid waste, Methods of solid waste
disposal (composting and sanitary landfill).
Liquid waste management: Composition and strength of sewage (BOD and COD), Primary, secondary (oxidation ponds, trickling filter, activated sludge process and septic tank) and tertiary
sewage treatment.

UNIT - IV **No. of hours:7**

Plant Growth Promoting Microorganisms - Mycorrhizae, Rhizobia, Azospirillum, Azotobacter,
Frankia, phosphate-solubilizers and Cyanobacteria.
Outlines of biological nitrogen fixation (symbiotic, non-symbiotic).
Biofertilizers - Rhizobium.

UNIT – V **No. of hours:8**

Concept of disease in plants. Symptoms of plant diseases caused by fungi, bacteria, and viruses.
Plant diseases - groundnut rust, Citrus canker and tomato leaf curl.
Principles of plant disease control.

MBP- 501 ENVIRONMENTAL & AGRICULTURAL MICROBIOLOGY

TOTAL HOURS: 36 **CREDITS: 2**

1. Analysis of soil - pH, Moisture content and water holding capacity.
2. Isolation of microbes (bacteria and fungi) from soil.

3. Study of air flora by petriplate exposure method.

4. Analysis of potable water: SPC, Presumptive, confirmed and completed test, determination of coli form count in water by MPN.

5. Determination of Biological Oxygen Demand (BOD) of waste water samples.

6. Isolation of Rhizobium from root nodules.

7. Staining and observation of Vesicular Arbuscular Mycorrhizal (VAM) fungi.

8. Observation of plant diseases of local importance - Citrus canker, Tikka disease of Groundnut, Bhendi yellow vein mosaic, Rusts, Smuts, Powdery mildews, Tomato leafcurl.

SUGGESTED READINGS

Atlas RM and Bartha R. (2000). Microbial Ecology: Fundamentals & Applications. 4th edition.
Benjamin/Cummings Science Publishing, USA

Barton LL & Northup DE (2011). Microbial Ecology. 1st edition, Wiley Blackwell, USA

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Press.

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& London.

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New York.

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Willey JM, Sherwood LM, and Woolverton CJ. (2013). Prescott's Microbiology. 9th edition. McGraw Hill Higher Education.

B.Sc MICROBIOLOGY (CBCS) SYLLABUS

THIRD YEAR - SEMESTER -V

MBT- 601 MICROBIAL DIAGNOSIS IN HEALTH CLINICS

TOTAL HOURS: 36 **CREDITS: 3**

UNIT- I **No. of hours: 8**

Bacterial, Viral, Fungal and Protozoan Diseases of various human body systems, Disease associated clinical samples for diagnosis. (any three diseases of each).

UNIT- II **No. of hours: 8**

Collection of clinical samples (oral cavity, throat, skin, blood, CSF, urine and faeces) and precautions required.

Method of transport of clinical samples to laboratory and storage.

UNIT- III **No. of hours:8**

Examination of sample by staining - Gram stain, Ziehl-Neelson staining for tuberculosis, Giemsa-stained thin blood film for malaria

Preparation and use of culture media - Blood agar, Chocolate agar, Lowenstein-Jensen medium, MacConkey agar, Distinct colony properties of various bacterial pathogens.

UNIT- IV **No. of hours:6**

Serological Methods - Agglutination, ELISA, immunofluorescence, Nucleic acid based methods - PCR, Nucleic acid probes.

Typhoid, Dengue and HIV, Swine flu.

UNIT- V **No. of hours:6**

Importance, Determination of resistance/sensitivity of bacteria using disc diffusion method,

Determination of minimal inhibitory concentration (MIC) of an antibiotic by serial double dilution method

MBP- 601 MICROBIAL DIAGNOSIS IN HEALTH CLINICS

TOTAL HOURS: 36 **CREDITS: 2**

1. Collection transport and processing of clinical specimens (Blood, Urine, Stool and Sputum).

Receipts, Labeling, recording and dispatching clinical specimens.

2. Isolation of bacteria in pure culture and Antibiotic sensitivity.

3. Identification of common bacteria by studying their morphology, cultural character, Biochemical reactions, slide agglutination and other tests.

4. Maintenance and preservation of stock culture.

SUGGESTED READING

Ananthanarayan R and Paniker CKJ (2009) Textbook of Microbiology, 8th edition, Universities Press Private Ltd.

Brooks G.F., Carroll K.C., Butel J.S., Morse S.A. and Mietzner, T.A. (2013) Jawetz, Melnick and Adelberg's Medical Microbiology. 26th edition. McGraw Hill Publication.

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Randhawa, VS, Mehta G and Sharma KB (2009) Practicals and Viva in Medical Microbiology 2ndedition, Elsevier India Pvt Ltd.

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B.Sc MICROBIOLOGY (CBCS) SYLLABUS

THIRD YEAR - SEMESTER -VI

MBT- 701 FOOD AND INDUSTRIAL MICROBIOLOGY

TOTAL HOURS: 36 **CREDITS: 3**

UNIT- I **No. of hours: 8**

Intrinsic and extrinsic parameters that affect microbial growth in food

Microbial spoilage of food - fruits, vegetables, milk, meat, egg, bread and canned foods

Food intoxication (botulism).

Food-borne diseases (salmonellosis) and their detection.

UNIT – II **No. of hours: 7**

Principles of food preservation - Physical and chemical methods.

Fermented Dairy foods – cheese and yogurt.

Microorganisms as food – SCP, edible mushrooms (white button, oyster and paddy straw).

Probiotics and their benefits.

UNIT – III **No. of hours: 6**

Microorganisms of industrial importance – yeasts,(Saccharomyces cerevisiae) moulds,(Aspergillus niger) Bacteria(E.coli), actinomycetes (Streptomyces griseus).

Outlines of Isolation and Screening and strain improvement of industrially-important microorganisms.

UNIT – IV **No. of hours: 8**

Types of fermentation processes – solid state, liquid state, batch, fed-batch, continuous.

Basic concepts of Design of fermenter.

Ingredients of Fermentation media

Downstream processing - filtration, centrifugation, cell disruption, solvent extraction.

UNIT – V **No.of hours: 7**

Microbial production of Industrail products : Citric acid, Ethanol, Amylase, Penicillin, glutamic acid, and vitamin B12.

MBP- 701: FOOD AND INDUSTRIAL MICROBIOLOGY

TOTAL HOURS: 36 **CREDITS: 2**

1. Isolation of bacteria and fungi spoiled bread / fruits / vegitables
2. Preparation of yogurt / dahi
3. Determination of microbiological quality of milk sample by MBRT
4. Isolation of antagonistic microorganisms by crowd plate technique
5. Design of fermenter (Identification of various types of fermenters and labeling of parts
6. Microbial fermentation for the production and estimation of ethanol from grapes
7. Microbial fermentation for the production and estimation of citric cid

B.Sc MICROBIOLOGY (CBCS) SYLLABUS

THIRD YEAR - SEMESTER -VI

MBT- 702 MICROBIAL BIOTECHNOLOGY

TOTAL HOURS: 36 **CREDITS: 3**

UNIT- I **No. of hours: 8**

Introduction to microbial biotechnology, Bacterial genes, genomes and genetics. Recombinant microbial biotechnology products , biotechnology regulation and ethics.

UNIT- II **No. of hours: 7**

Biomass and bio fuels: plant biomass (cellulose, starch, pectin, gum materials). Animal biomass (chitin, milk, whey, slaughter, house waste). Microbial biomass (alagal blooms, in fresh and sea water), fungal mushrooms, fermentation waters by yeasts, and bacterial biomass.

UNIT- III **No. of hours: 6**

Concept of single cell proteins, probiotics and their applications. Microbial production of fuels: alcohols, hydrogen and methane. Microbial production of polymers: xanthenes gums.

UNIT- IV **No. of hours: 7**

Expression of cloned genes in bacteria, yeast, plant and animal cells. Basic principles and application of biosensors. Nucleic acid probe technology.

UNIT- V **No. of hours: 7**

Concept of genetically modified microorganisms. Bt cotton : production, advantages and limitations. Probable advantages and disadvantages of genetically modified crops. Role of microorganisms in creation of transgenic animals and plants.

MBT- 702 MICROBIAL BIOTECHNOLOGY

TOTAL HOURS: 36 **CREDITS: 2**

1. Culturing of mushrooms
2. Isolation of yeast from grapes.
3. Production of wine
4. Production of ethyl alcohol
5. Isolation of Plasmid DNA from E.coli
6. Tissue culture: callus cultivation
7. Fermentative production of ethyl alcohol

.

B.Sc MICROBIOLOGY (CBCS) SYLLABUS

THIRD YEAR - SEMESTER -VI

MBT- 703 Microbial quality control, Instrumentation and biotechniques

TOTAL HOURS: 36 **CREDITS: 3**

UNIT – I **No.of hours:7**

Microbial quality control definition, history and introduction. Standard Methods involved in assessment of microbial quality control. Q.A and Q.C definitions and importance. Traditional Microbiological Quality Controling methods: Sampling methods, TVC, APC and serial dilution techniques. Microbiological criteria.

UNIT – II **No.of hours: 8**

Microbiological quality control in pharmaceuticals and medical devices: Scope and Aims.

Risk assessment methods: Assessment of risk. Steps involved in risk assessment. Laboratory facility design for quality control: Sterilization, disinfection and decontamination. Personnel training: Hygiene and handling techniques. Documentation. Good laboratory practices.

UNIT – III **No.of hours: 7**

Culture media used in QC and QA: Design of specialized media for identification of pathogens. Good laboratory practices in culture media preparation: raw material, water, pH. uses of media. Selective and indicator media used in pharmaceutical and food industries.

UNIT – IV **No.of hours:7**

Instruments associated in QC and QA: Principle involved, working conditions, uses and precautions of Laminar Air Flow (LAF), Autoclave, Incubator, pH meter, Colony counter, Hot air oven, Centrifuges and storage devices.

UNIT - V **No.of hours:7**

Techniques for enumeration of microorganisms: sample preparation from Aqueous, soluble, insoluble, medical and pasteurized materials. Counting methods: pour plate, spread plate, membrane filtration. Most Probable Number (MPN) and MIC. Turbidimetric methods. Staining techniques for identification bacteria and Fungi.

MBP- 703 Microbial quality control, Instrumentation and biotechniques

Total hours: 36 **credicts: 2**

1. Isolation and enumeration of bacteria form food / pharmaceutical source.
2. Quality Assurance of water by MPN method.
3. Preparation of any two selective and indicator media commonly used Q.A & Q.C

4. Microbial quality of in and around laboratory conditions.
5. Isolation and Identification of fungi by using selective media and staining procedures.
6. Identification of MIC of any one antibiotic.

Suggested readings

1. **Hand book of Microbial Quality control by Rosamund. M, Baird Norman. A, Hodges and Stephen. P, Denyer. CRC press.**
2. The Microbiological Quality of Food, 1st Edition, Editors: **Antonio Bevilacqua Maria Rosaria Corbo Milena Sinigaglia** eBook ISBN: **9780081005033** Imprint:**Wood head Publishing.**
3. **Guide to Microbiological Control in Pharmaceuticals and Medical Devices, Second Edition,** Stephen P. Denyer, Rosamund M. Baird**,** CRC Press.

B.Sc MICROBIOLOGY (CBCS) SYLLABUS

THIRD YEAR - SEMESTER -VI

MBT- 801 (1) INDUSTRIAL MICROBIOLOGY

TOTAL HOURS: 36 **CREDITS: 3**

UNIT – I **No.of hours:7**

Microorganisms of industrial importance – yeasts, moulds, bacteria, actinomycetes. Industrially important Primary and secondary microbial metabolites. Screening techniques. Techniques involved in selection of industrially important metabolites from microbes.

UNIT – II **No.of hours:7**

Fermentation and fermenter: concept and discovery of fermentation. Fermenter: its parts and function. Types of fermenter – batch, continuous and fed batch.

UNIT – III **No.of hours:8**

Pharma and therapeutic enzymes. Enzymes used in detergents, textiles and leather industries. Production of amylases. Production of therapeutic enzymes. Role of microorganisms in bioleaching and textile industry.

UNIT – IV **No.of hours:7**

Industrial microorganisms: cell growth, microbial growth kinetics, factors affecting growth, basic nutrition, principles of production media, components of media, chemical composition of media.

UNIT – V **No.of hours:7**

Bioreactors: basic structure of bioreactor, types of bioreactors, kinetics and methodology of batch and continuous bioreactors. Sterilization of bioreactors: fibrous filter sterilization. Aeration and agitation: agitation in shake flask and tube rollers.

MBP- 801 (1) INDUSTRIAL MICROBIOLOGY

Total hours: 36 **Credits: 2**

1. Production of ethanol
2. Estimation of ethanol

3. Isolation of amylase producing microorganisms from soil
4. Production and assay of amylase
5. Demonstration of fermenter
6. Production of wine from grapes
7. Growth curve and kinetics of any two industrially important microorganisms.

B.Sc MICROBIOLOGY (CBCS) SYLLABUS

THIRD YEAR - SEMESTER -VI

MBT- 801 (2) FOOD MICROBIOLOGY

TOTAL HOURS: 36 **CREDITS: 3**

UNIT – I **No.of hours:7**

Microorganisms of food spoilage and their sources. Spoilage of different food materials - fruits, vegetables, meat, fish. Canned foods. Food intoxication (botulism and staph poisioning), food-borne diseases (salmonellosis and shigellosis) and their detection.

UNIT – II **No.of hours:7**

General account of food preservation. Microbiological production of fermented foods – bread, cheese, yogurt. Biochemical activities of microbes in milk. Microorganisms as food – SCP, edible mushrooms (white button, oyster and paddy straw).

UNIT – III **No.of hours:8**

Microbial production of distilled beverages, gen and whisky. Introduction, processing and plant production, acetic acid bacteria and mechanism of acidic acid fermentation, commercial vinegar production processing, grades and uses of vinegar. preparation of Yogurt, Streptococcus species, *Lactobacillus bulgaricus*; Manufacture of cheese; *Penicillium roqueforti*.

UNIT – IV **No.of hours:7**

Food processing & preservation: Methods of food preservation, Aseptic handling, pasteurization of milk, refrigeration and freezing, dehydration, osmotic pressure, chemicals – organic acids, nitrates, nitrites and cresols; Radiation – UV light, Y-irradiation.

UNIT – V **No.of hours:7**

Probiotics: history, common properties of probiotics, examples of probiotic microorganisms. Uses of probiotics. Production of vitamins: vitamin B12 – organisms used, production method, process, recovery and assay. Vitamin C – organisms used, production method, process, recovery and assay.

MBP- 801 (2) FOOD MICROBIOLOGY

Total hours: 36 **Credits: 2**

1. Identification of pathogens from – formulation syrup
2. Identification of pathogens from tooth paste
3. Identification of pathogens from canned food materials

4. Identification of pathogens from tablets
5. Bioassay of vitamin B12
6. Bioassay of penicillin
7. Cultivation of edible mushrooms.

B.Sc MICROBIOLOGY (CBCS) SYLLABUS

THIRD YEAR - SEMESTER -VI

MBT- 801 (3) MANAGEMENT OF HUMAN MICROBIAL DISEASES

TOTAL HOURS: 36 **CREDITS: 3**

UNIT – I **No.of hours:7**

Introduction to human microbial diseases caused by bacteria, virus, fungi and protozoa. Definition and concept of health, disease, infection, and pathogen. Types of human microbial diseases and their transmission, causative agents and symptoms of human microbial diseases.

UNIT – II

General account of epidemiology: principles of epidemiology, current epidemics (AIDS, nosocomal, acute respiratory syndromes). Measures for prevention of epidemic – global health consideration, emerging and re-emerging infectious diseases. Biological warfare and Biological weapons.

UNIT – III

Over view of diseases caused by virus – AIDS, Hepatitis, Influenza, Rabies, Chikengunya and Polio, poxvirus, herpes virus, chiken pox virus – history, causative agent, pathogenesis, diagnosis, drugs and inhibitors.

UNIT – IV

Harmful microbial interaction: human entry of pathogens into the host, types of bacterial pathogens, mechanism of bacterial pathogenicity, colonization and growth, virulence, virulence factors, exotoxins, enterotoxins, endotoxins, neurotoxins – avoidance of host defense mechanisms, damage to host cell, host factors for infection & innate resistance to infection.

UNIT – V

Laboratory diagnosis of Common infective syndromes and parasitic manifestations; Methods of transmission and role of vectors- biology of vectors. (1) House fly (2) Mosquitoes (3) sand fly. Need and significance of epidemiological studies. Epidemiological investigations to identify a disease, Problems of drug resistance and drug sensitivity. Drug resistance in bacteria.

MBP- 801 (3) MANAGEMENT OF HUMAN MICROBIAL DISEASES

TOTAL HOURS: 36 **CREDITS: 2**

1. Clinical microbiology:
   a) Physical, Chemical & microscopic examination of clinical samples – urine, stool, puss, sputum.
2. Isolation and identification of following pathogens from clinical samples: *E.coli, Salmonella and Psedumonas.*

3. Demonstration of permanent slides of the following parasites:
    a) Entamoeba histolytica
    b) Ascaris spps.
    c) Plasmodium spps.
    d) Mycobacterium tuberculosis & Mycobacterium leprae
4. Estimation of hemoglobin (Acid hematin and cyan methanoglobin method).
5. ESR and PCV determination
6. Immuno hematology: Blood group typing by slide test & tube for ABO & Rh systems.

B.Sc MICROBIOLOGY (CBCS) SYLLABUS

THIRD YEAR - SEMESTER -VI

MBT- 802 (1) r-DNA TECHNOLOGY

TOTAL HOURS: 36 **CREDITS: 3**

UNIT – I **No.of hours:7**

Restriction and Modification: Classification of restriction endonucleases. Enzymes used in molecular cloning; Polymerases, ligases, phosphatases, kinases and nucleases; Advanced Molecular biology techniques, Electrophoresis and Blotting techniques.

Unit - II **No.of hours: 6**

Cutting and joining DNA: (cohesive end ligation, methods of blunt end ligation). Transfection and transformation. Selection of transformed cells. Screening methods (Genetic marker and blue white screening).

Unit - III **No.of hours: 7**

Cloning vehicles - Plasmid, Bacteriophage, Construction of genomic and cDNA libraries. Advantages of cDNA libraries.

Unit - IV **No.of hours: 8**

Methods of gene sequencing – Maxam - Gilberts and Sanger's dideoxy chain termination methods; Polymerase chain reaction technique (Components in PCR and PCR conditions)

Methods of gene transfer in fungi, yeast and higher plants using microinjection, microprojectile bombardment (gene gun method, Electroporation and Agrobacterium mediated transformation.

UNIT – V **No.of hours: 8**

Applications of recombinant DNA technology in Agriculture (Transgenic Plants) Medicine (production of Insulin, Growth harmone, Tissue plasmogen activator and HBsAg vaccine).

B.Sc MICROBIOLOGY (CBCS) SYLLABUS

THIRD YEAR - SEMESTER -VI

MBP- 802 (1) r-DNA TECHNOLOGY

TOTAL HOURS: 36 **CREDITS:2**

1. Problem in Genetic engineering.

2. Transformation in Bacteria using plasmid.

3. Restriction digestion of DNA and its electrophoretic separation.

4. Ligation of DNA molecules and their testing using electrophoresis.

5. Activity of DNAase and RNAse on DNA and RNA.

6. Isolation of Plasmid DNA.

7. Demonstration of PCR

B.Sc MICROBIOLOGY (CBCS) SYLLABUS

THIRD YEAR - SEMESTER -VI

MBT- 802 (2) Microbes in Sustainable Agriculture

TOTAL HOURS: 36 **CREDITS: 3**

UNIT – I **No.of hours: 7**

Soil Microbiology: Microbial groups in soil, microbial transformations of carbon, nitrogen, phosphorus and sulphur, Biological nitrogen fixation. Microflora of Rhizosphere and Phyllosphere microflora, microbes in composting.

UNIT – II

Beneficial microorganisms in Agriculture: Biofertilizer (Bacterial Cyanobacterial and Fungal), microbial insecticides, Microbial agents for control of Plant diseases, Biodegradation, Biogas production, Biodegradable plastics, Plant – Microbe interactions.

UNIT – III

Germ theory of disease, Protection against infections, Applied areas of Microbiology: genetic engineering, Plasmids, episomes, genetically modified Organisms and their applications in agriculture.

UNIT – IV

Diseases caused by bacteria and fungi to various commercial and food crops

Management of soil biota for maintaining soil fertility. Convertion of waste lands into fertile lands.

Management of soil nutrients.

UNIT – V

Importance of mycorrhizal inoculums, types of mycorrhizae associated plants, mass inoculums. Production of VAM, field applications of Ectomycorrhizae and VAM.

B.Sc MICROBIOLOGY (CBCS) SYLLABUS

THIRD YEAR - SEMESTER -VI

MBP- 802 (2) Microbes in Sustainable Agriculture

TOTAL HOURS: 36 **CREDITS:2**

1. Enumeration of bacteria, fungi and actinomycetes from soil
2. Enumeration and identification of rhizosphere micro flora
3. Isolation of rhizobium from root nodules.
4. Isolation of azatobcter from soil.
5. Observation description of any three bacterial and fungal plant diseases
6. Winigradsky collum.
7. Staining and observation of VAM.
8. Isolation of cellulose degrading organisms.

B.Sc MICROBIOLOGY (CBCS) SYLLABUS

THIRD YEAR - SEMESTER -VI

MBT- 802 (3) Biofertilizers and Biopestifcides

TOTAL HOURS: 36 **CREDITS: 3**

UNIT – I **No.of hours: 7**

General account of microbes used in biofertilizers for various crop plants and their dvatages over chemical fertilizers.

Symbiotic nitrogen fixation: Rhizobium – Isolation, characteristic types, inoculums production & field application, legume / pulses plants.

UNIT – II **No.of hours: 8**

Frankia – isolation, charecteristics, Alder, Casurina plants, non – leguminous crop symbiosis. Cyanobacteria, Azolla- Isolation, characterization, mass multiplication, role in rice cultivation, crop response, field application.

UNIT – III **No.of hours: 7**

Non – symbiotic nitrogen fixers and phosphate solubilizers: Free isolation, characteristics, mass inoculums, production and field application.

Phosphate solubilizing microbes – isolation, characterization, mass inoculums, production and field application.

UNIT – IV **No.of hours: 7**

Mycorrhizal biofertilizers: importance of mycorhizal inoculums, types of mycorrhizae and associated plants, mass inoculum, production of VAM, field applications of Ectomycorrhizae & VAM, field applications of Ectomycorrhizae & VAM.

UNIT – V **No.of hours: 7**

Bio insecticide: general account of microbes used as bio insecticides and their advantages over synthetic pesticides, *Bacillus thuringiensis*, production, field applications, viruses – cultivation and field applications.

B.Sc MICROBIOLOGY (CBCS) SYLLABUS

THIRD YEAR - SEMESTER -VI

MBP- 802 (3) Biofertilizers and Biopestifcides

TOTAL HOURS: 36 **CREDITS: 2**

1. Study of different bio pesticides, weedicides, inorganic and organic fertilizers.
2. Deficiency symptoms of nutrient deficiency (photographs).
3. Soil testing, limiting and fertilizing
4. Preparation of enriched farm yard manure
5. Study of composting methods
6. Study of recycling of farm waste
7. Study of methods of green manuring
8. Isolation and cultivation of rhizobium from root nodules.

B.Sc MICROBIOLOGY (CBCS) SYLLABUS

THIRD YEAR - SEMESTER -VI

MBT- 803 (1) Biostatistics and Bioinformatics

TOTAL HOURS: 36 **CREDITS: 3**

UNIT – I **No.of hours: 7**

Definition, nature and scope of bioinformatics. Bioinformatics versus computational biology. Branches of bioinformatics. Basic concepts in bioinformatics.

UNIT – II **No.of hours: 7**

Biostatistics: probability and distribution. Poisson and binomial distributions. Measurement of central tendency (mean, mode and range) and dispersion (standard error and standard deviation).

UNIT – III **No.of hours: 7**

Computational phylogenetics – various applications. Phylip soft ware. Microarray, Bio informatics – Experimental design & Over view of data analysis.

UNIT – IV **No.of hours: 8**

Basic concepts of system biology. Over view of computer aided drug design. Searching sequence database using BLAST. Concept of genomics and proteomics.

UNIT – V **No.of hours: 7**

Population and sampling test of significance. Student t-test for small samples. Chi^2 test for analysis, correlation and regression. Computer applications in Biotechnology.

B.Sc MICROBIOLOGY (CBCS) SYLLABUS

THIRD YEAR - SEMESTER -VI

MBP- 803 (1) Biostatistics and Bioinformatics

TOTAL HOURS: 36 **CREDITS: 2**

1. Isolation of plasmid DNA from *E.coli* cells
2. Quantitative and qualitative analysis of proteins / DNA by using spectrophotometer.
3. Demonstration of Southern hybridization
4. Demonstration of amplification DNA by PCR.
5. Use of software for sequence analysis of nucleotides and proteins.
6. Problem related to t – test and chi^2 test.

B.Sc MICROBIOLOGY (CBCS) SYLLABUS

THIRD YEAR - SEMESTER -VI

MBT- 803 (2) Bio safety and Intellectual property right

TOTAL HOURS: 36 **CREDITS: 3**

UNIT – I **No.of hours: 7**

Introduction: general introduction to IPR (parent, plant breeder's right). Trademarks, industrial design, trade secrets (or) undisclosed information integrated circuit designs.

UNIT – II **No.of hours: 7**

Patenting principle, international – standards and patent validity (neem and relaxins), recent developments in patent system and patentability of biotechnology, invention IPR issues of the Indian context.

UNIT – III **No.of hours: 7**

Biotechnology and hunger: challenges for the Indian biotechnological research and industries. Bio safety: the Cartagena protocol on bio safety.

UNIT – IV **No.of hours: 7**

Bio safety management: key to the environmentally responsible use of biotechnology, ethical implications of biotechnology product techniques, social and ethical implications of biological weapons

UNIT – V **No.of hours: 7**

Copy right and rights related to copy right, patent claims, the legal decision – making process.

International standards as per WHO, ISI, bio safety and validation. International organization agencies and treaties.

B.Sc MICROBIOLOGY (CBCS) SYLLABUS

THIRD YEAR - SEMESTER -VI

MBP- 803 (2) Bio safety and Intellectual property right

TOTAL HOURS: 36 **CREDITS: 2**

1. Study of components and design of a BSL – III laboratory
2. Filing applications for approval from bio safety committee
3. Filing primary applications for patents
4. Study of steps of patenting process
5. A case study of patent.
6. Study of bio safety measures in pharmaceutical industry.
7. Study on QA & QC parameters followed in R&D laboratory.

B.Sc MICROBIOLOGY (CBCS) SYLLABUS

THIRD YEAR - SEMESTER -VI

MBT- 803 (3) DRUG DESIGN AND DISCOVERY

TOTAL HOURS: 36 **CREDITS: 3**

Unit – I **No. of Hours: 7**

Introduction- History of drug design, Current approaches and philosophies in drug design, Molecular mechanisms of diseases and drug action with examples. Pharmaceutical products of microbial origin (antibiotics) animal origin (sex hormones), plant origin (Alkaloids & Morphine).

Unit – II **No. of Hours: 7**

Sources of Drugs- Microbial drugs, Plants as a source of drugs, E. coli as a source of recombinant therapeutic proteins. Expression of recombinant proteins in yeasts, animal cell culture systems.. Rational drug design and Combinatorial approaches to drug discovery

Unit – III **No. of Hours: 7**

Drug development process- Impact of genomics and related technologies upon drug discovery: Gene chips, Proteomics, Structural genomics and Pharmacogenetics. Drug manufacturing process- Guides to good manufacturing practice.

Unit – IV **No. of Hours: 8**

Vaccines and adjuvant- Traditional vaccine preparations, attenuated, dead or inactivated bacteria, Attenuated and inactivated viral vaccines, Toxoids, antigen-based and other vaccine preparations. Impact of genetic engineering on vaccine technology. Peptide vaccines and vaccine vectors. Adjuvant technology: Adjuvant mode of action.

Unit – V **No. of Hours: 7**

Nucleic acid as drugs- Gene therapy: Basic approach to gene therapy, Vectors used in gene therapy -Retroviral vectors, Additional viral-based vectors, Manufacture of viral vectors, Non-viral vectors. Gene therapy and genetic disease, cancer, Gene therapy and AIDS. Genebased vaccines.

B.Sc MICROBIOLOGY (CBCS) SYLLABUS

THIRD YEAR - SEMESTER -VI

MBP- 803 (3) DRUG DESIGN AND DISCOVERY

TOTAL HOURS: 36 **CREDITS: 3**

1. Isolation of antibiotic producing bacteria from soil samples
2. Isolation of drug resistant plasmid from bacteria (E.coli).
3. Isolation of Actinomycetes from soil.
4. Identification of antibacterial activity of actinimycetes.
5. Identification of antibacterial activity of fungi
6. Identification of antagonistic activity of any two fungal species.
7. Assay of any one antibiotic (Penicillin).
8. Determination of MIC of any one antibiotic (penicillin / streptomycin).
9. Visit to nearby pharmaceutical industry.

SUBJECT: MICROBIOLOGY

MODEL PAPER FOR SEMESTER END EXAMINATION

Time : 3hrs
Max. Marks : 75

Section - A

I ANSWER ANY FIVE OF THE FOLLOWING 5x5=25marks

Draw labeled diagrams wherever necessary

1.
2.
3.
4.
5.
6.
7.
8.

Section - B

II ANSWER ANY FIVE OF THE FOLLOWING 5 x 10=50 marks

Draw labeled diagrams wherever necessary

9 a)

Or

b)

10 a)

Or

b)

11 a)

Or

b)

12 a)

Or

b)

13 a)

Or

b)

Remedial classes

Register

2015 - 16

Department of Telugu.

Group	Subject	No of Periods taken	Name of the lecturer	Names of the students attended
II BSc	Telugu	4	N. Sarada	P. L. Prasanna
				B. Satyavathi
II MBC	Telugu			Ch. Padma
		3	N. Sarala	N. Bhavani
				P. Pavani
				S. V Sharai
II BBC		3	N. Sarada	D. Chinnatalli
II Bcom	Telugu	4	P.V.R. Reddy	G. Maunik
				P Ramadevi
				Ch. Sunitha
				D.S. Sailaja
				B. Rohini
				P. Aparna
				L. Meenakshi
				A. Maideepika
				V. Vasanthi
				M. Hemalatha
				V. Kalavathi

Remedial classes for slow learners

Marks	Number of classes Taken	Number of classes attended	Marks obtained university	Any improvement	Remarks
E	4	3			
E		4			
E		4			
E	3	2			
E		2			
E		2			
E		3			
F	3	2			
F		3			
F	4	4			
F		4			
F		4			
E		4			
E		3			
E		3			
E		2			
E		1			
E		3		Nisar	2

Group	Subject	No of Periods	Name of the lectrd	Name of the Students
BSc	Telugu	4	N. Sarada	A. Sravani
T. Sharmila			"	T. Sharmila
IBSc			"	S. Rohini Aparna
MPC				P. Bharathi
BA	Telugu	4	P.V. Ramana Reddy	Usha Patro
				A Teja
Edu				G. Srividya
				K. Sirisha
PEP				D. Manju
				Ch. Manjula
				I Suguna

Marks I sem	Number of classes taken by the lecturer	Number of classes attended	Slow learners		
F					
P	4	3			
F	4	2			
P	4	3			
F	4	2			
P	4	3			
F	4	4			
F	4	2			
ab	4	3			
P	4	3			
P	4	3			

N.Sai

Remedial classes

2016-17

Group	Subject	No of Periods	Name of the Lecturer	Name of the student
IIBSc	Telugu	4	N. Sarada	
				S. Rohini Aparna
				M. Sai Laxmi
				A. Sravani
				Ch. Usha
				Ch. Sandhya
				B. Sudha
				T. Amitha
IBA	Telugu	4	N. Sarada	V. Jagadeeswari
			P.V.R. Reddy	G. Srividya
Edu				E. Sravani
Edu				G Ramya
PEP				K. Sailaxmi
PEP				I Suguna

Slow learners

II Sem Marks	Number of classes taken by the lecturer	Number of classes attended	III Sem after Remedial conducted
C	4	3	B
C	4	4	B
F	4	4	B+
B	4	3	F
B	4	2	B+
B	4	2	B+
B.	4	2	F
B	4	3	F
C	4	3	C
C	4	2	B+
P	4	2	B+
C	4	3	B+
C	4	2	B+

M. Safa

Group	Subject	No of Periods	Name of the Lectures	Name of the Student
I B.Sc	Telugu	4	N. Sarada	K. Bhagyalaxmi
				M. Fathima
				P. Bhargavi
				R. Naga Mani
				G. Siva
				T. Sathya Pujitha
				P. Anupama
I Bcom	Telugu	4	P.V. Ramana Reddy	
				A. Vsharani
				B. Madhuri
				Ch. Dharani
				D. Sravani
				K. Satyavani
				N Girija
				O. Gayathri
				P. Varalaxmi
				S. Vijaya
				T. Prasanthi
				V. Bhavani

III/IV Sem marks	No of classes taken by the lecturer		No of classes attended	III & IV Sem marks
C	4	3	2	C
P	4	4	1	C
C	4	4	4	B+
C	4	3	–	F
C	4	3	–	F
C	4	2	2	B
C	4	3	–	F
C	4	3		
P	4	4		
C	4	4		
P	4	3		
C	4	4		
C	4	3		
C	4	2		
C	4	3		
P	4	4		
P	4	4		
P	4	4		

8m acy 14/3/18

Group	Subject	No of Periods	Name of the Lecturer	Name of the Student
II B.com	Telugu	4	P.V. Ramana Reddy	V. Neelima V. Devi
II BA	Telugu	4	P.V. Ramana Reddy and N. Sarada	A. Indu B. Saikumari T. Sai Lakshmi G. Rani M. Tulendai Devi O Manisha P. Silpa P. Prasanthi S. Bhargavi T. Kumari Y. Ramya Priya

II Sem marks	No of classes taken by the lecturer	No of classes attended	III Sem grades.
C	4	3	
C	4	3	
C	4	3	C
C	4	2	C
C	4	3	
P	4	2	B+
C	4	2	
C	4	2	C
C	4	3	A
C	4	4	B+
C	4	4	
C	4	2	B+
C	4	4	B
C	4		

2017 -18

Group	Subject	No of Periods	Name of the Teacher	Name of the Stud
IMPC	Telugu	4	N. Sarada	B. Sivamma
				M. Ramanamma
				D. Lakshmi
MBC				Y. Rama Lak
				U. Laxmi Gra
BA	Telugu	4	P.V.R. Reddy	A. Bindu Ma
				Ch Durga
				D. Mani
				G. Jyothi
				J. Divya
				J. Janaki
				K. Manikya
				K Anitha
				M R. Kumar
				R. Pavani
				S. Swathi

I Sem marks.	II Sem marks.	No of classes taken by the lecturer	No of classes attended by the student	III Sem grades.		Remarks
C	A					
F	F		ab			
C	B+					
F	F		ab			
C	B+					
F	ab					
F	B					
C	B+					
P	F					
F	F					
F	F					
F	F					
B	C					
C	B					
P	F					
P	F					

Group	Subject	No of Periods	Name of the Lecturer	Name of the Student
BA	Tel	4	P.V.R. Reddy	S Anusha
				V. Jhansi
				M. Sravanthi
				S. Shamala
				B. Jayalaxmi
				Ch. Phani Sri
				M. Mamika
				V. Lavani Devi
				D. Revathi
IBcom	Tel	4	P.V.R. Reddy	G. V. Lavani
				J. Jeshisha
				L. Yamuna
				P. Venkatalaxmi
				P Meena
				T. Madhuri

I Sem grades	II Sem grades	No Of classes taken by the teacher	No Of classes attended by the Student	III Sem grades	Remarks
F	C				
Ab	F				
F	C				
F	B				
F	C				
P	F				
C	F				
F	B				
C	C				
F	B				
F	B+				
F	F				
R	C				
C	B				
F	F				

2018-19

2018-19 - I Sem			
Group	Subject	No of Periods	Name of the Lecturer	Name of the Student
I Bsc	Telugu	4	N. Sarada	V. Sunitha MPC
				T. Ramya MPC
~~BBC~~				M. Bhavani MPC
BBC				ch. Anushakumari
BBC				K. Yasoda
MBC				N. Naga Lakshmi
				B Divya
				y. Nooka Ratnam
I BA				
MEP		4		D. Sravani
SWEP				B. Krishna Kumari
				ch. Mohammad Nandini
				E Nooka Ratnam
				K. Rajeswari
				K. Divya
				P. Appalamma
				P. Aruna
				S.S. Gayatri

I Sem Grade	No of Classes ~~attended~~ by the lecturer	No of classes taken attended by the student	II Sem Grade
F	4	3	
C	"	3	
C	"	4	
F	"	4	
F	"	4	
F	"	4	
P		3	
P		2	
P	4	4	
F	"	4	
F	"	4	
F	"	3	
F	"	2	
F	"	1	
F		2	
F		2	
F		2	

Group I	Subject	No of Periods	Name of the Lecturer	Name of the Stude
PEP	Telugu	4	P.V. Ramana Reddy	B. Kaveri
				G. Sridevi
				G. Triveni
				K. Madhavi
				P. Manisha
				P. Rupavathi
				P. Poornima
				S.B. Begum
IBcom	Telugu	4	N. Sarada	B. Udaya Sri
				B. Sravani
				K.M. Gayatri
				P. Jhansi Rani
				P. Ramya
				P. Padmavathi
				R. Asha Rafi
				S. Priya Devi

I Sem Grade	No of classes taken by the teacher	No of classes attended by Student	II Sem Grade	
F	4	4		
F	4	4		
F	4	4		
F	4	4		
F	4	4		
F		2		
F		3		
F	4	3		
F	4	3		
F	4	3		
F	4	3		
F	4	4		
F	4	4		
F		2		
F		1		
F		2		

II year 2018-19
III Sem.

Group	Subject	No of Periods	Name of the Lecturer	Name of the Student
II BSc	Telugu	4	N. Sarada	
BBC		4		V. Sirisha
MBC		4		K. Saipriya
		4		
BA				
HEP	Telugu	4	P.V.R. Reddy	D. Gayatri
PEP				J. Bhagya Lakshmi
				R Hemalatha
				ch. Durga
				D. Mani
				M. Divya Kiran
				V. Jhansi
SW Edn				M. Sravanthi
II Bcom	Telugu	4	N. Sarada	J Pavani
				P. Maheswari
				T. Madhuri

Grade III Sem	No Of Classes attended by the Student	No of classes Taken by The lectures
P	4	4
F	B	4
P	4	4
P	3	4
F	4	4
F	4	4
F	4	4
F	3	4
F	2	4
F	2	4
P	2	4
F	3	4

2019-20

Group	Subject	No of Periods	Name of the lecturers	Name of the Student
II BSc	Telugu	4	N. Sarada	1. K.L. Bhavani
				2. K. Bhanu
				3. M. Apoorva
				4. T. Ramya
				5. V. Swetha
				6. Ch. Ramyasri
				7. G. Lavanya
				8. Y. Yasoda
				9. M. Bhavani
				10. Ch.S.D.A. Kumari
				11. K. Yosoda
				12. B. Pavani
				13. N. Nagatani
				14. Y. Nookaratnam
II BA	Telugu	4	P.V. Reddy	15. B.S. Tulasi
				16. Ch. Dhanalaxmi
				17 M. Manasa
				18. S. Devi

II sem Grade	No of classes taken by the faculties	No of classes attended by the student	Result II sem Grade	III Sem Grade
B+			A	P
C			A	B
C			B+	B+
C			B	-
F			A	A
P			A	
C			B+	
C			B+	
C			B+	
F			C	
F			-	-
C			A	
F			B	
P			B+	
P			B	
P			B+	
C			B+	
C			B+	

Group	Subject	No of Periods	Name of the lecturer	Name of the Student
				19. B.K. Kumari
				20. Chandini
				21. E Nooka Ratna
				22. K. Rajeswari
				23. K. Divya
				24. P. Appalamma
				25. P. Anna
				26. T.K. Mahalaxmi
				27. G. Sridevi
				28. B. Kaveri
				29. G. Triveni
				30. K. Madhavi
				31. M. Naga Prasanna
				32. P. Thoudamma
				33. P. Manisha
				34. P. Rupavathi
				35. P. Poornima
				36. V. Sravani

Int Sem	No of Classes taken	No of Classes attended by the Student	II Sem	III Sem
F			F	
F			F	
F			—	
F			C	
F			C	
F			B	
F			B	
F			F	
F			C	
F			—	
F			C	
F			B+	
P			B	
P			B+	
F			B	
F			B+	
F			B+	
P			B+	

Group	Subject	No of Periods	Name of the Teacher		Name of the student
II BCom	Telugu	4	N. Sarada & P.V. Ramana Reddy	1	B. Swetha
				2	K.M. Jayathri
				3	P.V. Jhansi Rani
				4	P. Ramya
				5	P.V. Padmavathi
				6	R. Asha Reppa
				7	S.J.P. Devi
				8	B. Sravani

I Sem	No of classes taken by Teacher	No of classes attended by Student	II Sem	III Sem
F	4		B	B+
F			F	B
F			B	B+
F			B	A
F			F	—
F			C	B
F			—	—
F			C	B

N.Sc

Remedial classes. (I & 2nd year failed candidates)

2015-16.

Sl. No.	Name of the Student	class	16/01/16	17/01/16	18/01/16	19/01/16	20/01/16	21/01/16
①	L. Kalyani	II BA	✓	✓	✓	✓	✓	✓
②	Chandravadna	II BA	✓	✓	✓	✓	✓	-
③	Krishnaveni. N.	B.A II	✓	✓	✓	✓	✓	✓
④	Fathima SK.	BA I	✓	✓	✓	✓	✓	✓
⑤	P. Gayathri	II BSc	21/01/16 ✓	22/01/16 ✓	23/01/16 ✓	24/01/16 ✓	25/01/16 ✓	26/01/16 ✓
⑥	P. Gowsya Begum	II BSc	✓	✓	✓	✓	✓	✓
	Ch. Uma	II BSc	✓	✓	✓	✓	✓	-

PRINCIPAL
Kha Govt Degree College (W)
Visakhapatnam

Remedial classes. 2016-17

I st sem.

Sl.No	Name of the student	class								
1.	Omarhalimi	IDCom	P	P	P	P	P	P	P	A	A
2.	Bari Hanifa		P	P	A	P	P	P	P	A	A
3.	Tanuri Laxmi		P	A	P	P	P	P	A	P	A
4.	Kodurkrishnaveni		P	P	P	P	P	A	P	A	P
5.	Lalalamvalapni		P	P	P	P	P	P	A	P	P
6.	Vadilavanya		P	P	P	P	P	P	P	P	P

IInd semester

(1)	Leela Rani	II BA	P	P	P	A	P	P	P	P	P
(2)	Bhavaneswari	II BA	P	A	P	P	P	P	P	P	P
(3)	Ramalaxmi	II BA	P	P	P	P	P	P	P	P	P
(4)	Sivishnaveni	II BA	P	P	P	P	A	A	P	P	P

Dr. K. Sudha 24/10/17

PRINCIPAL
Govt. Degree College (W)
Visakhapatnam

Remedial classes 2017-18

Sl. no.	Name of the student	class	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	G. Leela Rani	II BA	P	P	P	P	P	P	P	P
2	P. Ramalaxmi	II BA	P	P	a	a	P	P	P	P
3	M. Bhuvaneswari	II BA	P	P	a	a	P	P	P	P
4	E. Nooka Ratnam	II BCom	P	P	P	P	P	P	P	P
5	R. L. [illegible] Nivedita	II BSC	P	P	P	P	P	P	P	a
6	S. Lavanya	II BSC	P	P	P	P	P	P	P	P
7	Vaishnavi Kalyani	II BSC	P	P	a	P	P	P	P	P
			[signature]	[signature]	[signature]	[signature]	[signature]	[signature]		

Sl. no.	Name of the student	class	[illegible]	[illegible]	24/3/18	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	P. Ekaveena		P	P	P	P	P	P	P	P
2	K. Vasantha		P	P	P	P	a	P	P	P
3	J. Divya		P	P	P	P	P	a	P	P
4	K. Revathi		P	P	P	P	a	P	P	P
5	Y. Maneesha		P	P	P	P	P	P	P	P
			[signature]	[signature]	[signature]	[signature]	[signature]	[signature]	[signature]	[signature]

[signature] (K. Sudhakar)

HOD, Dept. of Hindi

[signature]

PRINCIPAL
V[illegible]kha Govt. Degree College (W)
Visakhapatnam

Remedial classes 2018-19

Semi I

Sl.No.	Name of the student	class					
1	M. Supriya	IBA	P	P	P	P	P	P
2	B. Bharathi	IBA	P	P	P	P	P	P
3	D. Sakunthala	IBA	P	P	P	P	P	P
4	B. Aadeshwari	IBcom	P	P	P	P	P	P
5	Reshma Begum	IBcom	P	P	P	P	P	P
6	V. Sowjanya	IBSc	P	P	P	P	P	P
7	P. Mary	IBSc	P	P	P	P	P	P

Semi III

1.	J. Divya	IIIBA	P	P	P	P	P	P
2.	K. Vasantha	IIIBA	P	P	P	P	P	P
3.	Ekaveera	IIIBA	P	P	P	P	P	P
4.	P. Ramadevi	IIIBA	P	P	P	P	P	P
5.	G. T. Someswari	IIIBSc	P	P	P	P	P	P
6.	K. Gowri Devi	IIIBSc	P	P	P	P	P	P
7	P. Keerthi	IIIBSc	P	P	P	P	P	P

PRINCIPAL
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Visakhapatnam

2018-19.

Remedial classes Hindi

Sem II I year.

Slno.	Name of the candidate	class	4/9/19	5/9/19	6/9/19	7/9/19	8/9/19	9/9/19
1	M. Sakuntala	BBA	P	P	P	A	P	P
2	B. Bharathi	"	P	P	P	P	P	P
3	M. Supriya	"	P	P	P	P	P	P
4	S. Sravani	"	P	A	A	P	P	P
5	R. Anusha	BCom	P	P	P	P	P	P
6	P. Mary	BBA	P	P	P	P	P	P
7	Sravani. K.	BBA	P	P	P	P	P	P

Sem III 2019-20

Remedial classes Hindi

Slno.	Name of the candidate	class	25/9/19	26/9/19	27/9/19	28/9/19	29/9/19	30/9/19
1	B. Bharathi	IIIBA	P	P	P	P	P	P
2	M. Supriya	IIIBA	P	P	P	P	P	P
3	S. Sravani	IIIBA	P	P	P	P	P	P
4	R. Anusha	IIIBCom	P	P	P	P	P	P

PRINCIPAL
The Govt. Degree College

ANDHRA UNIVERSITY

SUBJECT-BIOTECHNOLOGY

MODEL PAPER FOR SEMESTER END EXAMINATION

I SEMESTER

BTT-101 MOLECULAR BIOLOGY

TIME:3HRS

MAX MAR:75

SECTION – A

I. Answer any FIVE of the following 5X5=25

Draw diagrams wherever necessary

1. Phase contrast microscope
2. Difference between gram positive and gram negative cell wall
3. Classification of viruses
4. Enriched and enrichment media
5. Microbial control through denaturation of proteins
6. Maintenance of pure culture
7. Neuromuscular junction
8. Lysosomes

SECTION-B 5X10 = 50

II Answer any 5 questions of the following

Draw neat labeled diagrams where it is necessary

(one from each unit)

UNIT-I

9.a)Explain about TEM and SEM

(or)

b) Write about differential staining techniques

UNIT II

10.a) Explain ultra structure of bacterial cell

(or)

b) Describe lytic cycle and lysogeny

UNIT III

11.a)write about different media used for culturing and identification of bacteria

(or)

b)write the importance and role of nutritional requirement of bacteria

UNIT IV

12.a)explain chemostat and turbidostat

(or)

b) Explain mechanism of cell injury by damage to cell wall and inhibition of protein synthesis

UNIT V

13.a)Describe structure and function of eukaryotic cell

(or)

b) Explain about cytoskeleton

ANDHRA UNIVERSITY

SUBJECT-BIOTECHNOLOGY

MODEL PAPER FOR SEMESTER END EXAMINATION

II SEMESTER

BTT 201: MACROMOLECULES, ENZYMOLOGY AND BIOENERGETICS

TIME: 3HRS

MAX MAR:75

SECTION – A

I. Answer any FIVE of the following EIGHT QUESTIONS:

5X5=25

1. Structure of purines
2. Zwitter ion
3. Hetero polysaccharides
4. Triglycerides
5. Aromatic amino acids
6. Active site
7. Enzyme inhibition
8. Free energy

SECTION-B

II. Answer the following (one from each unit)

5x10=50

UNIT-I

9. **a)** Explain nucleotides and nucleosides

(OR)

b) Write the chemical structure of DNA

UNIT-II

10.a) Discuss the chemical properties of amino acids.

(or)

b) Describe the primary and secondary structures of proteins**.**

UNIT-III

11. a) Write about the monosaccharides with examples.

(or)

b) Discuss about cytochromes.

UNIT-IV

12.a) Write about different types of enzyme specificity.

(Or)

b) Explain the mechanism of enzyme action.

UNIT - V

13.a)Write the relation of free energy entropy and enthalpy.

(or)

b)Discuss gluconeogenesis

ANDHRA UNIVERSITY

SUBJECT-BITECHNOLOGY

MODEL PAPER FOR SEMESTER END EXAMINATION

III SEMESTER

BTT 301: BIOPHYSICAL TECHNIQUES

TIME: 3HRS

MAX MAR: 75

SECTION – A

I. Answer any FIVE of the following question 5X5=25

Draw labelled diagrams wherever necessary

1. Write a brief note on spectroflourometry
2. Applications of Ion exchange chromotography and HPLC
3. Isoelectric focusing
4. Short notes on mass spectrometry
5. ANOVA
6. Derivation and deviations of beer law
7. Native gel
8. Different types of rotors

SECTION-B

II. Answer Any Five Of The Following (one from each unit)

UNIT-I

9. A) Write the principle of application of UV - Visible spectrophotometry.

(or)

b) Explain about spectroflorometry &flame photometry.

10. a) Explain TLC

(or)

b) Describe the principle and applications of affinity chromotography.

UNIT-III

11. a) Explain SDS-PAGE.

(or)

b) Describe paper electrophoresis.

UNIT-IV

12. a) write the application of isotopes in biotechnology.

(or)

b) Explain GM counter

13. a) write about analytical centrifugation

(or)

b) Explain the basic concepts of mean median and mode

ANDHRA UNIVERSITY

SUBJECT- BIOTECHNOLOGY

MODEL PAPER FOR SEMESTER END EXAMINATION

IV SEMESTER

BTT 401: IMMUNOLOGY

TIME: 3HRS

MAX MAR:75

SECTION – A

I. Answer any FIVE of the following 5X5=25

Draw diagrams wherever necessary

1.T cells

2.Antigenecity

3.Diversity of MHC

4.Discovery of vaccination

5.Significance of vaccination

6.Agglutination

7.ELISA

8.Immunodiffusion

SECTION-B

II. **Answer Any Five Of The Following 5x10=50**

(one from each unit)

UNIT-1

9.a) Describe the main path ways of complement system

(or)

b) Describe the complement system.

UNIT-II

10. a) Describe the mechanism of innate immune system

(or)

b) Describe the factors affecting antigenecity

UNIT-IV

11. a) Describe N K cells mediated immunity

(or)

b) Write an account on T c mediated immunity

UNIT-IV

12. a) Describe the types of vaccines

(or)

b) Describe the general of features of hypersensitivity.

UNIT-V

13. a) Explain Hybridoma technology

(or)

b) Describe monoclonal antibodies

ANDHRA UNIVERSITY

SUBJECT-BIOTECHNOLOGY

MODEL PAPER FOR SEMESTER END EXAMINATION

V SEMESTER

BTT-501 MOLECULAR BIOLOGY

TIME:3HRS

MAX MAR:75

SECTION – A

I. Answer any FIVE of the following **5X5=25**

Draw diagrams wherever necessary

1. Explain Watson & Crick model of DNA
2. DNA polymerases
3. Reverse transcription
4. Lac operon
5. Features genetic code
6. Hershey - Chase experiment
7. DNA ligases
8. Wobble hypothesis

SECTION-B 5X10 = 50

Answer any 5 questions of the following

Draw neat labeled diagrams where it is necessary

(one from each unit)

UNIT-I

9 a) Genome organization in prokaryotic and eukaryotic organisms and short notes on chromosomes

Or

b) Experiment to prove DNA as genetic material

UNIT-II

10.**a)** Explain enzymology of DNA replication

Or

b) Explain the process of replication and rolling circular replication of DNA

UNIT-III

11 a) Explain the process of transcription in eukaryotic organisms

Or

b) Post transcriptional modification

UNIT-IV

12. **a)** Regulation of gene expression - positive and negative control of lac operon.

Or

b) Regulation of gene expression in tryptophan

UNIT-V

13. **a)** Codon and anticodon intractions

Or

b) Structure of different types RNA'S

ANDHRA UNIVERSITY

SUBJECT-BIOTECHNOLOGY

MODEL PAPER FOR SEMESTER END EXAMINATION

V SEMESTER

BTT-601 r DNA TECHNOLOGY

TIME:3HRS

MAX MAR:75

SECTION – A

I. Answer any FIVE of the following **5X5=25**

Draw diagrams wherever necessary

1. Write short notes on phosphotases and kinases
2. Transformation
3. cDNA library
4. Short notes on genesequencing
5. Agrobacterium mediated gene transfer
6. HBs Ag vaccine
7. Western Blotting
8. Advantages of cDNA library

SECTION-B 5X10 = 50

II. Answer any 5 questions of the following

Draw neat labeled diagrams where it is necessary

(one from each unit)

UNIT-I

9. A) Enzymes used in r-DNA technology

(or)

b) Write an essay on blotting technique

UNIT-II

10.a)Write about biological transformations

(or)

b) Screening methods for selection of transformed

UNIT-III

11.a) Write about any two cloning vectors

(or)

b) Construction of genome and cDNA

UNIT-IV

12.a) Write about gene sequencing methods

(or)

b) PCR technique

UNIT-V

13.a)Applications of r-DNA technology in agriculture

(or)

b) Applications of r-DNA technology in medicine

AP STATE COUNCIL OF HIGHER EDUCATION

CBCS PATTERN FOR MICROBIOLOGY

B.Sc BIOTECHNOLOGY (CBCS) SYLLABUS

Semester	Course Code	Title of course	Number of Credits	Number of teaching hrs	Marks		
					Internal	SEE	Total
I	BTT- 101	Microbiology and cell biology	3	5	25	75	100
I	BTP- 102	Microbiology and cell Biology lab	2	2	0	50	50
II	BTT- 201	Macromolecules and metabolism	3	5	25	75	100
II	BTP- 202	Macromolecules and enzymology lab	2	2	0	50	50
III	BTT-301	Biophysical Techniques	3	5	25	75	100
III	BTP-302	Metabolism and Biophysical Techniques lab	2	2	50	75	50
IV	BTT- 401	Immunology	3	5	25	75	100
IV	BTP- 402	Immunology lab	2	2	0	50	50
V	BTT- 501	Molecular Biology	4	5	25	75	100
V	BTP-502	Molecular Biology lab	2	2	0	50	50
V	BTT- 601	rDNA Technology (Elective theory)	3	5	25	75	100
V	BTP- 602	rDNA Technology (Elective Lab)	2	2	0	50	50
VI	*BTT-701	Plant and Animal Biotechnology	4	5	25	75	100
VI	*BTP-702	Plant and Animal Biotechnology Lab	2	2	0	50	50
VI	*BTT -703	Environmental Biotechnology (Elective Theory)	4	5	25	75	100
VI	*BTP- 704	Environmental Biotechnology (Elective Lab)	2	2	0	50	50
VI	*BTT-705	Industrial Biotechnology (Elective Theory)	4	5	25	75	100
VI	*BTP- 706	Industrial Biotechnology (Elective Lab)	2	2	0	50	50

** Any one cluster from 801, 802 & 803	**BTT 801 **BTP 801	1.Nutritional Biotechnology 2. Food Biotechnology 3. Metabolisms Food Biotechnology Practical 1 Environmental Biotechnology :Practical 2 Metabolisms :Practical 3	100 100 100 50 50 50				
	**BTT 802 **BTP 802	1. Tissue Culture 2. Industrial Biotechnology 3. Environmental Biotechnology Tissue Culture Practical 1 Industrial Biotechnology Practical 2 Environmental Biotechnology Practical 3	100 100 100 50 50 50				
	**BTT 803	1. Cell Biology 2. Gene Biotechnology 3. Biostatistics &	100 100 100				

	**MBP 803	Bioinformatics 1.Cell Biology Practical 1 2. Gene Biotechnology Practical 2 3 Biostatistics & Bioinformatics Practical 3	50 50 50				

*Any one elective paper from 701, 703 and 704.

**** Cluster for 701 should be selected from 801, 802, 803.
Cluster for 703 should be selected from 802 (or) 803
Cluster for 705 should be selected from 801 (or) 803

FOUNDATION COURSES

1st Year:

Semester-I: Foundation Course- 1 HVPE (Human Values & Professional Ethics),
Foundation Course-2 Communication & Soft Skills-1

Semester-II: Foundation Course-3 Environmental Sciences
Foundation Course-4A ICT-1 (Information & Communication Technology)

2nd Year:

Semester-III: Foundation Course- 5 Entrepreneurship
Foundation Course-2B Communication & Soft Skills-2

Semester-IV: Foundation Course-2C Communication & Soft Skills-3
Foundation Course- 6 Analytical Skills
Foundation Course- 7 CE (Citizenship Education)
Foundation Course- 4 B ICT-2 (Information & Communication Technology)

3rd Year:

Semester-V: Skill Development Course-1 (University's Choice)
Skill Development Course- 2 (University's Choice)

I B.Sc., BIOTECHNOLOGY
SEMESTER I
BTT- 101 MICROBIOLOGY AND CELL BIOLOGY

UNIT I

History, Development and Microscopy

History and development of microbiology: contributions of Louis Pasteur, Robert Koch and Edward Jenner. Microscopy: Compound microscopy: Numerical aperture and its importance, resolving power, oil immersion objectives and their significance, principles and applications of dark field, phase contrast, fluorescent microscopy. Electron microscopy: Principle, ray diagram and applications, TEM and SEM, comparison between optical and electron microscope, limitations of electron microscopy.

Stains and staining procedures: Acidic, basic and neutral stains, Gram staining, Acid fast staining, Flagella staining, Endospore staining.

UNIT II

Bacteria: Bacterial morphology and sub cellular structures, general morphology of bacteria, shapes and sizes, generalized diagram of typical bacterial cell. Slime layer and capsule, difference between the structure, function and the position of the two structures. Cell wall of gram +ve and Gram -ve cells, Prokrayotic classification.General account of flagella and fimbriae. Chromatin material, plasmids; definition and kind of plasmids (conjugative and non-conjugative) F, R, and Col plasmids. Endospores: Detailed study of endo spore structure and its formation, germination, basis of resistance. A brief idea Bergey's manual. Morphology of archaea, archaeal cell membrane (differences between bacterial and archaeal cell membrane), other cell structures, concept of the three distinct archaea groups.

Viruses: General characteristics of viruses, difference between virus and typical microbial cell, structure, different shapes and symmetries with one example of each type, classification of viruses on the basis of nucleic acids, phage and animal cell viruses, example of each and their importance. Brief idea of lytic cycle and lysogeny.

UNIT III

Microbial Nutrition: Basic nutritional requirements: Basic idea of such nutrients as water, carbon, nitrogen, sulfur and vitamins etc., natural and synthetic media, nutritional classification of bacteria. Selective and Differential media, Enriched media, Enrichment media.

UNIT IV

Microbial growth and control:Growth: Growth rate and generation time, details of growth curve

and its various phases.Concept of synchronous cultures, continuous and batch cultures (chemostat and turbidostat). Measurement of growth.Physical conditions required for growth: Temperature (classification of microorganisms on the basis of temperature requirements), pH etc. Pure cultures and cultural characteristics. Maintenance of pure culture.Microbial Control: Terminologies - Sterilization, disinfection, antiseptic, sanitization, germicide, microbistasis, preservative and antimicrobial agents.Mechanism of cell injury: Damage to cell wall, cell membrane, denaturation of proteins, inhibition of protein synthesis, transcription, replication, other metabolic reactions and change in supercoiling of DNA.Physical control: Temperature (moist heat, autoclave, dry heat, hot air oven and incinerators), dessication, surface tension, osmotic pressure, radiation, UV light, electricity, ultrasonic sound waves, filtration.
Chemical control: Antiseptics and disinfectants (halogens, alcohol, gaseous
sterilization. Concept of biological control.

UNIT V

Cell Biology: Eukaryotic Cell - Structure and function of the following: nucleus, nuclear membrane, nucleoplasm, nucleolus, golgi complex, Mitochandria, Chloroplast, endoplasmic reticulum, lysosomes, peroxisomes, glyoxisomes and vacuoles.

BTP-102 MICROBIOLOGY & CELL BIOLOGY

1. Demonstration, use and care of microbiological equipments.
2. Preparation of media, sterilization and isolation of bacteria.
3. Isolation of Bacteriophage from sewage / other sources.
4. Demonstration of motility of Bacteria.
5. Simple staining of bacteria
6. Gram staining of Bacteria
7. Acid fast staining of Bacteria
8. Endospore staining.
9. Demonstration of starch hydrolysis by bacterial cultures.
10. Growth of fecal coliforms on selective media.
11. Isolation of pure culture by pour plate method.
12. Isolation of pure culture by streak plate method.
13. Anaerobic cultivation of microorganisms.
14. Cultivation of yeast and moulds.
15. Antibiotic sensitivity assay.
16. Oligodynamic action of metals.
17. To study germicidal effect of UV light on bacterial growth.
18. Stages of mitosis.
19. Stages of meiosis.

Note: - Mandatory to perform at least ten practical.

I B. Sc. BIOTECHNOLOGY
SEMESTER II
BTT- 201 MACROMOLEULES, ENZYMOLOGY AND BIOENERGETICS

UNIT I

Nucleic Acids and Chromosomes: Chemical structure and base composition of nucleic acids, Chargaff's rules, Watson Crick Model (B-DNA), deviations from Watson-Crick model, other forms of DNA (A- and Z-DNA), forces stabilizing nucleic acid structures, (hydrogen bonds and hydrophobic associations, base stacking).

UNIT II

Amino acids and Proteins: Structure of amino acids occurring in proteins, classification of amino acids (pH based, polarity based and nutrition based physico-chemical properties of amino acids. Primary, Secondary, Tertiary & Quaternary structure of proteins.

UNIT III

Carbohydrates:Definition, classification, nomenclature of carbohydrates, structures of monosaccharides, disaccharides and polysaccharides. Concept and examples of heteropolysaccharides.

Lipid:Types of lipids, structures of saturated and unsaturated fatty acids, triglycerides, phospholipids, Concept of acid value, saponification value and iodine value. Chemistry of Porphyrines, Heme, Cytochromes, and Chlorophylls

UNIT IV

Enzymes: Terminology: Active site, allosteric site, Holoenzyme, apoenzyme, coenzyme, substrate, inhibitor, activator, modulator etc. Classification and nomenclature of enzymes. Substrate Specificity (bond specificity, group specificity, absolute specificity, stereo-specificity), lock and key and induced fit models.

Enzyme kinetics: Michaelis-Menten equation, effect of substrate concentration, effect of enzyme concentration, effect of p H and temperature, temperature. Enzyme inhibition kinetics (reversible inhibition types – competitive, uncompetitive and non-competitive), brief idea of irreversible inhibition.

UNIT V

Bioenergetics: Concept of free energy, Entropy, Enthalpy & Redox Potential. Concept of high energy bonds as related to the structure of ATP, Phosphoenolpyruvate, Creatine phosphate etc. Glycolysis (pathway, entry of other monosachharides and disaccharides, regulation, inhibitors) Gluconeogenesis: Bypass reactions. Structure of mitochondria.

BTP- 202 MACROMOLECULES & ENZYMOLOGY

1. Qualitative estimation of Carbohydrates
2. Qualitative estimation of Amino acids
3. Quantitative Estimation of proteins by Biuret method
4. Estimation of DNA by Diphenylamine method
5. Estimation of RNA by Orcinol method
6. Quantitative estimation of sugars (Dinitrosalicylic acid method).
7. Estimation of glucose by Benedict's quantitative method
8. Quantitative estimation of proteins by Lowry's method.
9. Determination of saponification value of Fats
10. Determination of Acid Value of Fats
11. Immobilization of enzymes / cells by entrapment in alginate gel 19. Effect of temperature / pH on enzyme activity
12. Assay of protease activity.
13. Assay of alkaline phosphatase
14. Preparation of starch from Potato and its hydrolysis by salivary amylase
15. Isolation of urease and demonstration of its activity

*** Minimum of Ten practical's are mandatory**

IIB.Sc.BIOTECHNOLOGY
SEMESTER III

BTT- 301: BIOPHYSICAL TECHNIQUES

UNIT – I

Spectrophotometry: Spectrum of light, absorption of electromagnetic radiations, Beer's law - derivation and deviations, extinction coefficient. Instrumentation of UV and visible spectrophotometry, Double beam spectrometer; dual-wavelength spectrometer, Applications of UV and visible spectrophotometry. Spectrofluorometry: principle, instrumentation and applications. Absorption & emission flame photometry: principle, instrumentation and application.

UNIT II

Chromatography: Partition principle, partition coefficient, nature of partition forces, brief account of paper chromatography.Thin layer chromatography and column chromatography.Gel filtration: Concept of distribution coefficient, types of gels and glass beads, applications.Ion-exchange chromatography: Principle, types of resins, choice of buffers, applications including amino acid analyzer.Affinity chromatography: Principle, selection of ligand, brief idea of ligand attachment, specific and non-specific elution, applications.HPLC

UNIT III

Electrophoresis: Migration of ions in electric field, Factors affecting electrophoretic mobility. Paper electrophoresis, Gel electrophoresis: - Types of gels, Solubilizers, Procedure, Column & slab gels Detection, Recovery & Estimation of macromolecules.SDS-PAGE Electrophoresis and applications. Isoelectric focusing,Pulsed-field gel electrophoresis.

UNIT – IV

Isotopic tracer technique: Radioactive & stable isotopes, rate of radioactive decay. Units of radioactivity. Measurement of radioactivity: - Ionization chambers, proportional counters, Geiger- Muller counter, Solid and liquid scintillation counters (basic principle, instrumentation and technique), Cerenkov radiation. Measurement of Stable isotopes: Falling drop method for deuterium measurement, Mass spectrometry. Principles of tracer technique, advantages and limitations, applications of isotopes in biotechnology (distribution studies, metabolic studies, isotope dilution technique, metabolic studies, clinical applications, autoradiography).

UNIT V

Centrifugation: Basic principles, concept of RCF, types of centrifuges (clinical, high speed and ultracentrifuges).Preparative centrifugation: Differential and density gradient centrifugation, applications (Isolation of cell components).Analytical centrifugation: Sedimentation coefficient, determination of molecular weight by sedimentation velocity and sedimentation equilibrium methods.

BiostatisticsBasic concepts of mean, median, mode, Standard deviation and Standard error.

Introduction to ANOVA

B T P : 3 0 2 - METABOLISM & BIOPHYSICAL TECHNIQUES

1. Spectrophotometric analysis of DNA denaturation.
2. Determination of absorption spectrum of oxy- and deoxyhemoglobin and methemoglobin.
3. Protein estimation by E280/E260 method.
4. Paper chromatography of amino acids/sugars.
5. TLC of sugars/amino acids.
6. Cellular fractionation and separation of cell organelles using centrifuge.
7. Isolation of mitochondria and assay of marker enzyme.
8. Estimation of Urea by diacetyle monoxime method.
9. Estimation of Sugars by Folin Wu method
10. Validity of Beer's law for colorimetric estimation of creatinine.
11. Absorption spectrum of NAD & NADH
12. Preparation of standard buffers and determination of pH of a solution
13. Titration of a mixture of strong & weak acid
14. Paper electrophoresis of proteins
15. Gel electrophoresis of proteins.
16. SDS-PAGE of an oligomeric protein.
17. Calculation of mean, median, and mode (manual/computer aided).
18. Calculation of standard deviation and standard error (manual/computer aided).
19. Biostatistical problem based on standard deviation.

Note: - Mandatory to perform atleast 10 practicals

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II B. Sc., BIOTECHNOLOGY

SEMESTER IV

BTT-401: IMMUNOLOGY

UNIT I

Immune system: Organs and cells of immune system Immunity, innate immune mechanism, Acquired immune mechanism, Antigen,
Humoral immunity, main pathways of complement system.

UNIT II

Antibody and Antigen: Antibody structure and classes, Antibody diversity, Types of Antigens Antigenecity (factors affecting antigenecity). Complement system .

UNIT III

Immunity: Cell mediated immunity: TC mediated immunity, NK cell mediated immunity, ADCC, brief description of cytokines and MHC (MHC types and diversity)

UNIT IV

Hypersensitivity and vaccination : General features of hypersensitivity, various types of hypersensitivity, Vaccination: Discovery, principles, significance, Types of Vaccines

UNIT V

Immunological Techniques:Antigen-antibody reactions: Precipitation, agglutination, complement fixation, immunodiffusion, ELISA. Hybridoma technology: Monoclonal antibodies and their applications in immunodiagnosis.

BTP- 402 IMMUNOLOGY & BIOPHYSICAL TECHNIQUES

1. Antigen – antibody reaction – determination of Blood group , Cross reactivity
2. Pregnancy test
3. Widal test
4. Ouchterloney immunodiffusion
5. Radial immunodiffusion
6. ELISA
7. Isolation of casein by isoelectric precipitation
8. Production of antibodies and their titration

Note: - Mandatory to perform atleast 6 practicals

III B. Sc. BIOTECHNOLOGY
SEMESTER V
BTT- 501: MOLECULAR BIOLOGY

Unit I

Genome Structure: Watson and Crick model of DNA; Genome organization with specific reference to prokaryotic and eukaryotic genomes; Genome size. Concepts of Genetic Material, Gene, Chromosome and Genome. Experiments to prove DNA as genetic material (Griffith experiment, Hershey- Chase experiment)

Unit II

DNA Replication:Enzymology of replication (DNA polymerase I, pol II and III, helicases, topoisomerases, single strand binding proteins, DNA melting proteins, primase. Proof of semiconservative replication, Replication origins, initiation, elongation, and termination. Rolling circle replication of DNA

Unit III

Transcription : Enzymatic synthesis of RNA: Basic features of transcription, structure of prokaryotic RNA polymerase (core enzyme and holo enzyme, sigma factor), concept of promoter (Pribnow box, -10 and -35 sequences), Four steps of transcription (promoter binding and activation, RNA chain initiation, chain elongation, termination and release). Reverse transcription.

Unit IV

Gene Expression and regulation

Regulation of gene expression; Clustered genes and the operon concepts - Negative and positive control of the Lac Operon, trp operon, Control of gene expression. Poly and Mono cistronic m-RNA,

Unit V

Genetic Code and Protein Synthesis

Genetic code: Features of genetic code, Structure of m RNA, brief structure of tRNA, the adaptor hypothesis, attachment of amino acids to tRNA. Codon-anticodon interaction - the wobble hypothesis. Initiation, elongation, termination of protein.

BTP: 502-MOLECULAR BIOLOGY

1. Effect of UV radiations on the growth of microorganisms.
2. Determination of absorption maxima of DNA and RNA and their quantification
3. Quantitative estimation of RNA

4. Quantitative estimation of DNA
5. Isolation of plasmid DNA from bacteria
6. Isolation of genomic DNA from *E.coli*
7. Isolation of DNA from sheep liver
8. Isolation of DNA from plant leaves (Rice or Tobacco or any other plant)
9. Separation of DNA by Agarose gel Electrophoresis
10. Purity analysis of the Nucleic acids

III B. Sc. BIOTECHNOLOGY
SEMESTER V
BTT- 601: rDNA TECHNOLOGY (Elective Theory)

Unit I

Restriction and Modification. Classification of restriction endonucleases. Enzymes used in molecular cloning; Polymerases, ligases, phosphatases, kinases and nucleases; Advanced Molecular biology techniques, Electrophoresis and Blotting techniques.

Unit II

Cutting and joining DNA (cohesive end ligation, methods of blunt end ligation). Transfection and transformation. Selection of transformed cells. Screening methods (Genetic marker and blue white screening)

Unit III

Cloning vehicles - Plasmid, Bacteriophage, Construction of genomic and cDNA libraries. Advantages of cDNA libraries.

Unit IV

Methods of gene sequencing – Maxam - Gilberts and Sanger's dideoxy chain termination methods; Polymerase chain reaction technique (Components in PCR and PCR conditions)
Methods of gene transfer in fungi, yeast and higher plants using microinjection, microprojectile bombardment (gene gun method, Electroporation and Agrobacterium mediated transformation

Unit V

Applications of recombinant DNA technology in Agriculture (Transgenic Plants) Medicine (production of Insulin, Growth harmone, Tissue plasmogen activator and HBsAg vaccine)

BTP 602: rDNA TECHNOLOGY (Elective Lab)

1. Problem in Genetic engineering.
2. Transformation in Bacteria using plasmid.
3. Restriction digestion of DNA and its electrophoretic separation.
4. Ligation of DNA molecules and their testing using electrophoresis.
5. Activity of DNAase and RNAse on DNA and RNA.
6. Isolation of Plasmid DNA.

7. Demonstration of PCR

III B. Sc. BIOTECHNOLOGY
SEMESTER VI
BTT- 701: Plant and Animal Biotechnology

UNIT I

Cell and tissue culture: Introduction to cell and Tissue culture Laboratory facilitiesTissue culture media (composition and preparation) Callus and suspension cultures: initiation and maintenance of callus and suspension cultures; single cell clones.

UNIT II

Tissue and micropropagation, regeneration, production of haploids, protoplast culture and somatic hybridization. Cloning in plants - Ti plasmid organization. Concept of transgenic plants Bt cotton and other plant applications.

UNIT III

Various techniques of animal cell and tissue culture: Culture media, growth factors, laboratory facilities.
Characteristics of cells in culture: Contact inhibition, anchorage dependence, cell-cell communication etc.; Cell senescence; cell and tissue response to trophic factors. Primary culture, immortal cells, cell lines. d) Maintenance of cell lines in the laboratory.

UNIT IV

rDNA products: Brief idea about recombinant DNA products in medicine (insulin, somatostatin, vaccines), Concept of Gene therapy, Production of recombinant vaccines – hepatitis. Concept of transgenic animals. In vitro fertilization and embryo transfer in humans and farm animals.

UNIT V

IPR: Intellectual property rights. Protection of Copy rights. Patents and their significance. Management studies: society and ethical aspects of Biotechnology. Good manufacturing practices. Bio safety issues and bioehics.

PRACTICALS: BTP- 702 PLANT AND ANIMAL BIOTECHNOLOGY

1.Establishing a plant cell culture (both in solid and liquid media) – seed germination, callus culture, suspension cell culture, regeneration from callus cells.

2. Suspension culture.

3.Cell count by hemocytometer.

4.Cytology of callus.

5.Establishing primary cell culture of chicken embryo fibroblasts.

6.Animal tissue culture – maintenance of established cell lines.

7.Animal tissue culture – virus cultivation.

8.Measurement of cell size.

9. Microphotography.

10. .Determination of seed viability.

III B. Sc. BIOTECHNOLOGY
SEMESTER VI
BTT: 703 - Environmental Biotechnology (Elective theory)

Unit I

Principles of Ecology**,** Water and terrestrial ecosystems, Bio-geo chemical cycles - Carbon, Nitrogen cycles. Role of microbes in bio-geochemical cycles.

Unit II

Inorganic and Organic pollutants of air, land and water; maintenance of standards, Environmental monitoring. Detection, treatment and prevention of pollution. Biological indicators

Unit III

Biocides, Four stage alternatives, Refuse disposal - Treatment methods, effluent from pharmaceuticals, fertilizers, pulp and paper industry. Biogas, bioethanol, microbial hydrogen production.

Unit IV

Waste water management - Aerobic and anaerobic treatment, primary, secondary and tertiary treatment of municipal wastes, Solid waste management. Microbiological analysis of milk and food.

Unit V

Bioremediation, Biodegradation of recalcitrant compounds and the role of genetically engineered microbes and genetically modified organisms in the environmental management. Microbial degradation of pesticides and toxic chemicals.

PRACTICALS BTP: 704 - ENVIRONMENTAL BIOTECHNOLOGY (Elective Lab)

1. Detection of coliforms for determination of the purity of potable water.
2. Determination of total dissolved solids of water
3. Determination of Hardness and alkalinity of water sample.
4. Determination of dissolved oxygen concentration of water sample
5. Determination of biological oxygen demand of sewage sample
6. Determination of chemical oxygen demand (COD) of sewage sample.
7. Isolation of xenobiotic degrading bacteria by selective enrichment technique
8. Estimation of heavy metals in water/soil

9. Estimation of nitrate in drinking water.
10. Preparation and formulation of microbial biopesticide (bacteria, fungi and viruses)
11. In vitro evaluation of medicinal plants against pathogenic microbes.
12. Effect of mycorrhizal fungi on growth promotion of plants.
13. Production of microbial fertilizers (Rhizobium, Azotobacter and AMF).

III B. Sc. BIOTECHNOLOGY
SEMESTER VI

BTT: 705 Industrial Biotechnology (Elective theory)

Unit I

Isolation, Screening, Preservation and Improvement of Industrially Important Microorganisms. Synthetic and Natural Medium, Precursors, Antifoams, Sterilization Methods and Inoculum Preparation.

Unit II

Definition of bioreactor, basic principles of bioreactor. Classification of bioreactors. Analysis of batch, continuous, fed batch and semi-continuous bioreactors.

Unit III

Ethanol Production by Fermentation using Molasses, Starchy Substances. Production of Alcoholic Beverages like Beer and Wine. Production of Citric Acid by Submerged and Solid State Fermentations.

Unit IV

Sources of Industrial Enzymes, Production of Microbial Enzymes like Amylase and protease. Backer's Yeast and SCP Production. Production of Antibiotics : Penicillin .

Unit V

Biotechnology Products- Production of recombinant proteins having therapeutic and diagnostic applications(Insulin, Growth Harmone, Recombinant vaccines, Monoclonal Antibody).

PRACTICALS BTP: 706 Industrial Biotechnology (Elective Lab)

1. Isolation of industrially important microorganisms from soil.
2. Isolation of amylase producing organisms from soil.
3. Production of α – amylase from *Bacillus Spp.* by shake flask culture.
4. Production of alcohol or wine using different substrates.
5. Estimation of alcohol by titrimetry.

6. Estimation of alcohol by calorimetric method .
7. Production of citric acid.
8. Citric acid production by submerged fermentation.
9. Estimation of citric acid by titrimetry.

III B. Sc. BIOTECHNOLOGY
SEMESTER VI
BTT- 801(1) : Nutritional Biotechnology (Elective Theory)

Unit I

Components of food: Carbohydrates, Fats, Proteins and their importance in daily diet. Deficiency disorders: Protein deficiency disorders, Calorie maintenance diet, Malnutrition, Kwashiarkar, Maranus, Starvation.

Unit II

Vitamins: types of vitamins, sources of various vitamins. Essential vitamins A, D, E, K, B complex and C. biological role of A, D, E, K, B complex and C in metabolisms. Vitamin deficiency disorders.

Unit III

Basal Metabolic Rate (BMR) and its determination. Factors influencing BMR, Calorific values of foods, Atherosclerosis and obesity. Body Mass Index (BMI).

Unit IV

Recommended dietary allowances, Dietary fibers, Role of water, Food allergy and its importance in health, Controlling measures. Role of food allergy in diagnosis and management.

Unit V

Essential minerals: Ca, Mg, Fe, I, Co, Mo, Zn, Se & F. Their role and deficiency disorders. Specific dynamic actions of foods. Nutrition for pregnant, lactating women and for infants.

Practical BTP: 801(1) - Nutritional Biotechnology

1. Quantitative analysis of food for a) Moisture b) ash c) Iron d) Calcium

2. Isolation of Glycogen from sheep liver

3. Preparation of chloroplast from green leaves.

4. Preparation of carotens from carrots.

III B. Sc. BIOTECHNOLOGY
SEMESTER VI
BTT- 801(2) : Food Biotechnology (Elective Theory)

Unit I

Principles of food preservation. Microorganisms associated with foods. Infection, food intoxication, definition of self life, perishable foods.

Unit II

Food preservation by freezing, refrigeration. Storage at high temperature: sterilization, pasteurization, blanching, drying, dehydration, evaporation and irradiation.

Unit III

Food packing, methods of cooking – dry, moist, frying and microwave cooking. Advantages, disadvantages and effects of various cooking methods of food.

Unit IV

Canning, fermentations, pasteurization and adulteration. Food additives. Animal and sea foods - their importance, nutritional values and preservation methods.

Unit V

Microbiology of milk, milk products – cheese, yoghurt, butter, ice – cream, milk powder and their preparation. Food preservation by salting, smoking, curing and crystallization.

Practical BTP: 801 (2) : Food Biotechnology

1. To study concept of asepsis and sterilization.
2. To perform pasteurization of fluids using different methods.
3. Determination of pH of different foods using pH meter.
4. Study of food preservation methods
5. Study of osmotic dehydration
6. Nutritional labeling of food
7. Preparation of yoghurt
8. Isolation and identification food spoiling microorganisms.

III B. Sc. BIOTECHNOLOGY
SEMESTER VI
BTT- 801(3) : Metabolisms (Elective Theory)

Unit I

Carbohydrate metabolism – concept of metabolism (anabolism & catabolism). Glycolysis – formation of lactate and pyruvate, TCA cycle, glycogenolysis and glycogenesis, glucogenesis, HMP stunt pathway

Unit II

Photosynthesis – light and dark reactions. Calcium cycle, C4 pathway, Nitrogen cycle, Urea cycle.

Unit III

Degradation of fatty acids (β – oxidation), ketogenesis, Biosynthesis & degradationof TAG (Triacyl Glycerol), Cholestrol metabolism.

Unit IV

General reactions of amino acids, deamination, decarboxylation & transamination. Biosynthesis of cratinine. In born errors of aromatic and branched chain aminocid metabolism.

Unit V

Metabolism of nucleic acids: biosynthesis of purine and pyramidine nucleotides. Denovo and Salvage pathway. Catabolism, biosynthesis and degradation of heme.

Practical BTP: 801 (3) : Metabolisms

1. Estmation of amino acids by ninhydrin method
2. Estimation of protein by Bieuret method
3. Estimation of glucose by DNS method
4. Estimation of glucose by Benedicts titrimetrc method
5. Estimation of total carbohydrates by anthrone method

III B. Sc. BIOTECHNOLOGY
SEMESTER VI
BTT- 802(1) : Tissue Culture (Elective Theory)

Unit I:

Animal tissue culture – Introduction to culture medium – natural and artificial medium preparation and sterilization of medium, Isolation of explants, Disagrigation of explants and subculturing.

Unit II

Cell cultures, suspension cultures, maintenance of cell lines, organ culture – techniques, advantages, applications, limitations of hybridoma technology.

Unit III

Plant tissue culture, Introduction to culture room, Culture vessels, their working. Sterilization of nutrient medium, callus cultures, subculture.

Unit IV

Somatic embryogenesis, meristem culture, somatic hybridization, micro propagation, somatic hybrids & cybrids.

Unit V

Invitro pollination, parthenogenisis, applications of tissue culture both in agriculture and animal husbandry. Embryo culture technique.

Practical BTP: 802(1) Tissue Culture

1. Preparation of plant tissue culture medium
2. Initiation of callus from any one selected plant species
3. Micro propagation of plants
4. Cell disaggregation and cell counting
5. Study of gene transfer techniques (Transformation)
6. Preparation of animal tissue culture medium.

SEMESTER VI

BTT- 802(2) : Industrial Biotechnology (Elective Theory)

Unit I

Introduction to industrial biotechnology. Primary and secondary metabolic products of microorganisms. Screening, isolation and preservation of industrially important microorganisms.

Unit II

Fermentation technology: principles of fermentation, fermentation medium, types of fermenters, fermentation conditions and sterilization methods. Factors involved in fermenter design. Fermenter configurations. Principle operating characteristics of fermenters.

Unit III

Factors effecting fermentation. Fermented products like – fermentation of molasses, production of alcoholic beverages like beer, wine. Commercial production of fuels and chemicals by microbial fermentations.

Unit IV

Production of antibiotics – penicillin and streptomycin. Downstream process techniques. Production and application of recombinant proteins – Insulin, Growth harmone, Recombinant vaccines, Monoclonal Antibodies and interferons.

Unit V

Fermentative production of foods and dairy products. Production of vitamins – B12, B2 & C. Good manufacturing practices. Bio safety issues. Intellectual property rights and patenting issues.

Practical BTP: 802(2) : Industrial Biotechnology

1. Isolation of Amylase producing organisms from soil.
2. Production of Amylase from bacteria / fungi
3. Assay of Amylase activity.
4. Production of alcohol (or) wine from grapes
5. Estimation of alcohol by colorimetric method
6. Production of citric acid from bacteria / fungi
7. Estimation of citric acid by titrimetric method.

III B. Sc. BIOTECHNOLOGY

SEMESTER VI

BTT- 802(3) : Environmental Biotechnology (Elective Theory)

Unit I: Environmental Concepts

Introduction to environmental biotechnology and ecology. Environmental Concepts – Atmosphere, Ozone layer, Hydrosphere, Lithosphere and Biosphere.

Unit II: Ecosystem and Ecology

Ecosystem and community. Factors effecting Ecosystem. Ecological pyramids. Endangered and Extinct species. Renewable and non renewable energy resources.

Unit III: Pollution

Air, Water, Soil, types of pollutants i.e pesticides, insecticides, heavy metals, toxins, radiation, hazardous waste and biodegradation with microbes. Biopesticides and biofertlizers.

Unit IV: Protection and Restoration of Ecosystem

Major protection acts in India (Forest conservation act 1980, wild life protection act 1972), Bioremediation, Phytoremediation, waste water treatment, solid waste management. Microbial ore leaching.

Unit V: Environmental Protection

Biodegragation, Bioremediation, Phyto remediation of pollutants. Bio gas production, Global warming, Green house effect, Rain water harvesting, Energy conservation, acid rains, ozone depletion, deforestation and its effects, reforestation.

Practical BTP: 802(3) Environmental Biotechnology

1. Estimation of BOD of water
2. Estimation of COD of polluted water
3. Collection of endangered and extinct species data
4. Study production of hydrogen (or) biogas using Cow / cattle dung
5. Most Probable Number for water

III B. Sc. BIOTECHNOLOGY

SEMESTER VI

BTT- 803(1) : Cell Biology (Elective Theory)

Unit I

Cell basic unit of life. Discovery of cell. Cell theory. Ultra structure of eukaryotic (palnt & animal) cell and prokaryotic cell.

Unit II

Structural organization and functions of plasma membrane and cell wall of eukaryotes – plant, animal and fungi.

Unit III

Structure and functions of cell organelles – endoplasmic reticulum, golgicomplex, mitochondria, chloroplast, ribosomes, lysosomes, peroxisomes and nucleus. Cytosol and cytoskeletel system – microtubules, microfilaments and intermediate filaments.

Unit IV

Chromosomes – discovery, morphology and structural organization of centromere, secondary constriction, telomeres, chromonema, euchromatin, hetrochromatin, karyotype. Types of chromosomes – salivary gland and lamp brush chromosome.

Unit V

Cell division – mitosis, meosis, cell cycle. Regulation of cell division. Programmed cell death (apoptosis). Cell signaling and functions. Introduction to cancer biology.

Practical BTP: 803(1) : Cell Biology

1. Observation of mitotic stages in onion root tips
2. Observation of meiosis stages in onion floral buds
3. Karyotyping
4. Observation of cell organelles under microscope
5. Preparation of protoplast
6. Isolation of chloroplast from leaves.
7. Isolation of genomic DNA from plant cell.

III B. Sc. BIOTECHNOLOGY
SEMESTER VI

BTT- 803(2) : Gene Biotechnology(Elective Theory)

Unit I

Mendels laws of inheritance:-Mendel experiments laws of heredity deviations- incomplete dominance & co-dominance penetration & pleiotropism. Linkage and Crossing over. Epistatisis. Concept of multiple alleles.

Unit-II

Structure of gene, gene & environments, gene copies of prokaryotic & eukaryotic chromosome organization his tone proteins.

Unit-III

Human genetics : Karotype in man, in herited disorders: Allosomal & autosomal. Banding techniques. **Transposable elements:** Structure and Molecular basis of AC-DS transposition in maize, "P" element of Drosophila and hybrid dysgenesis, Yeast "T_7" elements, Retroposans

Unit-IV

Mutation :- types, spontaneous ,and induced ,mutagens , physical and chemical , mutations of molecular levels , point mutations , frame shift auseotropic and suppressor mutations .

Unit-V

Light induced repair, excision repair and mismatch repair, post replication repair , Rec gene and its role in DNA repair SOS repair and SOS response.

Practical BTP: 803(2) : Gene Biotechnology

1. Study of different phases of mitosis in onion root tips.
2. Study of different phases of meiosis in Alliomcepa flonal buds
3. Mutation of DNA by UV
4. Problems and assignments in mendilian genetics.
5. Chemical induced mutation in bacteria.
6. Induction of chromosomal aberrations by chemical mutagenesis in any plant.
7. Isolation of auxotrophic mutants (plants or insects).
8. Repair of DNA by Photo activation of Photolyase in bacteria.
9. Mutation of bacteria by UV.

III B. Sc. BIOTECHNOLOGY
SEMESTER VI

BTT- 803(3) : Biostatistics and Bioinformatics (Elective Theory)

UNIT – I

Scope of computers in biological research, Introduction to Bioinformatics: Definition, nature and scope of bioinformatics. Bioinformatics versus computational biology. Branches of bioinformatics. Basic concepts in bioinformatics.

UNIT – II

Biostatistics: probability and distribution. Poisson and binomial distributions. Normal distribution. Measurement of central tendency (mean, mode and range) and dispersion (standard error and standard deviation).

UNIT – III

Computational phylogenetics – various applications. Phylip soft ware. Microarray, Bio informatics – Experimental design & Over view of data analysis.

UNIT – IV

Basic concepts of system biology. Over view of computer aided drug design. Searching sequence database using BLAST. Concept of genomics and proteomics.

UNIT – V

Population and sampling test of significance. Test hypothesis. Student t-test for small samples. Chi^2 test for analysis, correlation and regression. Computer applications in Biotechnology.

Practical BTP: 803(3) : Gene Biotechnology

1. Isolation of plasmid DNA from *E.coli* cells
2. Quantitative and qualitative analysis of proteins / DNA by using spectrophotometer.
3. Demonstration of Southern hybridization
4. Demonstration of amplification DNA by PCR.
5. Use of software for sequence analysis of nucleotides and proteins.
6. Problem related to t – test and chi^2 test.

SUBJECT: BIOTECHNOLOGY

MODEL PAPER FOR SEMESTER END EXAMINATION

Time : 3hrs
Max. Marks : 75

Section - A

I . ANSWER ANY FIVE OF THE FOLLOWING 5x5=25marks
Draw labeled diagrams wherever necessary

1.
2.
3.
4.
5.
6.
7.
8.

Section - B

II ANSWER ANY FIVE OF THE FOLLOWING 5 x 10=50 marks
Draw labeled diagrams wherever necessary

9 a)

Or

b)

10 a)

Or

b)

11 a)

Or

b)

12 a)

Or

b)

13 a)

Or

b)

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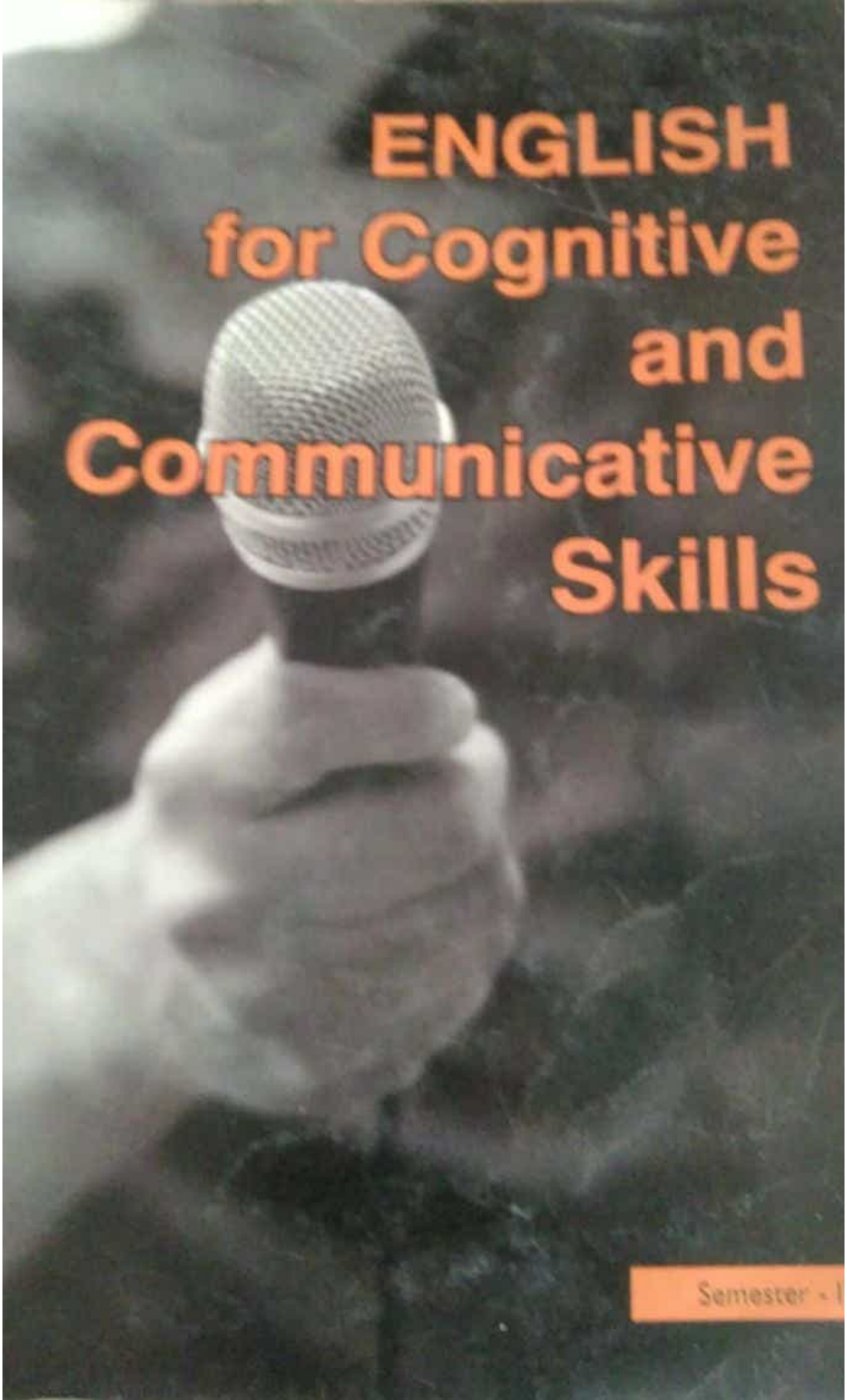
Communication & Soft Skills
Semester - IV


ENGLISH
for Cognitive
and
Communicative
Skills
Semester - I

Contents

Engage with English

Prepared for UG General English, Semester II,
as per the revised Andhra Pradesh Common Core syllabus.

Skill Pro-I

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Annexure-1			M.COM COURSE STRUCTURE (CBCS) (UNDER DUAL SPECIALISATION)					
			wef from 2015-16 Admitted Batch	Intrl	Extrl	Total	Hrs/	Crdits
SEMESTER-I							Week	
Core Paper								
1			Management Theory & Practice	20	80	100	4	4
2			Business Environment (India & International)	20	80	100	4	4
3			Advanced Management Accounting	20	80	100	4	4
4			Business Economics	20	80	100	4	4
5			Business Communication	20	80	100	4	4
6			Soft Skills (Business & Spoken English)	20	80	100	4	4
SEMESTER-II								
Core Paper								
1			E- Business	20	80	100	4	4
2			Financial Management	20	80	100	4	4
3			Human Resource Management	20	80	100	4	4
4			Marketing Management	20	80	100	4	4
ELLECTIVE Choose any Two								
1			Quantitative Techniques for Business Decision	20	80	100	4	4
2			Soft Skills (Personality Development & GD)	20	80	100	4	4
3			Entrepreneurship Development	20	80	100	4	4
4			Corporate Governance	20	80	100	4	4
SEMESTER-III								
Core Paper								
1			Insurance Products and Management	20	80	100	4	4
ELECTIVE: ACCOUNTING Choose any Two								
1			Corporate Accounting	20	80	100	4	4
2			International Accounting	20	80	100	4	4
3			Total Cost Management	20	80	100	4	4
4			Management and Cost Audit	20	80	100	4	4
ELECTIVE: FINANCE Choose any Two								
1			Strategic Financial Management	20	80	100	4	4
2			Financial Markets and Services	20	80	100	4	4
3			Management of Mutual Funds	20	80	100	4	4
4			Financing Foreign Trade	20	80	100	4	4
ELECTIVE: TAXATION Choose any Two								
1			Direct Taxes	20	80	100	4	4
2			Indirect Taxes	20	80	100	4	4
3			Customs Act	20	80	100	4	4
4			Public Finance	20	80	100	4	4
ELECTIVE: BANKING Choose any Two								
1			Advanced Banking	20	80	100	4	4
2			Bank Financial Management	20	80	100	4	4
3			NBFCs	20	80	100	4	4
4			Rural Banking	20	80	100	4	4

SEMESTER-IV								
Core Paper								
1			Computer Applications in Accounting	20	80	100	4	4
Audit Paper								
			Ethics and Moral Values					
ELECTIVE: ACCOUNTING Choose any Two								
1			Strategic Cost Management	20	80	100	4	4
2			Management Control Systems	20	80	100	4	4
3			Financial Statement Analysis	20	80	100	4	4
4			Accounting for Public Utilities	20	80	100	4	4
ELECTIVE: FINANCE Choose any Two								
1			Security Analysis and Portfolio Management	20	80	100	4	4
2			Financial Derivatives	20	80	100	4	4
3			Treasury Management	20	80	100	4	4
4			International Financial Management	20	80	100	4	4
ELECTIVE: TAXATION Choose any Two								
1			Vat and Service Tax	20	80	100	4	4
2			Tax Planning Management	20	80	100	4	4
3			Excise Duty	20	80	100	4	4
4			Fiscal Policy	20	80	100	4	4
ELECTIVE: BANKING Choose any Two								
1			Financial Institutions	20	80	100	4	4
2			Banking Technology	20	80	100	4	4
3			International Banking	20	80	100	4	4
4			Central Banking	20	80	100	4	4
			Project Report			100		6
			Comprehensive Viva Voce			100		4
						2400		

M.COM. FIRST SEMESTER (w.e.f. 2015 – 16 Admitted Batch)

CP 1: MANAGEMENT THEORY AND PRACTICE

Objectives: To familiarise the students with basic management concepts and the process of organisation.

Unit – I: Introduction: Concept of Management: Definition, Nature, Purpose, Scope and Significance – Evolution of Management Thought – Approaches to Management – Process of Management – External Environment Functions of Management.

Unit – II: Planning: Types of Plans – Objectives, Management by Objectives, Planning Premises Decision Making: Decision Making Process – Decision Tree Analysis – Linear Programming, Game Theory.

Unit – III: Organisation: Principles of Organization: Formal and Informal Organisation – Span of Control – Delegation of Authority – Centralisation and Decentralization – Line and Staff Conflict and Cooperation. Staffing Process The nature and Purpose of Staffing – Executive Development Programme (EDPs).

Unit – IV: Directing: Elements of Directing Communication – Importance, Process, Media, Barriers to Communication. Effective Communication. Motivation – Leadership – Concept, Styles, Theories – Managerial Grid: Likerts Four Systems of Leadership.

Unit – V: Process of Control, Techniques of control, PERT and CPM.

Suggested Books:

1. James A. F. Stoner, R. Edward Freeman and Daniel R. Gilbirth Jr. – Management, Prentice Hall of India.

2. Heinz Weihrich and Harold Koontz, Essentials of Management – Tata McGraw Hill International.

3. Stephen Robbins and Mary Coulter, Management, Prentice Hall of India.

4. Bajaj: Management Processing and Organization, Excel Publications.

5. Tripathy and Reddy – Principles of Management – Tata McGraw Hill.

6. John F. Wilson – The Making of Modern Management, Oxford University Press.

7. Heiny Weihrich and Harold Koontz – Management, A Global Perspective – McGraw Hill International

.

8. R.K. Suri, Organizational Behaviour, Wisdom Publication.

9. A. Pardhasaradhy & R. Satya Raju: Management Text and Cases, Prentice Hall of India.

CP 2: BUSINESS ENVIRONMENT (India & International)

Objective: To familiarize the students with the business environment prevailing in India and international and understand its implications to business.

Unit-I: Business Environment: Components and Significance – Economic Scope – Cultural, Political, Technological and External Factors Influencing Business Environment – Dimensions of International Business Environment – Challenges.

Unit-II: Structure of Indian Economy; Economic systems- Economic planning with special reference to last three plans, public, private joint and cooperative sectors - Industrial Policy of the Government - Policy Resolutions of 1956, 1991 Industrial Policy and Economic Policy - Subsequent policy Statements.

Unit-III: Indian Companies -Competitiveness, Changes and Challenges, Sustainable Development, Social Responsibilities, Ethics in Business- Competition Act 2002 - Emerging Trend in Indian Business Environment.

Unit – IV: International Trade Theories, Balance of Payments – Concepts, Disequilibrium in BOP Structural, Cyclical and Monetary Disequilibrium, Methods of Correction, Trade Barriers and Trade Strategy - Free Trade vs. Protection-World Financial Environment – Foreign Exchange Market Mechanism, Exchange Rate Determination, Euro Currency.

Unit – V: Globalisation: International Economic Integration, Country Evaluation and Selection, Foreign Market Entry Methods, International Trade Stocks – Their Objectives; WTO Origin, Objectives, Organisation Structure and Functioning – WTO and India.

Suggested Books:

1. K.V.Sivayya and VBM Das: Indian Industrial Economy, Sultan Chand Publishers, Delhi.
2. Suresh Bedi: Business Environment, Excel, New Delhi.
3. Francis Cherunilam: Business Environment - Text & Cases.
4. M.Adhikari, Economic Environment of Business.
5. Pandey G.N., Environmental Management, Vikas Publishing House.
6. Raj Agarwal: Business Environment, Excel Publications.
7. Govt. of India, Latest Economic Survey.
8. Chari, S. N: International Business, Wiley India
9. Francis Cherunilam: International Business: Text and Cases, Prentice Hall of India.
10. E. Bhattacharya: International Business, Excel Publications.
11. Sundaram & Black: International Business Environment Text and Cases, PHI.
12. Sajahan: International Business, Mac-Milan India. New Delhi.

CP 3: ADVANCED MANAGEMENT ACCOUNTING

Objective: To develop an insight of postulates, principles and techniques of accounting and utilisation of financial and accounting information for planning, decision-making and control.

Unit – I: Management Accounting – Nature and Scope – Management Accounting Vs Financial Accounting and Cost Accounting – Role of Management Accountant in a Modern Organisation.

Unit – II: Cost Concepts for Decision Making - Cost – Volume – Profit Analysis – Behaviour of Variable Cost – Behaviour of Fixed Cost – Relationships Among Cost and Profits at Various Levels of Activity – Break-Even Point – Margin of Safety – Contribution Approach for Decision Making – Analysis of Contribution Per Unit of Critical Factor.

Unit – III: Cost Analysis for Pricing Decisions – Evaluating the cost Effects of Price – Quantity Relationships Price Elasticity of Demand and Optimal Pricing Decisions – Cost Analysis for Pricing During Recession Conditions – Flexible Cost Data for Pricing Decisions – Special Order Pricing – Impact of Special Order Pricing on Regular Sales and Overall Profits – Partial Fulfilment of Special Order Vs Outsourcing Decisions – Make or Buy Decisions.

Unit – IV: Cost Analysis for Product Decisions – Breakeven Analysis of Multi-Product Firms – Differential Costs for Product – Mix Alterations Decisions – Product Additions Decision – Adding New Products Combining Pricing Decisions with Product Addition Decision and Selecting Profitable Product-Price Strategies – Produce Deletion – Sell or Process Further Decision of Joint and By-Products.

Unit – V: Budgeting – Types of Budgets – Financial Budgets – Operating Budgets – Cash Budget – Production Budget – Flexible Budget – Concepts of Performance Budgeting and Zero Based Budgeting.

Suggested Books:

1. I.M. Pandey: Management Accounting, Vikas Publishing House.
2. N.M. Singhvi, Management Accounting: Text and Cases, Prentice Hall of India.
3. T.P. Ghosh: Fundamentals of Management Accounting, Excel Publications.
4. Ravi M. Kishore, Management Accounting, Taxman Publications.
5. Chakraborty, Hrishikesh – Management Accountancy, Oxford University Press.
6. Horngren, C.T., Introduction to Management Accounting, Prentice Hall of India.
7. Khan and Jain, Management Accounting, Tata McGraw Hill, Delhi.
8. J.C. Varshney: Financial and Management Accounting, Wisdom Publication.
9. Horngren Sundem Stratton, Management Accounting, Prentice Hall of India.
10. Paresh P. Shah, Management Accounting, Wiley India, New Delhi.

CP 4: BUSINESS ECONOMICS

Objective: To enable the students to understand economic concepts and theories and their application in management decision-making.

Unit - I: Introduction: Nature and Scope of Business Economics; Objectives of the Firm – Traditional Theory, Sales and Revenue Maximizing Theories, Managerial Theories and Behavioral Theories; Profit Maximization Vs. Wealth Maximization; Demand Forecasting – Methods of forecasting demand for Existing and New Products, Criteria for Good Forecasting Method.

Unit - II: Production Analysis and Cost Analysis: Production Function – Law of Variable Proportions, Isoquant and Isocost Curves, Least Cost Combination, and Returns to Scale; Economies of Large Scale; Cobb-Douglas Production Function and C.E.S. Production Function; Cost-Output Relationships – Short and Long Run; Cost Oriented Pricing Methods – Full Cost Pricing, Marginal Cost and Differential Cost Pricing.

Unit - III: Market Analysis: Price and Output Determination Under Perfect Competition, Monopoly, Monopolistic Competition, Oligopoly and Duopoly.

Unit - IV: Profit Analysis: Meaning of Profit, Limiting Factors of Profit, Criteria for Standard Profit: Theories of Profit; Business Forecasting – Nature and Scope of Forecasting and Different Methods of Business Forecasting and their Advantages and Disadvantages.

Unit - V: Macro Economic Concepts: National Income, Trade Cycles, Inflation, Monetary and Fiscal Policies.

Suggested Books:

1. Mukherjee Sampat: Business and Managerial Economics (In the Global Context), Third Edition, New Central Book Agency (P) Ltd., Kolkatta, 1996.
2. Dwivedi, D.N.: Managerial Economics, Vikas Publishing House Pvt. Ltd., 2003.
3. Dhingra, I.C., Essentials of Managerial Economics; Theory, Applications and Cases, Sultan Chand, New Delhi, 2003.
4. Mithani, D.M.: Managerial Economics; Theory and Applications, Himalaya Publishing House, 2003.
5. Mehta, P.L.: Managerial Economics, Text and Cases, S.Chand & Co., Delhi.
6. Varshney, R.L. and Maheswari, K.L.: Managerial Economics, S.Chand & Co, Delhi.
7. Dwivedi, D.N.: Macroeconomics; Theory and Policy, Tata McGraw Hill Publishing Company, 2002.
8. Gupta, G.S.: Macroeconomics; Theory and Applications, Tata McGraw Hill Publishing Company Ltd.
9. Yogesh Maheswari, Managerial Economics, 2nd Edition, Prentice Hall of India.

CP 5: BUSINESS COMMUNICATIONS

Objective: To equip the students with the necessary techniques and skills of communication to inform others, inspire them enlist their activity and willing cooperation in the performance of their jobs.

Unit – I: Importance of Communication in Business Organisations – Communication Objectives – Media of Communication: Written, Oral, Visual – Audio Visual Communication.

Unit – II: Interpersonal Communication – Interpersonal Communication – Communication Models: Exchange Theory – Johari Window – Transactional Analysis, Communication Styles.

Unit – III: Communication Barriers – Communication Gateways – Developing Listening Skills – Influence of Culture on Communication.

Unit – IV: Report Writing – Formal Reports – Informal Reports – Writing Good News and Bad News.

Unit – V: Meetings and Oral Presentations – Communication Through Visuals – Use of Electronic Media in Business Communication.

Suggested Books
:

1. Jerry C. Wofford, Edwin A. Gerloff and Robert C. Cummins, Organisational Communication – The Key stone of Managerial Effectiveness.
2. McGrath, Basic Managerial Skills for All, 5th ed., Prentice Hall of India.
3. Urmila Rai & S.M. Rai, Business Communication, Himalaya Publishers, Mumbai.
4. Meenakshi Raman – Business Communication, Oxford University Press.
5. Bovee, Thill and Schatzman: Business Communication Today: Pearson Education.
6. Biswajit Das: Business Communication personality Development, Excel Publications.
7. Parag Diwan: Business Communication, Excel Publications.
8. Lesikar I Flatley, Basic Business Communication, Tata McGraw Hill.
9. Dalmar Fisher, Communication in Organizations, A Jaico Book.
10. Scot Ober, Contemporary Business Communication, Wiley India, New Delhi.

CP 6: SOFTSKILLS
(Business and Spoken English)

Objective: To train students in English language to improve their oral and written business communication

Unit-I: Business Correspondence: Meaning, Scope and Significance - Formal, informal and semiformal introductions – Describing company activities and structures – Describing job responsibilities – Understanding and writing letters - Differences between formal and informal writing – Use of formal vocabulary and functional language in business letter writing – Planning effective initial business letters and responses – email writing skills, call taking etiquette/skills/

Unit-II: Business Information: Completing forms with required details: Asking appropriate questions to gather information – Polite phrases of confirmation and communication breakdown- understanding native speaking accents and dialects; Functional language used in making verbal agreements — Effective techniques of making and accepting offers – Efficient written offer making and accepting.

Unit-III: Business Presentations: Basic presentation techniques – Use of information in presenting product features – Explaining technical features for simplification; Giving and interpreting numerical data, common useful business abbreviations and acronyms - Oral and written conventions for expressing numerical information in English – Pronunciation issues in expressing numbers and the alphabet.

Unit-IV: Business Reporting: Use of grammar in giving instructions– Effective presentation of oral instructions – effective presentation of written instructions, Presenting and describing company information: Vocabulary of describing graphical and numerical information – Expressing cause and result in English – Summarizing important information concisely.

Unit-V: Feedback and Evaluation: Giving feedback to others - Use of questions in self-assessment elicitation – Functional language of agreement/disagreement and opinion giving – Use of tone and intonation in good/bad feedback – Motivating others – Use of emphatic structures in English – Use of conditionals to discuss future possibilities – Discourse strategies for effective relationship – team building skills.

Suggested Books:

1. K. Srinivasa Krishna & B. Kuberudu: Business Communication and soft skills, excel, Hyderabad, 2008.
2. Seghal, M.K. Business Communication, Excel Books, New Delhi.
3. Mary Ellen Guffey, Business English.
4. Marie M. Stewart, Business & Communication
5. G.L. Handesson, P.R. Voiles, Business English & Communication.
6. Robert E. Barry, Pat Taylor Ellison, Business English for 21st Century.

M.Com: SECOND SEMESTER

CP: 1 E-BUSINESS

OBJECTIVE :
Objective of this course is to provide basic concepts of e-business and equip the student with the skill of integrating business process with electronic technology.

UNIT –I
Introduction – Traditional Business Vs E-Business - E-Business, E-Commerce, E- Marketing and M-Commerce –Internet, WWW and Evolution of E-Business – Growth of E-Business in India

UNIT - II
Infrastructure for E-Business – Internet Protocals, Web-Based Clint/Server, Internet Security, Media Convergence, Multimedia –Architectural Framework for E- Business – WWW as the Architecture

UNIT - III
E-Business Models based on Relationship of Transaction Parties and based on Relationship of Transaction Types – E-Business for Service Industry – Travel and Tourism, Employment Placement, Real Estate, Stocks Trading, Publishing - Mobile Commerce through different Apps

UNIT –IV
E-Payment Systems – Classification of Payment Systems – Risk and E-Payment Systems – E-Security – Privacy, Integrity, Authentication, Non Repudiation, Technical Attacks and Non Technical Attacks

UNIT –V
E- Advertisement - E-Business Strategies and Implementation – E-Supply Chain Management – Legal Ethical Issues of E-Business

SUGGESTED READINGS :
Ravi Kalakota & Marcia Robinson, E-Business Road map for success, Pearson Education, Asia.
Ravi Kalkota & Andrew B. Whinston, Frontiers of Electronic Commerce, Addison Wesley.
P.T.Joseph, S.J. E-Commerce: An Indian Perspective, Prentice Hall of India
Kenneth C. Laudon, Carol Guercio Traver, E-Commerce: Business, Technology, Society, Pearson Education
Efraim Turban, Jae Lee, David King and H. Michael Chung, Electronic Commerce, Pearson Education
C.S.V. Murthy, e-commerce : concepts, models and strategies, Himalaya Publishing/
C.S. Rayudu, E-Commerce and E-Business, Himalaya Publishing House.
Kamalesh Bajaj and Debjani Nag, E-Commerce, Tata McGraw Hill.
N.Bandopadhyaya, E-Commerce Context, Concepts and Consequences, Tata McGraw Hill.
. Abhjit Choudhary, E-Business and E-Commerce Infrastructure Technologies supporting

CP 2: FINANCIAL MANAGEMENT

Objective: To develop an understanding of the Finance functions and relevant techniques of financial administration.

Unit – I: Introduction: Nature, Scope and Objectives of Financial Management: Finance Function – Profit Goal vs. Wealth Goal Maximization; Techniques of Financial Analysis: Funds Flow Analysis and Ratio Analysis Role of Financial Manager in Modern Environment.

Unit – II: INVESTMENT DECISION: Techniques of Appraisal; Process of Capital Budgeting – Risk Vs. Return Traditional and Modern Techniques. (including problems).

Unit – III: FINANCING DECISIONS: Capital Structure – Determinants; Leverages – Financial, Operating and Combined: Cost of Capital. (including problems)

Unit – IV: DIVIDEND AND RETAINED EARNINGS: Dividend Policy Decisions; Parameters, Dividend Models; Policies Regarding Retained Earnings.

Unit – V: WORKING CAPITAL MANAGEMENT: Concept, Need and Determinants of Working Capital - Working Capital Cycle – Working Capital Policy.

Suggested Books:

1. Brearley, Richard and Myers, Steward: Principles of Corporate Finance, New York, McGraw Hill.
2. Soloman, Ezra, Theory of Financial Management, Columbia Press.
3. James C. Van Horne, Financial Management and Policy, Prentice Hall of India.
4. Weston J. Fred and Brigham, Eugne F., Managerial Finance, Dryden Press.
5. Prasanna Chandra, Financial Management, Tata McGraw Hill.
6. Khan, M.Y. and Jain, Financial Management, Tata McGraw Hill.
7. Pandey, 1M, Financial Management, Delhi, Vikas Publishing House.
8. Ravi M. Kishore: Financial Management, Taxmann.
9. Sudhirbhat, Financial Management, Excel Books.

CP 3: HUMAN RESOURCE MANAGEMENT

Objective: To enable the students to familiarize with the main aspects of Human Resource Management at the organization level and apply the same in management of Human Resources.

Unit – I: Human Resources Management: Concept, Significance and Evolution; Functions of HR Manager, Place of HR Department in Organization.

Unit – II: Human Resource Planning: Significance – Methods and Techniques - Job Analysis – Recruitment and Selection Processes - Induction – Placement – Promotion and Transfers.

Unit – III: Training and Development: Significance – Identification of Training Needs – Employee Training Methods – Executive Development Methods – Evaluation of Training and Development Programmes.

Unit – IV: Wage and Salary Administration: Wage Concepts; Job Evaluation – Methods & Techniques Wage Structure & Policy – Wage Differentials – Wage Payment Methods – Incentives – Fringe Benefits – Performance Appraisal: Scope & Significance – Methods of Appraisal - Limitations of Appraisal.

Unit – V: Industrial Relations: Significance, Causes of Disputes and Settlement - Role of State in Industrial Relations - Collective Bargaining - Employee Participation in Management.

Suggested Books:

1. Venkat Ratnam C.S., and Srivastava B.K., Personnel / Human Resource Management, Tata McGraw Hill.
2. Cynthia D. Fisher & Lyle F. Schoenfeldt, Human Resource Management, Wiley India, New Delhi.
3. N.K. Singh: Human Resources Management, Excel Publications.
4. Jyothi – Human Resource Management, Oxford University Press.
5. Gary Dessler, Human Resource Management.
6. Edwin B Flippo, Personnel Management.
7. Decenzo / Robbins, Personnel / Human Resource Management, 3rd Ed, John Wiley & Sons Pvt. Ltd.
8. P. Subba Rao, Human Resource Management, Himalaya Publishers, Mumbai.
9. Deepak Kumar, B. Human Resource Management, Excel Books.
10. Ghosh, HRD and Management, Vikas.
11. Ian Badwel, Len Holden: Human Resource Management – A Contemporary Perspective, Macmillan India Ltd.

CP 4: MARKETING MANAGEMENT

Objective: To develop an understanding of the concepts, strategies and issues involved in marketing and its Management.

Unit – I: Importance of Marketing – Concepts – Approaches to the Study of Marketing – Marketing Environment.

Unit – II: Consumer Behaviour – Market Segmentation – Market Targeting and Positioning – Marketing Information System and Research.

Unit – III: Marketing Mix: Product Planning – New Product Development – Product Life Cycle – Branding Packaging – Product Mix Management.

Unit – IV: Pricing: Objectives – Methods and Strategies – Distribution – Channel Selection and Management Retail Management.

Unit – V: Promotion: Integrated Marketing Communications: Personal Selling – Advertising – Sales Promotion, Publicity and Public Relations – Direct Marketing: Evaluation of Communication Effort.

Suggested Books:

1. Philip Kotler and Kevin Lane Keller: Marketing Management, Prentice Hall of India / Pearson Education, New Delhi.
2. William J Stanton & Futrell: Fundamentals of Marketing.
3. V. J. Ramaswami and S. Namakumari: Marketing Management, Macmillan Business Books, Delhi.
4. S. Jayachandran: Marketing Management, Text and Cases, Excel Publications.
5. Tapan K. Panda, marketing management, Excel.
6. Zinkota & Kotabe: Marketing Management, Prentice Hall of India.
7. Joel R. Evans & Barry Berman: Marketing, Wiley India, New Delhi.
8. Mukesh Dhunna: Marketing Management, Wisdom Publication.
9. Rajiv Lal, John A. Quelch & V. Kasturi Rangan, Marketing Management, Tata McGraw Hill.

ELECTIVE
(Choose any Two)

1. QUANTITATIVE TECHNIQUES FOR BUSINESS DECISIONS

Objective: To make the students familiar with the statistical and mathematical techniques and their applications in business decision making.

Unit – I: Functions, Linear, Quadratic, Logarithmic and Exponential Functions – Permutations and Combinations – Matrices – Solving System of Equations with Matrix Methods – Differentiation and Integration of Simple Functions and their Applications.

Unit – II: Measures of Central Tendency – Measures of Dispersion – Simple Correlation and Regression Analysis – Concept and Applications of Multiple Regressions.

Unit – III: Concept of Probability – Probability Rules – Joint and Marginal Probability – Baye's Theorem – Probability Distributions – Binomial, Poisson, Normal and Exponential Probability Distributions.

Unit – IV: Sampling and Sampling Distributions – Estimation – Point and Interval Estimates of Averages and Proportions of Small and Large Samples – Concepts of Testing Hypothesis – One Sample Test for Testing Mean and Proportion of Large and Small Samples.

Unit – V: Tests of Two Samples – Tests of Difference Between Mean and Proportions of Small and Large Samples – Chi-square Test of Independence and Goodness of Fitness – Analysis of Variance.

Suggested Books:

1. K.V. Sivayya and K. Satya Rao, Business Mathematics.
2. R. Selvaraj, Quantitative Techniques, Excel Books, New Delhi.
3. Misra: Quantitative Techniques for Management, Excel Publications.
4. Barry Render, Ralph M. Stair Jr. & Michael E. Hanna, Quantitative Analysis for Management, 8th ed., Prentice Hall of India.
5. Levin, Krehbiel and Berenson, Business Statistics: A first course, Pearson Education Asia.
6. Nagar, Das – Basic Statistics, Oxford University Press.
7. Shenoy, Sarma and Srivatsava, Quantitative Techniques for Management, New Age (International) Pvt. Ltd.
8. N.D. Vohra, Quantitative Techniques in Management, Tata McGraw Hill, 2001.
9. C.R. Kothari, Quantitative Techniques, Vikas Publishers.
10. Anand Sharma, Quantitative Techniques for Decision Making, Himalaya Publishers, Mumbai.
11. Zameerudding, Khanna and Bhambri, Business Mathematics, Vikas Publishing House.

2. SOFTSKILLS
(Personality Development & GD)

Objective: to equip students with the most needed personality characteristics of modern professional managers with an emphasis on positive thinking, creativity, goal-setting, time management, self-discipline and interview skills.

Unit - I: CAREER PLANNING: Meaning And Importance – The Process Of Career Planning – Different Dimensions – Factors To Be Considered For Career Planning - Goal Setting - Positive Thinking

Unit - II : PERSONALITY DEVELOPMENT: Intra-personal Skills - Inter-personal Skills - Communication Skills – Spoken, Written, Non-Verbal (Body Language), Listening skills - Time Management – Leadership – Creativity - Problem Solving - Strategic Planning.

Unit - III: INTERVIEW PREPARATION: Art of Facing Interview - Resume Preparation- Preparation for Campus Interviews - Pre-requisites for Campus Interviews - Stress and Anxiety Management - Dress Code & Appearance.

Unit - IV : INTERVIEW PROCESS: Written Test - Group Discussion - Role-Play- Response to Oral Questions - Employer's Criteria.

Unit - V:NEGOTIATION WITH PROSPECTIVE EMPLOYER: Terms and Conditions - Compensation Package - Place of Posting - Career, Succession - Multi-Skill Development.

Suggested Books:

1. Biswajit Das, Business Communication and Personality Development, Excel Books.

2. Subrahmanyam, et.al., Personality Development, Excel Books, New Delhi.

3. ENTREPRENEURSHIP DEVELOPMENT

Objective: The objective of this course is to expose the students to the subject of entrepreneurship and small business management, so as to prepare them to establish and a new enterprise and effectively manage the same.

Unit – I: Entrepreneurship: Importance, Characteristics and Qualities of Entrepreneurship; Entrepreneurial; Role of Entrepreneurship, Ethics and Social Responsibilities.

Unit – II: Role of Government; Role of IDBI, NIESBUD, SISI, DIC Financial Institutions Commercial Banks, Entrepreneurial Development Institutes, Universities and other Educational Institutions Offering Entrepreneurial Development Programme.

Unit – III: Training: Designing Appropriate Training Programme to Inculcate Entrepreneurial Spirit, Training for New and Existing Entrepreneurs, Feedback and Performance of Trainees.

Unit – IV: Women Entrepreneurship – Role & Importance, Profile Women Entrepreneur, Problems of Women Entrepreneurs, Women Entrepreneurship Development in India.

Unit – V: Creativity and Entrepreneurship Sources and Methods of Ideas Planning and Development of Programmes E-Business Ventures; New Venture Management.

(Case Studies are Compulsory)

Suggested Books:

1. NVR Naidu and T.Krishna Rao, Management and Entrepreneurship, IK Int Pub House, New Delhi
2. S Anil Kumar, Small Business and Entrepreneurship, IK Int Pub House, New Delhi
3. Balraj Singh, Entrepreneurship Development, Wisdom, Delhi
4. Timmons and Spinelli, New Venture Creation:Entrepreneurship for 21st Century, TMH, ND
5. Tabarrok – Entrepreneurial Economics, Oxford University Press.
6. C.V. Bakshi, Entrepreneurship Development, Excel Publications.
7. Jain, Hand Book of Entrepreneurs, Oxford University Press.

Vasant Desai, Small Business in Entrepreneurship, Himalaya Publishing House.

4. CORPORATE GOVERNANCE

Objectives: This course exposes the students to the various concepts of Corporate Governance and business ethics and provides an in-depth study of various issues there under.

Unit I: Corporate Governance – concept -meaning – scope – need – Corporate Governance mechanism – Corporate Governance and stakeholders – Investors protection – obligation to investors –obligation to employees –obligation to customers – managerial obligation – obligation to government – Corporate governance and value maximization.

Unit II: Historical perspective of Corporate Governance – World Bank on Corporate Governance – OECD Principles – Mckinsey survey on corporate governance – Sarbanes-Oxley Act 2002 – Indian Committees and guidelines and corporate governance- Naresh Chandra committee – Narayana murthy committee - J.J.Irani committee- Kumar mangalam birla committee – The Confederation of Indian industry's Initiatives – SEBI initiatives – Corporate Governance practices in India.

Unit III: Corporate Governance and role of Board of directors – Role of Board – governance issues relating to the Board – the role of directors – independent directors – Clause 49 of Listing agreement – Directors" remuneration – Corporate Governance Reporting and Best practices.

Unit IV: Corporate Governance and the role of Audit committees – role , duties and responsibilities of auditors –types of auditors –corporate governance and internal auditors – cost audit methodology – quality audit –Naresh Chandra Committee report on Corporate audit and governance.

Unit V: Corporate Governance and business ethics – meaning – scope – need for business ethics – roots of unethical behavior – unethical issues –corporate governance and ethics – the Indian context- Corporate Social Responsibility – meaning – scope – Corporate Governance and CSR – Social responsibility and Indian corporations. Corporate Governance and regulators role – SEBI – The future of Corporate Governance in India.

Suggested books:

1.A.C. Fernando, "Corporate Governance" Principles, policies and practices, Pearson Education, New Delhi.

2.Dr. Singh, Corporate Governance: Global concepts and practices.

3.ICSI, Corporate Governance – Modules of Best Practices.

4.Report on Corporate excellence on a sustained basis, Dr. M.R.Rao, Director, IIMB.

SEMESTER THREE

CP:1 INSURANCE PRODUCTS AND MANAGEMENT

Unit – I: Life Insurance Concept – Basic Principles of Life Insurance Utmost Good Faith-Insurance Interest – types of Life Insurance – Variations of Whole Life Insurance – Other types of Life Insurance.

Unit – II: Life Insurance Contractual Provisions – Dividend Options – Non Forfeiture Options – Settlement Options – Additional Life Insurance Benefits – Insurance Pricing – Objectives of Rate Making – Rate Making in Life Insurance.

Unit – III: Health and Disability – Income – Insurance – Types of Individual Health Insurance Coverage's – Individual Medical Expense Contractual – Group Insurance Group Life Insurance Plans – Group Medical Expense Insurance.

Unit – IV: Employee Benefits – Retirement Plans –Fundamentals of Private Retirement Plans – Types of Qualified Retirement Plans – Profit Sharing Plans – Self Retirement Plans for Employed – Single Retirement Plans – Simplified Retirement Pension.

Unit – V: Re-Insurance Reasons For Reinsurance- Types of Reinsurance – Alternatives to Traditional Reinsurance Functions of Reinsurance – Advantage and Disadvantage of Reinsurance.

Suggested Books:

1. George E. Rejoa, Principles of risk management and insurance, Pearson Education, New Delhi, 2004.

2. Black Jr. Skipper Jr. Health Insurance, Pearson Delhi, 2003.

3. M.N. Mishra, Insurance Principles and Practice, S. Chand, New Delhi, 2003.

4. M.J. Mathew, Insurance Principles and Practice, RBSA publishers, Jaipur 2005.

Elective: Accounting
(Choose any Two)

1. CORPORATE ACCOUNTING

Unit - I: Corporate Financial Accounting: Objectives-Scope - Role of Corporate Accountant-Analysis and Interpretation of Financial Statements - Inflation Accounting.

Unit - II: Valuation of Shares: Need for Valuation of Shares – Factors Effecting Value of Shares – Methods of Valuation – Impact of Earnings on Share Valuation – Role of Fundamental Analysis and Technical Analysis in Share Valuation – Fair Value of a Share – Buy Back of Equity Shares.

Unit - III: Consolidated Financial Statements: Definition of Parent or Holding and its Subsidiary – Need for Consolidated Financial Statement – Preparation of Consolidated Balance Sheet of a Holding Company with one Subsidiary – Consolidation of Profit and Loss Account – Consolidated Statement of Changes in Financial Position.

Unit - IV: Accounting Standards: Objectives – Advantages and Disadvantages of Accounting Standards – Accounting Standards Board (ASB) – Compliance with Accounting Standards – International Accounting Standards and Linkage with Indian Accounting Standards – Accounting Standards Under US GAAP and Indian GAAP.

Unit - V: Financial Reporting: Concept, Objectives – Users Purpose of Financial Reporting and Specific Purpose of Report – Segment Reporting – Difficulties in Segment Reporting– Interim Reporting – Problems in Interim Reporting – Improving Financial Reporting – Value Added Statements – Disclosure of Value Added Statements – Economic Value Added – Human Resource Reporting - Environmental Reporting.

Suggested Books:

1. Advanced Accounting – Corporate Accounting Vol. 2 – Ashok Sehgal & Deepak Sehgal, Taxmann Allied Services Pvt Ltd, New Delhi.
2. Advanced Accounting – Volume – 2; R.L. Gupta & Radhaswami S. Chand & Co. Delhi.
3. Financial Accounting: A Managerial Perspective, R. Narayana Swamy, Prentice Hall of India.
4. Financial Accounting for Business Managers: Asish K. Bhattacharyya, Prentice Hall of India.
5. Human Resource Accounting – D. Prabhakara Rao.
6. Advanced Accounts – Chakravarthy – Oxford Publishers.
7. Modern Accountancy Vol.2 – A. Mukharjee and M. Hanieff – Tata McGraw hill publishing Company. New Delhi.
8. Financial Accounting – A Managerial Perspective – R. Narayana Swami – Prentice Hall of India, New Delhi.
9. Corporate Accounting – S.N. Maheswari & S.K. Maheswari, Vikas Publishing House, New Delhi.

2. INTERNATIONAL ACCOUNTING

Unit – I: International Dimensions of Accounting – Definition and Importance of International Accounting – Scope of International Accounting – Status of International Accounting in India.

Unit – II: Internationalisation of Accounting Profession – Harmonization of Accounting Practices – Comparative Analysis Between US GAAP, Indian GAAP and IAS – Models of Uniformity in Accounting.

Unit – III: Accounting for Currency Translation – Need – Foreign Exchange and Procedural Issues – Practices.

Unit – IV: Transfer Pricing – Definition – Evolution and Approaches to Transfer Pricing in International Business with Special Reference to Multinational Corporations – Indian Experience.

Unit – V: International Dimensions of Financial Reporting – Introduction – Transactional Reporting – Considerations Reporting Practices – Recent Changes – Indian Experience.

Suggested Books:

1. 'International Accounting' – Dr. Shirin Rathore, Prentice Hall of India Pvt. Ltd., New Delhi.

2. FDC Choi and G.G. Mueller, 'An introduction to multinational Accounting' (Prentice Hall, 1982).

3. 'International Accounting and financial reporting, Rueshhoff (Norlin G)

4. 'International Accounting – A User perspective Shahorkh M. Suddagaran, TAXMAN INDIA. 2000.

5. "Advanced Financial Accounting". Richard E Baker, Valdean C. Lembke Thomases King, McGraw-Hill Higher Education, Irwin, 2005.

6. "Comparative International Accounting" Christopher Nobes & Robert Parker, Pearson Education, 2002, New Delhi.

3 . TOTAL COST MANAGEMENT

Objective: To enable the students to have a comprehensive understanding about the concept and components of Total Cost Management.

UnitI; Cost Management-Nature and Scope-Management of value chain-tools of cost management-Product costing systems-Job and Process Order costing systems.

Unit II: Activity Based Costing system-Meaning and scope-Limitations of traditional costing allocation methods-Application of ABC system-Target Costing-Benchmark Costing.

Unit III: Quality cost systems-meaning and application-Conflict between quality and cost-Trade-off between Quality and Price-Value analysis-Life Cycle costing-Learning Curve Analysis-JIT and Cost Reductioin

Unit IV: Cost estimation-Methods-Costing Engineering-Using Regression Analysis-Evaluating Performance-Cost Variance Analysis-Kaizen Costing

Unit V: Cost Audit-Definition-Purpose-Scope-Aspects of Cost Audit-Cost Audit Programme-Advantages-Limitations-Cost Audit Vs. Financial Audit-Cost Audit in India.

Text Book:

1. Hilton, Maker and Selt, Cost Management-Strategies for Business Decisions, Tata McGraw Hills, New Delhi

Reference Books:

1. Jack Campanella, Principles of Quality Costs, Principles, Implementation and Use, Prentice Hall of India Pvt. Ltd.
2. Benerjee, B, Cost Accounting, World Press, Calcutta
3. Charles T Horngren, Cost Accounting-A Managerial Emphasis, Prentice Hall of India, New Delhi

4. MANAGEMENT AND COST AUDIT

Objective: To expose the student with the managerial issues of cost and management audit.

Unit I : Objectives of Audit-Meaning and scope of cost and management audit-Managerial uses of cost and management audit.

Cost Audit-Distinction between Financial and Cost Audit-Maintenance of Statutory Cost Audit.

Unit II : Management Audit-Nature and Scope –Statutory audit Vs.Management Audit.

Management Audit-Efficiency Measures-Questionnaire for evaluation of management functions-Techniques for assessing managerial efficiency-Preparing for management audit report.

Unit III: Appointment of Cost Auditor-Powers and Duties of cost Auditor-Professional Ethics for Cost Auditor

Cost Audit Planning-Checking of basic records-Study of cost structure of the company-Familiarity with industry cost structure-Precautions for including Cost Audit Report

Unit IV: Practical aspects of Cost Audit-Material checking –Payroll checking-Overhead checking-Depreciation checking-Production records checking-Stock valuation checking-Post-checking work.

Unit V: Cost Audit Report Writing- The main certificate-Cost Accounting system-Financial position-Production –Process of manufacturing-various expenses-Sales

Prescribed Text Book:

1. Ramanathan, A.R., Cost and Management Audit, Tata McGraw Hill, New Delhi

Reference Books:

1. Greenwood W.T., Business Policy-A Management Audit Approach,MacMillan, New York
2. Kamal Gupta, Contemporary Auditing, Tata McGraw Hill, New Delhi

Elective: FINANCE
(Choose any Two)

1. STRATEGIC FINANCIAL MANAGEMENT

Unit – I: Financial Goals and Strategy – Shareholder Value Creation (SCV): Market Value Added (MVA) – Market-to-Book Value (M/BV) – Economic Value Added (EVA) – Managerial Implications of Shareholder Value Creation.

Unit – II: Financial Strategy for Capital Structure: Leverage Effect and Shareholders' Risk – Capital Structure Planning and Policy – Financial Options and Value of the Firm – Dividend Policy and Value of the Firm.

Unit – III: Investment Strategy – Techniques of Investment Appraisal Under Risk and Uncertainty – Risk Adjusted Net Present Value – Risk Adjusted Internal Rate of Return – Capital Rationing – Decision Tree Approach for Investment Decisions – Evaluation of Lease Vs Borrowing Decision.

Unit – IV: Merger Strategy – Theories of Mergers – Horizonal and Conglomerate Mergers – Merger Procedure – Valuation of Firm – Financial Impact of Merger – Merge and Dilution Effect on Earnings Per Share – Merger and Dilution Effect on Business Control.

Unit –V: Takeover Strategy – Types of Takeovers – Negotiated and Hostile Bids – Takeover Procedure – Takeover Defences – Takeover Regulations of SEBI – Distress Restructuring Strategy – Sell offs – Spin Offs – Leveraged Buyouts.

Suggested Books:

1. Coopers & Lybrand, Strategic Financial: Risk Management, Universities Press (India) Ltd.
2. Robicheck, A, and Myers, S., Optimal Financing Decisions, Prentice Hall Inc.
3. James T. Gleason, Risk: The New Management Imperative in Finance, A Jaico Book.
4. Van Horn, JC. Financial Management and Policy, Prentice Hall.
5. Prasanna Chandra, Financial Management Theory and Practice, Tata McGraw Hill.
6. Weston JF, Chung KS & Hoag SE., Mergers, Restructuring & Corporate Control, Prentice Hall.
7. Pandey IM, Financial Management, Vikas.
8. Shiva Ramu, S., Corporate Growth through Mergers & Acquisitions, Response Books (A Division of Sage Publications).
9. Khandawalla, PN, Innovative Corporate Turnarounds, Sage Publications.

2. FINANCIAL MARKETS AND SERVICES

Unit - I: Structure of Financial System – Role of Financial System in Economic Development- Financial Markets and Financial Instruments- Capital Markets – Money Markets –Primary Market Operations- Role of SEBI – Secondary Market Operations - Regulation – Functions of Stock Exchanges – Listing - Formalities -Financial Services Sector Problems and Reforms.

Unit - II: Financial Services: Concept, Nature and Scope of Financial Services – Regulatory Frame Work of Financial Services – Growth of Financial Services in India - Merchant Banking – Meaning –Types – Responsibilities of Merchant Bankers – Role of Merchant Bankers in Issue Management – Regulation of Merchant Banking in India.

Unit - III: Venture Capital – Growth of Venture Capital in India – Financing Pattern Under Venture Capital – Legal Aspects and Guidelines for Venture Capital. Leasing – Types of Leases – Evaluation of Leasing Option. Vs. Borrowing.

Unit - IV: Credit Rating – Meaning, Functions - Debt Rating System of CRISIL, ICRA and CARE. Factoring, Forfeiting and Bill Discounting –Types of Factoring Arrangements-Factoring in the Indian Context.

Unit - V: Mutual Funds – Concept and Objectives, Functions and Portfolio Classification, Organization and Management, Guidelines for Mutual Funds, Working of Public and Private Mutual Funds in India. Debt Securitisation - Concept and Application - De-mat Services-need and Operations-role of NSDL and CSDL.

Suggested Books:

1. I.M. Bhole, Financial Institutions and market, Tata McGraw Hill.
2. V.A. Avadhani, Marketing of Financial Services, Himalayas Publishers, Mumbai.
3. Vasant Desai, Indian financial system, Himalaya Publisher.
4. Benton E.G., Financial Intermediaries An introduction.
5. Edminister R. D, Financial Institution, Markets and Management.
6. Verma J.C A manual of Merchant Banking.
7. West Lake. M, Factoring.
8. N. Vinaykan, A Profile of Indian Capital Market.

3. MANAGEMENT OF MUTUAL FUNDS

Objective: To facilitate the students in having comprehensive understanding about the conceptual framework of mutual funds and their progress in India.

Unit I: Financial Markets in India-Money Market-Features-Instruments; Capital Market-Features-Instruments.

Unit II: Mutual Funds-Concept-importance-classification-Advantages-Rationale for investments in mutual funds.

Unit III: Investment management-Investment portfolio risk and returns-Measuring risk; Marketing of mutual funds-Market analysis-Developing market strategy-Marketing mix for Mutual Fund Institutions-E-marketing in Mutual Funds.

Unit IV: Regulatory framework of Mutual Funds in India-Guidelines by the Ministry of Finance-SEBI Guidelines-Evaluation of Mutual Funds-Role of Association of Mutual Funds of India.

Unit V: Mutual Funds in India-Trends and Progress of Mutual Funds-Emerging issues in Mutual Funds in India.

Suggested Books:

Text Book:

1. Nani Prava Tripathy, Mutual Funds, Emerging Issues in India, Excel Books, New Delhi.

Reference Books:

1. Padmalatha Suresh & Justin Paul, Management of Banking and Financial Services, Pearson Publishers, New Delhi.

2. Mukunda Sharma, Banking and Financial Services, Himalaya Publishing House, Mumbai.

4. FINANCING FOREIGN TRADE

Objective: To make the students aware of different concepts and techniques involved in financing foreign trade in India.

Unit I: Foreign Trade-Meaning-Need for Foreign Trade-Balance of Trade-Methods of Foreign Trade-Instruments of Foreign Trade.

Unit II: Exchange controls-Meaning, need for exchange controls-Methods of exchange control measures in India.

Unit III: Import Finance (Documentary credit) – Finance Exports (pre and post shipment)

Unit IV: Project Exports – Meaning and importance – Methods of finance project exports

Unit V: Role of commercial banks and Exim Bank of India in financing India's foreign trade.

Suggested Books:

Text Book:

1. Chaudhuri B.K & Agarwal O.P. A Text Book of Foreign Trade and Foreign Exchange, Himalaya Publishing House, Mumbai.

Books and Reference:

1. Jeevanandam, C. Foreigh Exchange-Practice, Concepts and Control, Sultan Chand & Sons, New Delhi.

2. Jhingan M.L., Money, Banking & International Trade, Konark Publications, New Delhi.

3. Francis Cherunilam, International Trade and Export Management, Himalaya Publishing House, Mumbai.

4. Prabhakar, J.V. & Rangandhachary, A.V. International Business (International Trade & Finance), Kalyani Publishers, Ludhiana.

Elective: Taxation
(Choose any Two)

1. DIRECT TAXES

Unit – I: Income Tax Act 1961: Basic Concepts, Income, Agriculture Income -Residential Status and Incidence of Tax - Incomes Exempt from Tax.

Unit – II: Income from Salaries: Chargeability, Deductions, Perquisites, Computation of Salary Income.

Unit – III: Income from House Property, Chargeability, and Computation of Income.

Unit – IV: Income from Business & Professions - Capital Gains and Income from Other Sources –Computation of Total Income.

Unit – V: Wealth Tax Act, 1957 – Chargeability – Incidence of Tax – Assets – Deemed Assets - Assets Exempt from Wealth Tax - Return of Wealth and Assessment – Rates of Tax - Computation of Net Wealth.

***Suggested Books**:*

1. Dr. V.K. Singhania & Dr. Kapil Singhania, Direct Taxes Law and Practice, Taxman Publications Pvt. Ltd., New Delhi.

2. Bhagavati Prasad, Direct Taxes Law and Practice, Wishwa Prakashan, New Delhi.

3. Dinkar Pagare, Income Tax and Practice, Sultan Chand and Sons, New Delhi.

2. INDIRECT TAXES

Unit – I: Excise Duty - Introduction – Laws Relating to Excise Duty – Nature of Excise Duty – Basic Concepts – Taxable Event for Excise Duty – Types of Excise Duties – Exempted Goods.

Unit – II: Excisable Goods – Classification of Goods – Valuation of Goods.

Unit – III: CENVAT – Input Goods and Services for CENVAT – Capital Goods for CENVAT – Exempted Final Products / Output Services.

Unit – IV: Customs Duty - Introduction – Basic Concepts – Scope and Coverage of Customs Duty - Nature of Customs Duty – Classification for Customs – Types of Custom Duties. Exemptions from Customs Duty – Valuation for Customs Duty.

Unit – V: Customs Procedures: Import Procedures - Export Procedures - Baggage, Courier and Post – Warehousing in Customs – Duty Draw Back.

***Suggested Books**:*

1. V.S. Datey, Indirect Taxes Law & Practice, Taxman Publications Pvt. Ltd., New Delhi.

2. V.K.Sareen and Ajay Sharma, Indirect Tax laws, Kalyani Publications, New Delhi.

3. CUSTOMS ACT

Unit-I Tax System – Indirect Taxes - Background of Customs Law – Overview of Customs Act – Customs Tariff Act, 1975 – Territorial Waters and Customs Waters - Administrative Set up of Customs

Unit-II Customs Duty – 'Goods' under Customs Act – Type of Customs Duty – Anti-Dumping Duty – Valuation of Customs – Methods of Valuation – Procedures for Import – Initials Steps by Exporter – Education Cess on customs duty – Secondary Higher Education Cess - Problems on Custom Duty Assessment

Unit-III Customs Procedures – General Provisions – Import Provisions – Export Procedures - Baggage, Courier and Import Through Post

Unit-IV Other Provisions of Customs – Penalties under Customs Act – Anti Dumping Duty on Dumped Articles - Value for Purpose of Customs Act – Tariff Value

Unit-V Methods of Valuation of Imported Goods - Valuation of Export Goods – Risk Management System (RMS) – Provisional Assessment of Duty (Sec.18)

References

1. Customs Law Manual and Customs Tariff of India- R K Jain
2. Central Excise Manual and Central Excise Tariff- Taxman's
3. CENVAT Law and Procedure- Taxman's
4. Income Tax Law including VAT/Service Tax- T N Manoharan, Snow White Publications
5. Direct taxes Law & Practice – Vinodh Singhania, Kapil Singhania, Taxman.
6. Direct Taxes- H C Mehrotra and Goyal, Sahithya Bhavan Publications.
7. Direct Taxes- Gaur and Narang, Kalyani Publishers, Ludhiana.

4. PUBLIC FINANCE

Objective: To make the students familiarizing with the theoretical framework of public finance.

Unit I: Introduction – The Role of the Government in a Changing Perspective, Fiscal Functions of the Government, Co-ordination among those Functions, Provision of Private Goods, Public Goods, Social Goods, Merit Goods and Mixed Goods.

Unit II: Principles of Taxation – Principle of Fiscal Neutrality, Excess Burden, Doctrine Principle of Equity, Benefit Principle, Bowen and Lindhal Models, Ability to pay Principle Administrative Efficiency, Application of Taxation Principles in Developing Countries, Meaning, Types and Measurement of Taxable Capacity.

Unit III: Impact and Incident of Taxes – Meaning of Impact and Incidence, Distinction Between Impact and Incidence, Types of Incidence, Theories of Shifting Incidence, Shifting of Tax Incidence under Different Market Conditions.

Unit IV: Public Expenditure – Wagner's Law, Wiseman – Peacock Hypothesis, Pure Theory of Public Expenditure, Social Cost – Benefit Analysis.

Unit V: Public Debt – Classical, Keynesian and Post – Keynesian Approaches of Public Debt, Classification of Public Debt, Burden of Public Debt, Public Debt Management, Repayment of Public Debt.

Suggested Books:

Text Book:

1. Richard A. Musgrave, Public Finance in Theory and Practice McGraw Hill Book Company, New York.

Reference Books:

1. Buchaman, J.M. The Public Finances, Richard D. Irwin, Homewood.

2. Jha H. (1998), Modern Public Economics, Routledge, London.

3. Singh. S.K. Public Finance in Development and Developing Countries, S. Chand and Company Ltd., New Delhi.

4. Hemlata Rao Fiscal Fedralism – Issues and Policies, New Century Publications, New Delhi.

5. Atkinson A. B. And J.E. Siglitz (1980), Lectures on Public Economics, Tata McGraw Hill, New Delhi.

6. Reports of Ministry of Finance, Government of India on Budgets.

Elective: BANKING
(Choose any Two)

1. ADVANCED BANKING

Unit – I: Central Banking Concept – Central Banking Policy in Developed and Developing Economics – Functions – Note Issues – Banker to the Government; Banker to Commercial Banks – Credit Control – Techniques – Structure and Organization of RBI – Role of RBI as Central Bank.

Unit – II: Structure and Organisation of Central Bank in USA and UK – Objectives and Techniques of Central Banking Policy in Developed and Less Developed Countries – A Critical Study of Theory and Practice of Central Banking in USA and UK.

Unit – III: Development of Commercial Banking in UK, USA and India – Study of Nature and Structure of Commercial Banking in India and Abroad – Theories of Asset Management of Commercial Banks, Recent Developments in Commercial Banking in USA, UK and India. A Study of Money and Capital Markets in UK, USA and India.

Unit – IV: Economic Stabilization Policy – Objectives of Monetary Policy – Choosing Between Conflicting Objectives – Monetary Policy and Economic Stabilization – Fiscal Policy and Economic Stabilization – Interdependence of Monetary and Fiscal Policies – Debt Management Policy.

Unit –V: Financial Sector Reforms in India – Need for Reforms – Major Reforms After 1991 – Issues and Impact of Financial Reforms.

***Suggestive Books**:*

1. Hawtrey "The art of Central Banking " Augustus M.Kelley Publishers, 1970 – New York.
2. Narendra Kumar – Bank Nationalism of India – A Symposium – Lalvani Publishing House, 1969 – Mumbai.
3. Pai Panandikar & N C Mehra – Rural Banking – National Institute of Bank Management – Mumabi.
4. Vasant Desai – Indian Banking – Nature and Problems – Himalaya Publications House – Mumbai.
5. Benjamin H Bankhurt – Banking Systems – Times of India Press – Mumbai.
6. Charless L Prather – Money & Banking – Richard.D.Irwin Inc. – Illinois
7. Mongia J.N. – Banking Around the world – Allied Publishers Pvt Ltd., Mumbai.
8. Bhole, L.M – Financial Institutions and Markets, Tat McGraw – Hill Publishing Company Limited, New Delhi, 2004.
9. Khan, M.Y – Indian Financial System, Tat McGraw Hill Publishing Company Limited, New Delhi, 2004.

2. BANK FINANCIAL MANAGEMENT

Unit – I: CONCEPTUAL FRAMEWORK: Overview of Financial System – Introduction to Financial Management in Banks – Financial Analysis of Banks.

Unit – II: MANAGEMENT OF FUNDS: SOURCES: - Management of Owned Funds – Management of Borrowed Funds – Cost of Funds.

Unit – III: MANAGEMENT OF FUNDS: INVESTMENTS: Forms of Bank Investment – Long-term Investment – Short-term Investments – Investments in Guilds and other Financial Securities – Investment in Foreign Exchanges.

Unit – IV: RISK MANAGEMENT: Risk Management: An Overview – Estimating/Forecasting of Risks – Measuring Risks – Management of Risks – Asset-Liability Management.

Unit – V: SPECIAL ISSUES: Mergers and Acquisitions – Accounting Policies – Pricing of Bank Products & Services.

Suggested Books:

1. Edminister R.D, Financial Institution, Markets and Management.

2. Verma J.C. A manual of Merchant Banking.

3. Hawtrey "The art of Central Banking " Augustus M.Kelley Publishers, 1970 – Newyork.

4. Vasant Desai – Indian Banking – Nature and Problems – Himalaya Publications House – Mumbai.

5. Khan, M.Y – Indian Financial System, Tat McGraw Hill Publishing Company Limited, New Delhi, 2004.

6. Narendra Kumar – Bank Nationalism of India – A Symposium – Lalvani Publishing House, 1969 – Mumbai.

7. A.V. Rajwade, Foreign Exchange, International Finance and Risk Management, Academy of Business Studies, New Delhi.

3. Non-Banking Financial Companies

Objective: To acquaint the student with the different types of NBFCs and their contribution to the overall development of the Indian financial system.

Unit I: The Nature and role of Financial system – Structure of Financial System in India-An overview of Indian Financial System.

Unit II: Nature and categories of NBFCs-Importance of NBFCs-Structure and growth of NBFCs in India.

Unit III: Regulatory Framework of NBFCs in India-Role of RBI.

Unit IV: Progress and Problems of NBFCs – Leasing companies, Hire-purchase Finance Companies, Housing Finance Company, Investment Company, Loan Company, Mutual Benefit Financial Companies, Miscellaneous Non-Banking Company & Residuary Non-Banking Companies.

Unit V: Non-Bank Financal Services Companies-Merchant Banks-Venture Capital Funds-Credit Rating Agencies.

Suggested Books:

Text Book:

1. Bhole. LM. Financial Institutions and Markets, Structure, Growth and Innovtions, Tata McGraw-Hill Publishing Company Ltd. New Delhi.

Reference Books:

1. Srivatsava, RM, Management of Financial Institutions, Himalaya Publishing Company Ltd., Mumbai.

2. Khan, MY, Indian Financial System, Tata McGraw Hill Publishers, New Delhi.

3. Vasant Desai, Financial Markets & Services, HPH, Mumbai.

4. RURAL BANKING

Objective: To expose the students with the functioning of rural credit institutions in India along with the prospects and problems of financial inclusion including priority sector.

Unit I – Rural India: Demographic features-Economic features-Rural poverty-main causes and methods of measuring rural poverty-Rural Infrastructure-Rural Development Policy-Govt. policies and programmes-Economic Reforms and its impact on rural economy

Unit II-Financing Rural Development: Functions and policies of RBI and NABARD ;Rural Credit Institutions-Role and functions -Role of Information and Communication Technologies in rural banking- Regulation of Rural Financial Services;

Unit III-Financial inclusion: Concept and its role in inclusive growth- Micro credit, micro insurance scheme - Business Facilitators and Business Correspondents in rural financing-SHGs/NGOs, linkages with banking, latest guidelines of GOI and RBI

Unit IV-Priority Sector Financing and Govt. initiatives: Components of priority sector-RBI Guidelines; Government initiatives: Poverty alleviation programmes/Employment programmes/Production oriented programmes-Rural housing and Urban housing schemes under priority sector-Educational loans

Unit V-Problems and prospects of Rural Banking: Problems of rural branches of commercial banks and regional rural banks-emerging trends in rural banking-financing poor as bankable opportunity.

(Case Studies are compulsory)

Suggested Books:

1. Vasantha Desai, Indian Banking-Nature and Problems, Himalaya Publishing House, Mumbai
2. Khan, M.Y., Indian Financial System, Tata McGraw Hill Publishing Company Ltd., New Delhi
3. Pai Panandikar & NC Mehra, Rural Banking, National Institute of Bank Management, Pune
4. Guruswamy, S., Banking in the New Millenium, New Century Publications, New Delhi
5. Uppal RK, & Rimpi Kaur, Banking Sector Reforms in India, New Century Publications, New Delhi
6. Indian Institute of Banking & Finance, Rural Banking, Mumbai
7. Uppal RK & Pooja, Transformation in Indian Banks-Search for better tomorrow, Sarup Book Publisher Private Ltd., New Delhi
8. Shyam Ji Mehrotra, New Dimensions of Bank Management, Skylark Publications, New Delhi

FOURTH SEMESTER

CP:1 COMPUTER APPLICATIONS IN ACCOUNTING

Unit – I: Introduction to Computerised Accounting: Significance of Computerized Accounting – Advantages – Disadvantages – Computerised General Ledger System – Spreadsheet Software and Its Applications – Different Software Available in the Market Advantages – Disadvantages.

Unit – II: Accounting Software Tally (Ver. 7.2): Characteristics of the Software – Creation of a Company – Security Control – Configuration – Accounts Information – Creation of Ledgers – Vouchers – Types of Vouchers – Cost Center Budgets – Balance Sheet – Alteration of Vouchers – Audit – Trial – P & L a/c – Ratio Analysis – Security – Limitations of Tally – Short Cut Keys.

(Lab – with practicals)

Unit – III: Tally's Forte (Reports): Displaying Reports – Characteristics – Objectives – Printing Reports – Display Account Books – Display Statement of Bank Reconciliation of Bank Accounts – Display Inventory Reports – Expert Usage. (Lab – with practicals)

Unit – IV: Inventory Handling Using Tally Ver 7.2 – A Practical Approach: Creation of Stock Groups – Creation of Stock Categories – Creation of Stock Items – Creation of Godown – Creation of Units of Measure – Inventory Vouchers. (Lab – with practicals)

Unit – V: Accounts of Banking Companies and Departmental Accounting: Objectives – Characteristics – Advantages – Disadvantages – Preparation of Accounts Using Tally in Departmental Accounts – Usefulness in Banks – Ledger Preparation – Guidelines of RBI for Profit & Loss Account – Expert Usage. (Lab – with practicals)

Suggested Books:

1. Computers and Common Sense, Robert Hunt & John Shelly, Prentice Hall of India, New Delhi.

2. Computers and Information Management, S.C. Bhatnagar, K.V. Ramani, Prentice Hall of India, New Delhi.

3. Management Information Systems and Data Processing, Bently, Holt, Rinehart and Winston.

4. Principles of Data Base Management, Martin, Prentice Hall of India, New Delhi.

5. Introduction of Systems Software, Dhandhere, Tata-Mc Grawhill Publications, New Delhi.

6. Accounting Systems, M. Sulochana, K. Kameswara Rao & R. Kishore Kumar, Kalyani Publishers, Hyderabad.

Elective: ACCOUNTING
(Choose any Two)

1. STRATEGIC COST MANAGEMENT

Unit – I: Cost Management – Nature and Scope – Management of Value Chain – Tools of Cost Management. Product Costing Systems – Concepts and Design Issues.

Unit – II: Activity Based Costing System – Meaning and Scope – Limitations of Traditional Costing Allocation Methods – Application of ABC System – Activity – Based Management – Concept and Scope – Target Costing – Benchmark Costing.

Unit – III: Quality Cost Systems – Meaning and Application – Conflict Between Quality and Cost – Trade–off Between Quality and Price – Value Analysis – Life Cycle Costing – Learning Curve Analysis – JIT.

Unit – IV: Cost Estimation – Methods – Costing Engineering – Using Regression Analysis – Evaluating Performance – Variance Analysis – Kaizen Costing.

Unit – V: Cost Control and Cost Reduction – Managerial and Technical Aspects – Meeting the Cost Reduction Challenges Role of Cost Accountant.

Suggested Books:

1. 'Cost Management' – Strategies for Business Decisions HILTON, MAHER and SELT, Tata McGraw Hill, II ed. 2002.

2. 'Cost Accounting' – Principles and Practice, B.M.Lall Nigam, Prentice Hall of India.

3. Cost Accounting: Theory and Practice, Bhabatosh Benarjee, Prentice Hall of India.

4. 'Principles of Quality Costs' Principles, Implementation and Use Jack Companella, Prentice Hall of India Pvt. Ltd. 2000 (3rd Ed.)

'Cost Accounting' – Jain and Narang.

'Cost Accounting' – A Managerial Emphasis' Chrles Tn Horngren.

'Cost Accounting' – B. Benerjee, World Press, Calcutta.

MANAGEMENT CONTROL SYSTEMS

Unit -I: Management Control: Objectives- Basic Concepts- The Formula Control Systems, Characteristics of Management Control Systems- Inter Relationship Among Strategic Planning, Management Control and Operational Control – Designing and Introduction of Management Control System – Management Control System and Responsibility Accounting -Informal Management Controls.

Unit -II: Structure of Management Control : Need for Delegation- Responsibility Centers – Expense Centers -Revenue Centers – Profit Centers- Investment Centers, Research and Development Centers – Administrative and Support Centers – Performance of Expense Centers – Revenue Centers – Profit Centers – Investment centers – Organizational Structure of Responsibility Centers – Transfer Pricing – Objectives – Methods – Pricing Corporate Services and Administration of Transfer Prices.

Unit -III: Management Control Process: Strategic Planning – Nature, Analysis of New Programmes – Ongoing Programmes – Strategic Planning Process – Programming and Budgeting – Budget Preparation Process; Performance Evaluation – Performance Evaluation Systems Interactive Control – Analysing and Reporting – Types of Reports – Report Preparation MIS –MIS & Computers.

Unit -IV: Special Applications: Controls for Differentiated Strategies – Corporate Strategy – Strategic Business Unit Concept – Top Management Style – Management Control in Service Organizations; Professional Services – Financial Services – Healthcare Service Organizations – Management Control in Non-profit Organizations – Characteristics – Measuring Output – Pricing Management Structure – Control in NPOs.

Unit -V: Management Control in Multinational and Multi project Corporations (MNCs): Objectives, Characteristics, Performance Measurement of Subsidiaries Reporting System – Need for MIS Between Parent and Subsidiary Companies – Structure of Multi Project Organization – Characteristics, Project Planning and Control Techniques, Control Indicators in Multi Project Organizations.

Suggested Books:

1. Management control Systems – Robert Anthony and Vijay Govindarajan Tata – McGrawhill publishing Company, New Delhi.
2. Management Control Systems, N. Ghosh, Prentice Hall of India.
3. Management information and control systems – Dr. Sushila Madan. Taxmann Allied Services Pvt. Ltd., New Delhi.
4. Management Control systems Text and Cases – Subhash Sharma Tata- McGrawhill publishing Company, New Delhi.

Elective: Accounting: 3 FINANCIAL STATEMENT ANALYSIS

Unit-I Financial Statements Analysis – Introduction – Nature – Objectives – Types of Financial Statement Analysis – procedure – Methods/ Devices – Comparative Statements – Trend Analysis – Common Size Statements

Unit-II The Gabelli Utility Trust - Balance Sheet - Financial Condition, Assets and Liabilities - Stockholders' Equity - Income Statement - Statement of Retained Earnings - Statement of Shareholders' Equity - Earnings Quality – Inflation

Unit-III Ratio Analysis – Introduction – Nature and Significance – Classification – Position Statement Ratios - Revenue/ Income Statement Ratios – Inter-Statement Ratios – Du Pont Control Chart

Unit-IV Statement of Changes in Financial Position – Funds Flow Statement – Introduction – Meaning & Concept – Current and Non-Current Accounts – Uses, Significance and Importance – Procedure for preparing for a Funds Flow Statements – Changes in Working Capital – Depreciation as a Source of Funds

Unit-V Cash Flow Statement - Introduction – Classification of Cash Flows – Treatment of Some Typical Items – Format of Cash Flow Statement - Procedure for preparing for a Cash Flow Statements – Methods of Calculating Cash Flows from Operating Activities

References

1. Management Accounting Advanced Management Accounting By Ravi M.Kishore – Taxman Publication
2. Kaplan & Atkinson, Advanced Management Accounting, Prentice Hall of India – 1999
3. S.n.Maheswari – Management Accounting, Sultan Chand, New Delhi – 1998.
4. V.K.Saxana & C.D.Vashist, Advanced Cost of Management Accounting, Sultan Chand & Sons, New Delhi, 1998.
5. Dr.Manmohan & S.N.Goyal, Principles of Management Accounting Shakithabhavan Publication, Agra,
6. R.L. Gupta and M. Radhaswamy, Advanced Accountancy Sultan Chand & Sons, New Delhi.

Elective: Accounting: 4 ACCOUNTING FOR PUBLIC UTILITIES

Unit – I Concept of Public utilities – Origin, Objectives and Special Features - Accounting concept, American concept, types of Public utility regulations - Capital Account and General Balance Sheet - Treatment of Capital Losses, Depreciation, Extensions, Replacement etc. - Application of the System to Different Enterprises Practical Problems

Unit-2 Rate making in public utilities - Rate level and rate structure - Meaning and distinction, determination of rate level, determination of rate structure. Marginal cost pricing. Rate making in Electricity Undertaking.

Unit – 3 Public utilities in India – Forms of organization, Post and telegraph services, Radio and television- Air organisation, T.V. services in India. Autonomy for Radio and T.V. Prasar Bharti.

Unit – 4 Working of SEB's, salient features of electricity supply Act, Electricity rate schedules, consumer categories.

References

1. Barnes I.R. – Economics of Public Utility regulation.
2. Sleeman J.F. – British Public Utilities.
3. 5. Hanson A.H. – Public Enterprises and Economics Development.
4. Ramanadhan V.V. – The structure of Public Enterprises in India.
5. Gupta K.R. – Issues on Public Enterprises.
6. Centre for Public Sector Studies – Profitability Accountability and Social Responsibility of Public Enterprises.
7. Khera S.S. – Government in Business.
8. Maheshwari R.K. – Electricity Rate Making and Tariff Regulations.

Elective: FINANCE
(Choose any Two)

1. SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT

Unit – I: Concept of Investment, Investment Vs Speculation, and Security Investment Vs Non-security Forms of Investment. Investment Process; Sources of Investment Information. Security Markets – Primary and Secondary – Market Indices.

Unit – II: Return and Risk – Meaning and Measurement of Security Returns. Meaning and Types of Security Risks, Systematic Vs Non-systematic Risk. Measurement of Total Risk.

Unit – III: Fundamental Analysis – Economy, Industry and Company Analysis, Intrinsic Value Approach to Valuation of Bonds, Preference Shares and Equity Shares.

Unit – IV: Technical Analysis – Concept and Tools of Techniques Analysis – Technical Analysis Vs Fundamental Analysis. Efficient Market Hypothesis; Concept and Forms of Market Efficiency.

Unit – V: Elements of Portfolio Management, Portfolio Models – Markowitz Model, Sharpe Single Index Model and Capital Asset Pricing Model. Efficient Frontier and Selection of Optimal Portfolio. Performance Evaluation of Portfolios; Sharpe Model – Jensen's Model for PF Evaluation.

Suggested Books:

1. Donald E. Fischer, Ronald J. Jordan, Security Analysis and Portfolio Management; Prentice Hall of India.
2. Prasanna Chandra, Investment Analysis and Portfolio Management, Tata McGraw Hill.
3. S. Kevin, Security Analysis and Portfolio Management, Prentice Hall of India.
4. S. Kevin, Portfolio Management, Prentice Hall of India.
5. J.C. Francis, Investments – Analysis and Management, McGraw Hill Int.
6. Elton, EJ & Grober, MJ, Modern Portfolio Theory and Investment Analysis, John Wiley.
7. Avadhani, VA, SAPM, Himalaya Publishers.
8. Bhalla, VK Investment Management, S Chand.
9. Punitavathy Pandian, SAPM, Vikas.
10. Preeti Singh, Investment Management, Himalaya Publishers.

2. FINANCIAL DERIVATIVES

Unit - I: Introduction to Financial Derivatives – Meaning and Need – Growth of Financial Derivatives in India – Derivative Markets – Participants- Functions – Types of Derivatives – Forwards – Futures – Options-Swaps – The Regulatory Framework of Derivatives Trading in India.

Unit - II: Features of Futures –Differences Between Forwards and Futures – Financial Futures – Trading – Currency Futures – Interest Rate Futures – Pricing of Future Contracts-Value at Risk (VaR)-Hedging Strategies – Hedging with Stock Index Futures – Types of Members and Margining System in India – Futures Trading on BSE & NSE.

Unit - III: Options Market – Meaning & Need – Options Vs Futures -Types of Options Contracts – Call Options – Put Options- Trading Strategies Involving Options – Basic Option Positions – Margins – Options on Stock Indices – Option Markets in India on NSE and BSE.

Unit - IV: Option Pricing – Intrinsic Value and Time Value- Pricing at Expiration – Factors Affecting Options pricing- Put-Call Parity Pricing Relationship- Pricing Models - Introduction to Binominal Option Pricing Model – Black Scholes Option Pricing Model.

Unit – V: Swaps – Meaning – Overview – The Structure of Swaps – Interest Rate Swaps – Currency Swaps – Commodity Swaps – Swap Variant – Swap Dealer Role –Equity Swaps – Economic Functions of Swap Transactions - FRAs and Swaps.

Suggested Books:

1. Hull C. John, "Options, Futures and Other Derivatives", Pearson Educations Publishers,
2. David Thomas. W & Dubofsky Miller. Jr., Derivatives valuation and Risk Management, Oxford University, Indian Edition.
3. ND Vohra & BR Baghi, Futures and Options, Tata McGraw-Hill Publishing Company Ltd.
4. Red Head: Financial Derivatives: An Introduction to Futures, Forward, Options" Prentice Hall of India.
5. David A. Dubofsky, Thomas W. Miller, Jr.: Derivatives: Valuation and Risk Management, Oxford University Press.
6. Sunil K.Parameswaran, "Futures Markets: Theory and Practice" Tata-McGraw-Hill Publishing Company Ltd.
7. D.C. Patwari, Financial Futures and Options, Jaico Publishing House.
8. T.V. Somanathan, Derivatives, Tata McGraw-Hill Publishing Company Ltd.
9. NSE Manual of Indian Futures & Options & www. Sebi.com
10. S.C. Gupta, Financial Derivatives: Theory, Concepts and Problems, Prentice Hall of India.

3. TREASURY MANAGEMENT

Objective: To provide an insight into Treasury Management practices in India.

Unit I: Treasury Management: Objectives of Treasury, Structure and Organization, Functions of a Treasurer, Responsibility of a Treasurer.

Unit II: Liquidity Management Concept, importance and objectives-Liquidity planning-Liquidity flow cycle-Cash budgeting and forecasting-sources of liquidity.

Unit III: Treasury operations: Treasury Instruments-CRR/CCIL/RTGs-objectives, sources and deployment, internal control, Netting-Cost centre/Profit centre, integrated treasury, planning and control, Risk analysis.

Unit IV: Treasury and investment policy.

Unit V: Role of IT in treasury management-Regulation and companies-Internal and External Audit.

Suggested Books

Text Book:

1. Indian Institute of Bankers, Treasury, Investment and Risk Management.

Reference Books.

RBI and Government of India Publications.

4. INTERNATIONAL FINANCIAL MANAGEMENT

Objective: to enlighten the students with the Concepts and Practical applications of International Financial Management.

Unit I : International Monetary and Financial System: Evolution; Breton Woods Conference and Other Exchange Rate Regimes; European Monetary System, South East Asia Crisis and Current Trends.

Unit II : Foreign Exchange Risk: Transaction Exposure; Accounting Exposure and Operating Exposure – Management of Exposures – Internal Techniques, Management of Risk in Foreign Exchange Markets: Forex Derivatives – Swaps, futures and Options and Forward Contracts (Cases).

Unit III : Features of Different International Markets: Euro Loans, CPs, Floating Rate Instruments, Loan Syndication, Euro Deposits, International Bonds, Euro Bonds and Process of Issue of GDRs and ADRs.

Unit IV : Foreign Investment Decisions : Corporate Strategy and Foreign Direct Investment; Multinational Capital Budgeting; International Acquisition and Valuation, Adjusting for Risk in Foreign Investment.

Unit V : International Accounting and Reporting; Foreign Currency Transactions, Multinational Transfer Pricing and Performance Measurement; Consolidated Financial Reporting.

(Case Studies are Compulsory)

Suggested Books:

1. Buckley Adrin, Multinational Finance, 3rd Edition, Engle Wood Cliffs, Prentice Hall of India.
2. S.P.Srinivasan, B.Janakiram, International Financial Management, Wiley India, New Delhi.
3. Clark, International Financial Management, Cengage, ND
4. V.Sharan, International Financial Management, 3rd Edition, Prentice Hall of India.
5. A.K.Seth, International Financial Management, Galgothia Publishing Company.
6. P.G.Apte, International Financial Management, Tata McGrw Hill, 3rd Edition.
7. Bhalla, V.K., International Financial Management, 2nd Edition, New Delhi, Anmol, 2001.
8. V.A.Avadhani, International Financial Management, Himalaya Publishing House.
9. Bhalla, V.K., Managing International Investment and Finance, New Delhi, Anmol, 1997.

Elective TAXATION
(Choose any Two)

1. VAT AND SERVICE TAX

Unit – I: A.P. VAT Act, 2005 – Basic Concepts – Salient Features of VAT – Incidence of VAT – Exempted Goods.

Unit – II: Registration of Dealers – Determination of Taxable Value – Calculation of VAT Payable.

Unit – III: Procedure and Administration of the Act - Maintenance of Books of Accounts by Dealers – Assessment Procedure.

Unit – IV: Service Tax: Nature of Service Tax - Service Provider and Service Receiver, Individual Service, CENVAT Vs. Service Tax – Exemptions.

Unit – V: Procedures of Service Tax: Registration, Maintenance of Records, Payment of Service Tax, Taxable Services – Computation of Service Tax.

Suggested Books:

1. Kul Bhushan, How to deal with VAT, Pearson Education, Pvt. Ltd., New Delhi.

2. A.P. VAT Bill, 2005, Govt. of A.P. Commercial Taxes Department.

3. V.S. Datey, Indirect Taxes Law and Practice, Taxman Publications Pvt. Ltd., New Delhi.

2. TAX PLANING AND MANAGEMENT

Unit – I: Introduction: Tax Planning and Management – Tax Avoidance, Tax Planning, Tax Evasion – Tax Evasion in India – Measures of the State for Tax Evasion.

Unit – II: Tax Planning for Salaried Persons.

Unit – III: Tax Planning for Firms and HUF.

Unit – IV: Tax Planning for Companies.

Unit – V: Tax Planning for Small Business.

Suggested Books:

1. Dr. V.K. Singhnia & Dr. Kapil Singhania, Direct Taxes Law and Practice, Taxman Publications Pvt. Ltd., New Delhi.

2. Bhagavati Prasad, Direct Taxes Law and Practice, Wishwa Prakashan, New Delhi.

3. EXCISE DUTY

Unit-I Taxation under Constitution in India – Indirect Taxes – Features – Administrative Set up of Central Excise – Constitutional Background of Central Excise – Overview of Central Excise Act – Central Excise Tariff Act,1985 (CETA)

Unit-II Manufacture and Manufacturer – Definition of Manufacture - Definition of Manufacturer - Manufacturer-Other Aspects - Sales Exempt from Central Sales Tax, Interstate and Intra state sale, sales in the course of imports and exports, registration under CST Act.

Unit-III Nature of Excise Duty - Types of Excise Duties – Excisable Goods – Classification of Goods – Rules for Interpretation of Tariff – GIR Tariff –Trade Parlance Theory

Unit-IV Valuation of Goods – Methods & Techniques of Valuation – Captive Consumption – Refund & Other Important Provisions – Levy, Collection & Exemptions from Excise Duty - Assessment under Central Excise Law

Unit-V Warehousing – Export Benefits and Procedures – Excise on Small Scale Industries – Procedural Aspects under Central Excise Duty – Other Procedures in Central Excise

References

1. Central Excise Manual and Central Excise Tariff- Taxman's
2. CENVAT Law and Procedure- Taxman's
3. Income Tax Law including VAT/Service Tax- T N Manoharan, Snow White Publications
4. Direct taxes Law & Practice – Vinodh Singhania, Kapil Singhania, Taxman.
5. Direct Taxes- H C Mehrotra and Goyal, Sahithya Bhavan Publications.
6. Direct Taxes- Gaur and Narang, Kalyani Publishers, Ludhiana.

4. FISCAL POLICY

Objective : The main objective is to familiarize the students with different components of fiscal policy with special reference to India.

Unit-I: Fiscal Policy – Meaning – Features and Importance – Objectives of Fiscal Policy – Allocation – Distribution – Stabilization – Full Employment.

Unit-II Fiscal Policy – Tools – Public Revenue - Public Expenditure – Public Debt.

Unit-III : Public Revenue – Tax and Non-tax revenue – Classification different taxes.

Unit-IV : Budgets – Central and State Government budgets – Fiscal Responsibility and Budget Management Act - Deficit financing.

Unit-V: Fiscal Policy Impact on Business Savings and Investment – High Corporate Tax – Tax Incentives for Investment – Depreciation – Internal Finance – Impact of Indirect Taxes on Business

References

1. Richard A. Musgrave, Public Finance in Theory and Practice McGraw Hill Book Company, New York.

Reference Books:

1. Buchaman, J.M. The Public Finances, Richard D. Irwin, Homewood.

2. Jha H. (1998), Modern Public Economics, Routledge, London.

3. Singh. S.K. Public Finance in Development and Developing Countries, S. Chand and Company Ltd., New Delhi.

4. Hemlata Rao Fiscal Fedralism – Issues and Policies, New Century Publications, New Delhi.

5. Atkinson A. B. And J.E. Siglitz (1980), Lectures on Public Economics, Tata McGraw Hill, New Delhi.

6. Reports of Ministry of Finance, Government of India on Budgets.

Elective: Banking
(Choose any Two)

1. FINANCIAL INSTITUTIONS

Unit – I: Origin – Concept – Definition – Structure – Role of Financial Institutions.

Unit – II: Non-Bank Financial Companies – Introduction – Concept – Definition – Scope and Meaning – Role.

Unit – III: NBFCs – Structure – Growth – Regulation of NBFCs.- An Overview of the Present Position of NBFCs.

Unit – IV: Non – Bank Statutory Financial Organisations – Concept – Structure – Nature, Functions and Role of NBSFOs.

Unit – V: Financial Performance of Non-Banking Statutory Financial Organisations – Investment Pattern – Strengthening of NBFCs. – Reforms in NBSFOs.

Suggested Books:

1. Bhole, L.M – Financial Institutions and Markets, Tat McGraw – Hill Publishing Company Limited, New Delhi, 2005.

2. Khan, M.Y – Indian Financial System, Tat McGraw Hill Publishing Company Limited, New Delhi, 2004.

3. Indian Banks Association, Indian Banking Year Book 2004, Mumbai, 2005.

4. RBI, Report on Trends and Progress of Banking in India, various issues, Mumbai.

2. BANKING AND TECHNOLOGY

Unit – I: IT IN BANKING: AN INTRODUCTION: - Information Technology and Its Implications – Information Technology – Indian Banking Scenario – Initiatives and Trends.

Unit – II: IT APPLICATIONS IN BANKING: Computer-based Information System for Banking – Electronic Banking – Electronic Fund Management.

Unit – III: ENABLING TECHNOLOGIES OF MODERN BANKING: Electronic Commerce and Banking – Supply Chain Management – Customer Relationship Management – Integrated Communication Networks for Banks.

Unit – IV: SECURITY AND CONTROL SYSTEMS: Computer Security and Disaster Management – System Audit and Computer Crime – Security and Control Aspects of Emerging Banking Technologies.

Unit – V: PLANNING AND IMPLMENTATION OF INFORMATION SYSTEM: Security and Control Aspects of Emerging Banking Technologies – Data Warehousing and Data Mining – Designing and Implementing Computerization in Banking Sector.

Suggested Books:

1. Hawtrey “The art of Central Banking “ Augustus M.Kelley Publishers, 1970 – Newyork.

2. Vasant Desai – Indian Banking – Nature and Problems – Himalaya Publications House – Mumbai.

3. Khan, M.Y – Indian Financial System, Tat McGraw Hill Publishing Company Limited, New Delhi, 2004.

4. R.G. Murdick, J.E. Ross and J. R. clagget, Information systems for modern management, PHI.

5. Charlie Kaufman, Radia Perlman and Mike Speciner, Network Security – Private Communication in a Public World, Pearson / PHI.

6. Steve Hedley – Statutes on IT & E-Commerce, Oxford University Press.

3. INTERNATIONAL BANKING

Objective: To enable the students familiarising with functions and performance of international financial institutions and operational mechanism of foreign exchange market in India.

Unit I: International Banking: Global trends and developments in International banking-International Financial Centres, Offshore Banking Units, SEZs-International Financial Institutions: IMF;, IBRD, BIS, IFC, ADB-Legal and Regulatory aspects of international banking.

Unit II: International Finance: Fundamental principles of lending to MNCs; International Credit Policy Agencies and Global Capital Markets; Methods of raising equity and debt resources through ECBS, ADRs/GDRs, ECCBS and other types of Bonds,etc in international markets;

Unit III: Project and Infrastructure Finance-Investments both in India and abroad, joint ventures abroad by Indian Corporates, investment opportunities abroad for resident Indians; Financing of mergers and acquisitions.

Unit IV: Framework of Foreign Exchange: Sources and Uses of Foreign Exchange-Balance of Payments; Foreign Exchange Market Mechanism-Different types of exchange rates, exchange rate determination, convertibility of Indian Rupee; Role of Banks in Forex markets-Functions of a Forex Dept, maintenance of foreign currency accounts.

V: Forex Business: Foreign Exchange Management Act (FEMA) and its philosophy; Role of RBI and FEDAI in regulating foreign exchange business of banks/other authorised dealers-NRI customers and various banking and investment products available to them under FEMA.

(Case Studies are compulsory)

Suggested Books:

1. Jeevanandam C., Foreign Exchange, Practice, Concepts & Control, Sultan Chand & Sons, New Delhi
2. Chaudhuri BK & Agarwal OP, Foreign Trade & Foreign Exchange, Himalaya Publishing House, Mumbai
3. Apte PG, International Financial Management, Tata McGraw Hill Publishing Company Ltd., New Delhi
4. Rajwade AV, Foreign Exchange, International Finance & Risk Management, Academy of Business Studies, New Delhi
5. Indian Institute of Banking and Finance, International Banking, Mumbai

4. CENTRAL BANKING

Objective: To familiarise the students with the functions and performance of Central banks in general and Central banks in USA, UK, European Union and India in particular.

Unit I: Evolution and Functions of Central Banking-Development of Central Banks in Developed and Developing countries.Functions of a Central Bank-Regulatory and Developmental functions

Unit II Central Banking in USA, UK and, European Union-Organisational evolution, Constitution and Governance-Role, functions and performance-Recent Developments

Unit III: Reserve Bank of India:Organisational evolution, constitution and governance, major organizational and functional developments over time-RBI Act, Banking Regulation Act, Foreign Exchange Management Act, Banking Ombudsman Scheme, Financial Sector Reforms-Recent Developments

Unit IV: RBI and Supervision of Indian Financial System: Constituents of Indian Financial Markets and their Regulation-Evolution of Bank Regulation and supervision.

Unit V: RBI and Financial Stability: Financial Development Vs. Financial Stability, Risks to Financial Stability, Liquidity Management,Risk Management in Banks, The Basle Norms, Prudential Norms, Effect of liberalisation and Globalisation on Financial Stability.

(Case studies are compulsory)

Suggested Books:

1. Khan, M.Y. Indian Financial System, Tata McGraw Hill Publishing Company Ltd., New Delhi
2. Decock, MH, Central Banking, UBS Publisher Distributors Pvt. Ltd., New Delhi
3. Hawtrey, The Art of Central Banking, Augustus M Kelley Publishers, New York
4. Vasudevan A., Central Banking for Emerging Market Economies, Academic Foundation, New Delhi
5. Charles Albert Goodhart, Evolution of Central Banks: a natural development?,London School of Economics & Political Science, London
6. Indian Institute of Banking & Finance, Central Banking, Mumbai RBI , History and Evolution of Central Banking in India, Mumbai

ANDHRA UNIVERSITY

Regulations and Syllabus relating to
M.A.DEGREE EXAMINATION IN
SOCIAL WORK
(Syllabus under Credit Based Choice System)
(With effect from 2015-2016)

REGULATIONS

1. Candidates for the Master of Arts Degree Examination shall be required:

(a) To have passed the qualifying examination of this University as detailed in Annexure I, or an examination of any other University recognized by the Academic Senate as equivalent there to; and
(b) To have undergone subsequently a further course of study extending over a period of two academic years in this University, each academic year consisting of two terms ordinarily consecutive:

Provided that the B.O.M. shall have power to grant-exemption from the production of the prescribed attendance certificates in the subjects: in which instruction is available in the University College to candidates.

i. Who have obtained the prescribed qualifications noted in Annexure II against the M.A.Degree Course or an examination recognized as equivalent thereto; and

ii. Who, by the time they appear at the next higher examination, shall have completed at least one year after they passed the previous qualifying examination.

2. The course and scope of instruction shall be as defined in the syllabus prescribed.

3. (a) The course consists of 4 semesters, two in first year and two in second year.

(b) The candidates shall be required to take an examination at the end of each semester of the study as detailed in the scheme of examination. Each paper of the semester-end examination shall unless otherwise prescribed, be of three hours duration and carries 80 marks.

(c) In addition, two mid exams, one on-line with multiple choice questions and the other one, conventional (descriptive) type for 20 marks each for theory papers will be conducted under internal assessment. The average of these two mid exams shall be taken as marks obtained for the paper.

(d) A candidate appearing for the whole examination shall be declared to have passed the examination if he/she obtains not less than E grade, i.e, 35% of the total marks in all the papers put together in the semester- end for a maximum 100 marks in each paper. All other candidates shall be deemed to have failed in the examination. Candidates who have completed the first semester course and have earned the necessary attendance and progress certificates shall be permitted to continue the second semester course irrespective of whether they have appeared or not at the previous examination. Such candidates may be permitted to appear for the First semester and Second semester examination but they should register for 1st Semester examination.

4. (a) The candidate shall be required to take an examination at the end of the second semester of the course of study as detailed in the Scheme of Examination. Each paper of the examination shall, unless otherwise prescribed, be of three hours duration and carries 85 marks.

(b) In addition, two mid exams, one on-line with multiple choice questions and the other one, conventional (descriptive) type for 20 marks each for theory papers will be conducted under internal assessment. The average of these two mid exams shall be taken as marks obtained for the paper.

(c) A candidate appearing for the whole examination shall be declared to have passed the examination if he/she obtains not less than E grade, i.e., 35% of the total marks in all the papers put together in the semester-end for a maximum of 100 marks in each paper. All other candidates shall be deemed to have failed in the examination.

(d) Candidates who have completed the second semester course and have earned the necessary attendance and progress certificates shall be permitted to continue third semester course only if they have passed 50% of the subjects of first and second semester examinations put together in previous examination.

The items mentioned in (4) may be followed in the 3rd and 4th semesters also.

5. The Scheme of Instruction, Regulations concerning semester and examinations, and the Scheme of Examination as per Credit system of the branches shall be as given in Annexure II, Annexure III and Annexure IV.

6. (a) Not withstanding anything contained in the above regulations, in the case of Project Report/Dissertation and Concurrent Field Work/Consecutive Field Work/Block Field Work, candidates shall obtain not less than D grade, i.e., 40% of marks to be declared to have passed in the examination, and in the case of Viva-Voce examination not less than C grade, i.e., 50% of marks.

(b) Candidates shall put in attendance at the college for not less than 75% of the total number of working days in each semester. If a candidate represents the University officially at games, sports or other officially organized extra-curricular activities, it will be deemed that he/she has attended the college on the days he/she is absent for this purpose.

7. The names of the successful candidates at the examination shall be arranged in the order in which they are registered for the examination as follows on the basis of Grade and Grade points obtained by each candidate at the First, Second, Third and Fourth semester examinations put together.

M.A. Social Work, Andhra University - Grades and Grade Point Details

with effect from 2014-15 Admitted Batch

S.No	Range of Marks	Grade	Grade Points
1.	> 70 %	0	10.0
2.	60 % – 69 %	A	9.0
3.	55 % - 59 %	B	8.0
4.	50 % - 54 %	C	7.0
5.	40 % - 49 %	D	6.0
6.	35 % - 39 %	E	5.0
7.	< 35 %	F (Fail)	0.0
8.	The Grade W represents failure due to insufficient attendance in a year or semester	W	0.0
9.	Incomplete (Subsequently to be changed into pass or E to O or F grade in the same semester)	I	0.0

Only those candidates who appear and pass the examination in all the papers of the First semester of the M.A.Degree Examination, all the papers of the Second semester, all the papers of the Third semester, and similarly all the papers of the Fourth semester, at first appearance are eligible to be placed in O grade. However, no candidate who has not passed all the papers relating to any semester at the first appearance shall be eligible for the Award of Medals or Prizes by the University and to receive certificates of rank obtained by them in the examination.

Candidates declared to have passed Master's Degree course in Arts, Science, Commerce and Management Studies and also Diploma courses, obtaining third or second class may reappear for the same examination to improve their class by appearing for the papers of the first, second, third and fourth semester-end examination or whole or all four examinations with the existing regulation without further attendance at a college. Such reappearance shall be limited only to five chances with in 5 years from the date of first passing the final examination. Such candidates are not required to cancel their earlier results unless they want to retain their later result.

Provided further that candidates declared to have passed the first/second/third semester examination may reappear for the same examination before completing the Fourth semester examination to improve their grade by appearing for one or more papers of the first/second/third semester examination or whole of the first/second/third semester examination with the existing regulations without further attendance at a college. Such reappearance shall be limited only to 5 chances within 5 years from the date of first passing, the first/second/third semester examination. Such candidates are not required to cancel their earlier results unless they want to retain their later result.

Candidates who have reappeared for the examination under the above provision may opt for combining the better marks obtained by them at the latest examination to those of better marks obtained at earlier first, second, third and fourth semester–end examinations pattern for purposes of classification.

Candidates appearing for the above examination under transitory provision are eligible to appear and complete the examination or improve the class by appearing paper wise as long as the transitory regulations are in force. Thereafter they should take the whole examination under the regulations then in force.

ANNEXURE – I

Eligibility

M.A. Degree Examination in	*Qualifying Examination for Admission*
Social Work	B.A. Social Work as one of the subjects/ B.A. Social Sciences/ B.Sc./ B.Com./ B.L./B.G.L./B.F.A./ B.B.M./ B.A.L.

Annexure - II

SCHEME OF INSTRUCTION

First Semester:

Course No.	*Title of the Paper*	
First Semester:		
101.	Social Case Work	Core
102.	Social Group Work	Core
103.	History, Philosophy and Field Practice in Social Work	Elective
104.	Individual and Society	Elective
105.	Dynamics of Human Behavior	Elective
106.	**Integrated Social Work Practice**	**Elective**
107.	**Gandhian approach welfare and development**	**Elective**
	Concurrent field work	Compulsory
Second Semester:		
201.	Community Organization and Social Action	Core
202.	Social Work Research and Social Statistics	Core
203.	Social Problems and Social Legislations	Elective
204.	Human Rights, Social Justice and Social Work	Elective
205.	Participatory Development	**Elective**
206.	**Population and Environment**	**Elective**
207.	Unorganized Labour and Legislations	Elective
	Concurrent field work	**Compulsory**

Third Semester:

301. Life Skills and Soft Skills for Social Workers		Core
302. Social Policy and Planning		Core
303. Social Work with Elderly and Differently Abled.	(OR)	Elective
304 Political Economy and Development	(OR)	
305 Rehabilitation and after care services	(OR)	

306 Specialization papers **Elective**

(a) Human Resource Management (OR)

(b) Rural and Tribal Community Development (OR)

© Criminology (or)

(d) Social Medicine (OR)

(e) The Family – Changing Trends

307 Specialization papers Elective

(a) Labour Legislation and Labour Welfare (OR)

(b) Programmes for Rural and Tribal Community Development (OR)

© Crime, Criminal law and criminal policy (or)

(d) Psychiatry for Social Workers (OR)

(e) Family Welfare – Strategies and Interventions (OR)

Consecutive Field Work Compulsory

Fourth Semester:

401. Development Administration — Core
402. Corporate Social Responsibility — Core
403. a)Disaster management and Environmental Social Work (OR) — Elective
b) Project Report

404 SHG and Micro Credit

405 Social Work with HIV/AIDS

Specialization papers **Elective**

406 (a) Industrial Relations and Trade Unions (OR)

406 (b) Structure of Urban Community (OR)

406 © Penology, custodial Institutions and legislations

406(d) Medical Social Work (OR)

406(e) Child Welfare

Specialization papers **Elective**

407(a) Organizational Behaviour (OR)

407(b) Urban Community – Problems and Services (OR)

407 © Correctional Administration and Social Defence

407(d) Psychiatric Social Work (OR)

407(e) Women and Development

Consecutive Field Work **Compulsory**

Block Field Work **Compulsory**

Viva-voce **Compulsory**

In first and second semesters the candidate has to study 2 core papers and has to select three electives out of the 5 elective subjects. In the third and fourth semesters the candidate has to study 2 core papers i.e., 301,302,401,402 and has to select 1 elective each from 303, 304 & 305 and 403, 404 & 405 and he has to select one paper from among 306a,b,c,d,e. and 1 from 307 a,b,c,d,e. likewise in the 4th semester also. The candidate who has selected 306(a) should also select 307(a), 406(a), 407(a) like wise. Field work is compulsory in all the semesters.

Candidates shall have field work in the agencies/communities specific to their area of specialization for a period of one month at the end of 3rd & 4th Semesters. They will have the field work supervisory conference on every Saturday morning between 9AM and 1PM for a minimum duration of half an hour per each candidate.

Further the candidates shall have block field work placement in organizations specific to their area of specialization and outside the place where their Departments are located, for a period of 6 weeks at the end of 4th Semester.

The following five specializations are offered during the third and fourth semesters. Each specialization consists of four papers (2 during third semester and 2 during fourth semester).

(a) Personnel Management and Labour Welfare

(b) Community Development

(c) Criminology and Correctional Administration

(d) Medical and Psychiatric Social Work

(e) Family and Child Welfare

During all the four semesters the medium of instruction and writing examination is English only.

ANNEXURE – III

Regulations Concerning Semester-end Examinations

(a) The semester-end examination shall be based on the question paper set by an external paper-setter and there shall be single/double valuation as per the Universiy regulations.

(b) In order to be eligible to be appointed as an internal examiner for the semester-end examination, a teacher shall have to put in at least three years of service as a teacher for the degree class concerned.

(c) If the disparity between the marks awarded by both the examiners is 25% or less, the average marks shall be taken as the marks obtained in the paper. If the disparity happens to be more, the paper shall be referred to another examiner for third valuation. To the marks obtained in the third valuation the first or second valuation marks whichever is nearest to the third valuation marks are added for arriving at the average marks which shall be final.

(d) A candidate who fails in the semester-end examination or who is not able to take it even though qualified to do so shall be eligible to take the same examination at the end of the following year.

The concurrent field work at the end of first and second semester and consecutive field work at the 3rd and fourth semesters will have double valuation

Annexure - IV

Scheme of Examination as per Credit System

First Semester:

Course No.	Title of the Paper	Credit	Max. Marks.	Single valuation / Double Valuation (Internal + External) as per University rules	Internal Assessment
101	Social Case Work	6	100	80	20
102	Social Group Work	6	100	80	20
103	History, Philosophy and Field Practices in Social Work	6	100	80	20
104	Individual and Society	6	100	80	20
105	Dynamics of Human Behaviour	6	100	80	20
106	Integrated Social Work Practice	6	100	80	20
107	Gandhian Approach Welfare and development	6	100	80	20
	Case Presentations	6	100	80	20
	Concurrent Field Work	15	100	80	20
	Total	51	700	560	140

Average the marks obtained by a candidate to 100 to determine Grade point.

Second Semester:

Course No.	Title of the Paper	Credit	Max. Marks.	Single valuation/ Double Valuation (Internal + External) as per University rules	Internal Assessment
201	Community Organisation and Social Action	6	100	80	20
202	Social Work Research and Social Statistics	6	100	80	20
203	Social Problems and Social Legislations	6	100	80	20
204	Human Rights, Social Justice and Social Work	6	100	80	20
205	Participatory Development	6	100	80	20
206	Population and Environment	6	100	80	20
207	Unorganised Labour Legislation				
	Case Presentation	6	100	80	20
	Concurrent Field Work	15	100	80	20
	Total	51	650	560	140

Average the marks obtained by a candidate to 100 to determine Grade point.

Third Semester:

Course No.	Title of the Paper	Credit	Max. Marks.	Single valuation / Double Valuation (Internal + External) as per University rules	Internal Assessment
301	Life Skills and Soft Skills for Social Workers	6	100	80	20
302	Social Policy and Planning	6	100	80	20
303	Social Work with Elderly and Differentially Abled (OR)	6	100	80	20
304	Political Economy and Development (OR)	6	100	80	20
305	**Rehabilitation and after care services (OR)**	6	100	80	20
306	**Specialization** Papers: a) Human Resource Management (OR) b) Rural and Tribal Community Development (OR) c) Criminology (OR) d) Social Medicine (OR) e) The Family – Changing Trends	6	100	80	20
307	**Specialization** Papers: a) Labour Legislation and Labour Welfare (OR) b) Programmes for Rural and Tribal Community Development (OR) c) Crime , Criminal Law and Criminal Policy (OR) d) Psychiatry for Social Workers (OR) e) Family Welfare – Strategies and Interventions	6	100	80	20
	Consecutive Field Work	15	100	80	20
	Total	45	600	480	120

Average the marks obtained by a candidate to 100 to determine Grade point

Fourth Semester:

Course No.	Title of the Paper	Credit	Max. Marks.	Single valuation / Double Valuation (Internal + External) as per University rules	Internal Assessment
401	Development Administration	6	100	80	20
402	Corporate Social Responsibility	6	100	80	20
403	**a) Disaster Management and Environmental Social Work (OR)**	6	100	80	20
	b)Project Report	6	100	80	20
404	SHGs Micro Credits and Women Empowerment	6	100	80	20
405	Social Work with HIV + AIDS	6	100	80	20
406	**Specialization Papers** a) Industrial Relations and Trade Unions (OR) b) Structure of Urban Community (OR) c) Penology, Custodial Institutions and Legislation (OR) d) Medical Social Work (OR) e) Child Welfare	6	100	80	20
407	**Specialization Papers** a) Organizational Behavior (OR) b) Urban Community – Problems and Services (OR) c) Correctional Administration and Social Defence (OR) d) Psychiatric Social Work (OR) e) Women Development	6	100	80	20
	Consecutive Field Work	15		80	20
	Block Field Work	30		160	40
	Viva-Voce	6		100 *	
	Total	81		740	160

Average the marks obtained by a candidate to 100 to determine Grade point.

* Single Valuation by Viva-Voce committee.

Total Marks and Total Credits of M.A. Social Work:

Marks : First, Second, Third & Fourth Semesters put together : 700+700+600+ 900 = 2900

Credits: First, Second, Third & Fourth Semesters put together : 51+51+45+81 =228

SYLLABUS (CORE)

FIRST SEMESTER

101 SOCIAL CASE WORK

Objectives

- Understanding case work as a method of social work and its role in social work practice
- To have knowledge of values and principles of working with individuals.
- To develop knowledge of components of social casework.
- To develop knowledge of social resources and how they contribute to the uniqueness of social case work
- To know the various aspects of interview and its effective use in case work practice.
- To understand the role of worker client relationship and develop appropriate skills and attitudes to work with individuals.
- To understand various models of helping and their theoretical background.
- To understand the role of multidisciplinary approach in professional practice.
- To have knowledge about the use of casework in different practice settings.
- To develop skills in recording and measuring the effectiveness of Social Case Work.

UNIT I: Case work – definition, method in social work, its relationship with other methods in social work. Principles of social case work. Components of social case work – Problem, person, place, professional and process – Initiating a contact, collecting information, assessment and analysis, identifying areas needing intervention, intervention strategies. Knowledge and use of social resources.

UNIT II: Interview in case work – its structure, goals and components. Worker client relationship – qualities of a helping person and qualities of helping relationship.

UNIT III: Theories and models of helping – psycho-social, functional, problem solving, Crisis intervention and family therapy – critical analysis of models.

UNIT IV: Use of case work in different settings especially where complex psycho-social problems are handled like health, school, industry, correctional institutions and de-addiction programmes.

UNIT V: Social case recording – Need for recording, main considerations in recording, essential qualities and types of recording – discussion of select case records. Measurement of effectiveness of social case work.

References:

01. The Essence of Case Work Relationship
02. An Introduction to Social Case Work , Grace Mathew, TISS, 1991
03. Garrett, A. (1942). Principles of Social Case Recording, New York: Columbia University Press.
04. Social Case Work A Therapeutic Approaches, R.K. Upadhyaya, Rawat Publications .
05. Kadushin, A. (1972). Interviewing in Social Work, New York: Columbia University Press.
06. Peartman Helen Harris (1957). Social Case Work: A problem solving process, Chicago: University of Chicago Press.
07. Robert, Robert, W. & Nee Robert, H. (Eds.) (1970). Theories of social case work, Chicago: University of Chicago Press.

102 SOCIAL GROUP WORK (CORE)

Objectives

- To be enlightened about the concepts of social groups, their importance and group dynamics.
- To understand the need for social group work and its relationship with other methods of social work.
- To understand the principles and programme planning in social group work.
- To have knowledge about leadership in group work process.
- To understand the concept of evaluation with its various factors and its significance.
- To understand the nature and scope of social group work practice in different settings

UNIT I. Social Group – Definition, types, differences, significance of group life – concept of group dynamics, its nature, significance.

UNIT II. Social Group Work – Definition, as a method in social work, its relation with other methods. The need for group work in the modern society, specific objectives of group work, its values.

UNIT III. Principles of group work – nature and importance of programme planning – principles and strategies of programme planning in group work, leadership in group work process, importance of professional and voluntary leaders, their role, significance and functions.

UNIT IV. Concept of Evaluation – types, importance in group work programmes, significance and utility of recording – types, processes involved, their advantages and disadvantages, discussion of case records.

UNIT V. Nature and scope of social group work practice in various settings such as orphanages, old age homes, community centres, industries, hospitals, and rural, urban and tribal community development programmes.

References:

01.Davies, B. (1975). Use of groups in Social Work Practice, London: Routledge and Kegan Paul.

02.Douglas Tom (1976). Group Work Practice, London; Tavistock.

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05.Ottaway, A.K.C. (1966). Learning through group experience, London: Routledge and Kegan Paul.

06.Trecker, H.P (1970). Social group work – Principles and Practice, New York: Association Press.

07. Wilson, G. and Ryland, G. (1949). Social Group Work Practice, Boston: Hughton Mifflin Company.

(ELECTIVE)

FIRST SEMESTER

103. HISTORY, PHILOSOPHY AND FIELD PRACTICE IN SOCIAL WORK (ELECTIVE)

Objectives

- To get oriented to social reform movements in India.
- To develop knowledge about origin and growth of social work in USA, UK and India.
- To acquaint with the social work values, ethics, principles and approaches.

- To get equipped with the practice skills in different social work related settings.

UNIT I: History of social reform movements in India in the 19th and 20th Centuries – contributions made by prominent social reformers in the various fields – Women, depressed classes and un touchbility.

UNIT II: Definition and scope of Social Work; origin of social work profession in the UK and USA; Social Work values and ethics; social work as a profession, generic principles of social work; New approaches to social work – developmental and radical.

UNIT III: Concepts of social welfare and social services; scientific basis for social work, growth of professional social work in India; current social work practice in India – content and dimensions, Interface between professional and voluntary social work.

UNIT IV: Field work – its role and place in social work education; field work placement; supervision and evaluation; Recording – purpose, types and uses of recording. Types of field work.

UNIT V: Practice of social work in various fields-community development; medical and psychiatric social work; correctional social work, family and child welfare; labour welfare; school social work and gerontological social work.

References:

01. Billey R and Brake M (1975). Radical Social Work, London: Edward Arnold.
02. Dolgoff R (2005). An Introduction to supervisory practice in Human Services, New York: Allyn & Bacon.
03. Fink, A.E. (1945). The Field of Social Work
04. Friedlander, W.A. (1964). Introduction to Social Welfare, New Delhi: Prentice Hall of India.
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06. Khinduka, A.A. (1977). Supervision in Social Work
07. Khinduka, S.K. (1965). Social Work in India.
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10. Mujumdar, D. History of Indian Social and Political Ideas.
11. Nair, T.K. (ed). (1981) Social Work Education and Social Work Practice in India, Madras: ASSWI.
12. Natarajan, S. (1964). Century of Social Reforms in India, Bombay: Asia Publishing House
13. Singh, R.R. (1986). Field work in Social Work Education
14. Stroup, H.H. (1965). Social Work: an Introduction to the Field.
15. Sunna J.Wilson: Recording, Guidelines for Social Workers.
16. Wadia, A.R. (1968). History and Philosophy of Social Work in India, Bombay: Allied.

104. INDIVIDUAL AND SOCIETY (ELECTIVE)

Objectives

- To understand society and its situation
- To acquire knowledge of social institutions and their functions.
- To gain knowledge about the importance of socialization, social control and role of different agencies of socialization and social control.
- To develop knowledge about understanding social stratification.
- To have enhanced knowledge on social change and its impact on the society.

UNIT I. Society: Meaning; characteristics; functions; types of societies – Rural – urban – tribal communities – characteristics. Cultural, social, economic changes in all the three communities - Tribal, rural, urban – characteristics, individual and society – relationship. Social structure, social organisation.

UNIT II. Social Institutions – marriage – meaning, types, functions – changes. Family in the transmission of values and in proper development of the child. Changes in structure and function; kinship – meaning, characteristics, functions, changes. Economy: Meaning, types of economy, functions of economy; Modern political institutions, legislative violations, liberty, justice, equality, power – activity. Concept of welfare state – Religion – meaning, types, role, functions – modern religious institutions.

UNIT III. Socialisation and social control: Socialisation: meaning, process and mechanism. Agencies of Socialisation. Problems of Socialisation, Social Control: Meaning, nature, agencies of social control – custom, tradition, religion, morality, law, education and public opinion.

UNIT IV. Social stratification – social groups – Types. Society – class, caste, creed, untouchability. Social verses natural inequalities, middle class in capitalist society, social modality in present society

UNIT V. Social change: Factors of social change – social change process in India. Components of social change. Social change and social development. industrialisation, urbanisation, modernisation. Westernisation, globalisation, liberalisation, secularisation. Planned economic development and five year plans – future shock due to social change. Kinds of Social change

References:

1 Bottomore, T.B. (1962). Sociology – A guide to problems and Literature, London: Allen and Unwin.
2 Day, P.R. (1987). Sociology in Social Work Practice, London, Macmillan Education.
3 Dube, S.C. (1955). Indian Village, London: Routledge & Kengan Paul.
4 Furer Halmendarf, C.V. (1982). Tribes in India: The Struggle for Survival, Delhi: OUP.
5 Johnson, H.M. (1978). Sociology – A Systematic Introduction, Mumbai: Allied Publishers Private Limited.
6 Kapadia, K.M. (Ed.). (1959). Marriage and Family in India, Mumbai: OUP.
7 Srinivas, M.N. (1966). Social Change in Modern India, Mumbai: Allied Pub.
8 Maciver, R.M. and Page, C.H. (1985). Society – An Introductory Analysis, Chennai: Macmillan India Ltd.

105.DYNAMICS OF HUMAN BEHAVIOUR (ELECTIVE)

Objectives

- To acquire a clear understanding of Human Behaviour
- To develop knowledge and skills regarding the nature and conditions of learning.
- To learn the social and cultural dimensions of needs.
- To gain knowledge of normal and abnormal behaviours so as to work with different personalities.
- To know attitudes which are basis for the social behaviour

UNIT I: Understanding Human Behaviour: Nature and scope of psychology in relation to social work. Heredity and environment: Concepts, mechanisms – interplay of Heredity and environment in shaping human behaviour. Nature and principles of human growth and development: Determinants of development – Milestones of development – stages of development.

UNIT II: Learning – nature and theories – classical conditioning, operant conditioning, observational learning – application of learning principles in behaviour theory and in behaviour modification techniques.

UNIT III: Motivation – social and cultural dimensions of needs. Perception: Nature, process and factors – defence mechanisms.

UNIT IV: Personality: Meaning, Definition, and types– factors influencing personality development; – Neuroses, psychoses psychosomatic disorders, personality disorders. Psychological testing. Nature and types of tests – Use of psychological tests in Social Work.

UNIT V: Social bases of behaviour: attitudes – formation and changes of attitudes through techniques of persuasion, propaganda and education. Group dynamics and group behaviours – norms and conformity behaviour.

References:

01. Anstasi A.C. (1987). Psychological Testing, New York: Macmillan (Rev. Edition).
02. Halls C.S. and Lindzey, G. (1978). Theories of Personality, New York: Wiley.
03. Hillgard, Atkinson and Atkinson (1975). Introduction to Psychology, New Delhi: Mcgraw Hill Publications.
04. Kuppuswamy, B.C. (1980). An Introduction to Social Psychology, Bombay: Media Promoters & Pub. Pvt. Ltd.
05. Schimberg, L.B. (1985). Human Development, London: Macmillan Pub. Co., 2nd ed.

Paper – 106 : Integrated Social Work Practice (ELECTIVE)

UNIT-I

Concept of Social work, Characteristics of social Systems, Units of social work Individual, Family, Groups, communities and Organization

UNIT-II

Approaches to Integration, The system Approach, Environmental approach Understanding of life sustaining elements and their interrelationships.

Unit III

Social Work Roles, Roles, role –theories- theoretical insights. Role tasks, skill and techniques, outcomes.

UNIT-IV

Action for and Action In The client system, the problem, process and phases. Initiating contact, collecting data, assessment, negotiation of contract. Problem solving, termination and evaluation for integrated practices.

Unit-V

Social Work Professional and Practice Social work professional as a single change actor as one in the team integrated social work practice,

REFERENCES:-

1. Barborka, G.A 1972: The Devine Plane, Adyar, Chennai, India, the Therosophical Publishing House.
2. Barlett Harriett, 1970 the common base of social work practice. National Association of social workers.
3. Conn away Ronda, S 1988
4. Social work Practice, New Jersey: Prentice Hall.
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9. Lippit, R.J Watson 1958
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12. Pincus, Allen and Anne minaham 1973Social work practice: Model and Method, Illnois.
13. Specht. Harry and Anne Vickery 1977 Integration Social Methods, London: George Allen and Unwin.
14. Swamy Chinmayananda 2000Atema Bodha –A Contemporary of SwamyChinmayananda Mumbai Central Chinmaya Mission Trust.
15. Uberroi N.K 1995 Professional Competency in Higher education, Centre for Professional Development in Higher education

Paper 107 –
Title: GANDHIAN APPROACH TO WELFARE AND DEVELOPMENT (ELECTIVE)

INTRODUCTION
The course aims at sensitizing the learner to the Gandhian approach and to utilize Some of the skills in practice.

OBJECTIVES

a. Develop an understanding of Gandhi's concept of society and his approach to social transformation. Develop knowledge of the specific programmes formulated by Gandhi for rural reconstruction and the development of the weaker sections of society, with the focus on strategies and skills. c. Develop the ability to identify similarities and differences between the Gandhian and professional social work approaches to social change, welfare and development.

Course Content

Unit I
Gandhian thought: Salient features of Gandhian thought; Gandhian values; Concepts and methods; Concept of a healthy society; Sarvodaya.

Unit II

Gandhian Approach: Economic and its organization: Ownership of property; Concept of trusteeship, distribution and economic equality; System of production, problems of mechanization, decentralization of production, rural-urban relationship.

Unit III

Social Organisation: Marriage and family, position of women, social stratification, caste and untouchability, education and its role; Basic education.

Unit IV

Constructive programmes: 18 points constructive programme Contents training of constructive workers, skills involved, nature of programmes; Boodan, Gramdan. Gandhian and Vinbobha's movements with special reference to Bhoodan and Gramdan.

UNIT V Gandhian and Professional Social Work Approach: Similarities and differences between Gandhian and professional approach to social development and welfare

REFERENCES

1. Dasgupta, S (Ed.) 1967 towards Philosophy of Social Work in India, New Delhi: Popular Book Service
2. Bandopadhyaya, J 1969 Social and Political Thought to Gandhi, Bombay: Allied Publishers
3. Gandhi, M.K Social Service, Work and Reform; 3 Volumes, Ahmedabad: Navijivan Press
4. Ganguli, B.N 1972 Gandhi's Vission of Ideal Society, Hyderabad: Andhra Mahila Sabha
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6. Kumarappa, J.C 1951 Gandhian Economic Thought, Bombay: Vora and Co.
7. Mishra, R.M 1972 Bhoodan Movement in India, Delhi: S Chand.
8. Nanda, B.R 1985 Gandhi and His Critics, Delhi: Oxford University Press
9. Narayan, J 1965 from Socialism to Sarvodaya, Varanasi: Sarva Seva Sangh
10. Palkhiwala, N 1986 Relevance to Gandhi, New Delhi: Gandhi Peace Foundation. Page **47** of **102**
11. Unitahna, T.K.N 1979 Gandhi and Social Change, Jaipur: Rawat Publications

M. A. SOCIAL WORK - SECOND SEMESTER
SYLLABUS
PAPER: 201 COMMUNITY ORGANISATION AND SOCIAL ACTION (CORE)

Objectives

*** To study and understand the fundamental concepts and components** of community, community organization and social action
* To gain knowledge about practice, models and approaches of community organization and social action
* To study and enlist community development programmes and practices, and contribute for the peoples' understanding on the need for community development.
*To acquire developmental skills and knowledge; and promote strategies
*To practice social work knowledge, skills, techniques and interventions.

UNIT I. Community: Concept of community, definitions, components, characteristics, and needs; understanding and analyzing community problems, participatory approaches; community resources and mobilization; major forms of communities – tribal, rural, urban- their features and differences.

UNIT II. Community Organisation: Concept of community organisation, definition, scope; community organization in India; models, phases, and trends of community organisation; principles of community organisation.; role and functions of community organizer; community organisation and its relationship with other methods of social work.

UNIT III. Community Development: Concept, definition, objectives; forms of community development- tribal, rural and urban; micro- level planning; self-help groups; role of NGOs' in community development; Institution of Panchayat Raj, salient features of Panchayat Raj Act; structure and functions of ITDA, DRDA, UCD

UNIT IV. Social Action: Definition, concept and scope; relationship with other methods of social work ; forms of social action- Popular form and elitist form; principles and strategies of social action; creating awareness of social action – Role of power groups – Advocacy ; drafting a bill;Lobbying- techniques of winning public support and political parties for smooth passage of a bill; Role of Social workers and agencies in the enforcement of the Acts.

UNIT V: Social movements in India; Protest and dissent movements such as Dalit Movement, Agrarian and peasant movements, "Sons of soil" movements, Sarvodaya and Bhudan movements; Social action and social issues: civil, women and child rights; Environmental and ecological issues; Right to Information Act

References

1.Baldok Peter (1974) Community Work and Social Work, Routledge&Kegan Paul, London
2.Biklen, D (1983): Community Organising: Theory and Practice, Prentice Hall, New York
3.Burghardt, S (1982): Organising for Community Action, Sage, Beverly Hills
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16.Mehta R Shiv (1985) : Rural Development in India, Sage, New Delhi
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21.Siddique, H.Y (1997): Woking with Communities-An Introduction to Social Work,Hira Publications, New Delhi
22.Somesh Kumar (2002): Methods for Community Participation: A Complete Giude for Practitioners
23.Steve Burghardt (1982): Organizing for Community Action, Sage Publications, New Delhi
24.Thudipara J.Z (2008): Urban Community Development, Rawat Publications, Jaipur
25.Weil Marie (ed) (2005) The Hand Book of Community Practice, Sage, New Delhi
26.Maurianne et.al (2000) Readings for diversity and social justice. Routledge: New York

M. A. SOCIAL WORK - SECOND SEMESTER

202. SOCIAL WORK RESEARCH AND SOCIAL STATISTICS (CORE)

Objectives

- Acquire understanding about the nature and steps in the research process.
- Develop theoretical knowledge about the different methods and tools in social work research.
- Acquire skills and knowledge in the use of appropriate statistical methods in research.

UNIT I. The scientific method – nature and characteristics. Nature of social research and social work research – Selection of topic and problem formulation. Basic elements of research - concepts, operationalisation of concepts, variables, hypothesis; attributes and sources of good hypothesis.

UNIT II. Research design objectives: Exploratory, descriptive and experimental, research design types; survey, experimental, quasi-experimental and case study. Types of data - sources – primary and secondary – use and limitations. Approaches to research: - Quantitative and qualitative;. Sampling: Purpose, types; advantages and limitations of different types of sampling.

UNIT III. Methods of data collection: Observation, interview and questionnaire. Participatory research as an alternative methodology – techniques such as village social mapping, focus group discussions etc. Levels of measurement in Social research; Nominal, ordinal interval and ratio. Analysis and interpretation of data. Basic elements of research report writing, Elements of research proposal, Functions, importance and limitations of statistics.

UNIT IV. Social Statistics – Meaning, and use in social work research and limitations. Classification and tabulation of data, graphic and diagrammatic representation of data. Measures of Central tendency – meaning, types – mean, median, mode and quartiles, their specific application to social work research. Measures of dispersion – meaning; types, their specific application to social work research.

UNIT V. Correlation: Concept of product moment (only ungrouped data), spearman's rank correlation. Tests of significance – 't' test for significance of differences of two means, chi-square for independent association of attributes (two attributes only). Social work research and need for computer applications in social research – importance; Statistical Package for the Social Sciences (SPSS).

References:

1. Bruce Thyer (2010) the hand book of Social Work Research Methods, New Delhi; Sage Puiblications
2. Hart, C.H. (1998). Doing a literature review, Delhi: Sage.
3. Kidder, L.H. (1980). Research Methods in Social Relations (4th ed.), NY: Kolt, Rinehart & Winston.
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6. Nachmias, C. and Nachmias, D. (1981). Research Methods in Social Sciences, UK: Edward Arnold.
7. Punch, K.F. (1998). Introduction to Social Research, Delhi: Sage.
8. Yegidis, B.L. and Weinbach, R.W. (1990). Research Methods for Social Workers, NY: Allyn and Bacon.
9. Padgett, D.K. (1998). Qualitative Methods in Social Work Research, New Delhi:Sage.
10. Riessman, C.K. (1994) (ed.). Qualitative studies in Social Work Research, New Delhi: Sage.
11. Laldas, D.K. (2000). Practice of Social Research, New Delhi: Rawat.

203. SOCIAL PROBLEMS AND SOCIAL LEGISLATION (ELECTIVE)

Objectives

- To develop knowledge about and analyse the origin, and causes of social problems
- To understand the effects of social problems on individuals, groups and society.
- To acquire knowledge about social reforms, social policy and social legislation and critically understand their role in controlling the social problems.
- To create an awareness about the preventive and remedial services of Govt and Non- Govt organizations in dealing with social Problems

UNIT I. Concept of social pathology. Definition of Social deviance, social disorganisation and social problems. Social deviance – the process of induction and labelling of deviance, deviant subcultures and their interaction with society.

UNIT II. Study and analysis of specific social problems such as AIDS, crime, juvenile delinquency, prostitution, alcoholism, drug addiction, untouchability, women related specific social problems such as dowry, female foeticide and infanticide.

UNIT III. Historical development of social reform, formulation of social policies. Social legislation related to crime, juvenile delinquency, prostitution, alcoholism and drug addiction, dowry, untouchability and female foeticide, domestic violence.

UNIT IV. The preventive and remedial services available at the Government and Non-Governmental level to deal with problems mentioned above.

UNIT V. A critical study of models of preventive and remedial work with reference to the role of social work profession. Formulation of research projects to study social problems.

Reference:

1. Barber, J.G. (1995). Social work with Addiction, New Delhi: Macmillan Publications.
2. Becker, K.A. (1966). Social Problems: a Modern Approach, New York, John Wiley and Sons.
3. Dandekar, V.M. and Rath, N. (1971). Poverty in India, Poona: Indian School of Political Economy.
4. Fischer, J.H. (ed.) (1971). Problems of Urbanisation, Bombay: Leslie Sawhby Programme for Training for Democracy.
5. Gangrade, K.D. (1978). Social Legislation in India, Vol.I & II, Delhi: Concept Publishing Company.
6. Schriver, J.E. (1995). Human Behaviour and the Social Environment, Allyn and Bacon.
7. Velleman, R. (1998). Counselling for Alcohol problems, Delhi: Sage Publications.

204. HUMAN RIGHTS, SOCIAL JUSTICE AND SOCIAL WORK(ELECTIVE)

Objectives

- Orient about the origin and development of Human Rights.
- Develop knowledge about the constitutional provisions relating to Human Rights and Social Justice.
- Acquire advocacy skills to deal with several matters relating to Human Rights.
- To develop an integrated approach to Social Work practice to uphold Human Rights and Social Justice.

UNIT I. Human Rights – Evolution of human rights, UN Charter on Human Rights. International Covenants and treaties, India's position in this context.

UNIT II. Human Rights and Social Justice concerns in Indian society – inequality, injustice and oppression; social, economic, political structures of Indian Society.

UNIT III. Indian Constitution – preamble, fundamental rights and directive principles of state policy. Law as an instrument of achieving social justice in India. Legal aid as an instrument of Human Rights – a critical review.

UNIT IV. Role of social work in relation to Humanism. Human rights and social justice, public interest litigation. Role of advocacy, role of social action.

UNIT V. Efforts to prevent Human rights violation, national and international initiatives. NHRC, Amnesty International, Civil Liberties.

References

1. Director, Publications Division, Ministry of Information and Broad Casting (1985). Encyclopaedia of Social Work in India, Vol.I, II, and III, New Delhi: Author.
2. 02. Gore, M.S. (1965). Social Work and Social Work Education, Mumbai: Asia Publishing House.
3. 03 Kendall, K.A. (1978). Reflections on Social Work Education, New York: International Association of Schools of Social Work.
4. Minahen, A. (Ed-in-chief) (1987). Encyclopaedia of Social Work, Vol.1,2 & 3, New York, National Association of Social Workers.
5. Pandey, S.R. (1991). Community Action for Social Justice, New Delhi: Sage Publications.
6. Yalaja, S.A. (1982). Ethical issues in Social Work, Spring Field, Charles C.Thomas.
7. Young Husband, C. (1967). Social Work and Social Values, Vol.III, London: George Allen and Unwin.

205.PARTICIPATORY DEVELOPMENT(ELECTIVE)

Objectives

• Understand the evolution and meaning of people's participation and participatory development.
• Acquire knowledge about participatory research methodologies in participatory development.
• Acquire skills in using participatory skills and participatory research methodologies in Participatory development.

UNIT I. Understanding participation – meaning and principles; knowledge, power and participation; participation and governance.

UNIT II. Development – changing meaning of development; different approaches; development actors; participatory development –meaning, principles and experiences; Gender and development.

UNIT III. Methodologies to facilitate community participation; participatory planning – principles, processes and experiences; Micro-planning; Participatory monitoring and evaluation.

UNIT IV. Participatory research – History and meaning; PR Methodologies – principles and implications of PR and PD for NGO sector.

UNIT V. Case studies/exercises in PD and PR.

References:

1. Goulet, Denic (1989). Participation in development: New avenues, World Development 17(2), pp165-178.
2. Rehnema, Majid (1977). Participation, in Development dictionary: A guide to knowledge as power, New Delhi: Orient-
Longman. pp.155-175
3. Oakley, Peter (June, 1994). People's participation in development: Reviewing the balance sheet, New Delhi: PRIA.
4. Midgley, J. (1998). Social Development, New Delhi: Sage Publications.
5. Rahman Md.Anisur (Ed.) (1984). Grassroots participation and self-reliance, Oxford: IBH Publishing Co. and PRIA.
6. Oakely Peter (1988). Strengthening people's participation in Rural Development, Occasional paper series No.1, New Delhi; PRIA.
7. Narayan, D. and Srinivasan, L. (1994). Participatory development toolkit: Materials to facilitate community empowerment, Washington: World Bank.
8. Acharya, B. June (1996). Participatory programme planning as a renewal process. Experiences of NGOs in Western region of India. Renewal (2) June, pp.15-22.
9. Paul, Sohini, (1997). Microplanning: the Mandi experience, Participation andGovernance, 4(9), pp.10-18.
10. PRIA (1988). A manual for participatory training methodology in development(5th ed.), New Delhi: Author.
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13. Chambers, Robert (1994). Participatory Rural Appraisal (PRA): Analysis of experiences, World Development, 22(9), pp.1253-68.
14. Hall, Budd, Gillette, Arthur and Tandon, Rajesh (1982). Creating knowledge: A monopoly? Participatory Research in Development, New Delhi: PRIA.
15. Tandon, Rajesh (1988). Social transformation and participatory research,Convergence, 2192/3), pp.5-15.
16. Mukherjee, Amitava (Ed.) (1995). Participatory rural appraisal: Methods andapplications in rural planning. New Delhi:
Vikas Publishing House.
17. PRIA (1998). Doing research with people – Approaches to PR; AnIntroduction, New Delhi: ISI.
18. Sanjeev, S. and Sarngadharam M. (1995) PRA – an alternative to survey method in rural research, Kurukshetra, November.
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20. Chambers, R. (1994). The origins and practice of Participatory Rural Appraisal,

Paper 206 – Title : POPULATION AND ENVIRONMENT(ELECTIVE)

Objectives:

• To acquire the fundamental and theoretical knowledge about population
• To acquire a sound knowledge to understand the determinants of population growth.
• To enhance the knowledge and utilization of natural resources and management in waste material.
• To understand legal provisions related to environmental protection and role of NGO's. Evaluation of the role of social work in the conservation of environment..
• To get exposed to and participate in research in the fields of population and environment.

UNIT I. Population– components of population. Population growth in the World and India. Sources of demographic data, population theories.

UNIT II. Determinants of population growth: Fertility, mortality, migrationfactors influencing fertility, mortality and migration. Differentials of fertility, mortality and migration. Family planning: Methods of family planning. Population policy, population education – Role of social worker in family planning and allied services.

UNIT III. Natural Resources and Diversity: Utilisation and management of forest, land, water, air, energy sources. Pollution – sources, treatment, prevention. Waste material – disposal, recycling, renewal, problems, and issues.

UNIT IV. Acts related to environmental protection – Forest conservation, water pollution, standards and tolerance level. Role of government and NGO's. People's initiatives, international initiatives. Role of social worker in conservation of environment.

UNIT V. Understanding and utilization of Research: The students will examine at least four empirical studies in the areas of population and environment and they are expected to examine these studies in terms of objectives, research design, tools used for data collection, presentation of results, analysis and use of statistical methods etc. In this unit the students may be asked to write in their examinations a review of any of the research aspects covering the above areas or a research proposal in that field i.e., population and environment.

References

1.Cassen, R.H. (1978). Indian Population, Economy and Society, London: Macmillan.

2. Fisher, W.F., (1997). Toward sustainable development (struggling over India's Narmada River), New Delhi: Rawat Publications.

3.Prasad, R.K. Population Planning, Policy and Programmes, New Delhi: Deep and Deep Publications.

4. Satapathy, N. (1998). Sustainable Development (An alternative paradigm), Ahmedabad: Karnavati Publications.

Course : 207 : Unorganized Labour AND LEGISLATION (ELECTIVE)

UNIT I: Unorganized Labour: Concept, Nature, Size, Structure and Problems. Its role in the Indian Economy. Unorganized labour in primary sector: Nature, Size, Structure, Wages and legal Implications of Agriculture Labour; Plantation Labour; Fisheries Labour; Forest and Tribal Labour.

UNIT II : Unorganized Labour in Secondary Sector: Nature, Size, structure, Employment Status, Wages and Legal Implications of construction labour; Home based and domestic workers, Beedi Workers, Small and Medium Scale industries, Mines and Quarry Labour.

UNIT III : Unorganized labour and Employment classes, Nature, Size and structure, Employment Status, wages and legal enactments of contract and Casual labor, bonded labour, Inter – State Migrant labour, women labour, child labour, scavengers.

UNIT IV : Unorganized Labour in Service Sector: Nature, Size, Structure, Wages and Legal Implications of Shops and Establishments, Hotels, Loading and Unloading workers.

UNIT V : HRD Interventions for Unorganized Labour; Human Rights and Unorganized labour. ILO and Unorganized labour; Important futures of second National Labour Commission Report on Unorganized Sector; social Security for Unorganized Labour, Social Security Act, 2008; Organizing the Unorganized labour: Role of Trade Unions, CBWE, Cooperative Organizations, Jana Sikshana Samsthan, NGO's and Government.

Case Analysis :
Suggested readings :

1. Government of India, Report of the National Commission on Labour, New Delhi,1969.
2. Government of India, Report of the Second National Commission on Labour, New Delhi,2002.
3. Government of India, Report of the Royal Commission on Labour, New Delhi,1929.
4. Dutt, Rudra Organizing the Unorganized Workers, Vikas Pub. House. Pvt. Ltd., New Delhi.
5. Singh. I.S. (Ed.)., Women as a Work force in the Organized Sector: Empirical Perspectives, Oxford IBH publication. Ltd New Delhi.
6. Jhabrala, Renana and RKA Subarmanya, The Unorganized Sector - Work Security and Social Protection, Sage Publications, New Delhi.
7. Holomstrom, Mark, Industry ad Inequality, Orient Longman, Hyderabad.
8. Gangrade, K.D., Gathia, J.A., Women and child Workers in Unorganized Sector: Non Government Organizations' Perspective, Concept Pub. Co., New Delhi.
9. Sivaramakrishna, k., Ramensh.k., and Gangadhara Rao. M., HRM in Agriculture, Discovery Pub. House, New Delhi.
10. Neera, Burrra, Born to Work: Child Labour in India, Oxford University Press, New Delhi.
11. Government of India, Agricultural Labour Enquiry Reports, Labour Bureau, Simla.

THIRD SEMESTER

301. Life Skills And Soft Skills For Social Workers.(CORE)

Objectives

- To learn to communicate effectively, vocally, in writing and in presentation format.
- To develop skills in working with different groups.
- To gain knowledge of life skills.
- To develop a comprehensive understanding of inter personal influences on relationships in terms of power, persuasion and assertiveness.

UNIT I. Presentation skills: listening centered message, knowing about the listeners messages, over coming anxiety, persuasive strategies, structuring the presentation, effective use of visual aids, verbal and non verbal communication. Basic forms of writing, styles and contents, formal correspondence.

UNIT II. Life skills: Self awareness, self esteem, assertiveness, coping with anger, fear, anxiety, stress, hurt and depression, sensitivity, empathy and support, creative thinking, time management, decision making, understanding defence mechanisms, positive thinking, enhancing capacity to love, be happy and enjoy.

UNIT III. Soft- Skills: Communication, commitment, conflict resolution, civic and traffic sense, emotional competence, listening skills, nonverbal communication, skills in dealing with selected groups such as.

UNIT IV. Building effective relationships: Building rapport, nurturing friendship. Personal communication skills: Self- disclosure, feedback. Conflict management skill: negotiating; resolving disagreement, Team work and synergy skills: creating groups energy in pursuing collective goals, Open-minded ideas, Team work contribution, influencing skills, making a positive difference, leadership skills, initiating and managing needed change, and innovation.

UNIT V. Practicum: Public speaking on any topic, oral presentation with visual, technology, group discussion, listening comprehension. Group research projects. Using computer, role-play evaluation.

References:

1. Pasty McCarthy a Caroline Hatcher, (2002) Presentation Skills The essential guide for students, New Delhi SAGE Publications.
2. Neil Thompson (1996) People Skills, London; Macmillan.
3. Dalai Lama and Cutler, H.C (1998) the Art of Happiness: A Handbook for Living. London: Coronet Books.
4. Hargie, Saunders, C Dickson, D. (1994) Social Skills in Interpersonal Communication; London: Routledge.

302. SOCIAL POLICY AND PLANNING (CORE)

Objectives

- Acquire theoretical understanding about social policy and social development in the changing socio-economic context.
- Develop Understanding about the different sectoral polices and programmes relating to social development.
- Acquire knowledge about concepts relating to human development and macro social work practice approaches.

UNIT I. Social Policy – Concept, need, constitution basis for social policy and social welfare policy; relationship between social policy and development.

UNIT II. New economic policy and changing concept of social development and welfare state – concepts of state, market and civil society – their inter-relationship – people's participation in development – concept of sustainable development.

UNIT III. Models of social policy: Residual – welfare; achievement – performance; institutional – redistributive models; changing perspectives in social development. Social Empathy and its benefits.

UNIT IV. Social policy and social planning – social policy formulation, contribution of research, role of social worker, different sectoral policies and their implications; policies and measures concerning social welfare in general and of women, environment, poverty alleviation programmes in particular.

UNIT V. Social indicators of development – Human development index; concept of social work macro practice and methods.

References

1. Bajpai, N. (1995). Economic reforms in Developing Countries – Theory and Evidence, EPW 30(2), January 14, 113-118.
2. Ghosh, A. (1995). Development Paradigms: China and India since 1949, The Economic and Political Weekly (EPW) 30 (788) Feb. 18-25, 355-358.
3. Goel, S.L. and Jain, R.K. (1988). Social Welfare Administration, Vol.I & II, New Delhi: Deep & Deep.
4. Gore, M.S. (1975). Some Aspects of Social Development, Mumbai: TISS.
5. Govt. of India (1987). Encyclopaedia of Social Work in India, 4 volumes, New Delhi: Planning Commission.
6. Kulkarni, P.D. (1965). Social Policy in India, Madras: ASSWI.
7. Midgley, J. (1998). Social Development: The Developmental Perspectives in Social Welfare, New Delhi: Sage.
8. Minahan, A. (editor in chief) (1987). Encyclopaedia of Social Work (18th ed.), Vol.I & II Silver spring, Mary Land, MASW.
9. Netting, F.E.Kettner, P.M. and McMurtry, S.L. (1993). Social Work Macro Practice, NY:Longman.

303. SOCIAL WORK WITH ELDERLY AND DIFFERENTLY ABLED(ELECTIVE)

Objectives

- To acquire knowledge on Gerontology and the problems of the Elderly in India
- To know about the Constitutional and legislative provisions for the welfare of the elderly and the National Policy on Older Persons.
- To gain knowledge about the concept and types of differently abled.
- To enhance the knowledge of various services available for the differently abled in India.
- To acquire knowledge and skills of professional social work practice to work with the elderly and differently abled.

UNIT I. Gerentology: Concept, definition and growth of Gerontology - Factors contributing to the problems of the elderly – socio-economic, emotional and health problems of the elderly. Neglect and abuse of the elderly.

UNIT II. Programmes for the elderly: International and national Constitutional and legislative provisions for the welfare of the elderly. National policy on older persons, Maintenance and welfare of Parents and Senior citizens Act, 2007, institutional and Non-Institutional services for the welfare of the elderly.

UNIT III. Differently abled: Concept and, classification; causes and problems of locomotor, visual, hearing, speech and mentally retarded. .

UNIT IV. Constitutional and legislative provisions, for the differently abled; Rehabilitation Council of India; Persons with Disablities (equal opportunities protection of rights and full participation) Act 1995, National Trust for the welfare of persons with Autism, Cerebral Palsy, Mentally retarded and Multiple disabilities act; governmental and non-governmental services for the differentially abled. National Institutes for the differently abled in India.

UNIT V. Professional social work practice: Professional social work practice with the elderly and differently abled. Role of government and non-governmental agencies. HelpAge India - Objectives and functioning of HelpAge India.

References:

1. Binstock, R.H & Shanas, E (eds) (2002) Hand book of Ageing and the Social Sciences, New York, D.van Nostrand
2. Desai, K.G.(1982). Aging in India, Mumbai: TISS.
3. Gajendragadkar (ed.) (1983). Disabled in India, Mumbai: Somaiye Pub.
4. Marshal, M. (1993). Social Work with old-people, London: Macmillan Press.
5. Oliver, M. (1983). Social Work with the disabled, London: Macmillan.
6. Sharma, M.L. and Dak, T.M. (Eds.) (1987). Aging in India, New Delhi: Ajanta Publications.
7. Shubha, S. et. a;. (2000). Senior Citizens Guide, New Delhi: Help Age.

Paper - 304
Political Economy of Development (Elective)

UNIT – I
Introduction to Political Economy Meaning of Political Economy significance of the study of Political Meaning and Characteristics and under development.
UNIT – II
Development – A human Right Perspective Social ideals of Indian Constitution Fundamental right Human Right .
UNIT – III
Socio economic order and Comparitive economics system Capitalism, Socialism and Mixed economy, their features, merit and demerits.
UNIT – IV Poverty in India-Structural Problem Causes, effects and implications. Entitlement approach to understanding poverty.
UNIT – V Approaches to development Modernization, Capitalist, Socialist and Gandhian approaches to development.

REFERENCES :

1.Agrawal A.N.Lal Kundan 1989 Economics and development and planning, New Delhi; Vikas publishing house private ltd.,
2.Augustine, John S 1989 Strategies for third world development, New Delhi : Sage Publications
3. Chakraborthy Bimal 1996 the United Nations and the third world, New Delhi, Tata Mac Graw Hill Publishing Co.
4. Descroches, John 1977 metods of Social Analysis, Bangalore : Centre for Social Action
5. Elsenhans, Hartmut 1991 Development and Under Development : the History, economics and politics of North-South Relations, New Delhi, Sage Publication.
6.Nagards, S.P. 1994 Developmetn and change, New-Delh, Asian Publishing House.
7. Nana Poku Liyid Rebuilds up the third world, London, Mac Millan, Pres Ltd.,
8. Rao, V.Lakshmana 1994 Essays on Indian economy, New Delhi, Asian Publishing House.
9. Reddy, D.V. 1994 Essays on Indian Economy, Asian Publishing House.
10. Rugman Alan 2000 The end of Glo0balisation, London, Random
11. Seltz John 1990 the political of development, Bombaby, Popular Prakashan
12. Sharma S.L. 1986 Development : Socio Cultural Dimensions, Jaipur Rawat Publication
13. Tandon BB KK Tandon Indian Economy, New Delhi Tata MaeGraw Hill Publishing. Co.

Paper - 305
Title : Rehabilitation and after care services (Elective)

Objectives :

1. To impact knowledge on the technology used for the visually impaired.
2. To familiarize the students with current trends and issues faced in the field of Visual impairment
3. To enable the students to become aware of the technological developments, Educational programmes and communication approaches for persons with hearing Impairment.
4. To help students understand the fundamentals of mentally retarded like Definitions, causes and classifications.
5. To make students realize the scope of medical rehabilitations of mentally retarded.
6. To make the students aware of the vocational prospects for the mentally retarded
7. To enable the students gain practical experience in administrative skill.

UNIT – I

Multiple disability – Introduction and Definitions of persons with Multiple Disabilities, Implications and causes of Multiple disabilities, Characteristics of persons with multiple disabilities, Difference between Multiple Disabilities and Profound mental retardation. Assessment of multi- disabled and various functions, needs, communication and Approaches for persons with Multiple Disabilities, Curriculum and Life planning.

UNIT – II

Visual Impairment – Definitions and categories. Psycho social of visual impairment. Historical Perspectives, Physical, Medicine Eye Diseases. Technologies for prevention, Assistive Technology, Independence training, early detection and Learning for Visually Impaired, Trends and Issues in Rehabilitation of persons with Visual Impairment.

Unit III

Hearing Impairment – Definitions, Introduction and Advantages of Early Identification for Children with HI and Consequences of late identification, Syndromes related to persons with Hearing Impairment, Medical, Educational, Social and vocational rehabilitations, Psycholinguistics, Education and Assistive Technology for Children with Hearing Impairment.

Unit IV

Mental retardation- Definitions of mental Retardation world over, Causes of Mentally Retarded, characteristics, classification, prevention, Historical development of services for Mentally Retarded in India, Medical, Social, educational and vocational and vocational Rehabilitation of Mentally Retarded.

Unit V

Locomotor disability – Introduction and definition to Locomotor System. Introduction to body systems, Orthopedic and Neurological Problems, Common congenital Deformities, Components, of Rehabilitation of persons with Locomotor Disability (Meaning, causes, types, assessment and documentation, associated problems, aids and appliances)

References:

Punani .B. and Rawal N. (2000). Visual Impairment Handbook, 2nd Edition, Ahemedabad; Blind People's Association (India).

Koenig A.J. and Holbrook M.C. (Eds.) (2000). Foundations of Education (2nd Ed.), Vol. II, instructional strategies for Teaching Children and Youths with Visual Impairments, New York; AFB Press.

Murickan .J.S.J. (1995). Persons with Disabilities in Society, Trivandrum; Kerala Federation of the Blind.

Punani .B. and Rawal .N. (1993). Handbook: Visual Handicap. New Delhi: Ashish Publishing House.

Graham Martin (2001) 6th edn. Ballantyne's Deafness edited by John Graham &Muke Martin.

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Richard .W. Fling, (1994). History of Hearing Impairment. New Delhi; A.I.T.B.S. Publishers.

Divya Prabhat, (1991). Ear-Nose-Throat, Bombay; Vera Medical Publication.

Lauren . B.J. Jeanne et.al. (1998). Communication Assessment and Intervention for Adults with Mental Retardation. U.S.A.: Little Brown & Company.

Henley Martin & Ramsey .S. Roberta (1993). Characteristics and Strategies for Teaching Students with mild Disabilities. U.S.A. : Allyn & Bocon.

Usha Rani, P. (1988). Down's syndrome, New Delhi; Vijay Printers.

Muthaiah, N. (2001) Education of Low Vision Children with Associated Disabilities in Mani, M.N.G., (Ed.) Booklet on Education of Low Vision Children. B.Ed. (SE-DE) Programme, Bhopal: Madhya Pradesh Bhoj (Open) University.

Narayanan, J. (2001) Curriculum for Persons with Severe / Profound Mental Retardation and Multiple Disabilities in Booklet on Curriculum Guidelines in Mental Retardation. B.Ed. (SE-DE) Programme, Bhopal: Madhya Pradesh Bhoj (Open) University.

Narayanan, J. (2001) Booklet on Motor and Communication Aspects -Role of Multidisciplinary Team. B.Ed. (SE-DE) Programme, Bhopal : Madhya Pradesh Bhoj (Open) University.

Norris Meriel, (1997). Rehabilitation Therapy Assistant Manual. Bangalore; Rehabilitation, Research and Training centre.

306. (a) HUMAN RESOURCE MANAGEMENT

(SPECIALISATION PAPERS –ELECTIVE)

Objectives

- To achieve a sound Theoretical understanding about Human Resource Management.
- To develop knowledge and skill in handling and resolving different types of problems in an organization.
- To orient the student about the importance of "people" dimension in an organization.
- To acquaint the student with the goals of the organization.

UNIT I. Human Resource Management: Concept, definition, scope, philosophy, objectives and principles. Concept of Management; contributions of Taylor, Fayal, Elton Mayo. Approaches to the study of Management. Span of control, decentralisation, delegation of authority. Line and staff relationship and functions.

UNIT II. Human Resource Planning: Concept, objectives and process. Forecasting and determination of current and future human resource requirements. Career planning. Recruitment, selection, placement and induction, Job analysis, job description and job specification.

UNIT III. Training and development-concept, importance and identification of training needs. Process of training, designing, monitoring and evaluation of training programmes. Types and methods of training. Conceptual principles of learning.

UNIT IV. Wage and salary Administration: Meaning, scope, concepts and principles. Wage determination. Wage Boards, Pay Commissions, incentives, types and methods – employee compensation.

UNIV V. Job evaluation: Performance appraisal, management by objectives, career development programmes. Discipline and domestic enquiry, superannuation, retirement, discharge, dismissal and voluntary retirement schemes.

References

1. Ashwappa, K. Human Resource and Personnel Management, New Delhi: Tata Mcgraw Hill Publications.
2. Dale, S. Beach (1975). Personnel – The Management of People at Work.
3. Drucker Peter, F. (1989). Management Tasks, Responsibilities and Practices.
4. Fisher, Scheoenfeldt and Shaw: Human Resource Management; New Delhi: Tata Mcgraw Hill Publications.
5. Flippo, E.B. (1980). Principles of Personnel Management.
6. Ghosh, P. (1975). Personnel Administration in India.
7. Koontz O'Donnel. Principles of Management Tokyo: Mcgraw Hill Pub.
8. Monappa, Arun and Saiyadain, Mirza: Personnel Management, New Delhi: Tata Mcgraw Hill Pub.
9. Pigon, P. & Mynes, C.A. (1961). Personnel Administration, New York: Mcgraw Hill Pub.
10. Venkata Ratnam, C.S. and Shrivastav. Personnel Administration and Human Resources, New Delhi: Tata Mcgraw Hill Pub.

306 (b). RURAL AND TRIBAL COMMUNITY DEVELOPMENT

(SPECIALISATION PAPERS –ELECTIVE)

Objectives

- To understand the Rural Community and its features
- To acquire knowledge of Rural Economy and it's allied sectors.
- To know about Tribal Community and role of tribal social institutions.
- To learn about Tribal economy and role of forests in Tribal economy
- To understand the tribal problems interms of social, economic and environmental problems.

UNIT I. Rural Community: Major features of rural community. Physical, economic, social and political structure of an Indian village. Dominant power elite. Rural – urban relationships.

UNIT II. Rural Economy: Peasant economy. Cottage and small-scale industries. Co-operatives – origin, characteristics and principles. The role of co-operatives in India. Social change in rural India.

UNIT III. Tribal Community: Concept and definition of Tribes, Characteristics of tribal communities. Classification and distribution of tribes in India. Family and kinship, social organisation of tribal communities. Cultural, social, and economic changes in tribal communities – Tribes in Andhra Pradesh.

UNIT IV. Tribal Economy: Major features of tribal economy. Forms of tribal economy. Political and religious organisations of tribal community. The role of forests in tribal economy.

UNIV V. Tribal problems: Major tribal problems – social, economic, environmental problems of tribals in India. Land alienation and displacement among tribal communities.

References:

1. Desai, A.R. (Ed.) (1986). Agrarian struggles in India after independence, Delhi: Oxford University Press.
2. Desai, A.R. (1987). Rural Sociology in India, Mumbai: Popular Prakasan.
3. Dhanagare, D.N. (1983). Peasant movements in India – 1920-50, Delhi: Oxford.
4. Govt. of India (1987). Encyclopaedia of Social Work in India, New Delhi: Author.
5. Rao, M.A.S. (Ed.) (1978-79). Social Movements in India, Vol.I & II, Delhi: Manohar.
6. Singh, R.R. (1980). Social Work Perspectives on Poverty, New Delhi: Concept Publishing Company.
7. Dube, S.C. (1960). The Tribal problems in India.
8. Roy Burman (1975). Perspectives for Administration and Development of the Scheduled Tribes.
9. Singh, K.S. (1994). The Scheduled Tribes, Delhi: OUP.
10. Srinivas, M.N. (1987). The dominant caste and other essays, Delhi: OUP.

306 (c). CRIMINOLOGY

(SPECIALISATION PAPERS –ELECTIVE)

Objectives

- To study and understand the key concepts of deviance.
- To study and understand the key concepts of deviance
- To understand the characteristics and elements of crime.
- To gain knowledge about the fundamental theories of crime.
- To gain knowledge to understand the sociological theories of crime.

UNIT I. Concept of criminology, definition, meaning, scope and extent.

UNIT II. Concept of deviance, definition, meaning, scope content and theories.

UNIT III. Concept of crime, definition, meaning, scope and extent. Characteristics of crime and elements of crime.

UNIT IV. Theories of criminology – pre classical, classical, neo-classical and positive school. Physiological and psychological theories.

UNIT V. Sociological Theories – economic explanation, labeling, differential association and cultural theories.

References:

1. Barneshe & Teeters, N.K. (1966). New Horizons in Criminology, New Delhi: Prentice Hall of India.
2. Clinard, M.B. et. al. Anomie and Daviant Behaviour, Free Press.
3. Cohen, A.K. (1970). Deviance and Control, New Delhi: Prentice Hall of India.
4. Glasser D. Handbook of Criminology.
5. Maguirem, et. al. (ed.) (1994). The Oxford handbook of Criminology, London: Clarendon Press.
6. Vold, G. B. (1958). Theoretical Criminology. New York: O.U.P

306 (d) SOCIAL MEDICINE

(SPECIALISATION PAPERS –ELECTIVE)

Objectives

- To acquire sound theoretical understanding of Nutrition and Health.
- To know general epidemiology of communicable diseases and their control.
- To develop knowledge and skills to analyse different types of communicable diseases and their control.
- To acquire knowledge of various National and International health programmes and vital statistics.
- To know health planning in India.

UNIT I. Social Medicine – definition and scope. Nutrition and health, importance of nutrients, and their availability, deficiency disorders – their prevention and control.

UNIT II. Epidemiology – Definition, general epidimology of communicable diseases, dynamics of disease transmission, general measures of communicable disease control.

UNIT III. Study of communicable diseases such as malaria, T.B., leprosy, STD and AIDS with special reference to their incidence, causation, Prevention and treatment.

UNIT IV. Various national health programmes and their critical review. International health, occupational health and vital statistics.

UNIT V. Health Planning in India, Health care systems in India – at Central, State and District.

References:

1. Bereson, A.S. (1980). Control Communicable Diseases in Man (13^{th} ed.), New York: American Public Health Association.
2. Burn, J.L. (1959). Recent Advances in Public Health, (2^{nd} ed.), Churchill.
3. Park, K. (2004). Park's Textbook of Preventive and Social Medicine, Jabalpur, M/s.Banarsidas.
4. Susser, M.W. and Watson, W. (1962). Sociology in Medicine, London: Oxford.

306 (e). THE FAMILY – CHANGING TRENDS

(SPECIALISATION PAPERS –ELECTIVE)

Objectives

- To gain knowledge about the theoretical foundations of the institution of family and its importance.
- To develop an understanding on different types of Family and the social processes in the family.
- To orient the students with the changing forms of the family in the wake of industrialization.
- To develop insights in to the problems like marital break down and domestic violence faced by the families.

UNIT I. Family: Concept, definition, importance, functions. Perspectives on family – Marxian and functionalist views on family.

UNIT II. Types of family – joint, nuclear and extended. Family of origin and procreation. Marriage – rules of residence, social processes in the family, role relations. Impact of industrialisation on the family. Structural differentials and changing functions of family.

UNIT III. Types of families- single parent families, female-headed families, Re-marriage families – their structural characteristics, tensions and contradictions, Dual earner families, empty nest families. Alternative family systems cohabitation, singlehood.

UNIT IV. Marital breakdown – Dissertion, divorce and separation – definition, nature, extent and determinants and process.

UNIT V. Family violence – definition, .types – wife battering, child abuse, incest, sibling abuse, elder abuse.

References:

1. The Family – William Josiah Goode – Google Books
2. The Family (2nd Edition): William J. Goode : 9780133017540
3. A Sociology of Family Life : Deborah Chambers
4. Sociology of the Family : Macmillan
5. Successful Single Parenting: Gary Richmand
6. In Defense of Single – Parent Families : Nancy E. Dows : Amazon.com
7. Single Parent Families -: Kris Kissman, Jo Ann Allen- Google Books

307.(a). LABOUR LEGISLATION AND LABOUR WELFARE

(SPECIALISATION PAPERS –ELECTIVE)

Objectives

- To acquire knowledge about the labour laws that are applicable to factories, mines and plantations, contractors, and shops and establishments.
- To gain insights into the resolution of different types of industrial disputes.
- To acquire knowledge relating to labour welfare programmes undertaken in the industrial establishments.
- To develop knowledge about the labour problems and the role of social work in industry.

UNIT I. Welfare Legislation: Factories Act 1948, Mines Act 1952, Plantation Labour Act 1951, Contract Labour (Regulation and Abolition) Act 1970 and A.P.Shops and Establishments Act.

UNIT II. Industrial Relations Legislation: Industrial Disputes Act 1947; Industrial Employment (standing orders) Act 1946 and Trade Unions Act 1926.

UNIT III. Wage and Social Security Legislation; Payment of wages Act 1936, Minimum wages Act 1948; Payment of Bonus Act 1966. Payment of Gratuity Act 1972, workmen's compensation Act 1923; Employees State Insurance Act 1948, Maternity Benefit Act 1961 and Employees Provident Fund and Miscellaneous Provisions Act 1952.

UNIT IV. Labour Welfare: Concept, scope and philosophy, principles of labour welfare, Indian constitution and labour, agencies of labour welfare and their role. State, management and Trade unions. Role of ILO and ILC - Impact of ILO on labour welfare in India. Labour problems – Indebtedness, Absenteeism, Alcoholism, Personal and Family Counselling.

UNIT V. Labour welfare programmes – statutory and non-statutory, extra mural and intra mural, Central Board of Workers' Education; Workers' Cooperatives; Welfare Centers, Welfare Officers' role, status and functions. Role of social work in industry.

References:

1. Govt. of India (Ministry of Labour, 1969). Report of the Commission on Labour Welfare, New Delhi: Author.
2. Govt. of India (Ministry of Labour, 1983). Report on Royal Commission on Labour in India, New Delhi: Author.
3. Malik, P.L. (1977). Industrial Law, Lucknow: Eastern Book Company.
4. Mishra, S.N. (1990). An Introduction to Labour and Industrial Laws.
5. Moorthy, M.V. (1982). Principles of Labour Welfare, New Delhi: Oxford University Press.
6. Pant, S.C. Indian Labour Problems, Allahabad: Chaitanya Pub. House.
7. Sarma, A.M. (1988). Aspects of Labour Welfare and Social Security, New Delhi: Himalaya Publishing House.
8. Vaid, K.N. (1970). Labour Welfare in India, New Delhi: Sri Rama Centre for I.R.

307 (b). PROGRAMMES FOR THE RURAL AND TRIBAL COMMUNITY DEVELOPMENT (SPECIALISATION PAPERS –ELECTIVE)

Objectives

- To know the Constitutional provisions for local self-government and the structure and functioning of Panchayat Raj Institutions in India and Andhra Pradesh.
- To gain knowledge on rural and tribal development programmes in India.
- To understand the concept and importance of community participation.
- To enhance knowledge on professional social work practice, it's scope and application in rural and tribal community development programmes.

UNIT I. Rural Local Self Government: Origin, and development of Panchayathi Raj system in India. Salient features of 73rd Constitutional Amendment. Panchayathi Raj Institutions in Andhra Pradesh – Structure and Functions.

UNIT II. Rural Development Programmes: Early experiments of rural reconstruction – Sriniketan, Marthandom, Gurgoan, Baroda etc. Post independent projects – Nilokhiri, Faridabad, Etwah pilot projects etc. Community development programme – philosophy and objectives of community development. Community development and community organisation. Poverty alleviation programmes – implementing by the Central and State governments in rural areas, NABARD – objectives, and programmes, role of NABARD in Rural Development.

UNIT III. Tribal Development Programmes: Constitutional and legislative provisions for the development of tribals in India. Policies toward the tribals during post-Independence period. Integrated Tribal Development Agency – objectives, structure and functions. Other agencies and programmes for the tribal development in India and Andhra Pradesh .

UNIT IV. Community participation: People's participation – meaning and importance. Concept, objectives and role of self help groups. Participatory Rural Appraisal (PRA) – Concept, characteristics and methods of PRA. The use and applicability of PRA techniques in rural and tribal communities.

UNIT V. Professional Social Work Practice:- The scope of Social Work practice in Rural and Tribal Community Development. The role of non-governmental agencies in rural and tribal community development.

References:

1. Chhabra, S.S. (1983). Community Development, Delhi: Surjeet Publications.
2. Gangrade, K.D. (1986). Social Work and Development, New Delhi: Northern Book Centre.
3. Govt. of India (1987). Encyclopaedia of Social Work in India, New Delhi: Author.
4. Kurtz, L.F. (1977). Self Help and Support Groups, New Delhi: Sage.
5. Nair, T.K. (ed)(1981). Social Work Education and Social Work Practice in India, Madras: ASSWI.
6. Voluntary Action Network India (1995). State Panchayat Acts – a Critical Review, New Delhi: Author.

307 (c) CRIME, CRIMINAL LAW AND CRIMINAL POLICY

(SPECIALISATION PAPERS –ELECTIVE)

Objectives

- To understand the importance of personality factors in criminal and offender behaviour.
- To study and understand the major forms of crime.
- To understand crime in the context of individuals, community and associations.
- To gain knowledge in analysing crime statistics and identify the trends and patterns of crime.
- To study and understand the crime policy and criminal law.

UNIT I. Psychological factors in criminal and offender behaviour, emotional behaviour, habit formation and personality factors.

UNIT II. Forms of crime – professional crime, white-collar crime, organized crime, violent crime.

UNIT III. Crime and individuals – youthful offenders, denotified communities (ex criminal tribes). Decoity, recidivism, terrorism.

UNIT IV. Crime in India – Crime statistics, patterns and trends.

UNIT V. Criminal policy, criminal law – IPC and CRPC.

References:

01. Govt. of India: Crime in India, New Delhi: Author.
02. Reckless, W.C. The Crime Problem.
03. Simhadri, Y.C. (1979). Ex-Criminal Tribes of India, Delhi: National Publishing House.
04. Smith, J.C. and Hoger Brain (1992). Criminal Law, Butter Worth and Co.
05. Sutherland, E.H. and Cressary, D.R. (1968). Principles of Criminology, Bombay: Times of India Press.

307 (d). PSYCHIATRY FOR SOCIAL WORKERS

(SPECIALISATION PAPERS –ELECTIVE)

Objectives

- To understand what is personality and Freudian theory of personality development.
- To know the classification of mental disorders and the symptomtology of various psychiatric disorders
- To develop skill in case history taking in a psychiatric settings.
- To know the types and causative factors of different types of psychiatric disorders and to identify the role of social work intervention in dealing with them
- To develop understanding of various aspects of mental retardation and identify the role of social worker in dealing with it.
- To have knowledge about addictions and the role of social worker in dealing with them.
- To understand the problems of behaviour among children
- To understand the relation between Psychiatry and law.
- To know the need for knowledge of psychiatry for social workers working in the psychiatric settings.

UNIT I. Psychiatry – Definition, personality – definition, Freudian theory of personality development. Classification of mental disorders (DSM IV), symptomatology of psychiatric disorders. Case history taking in a psychiatric setting.

UNIT II. Anxiety Disorders – types, symptoms, causative factors and role of social worker; somatoform disorders- types, symptoms, causative factors and role of social worker. Schizophenia and other psychotic Disorders, mood disorders and Bi Polar disorders– types, symptoms, causative factors and role of social worker.

UNIT III. Mental retardation – Definition, causative factors, types symptoms and role of social worker. Personality disorders- types, symptoms . Addictions: drugs and alcohol, definition, symptoms, causative factors and role of social worker.

UNIT IV. Disorders usually first diagnosed in infancy, childhood or adolescence. Attention deficit and disruptive behaviour disorders, feeding and eating disorders of infancy or early childhood, Elimination disorders. Case history taking in a child psychiatry setting.

UNIT V. Psychiatry and law – Indian Luncy Act, Mental Health Act 1986. Need for the knowledge of psychiatry for social workers.

References:

1. Altschuler, J. (1997). Working with Chronic Illness – A family approach, New Delhi: Macmillan Publications.
2. Butcher, J.N., Mineka S and Hooley, J.M. (2007). Abnormal Psychology (13th ed.), New York: Pearson Allyan & Bacon.
3. Busfield, J. (1996). Men, Women and Madness, New Delhi: Macmillan Publications.
4. Caplan, G. (1964). Principles of Preventive Psychiatry, New York: Basic Books Inc.
5. First Michael B(ed) (1995) Diagnostic and statistical manual of Mental Disorders (IV edition) New Delhi: Jay Pee brothers.
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8. Prior, L. (1996). Social organisation of mental illness, New Delhi: Sage.
9. Prior, P.M. (1999). Gender and Mental Health, New Delhi: Macmillan Publications.
10. Suinn Richard, M. (1975). Fundamentals of behaviour pathology, New York: John Wiley and Sons Inc.
11. Surber, R.W. (1994). Clinical case management, New Delhi: Sage Publications.

307 (e). FAMILY WELFARE – STRATEGIES AND INTERVENTIONS

(SPECIALISATION PAPERS –ELECTIVE)

Objectives

- Gain knowledge about nature, scope and importance of family welfare, family policy and family well-being.
- Acquire knowledge of laws related to women's issues.
- Understand various aspects related to family life education.
- Acquire knowledge about strategies for intervention.
- Understand the various state, national and international initiatives for family welfare.

UNIT I. Family Welfare – Definition, nature, scope and importance. Family policy, family wellbeing.

UNIT II. Legislation relating to family, marriage, inheritance, dowry, divorce and violence against women.

UNIT III. Family Life Education - Definition, nature, content, principles. Types of family life education – parent education, sex education, education for family resource management, marriage and intimate relationship, major issues and challenges to family life education.

UNIT IV. Strategies for Intervention: Family service agencies – role and functions. Pre marital and marital counselling, counselling couples before and after divorce. Family crisis intervention, family therapy, family advocacy. Use of social work methods. Case presentations.

UNIT V. Initiatives for family welfare– state, national and international.

References:

1. Andrian & James, et. al. (1988). Social Work in family procedure – practice guide, Routledge Publications.
2. Arcus Margaret, E., Schvaneveldl Jay D. Joel Moss (1993). Handbook of Family Life Education, Delhi: Sage Publications, Vol.I and II.
3. Gelles: Intimate Violence, New Delhi: Sage Publications.
4. Hansen, M. & Harway, M. (1993). Battering and Family Therapy, Delhi: Sage Publications.
5. Holaling Gerald, T. et. al. (1988). Coping with family violence, Delhi: Sage Publications.
6. Kirkwood Catherine (1993). Leaving Abusive Partners, Delhi: Sage Publications.

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Koenig A.J. and Holbrook M.C. (Eds.) (2000). Foundations of Education (2nd Ed.), Vol. II, instructional strategies for Teaching Children and Youths with Visual Impairments, New York; AFB Press.

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Punani .B. and Rawal .N. (1993). Handbook: Visual Handicap. New Delhi: Ashish Publishing House.

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Henley Martin & Ramsey .S. Roberta (1993). Characteristics and Strategies for Teaching Students with mild Disabilities. U.S.A. : Allyn & Bocon.

Usha Rani, P. (1988). Down's syndrome, New Delhi; Vijay Printers.

Muthaiah, N. (2001) Education of Low Vision Children with Associated Disabilities in Mani, M.N.G., (Ed.) Booklet on Education of Low Vision Children. B.Ed. (SE-DE) Programme, Bhopal: Madhya Pradesh Bhoj (Open) University.

Narayanan, J. (2001) Curriculum for Persons with Severe / Profound Mental Retardation and Multiple Disabilities in Booklet on Curriculum Guidelines in Mental Retardation. B.Ed. (SE-DE) Programme, Bhopal: Madhya Pradesh Bhoj (Open) University.

Narayanan, J. (2001) Booklet on Motor and Communication Aspects -Role of Multidisciplinary Team. B.Ed. (SE-DE) Programme, Bhopal : Madhya Pradesh Bhoj (Open) University.

Norris Meriel, (1997). Rehabilitation Therapy Assistant Manual. Bangalore; Rehabilitation, Research and Training centre.

FOURTH SEMESTER
401.DEVELOPMENT ADMINISTRATION (CORE)

Objectives

- Gain knowledge about organizations life cycle, governing ideas and sustainability.
- Acquire knowledge and skills in the different aspects of management of non-governmental organizations.
- Acquire knowledge about Project management and proposal writing.

UNIT I. Human Service Organisation's – their characteristics like size, nature and design – origin and growth of organisations as response to social needs – External environment.

UNIT II. Management of human service organisations: Governance and administration – Executive Board, General Body – other functionaries – roles and inter relationship; Team building; Strategic planning for NGO's: Meaning, basic principles and processes; internal implications.

UNIT III. Development – Meaning and approaches, Development actors, Participatory Development – Meaning and Principles – Participation and governance.

UNIT IV. Organisational governance – Vision Mission and goals. Developing and implementing a promotional plan. Role of NGOs in Development Administration.

UNIT V. Project Management: Elements of project planning and development, Community Participation – Micro – Planning: Participatory research – Methodologies Principles and implecations of P.R and P.d for social development

References

1. Denver, J.C. (1979). Office Administration, Plymouth, Mac Donald and Evans.
2. Drucker, P. (1990). Managing the Non-profit Organisations, NY: Karper Collins.
3. Hurt, Karen (2003). Promoting your Organisation, CIVICUS toolkit, <www.civicus.org. >
4. Kandaswamy (1986). Governance and Financial Management in Non-profit Organisations – A reference Manual, New Delhi: Caritas India.
5. Leigh, Andrew (1996). 20 ways to Manage Better (2nd ed.), Hyderabad: University Press.
6. Mohanty, M. and Singh, A.K. (Eds.) (2002). Volunteerism and Government: policy, programmes and assistance, New Delhi: VANI.
7. Mohanty, M. and Singh, A.K. (Eds.) (2002). Foreign aid and NGOs, New Delhi: VANI.
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9. Shapiro, Janet (2003). Monitoring and Evaluation, CIVICUS toolkit, www.civicus.org.
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12. Thomas, A. (1996). What is Development Management: Journal of International Development 8(1), 95-110.
13. Thomas, A. et al (1998). Finding out Fast: Investigative skills for policy and development, New Delhi: Sage
14. Weiner, M. (1982). Human Service Management, Illinois, The Dorsey Press.

402: Corporate Social Responsibility (CORE)

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Objectives:

- Develop a holistic understanding of the concept CSR
- Gain adequate knowledge on CSR Policy
- Understand global perspectives on CSR practices
- Know various CSR practices in India and Andhra Pradesh through case study

UNIT: I Corporate Social Responsibility, Concept, definition and Scope Need and significance of CSR, principles and issues.

UNIT – II Social Responsibilities of Corporate Sector, Interest groups related to CSR, Drivers, Tools and Benefits of CSR. CSR in reduction of Poverty.

UNIT – III Designing a CSR policy, factors influencing CSR policy, managing CSR in an organization, social auditing, Global recognitions of CSR – ISO 14000, SA 8000, AA 1000, codes formulated by UN Global compact, UNDP, Global reporting initiative.

UNIT – IV Global perspective of CSR, History of CSR in India, CSR Activities in Andhra Pradesh carried out by different corporate giants and their outcomes, CSR Projects in primary, secondary and service sector.

UNIT – V CSR implementation and Directives of G+overnment, Need assessment surveys, execution Monitoring and evaluation of CSR projects, People's participation, CSR Networking with NGO's, Civil Societies and Government

References

Anil Prasad Bandela and R.D. Sampath Kumar 2013. Corporate Social Responsibility: A Perspective : Mohit publications, New Delhi
Bradshaw, T.and D. Vegel. 1981. Corporations and their Critics: Issues and Answers to the problems of Corporate Social Responsibility, New York: McGraw Hill Book Company.
Brummer, J.J. 1991. Corporate Social Responsibility and legitimacy – An Interdisciplinary Analysis, Westport, CT: Greenwood Press.
Cannon, T. 1992. . Corporate Social Responsibility (is ted.) London: Pitman Publishing
Grace, D. and S. Cohen 2005. Business Ethics: Australian Problems and cases. Oxford: Oxford University Press
Reddy, Sumati and Stefan Seuring. 2004. Corporate Social Responsibility: Sustainable Supply Chains. Hyderabad: ICFAI University Press.

403 (A) DISASTER MANAGEMENT AND ENVIRONMENTAL SOCIAL WORK (ELECTIVE)

Objectives:

- Dissemination of knowledge on Environmental issues
- Create understanding about disaster management
- Explain the role of stakeholders in environmental protection
- Study of relevant acts and cases related to environmental issues

UNIT I. Disaster concept, meaning, definition, significance; major disaster events in India and the world; types of disasters – natural disasters: famine, drought flood, cyclone, tsunami, earthquake; man-made disasters: riots, blasts, industrial, militancy, displacement; causes, effects & impact and interventions.

UNIT II. Disaster mitigation and disaster management – Profile, forms and reduction of vulnerability; pre-disaster; concept and principles of disaster mitigation and disaster management; risk assessment; prevention; preparedness; education & awareness.

UNIT IV. Disaster process: Concept and components of relief, reconstruction; rehabilitation; major issues and dynamics in the administration of relief, reconstruction and rehabilitation; short-term & long-term plans; community participation: objectives, prerequisites and constraints; resource mobilization.

UNIT III. Disaster and intervention opportunities: Disaster policy in India; disaster management act of 2005; national and international agencies: NDMA, NIDM NCMC; UN, UNDRO, UNESCO, UNDP; role of NGOs, media, defence; role of social workers and intervention strategies; case studies: Bhopal gas tragedy, Gujarat & Marathwada earthquakes, Orissa super cyclone, 2004, tsunami.

UNIT :IV - Environment: Meaning and Concept. Ecology: Definition, Principles and scope - Ecological imbalances. Ecological Sustainability; Environmental Education and Awareness: Environmental problems a and its causative factors. Over population, Food, Health and Energy security. N negative side of Green Revolution, Desertification and deforestation, Climate changed its effect

UNIT:V- Conservation and Management: Conventions on Biological diversity, Aims and Objectives, Conservation strategies and legislations-Forest and Environment Protection Acts, Wildlife (Protection), National Wildlife Action Plan. Biodiversity Act, 2002.

403 (B) Project Report

404 : SHGs and MICRO CREDITS

Objectives

- Understand the evolution and role of SHGs and micro-credit in alleviating poverty
- Develop the Knowledge and skills to promote and strengthen SHGs and microenterprises.
- Develop understanding about micro finance institutions

Unit I. Concept and contextualisation of poverty: trends, profiles of poverty-rural,urban and tribal -gender dimension of poverty – Credit needs of the Poor – Formal and informal sources characteristics; Empowering through microcredit and SHGs as a poverty alleviation initiative; Concept of self-help; Microcreditand self-help-emergence of SHG model – different models- Grameena system – critical evaluation.

Unit II. Preparation and group building – Life cycle of SHG; 4-stage model of SHGs development – group configuration, leadership, framing rules/bylaws, application of social group work skills in group building and stabilizing Basic Principles of Self Help groups - Norms for functioning - (*homogeneity,regularity in savings and internal lending, financial management, audit, bookkeeping, governance mechanisms, conduct of meetings, group control,conflict resolution, participation in community issues, and vision and mission building*); characteristics of a good SHG, Rural and urban differentials. SHGs: Case studies and success stories. SHG-Bank linkage Programme – RBI/NABARD guidelines for linkage of SHGs - role and importance of NABARD in the SHG movement

Unit III. Federating SHGs, and advantages; Levels: Village/ward, Mandal and District; Mutually Aided Co-operative Societies (MACS); Different models – Cooperative Development Forum (CDF), Mysore Resettlement and Development Agency (MYRADA), Development of Humane Action foundation (DHAN),Professional Assistance for Development Action (PRADAN), Kutumbasree, SAPAP and Velugu / Indira Kranti Pathakam (IKP).SHGs and entrepreneurship; qualities of a social entrepreneur; services needed to promote and build SHG –led Micro-enterprises - challenges.

Unit IV. Rating of SHGs – Need and significance; Procedures and methods, role of NABARD in developing assessment methods – Critical Rating Index (CRI); Capacity Building of SHGs – Issues; Trainings and Exposure visits – Training Needs Assessment. Best practices in SHGs.

Unit V. Micro Finance: Concept and historical emergence- models - Role of Micro finance in Poverty alleviation; Micro Finance Institutions (MFIs) – and related organizations in India and Andhra Pradesh – Rashtriya Mahila Kosh (RMK), RBI, Banks, National Bank for Agriculture and Rural Development (NABARD), Small Industries Development Bank of India (SIDBI) and other models- BASIX, Grameena Bank etc.

References

1. BASIX (1999), Case studies on select micro-finance institutions in India (study produced for the International Fund for Agriculture Development), Hyderabad BASIX.
2. CARE & STEP (2004). *Swayam Sahayaka Sanghala Sikshana Karadeepika*, Hyderabad, Ministry of Rural Development, A.P.
3. CDF (1999). Member participation in new generation thrift cooperatives around Warangal Town in Andhra Pradesh, 1997, Hyderabad: Author
4. Cooperative Development Foundation (1999). Set of books of SHGs (5 Volumes) Hyderabad: Books for change.
5. Devi Prasad, B (Ed.) (2006). Manual for Women's SHGs *(Mahila Swayamsahayaka Podupu Sanghala manual),* Visakhapatnam: Dept of Social Work, UGC DRS Programme.
6. Devi Prasad.B and Haranath .S (2004) "- Micro credit through self help groups: A strategy in poverty Alleviation in G. Rama Chandrudu and M. Prasad Rao:(Eds). *Census-2001 and Human Development in India*. New Delhi, Serialspublication.
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16. NABARD (2000). NABARD and Micro finance, Mumbai: Author.
17. Nair, A (2001). Sustainability of Micro finance Self Help Groups in India: Would federating Help? Paper submitted to Woodrow Wilson School of Public and International Affairs Princeton University.

Course : 405.SOCIAL WORK WITH HIV*/AIDS

Objectives:

• To understand the various clinical and epidemiological aspects, extent and spread of HIV in India and its consequences to public health.

• To understand pre and post test counselling. Have knowledge about behavior change.

• To understand psycho- social impact of HIV on the infected and affected persons. To develop knowledge about community based services.

• To have knowledge about issues related to HIV/AIDS such as stigma, discrimination and informed consent.

• To develop knowledge about communication strategies for HIV/AIDSprevention, care and management.

• Appreciate and appraise critically the policies, programmes and advocacy trategies of various national and inter-national organizations in the field of

HIV/AIDS.

• To understand the role of Social Worker in the field of HIV/AIDS.

• Acquire skills in understanding research studies pertaining to HIV*/AIDS,develop capacity to formulate research proposals regarding them.

UNIT I. History of the Virus, clinical and epidemiological aspects, Modes oftransmission. Magnitude of the problem in India and the world, surveillancemechanisms, implication to public health, Perceived risk and high-risk behaviour,Targeting unique population; Trafficking, Implications for HIV*/AIDS. Role of UN AIDS, NACO, SACS, NGOs and media.

UNIT II. Psychological impact of HIV+/AIDs on families and individuals with special reference to women and children, people living with AIDS (PLWA) CLHASand CAAS- problems and needs. Issues related to stigma and discrimination, informedconsent, professional ethics. Support groups (positive groups) community services.

UNIT III. Testing for HIV/AIDS; Different tests and their implications – VCTS,PPTCTS and related services – communication strategies; policies related to AIDSprevention, care and management.

UNIT IV. Counselling as an intervention strategy. Preventive, Counselling:Risk assessment and risk reduction, Counselling skills. Pre and Post test Counselling:Crisis counselling, dealing with disclosure – children and adults-skills. Supportivecounselling: living with HIV/AIDS-individual, family, community levels, ethical issues in HIV/AIDS counselling; Role of Social Worker.

UNIT V. Understanding and utilization of Research: The students will examine at least two empirical studies in the areas of HIV+/AIDS and they are expectedto examine these studies in terms of objectives, research design, tools used for datacollection, presentation of results, analysis and use of statistical methods etc. In thisunit, the students may be asked to write in their examinations of a review a researchstudy with reference to aspects covering the above areas or research in the field i.e.,

HIV+/AIDS.

References

1. Gracious, Thomas, et. al. (1997). AIDS, Social Work and Law, New Delhi:Rawat Publications.
2. Premilla, D' Cruz (2004). Family Care in HIV/AIDS – Exploring livedexperiences, New Delhi: Sage Publications.
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406 (a). INDUSTRIAL RELATIONS AND TRADE UNIONS (SPECIALISATION PAPER – ELECTIVE)

Objectives

- To acquire a sound theoretical knowledge regarding the concept, origin and perspectives on industrial Relations.
- To develop knowledge and skill to analyse Labour Management Cooperation in India.
- To acquire skills of Industrial Relations Mechinary.
- To know the concept, objectives, origin, and growth of trade unions and their social responsibilities.
- To acquire knowledge about Management of Trade Union in India.

UNIT I. Industrial Relations and Trade Unions: Concept, origin, development and determinants. Perspectives on industrial relations. Marxian approach, Gandhian approach, Human relations approach, development systems approach. International labour organisation and Indian Labour Conference.

UNIT II. Labour Management Cooperation in India; Works Committees, Joint Management Councils, Workers Participation in Management, Collective Bargaining Employee grievance redressal system. Industrial conflict and its causes.

UNIT III. Industrial Relations Machinery: Conciliation, mediation, adjudication, voluntary arbitration, code of conduct, code of discipline, unfair labour practices.

UNIT IV. Trade Unions: Concept and objectives, origin and growth of labour and trade unions movement. Trade unions in contemporary society. Emerging trends in unionisation in India. Trade union and social responsibility.

UNIT V. Management of Trade unions in India: Registration, structure, functions, membership, union security, leadership, trade union disputes, union finances, union elections, promotion of trade unions. Role of trade unions in Industrial Relations.

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406 (b). STRUCTURE OF URBAN COMMUNITY

(SPECIALISATION PAPERS –ELECTIVE)

Objectives

- To acquire knowledge on urban community and its features.
- To understand the process of urbanization.
- To enhance knowledge about Urban social organizations
- To know about urban local self-government and its types.
- To know the role of urban development authorities in Andhra Pradesh.

UNIT I. Urban Community: Concepts of urban, urbanisation and urbanism. Major features of urban community. Differences between rural and urban communities.

UNIT II. Urbanisation: Trends in India's urbanisation. Causes and consequences of urbanisation. Classification and growth of towns and cities in India. Urbanisation in Andhra Pradesh. .

UNIT III. Urban Social Organisation: Urbanisation and Social Institutions. The family, caste and class, economic and religious aspects of urban communities.

UNIT IV. Urban local self-government: Significance of municipal administration. Types of urban local self governments – Municipalities, Municipal Corporations, Cantonment Boards, etc. – their composition, powers and functions. The salient features of 74th amendment to the Constitution of India.

UNIT V. Urban Development Authorities: The origin and growth of urban development authority in Andhra Pradesh. The objective, structure, powers and functions of urban development authorities, co-ordination with the other agencies in Urban areas.

References

1. Anderson, N.L. and Iswaran, K. (1965). Urban Sociology, Mumbai: Asia Publication House.
2. Bose, Ashish (1973). Studies in India's Urbanisation 1970-71, Mumbai: Tata Mcgraw Hill.
3. Desai, A.R. et. al. (Ed.) (1970). Slums and Urbanisation, Mumbai: Popular Prakashan.
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406 (c). PENOLOGY, CUSTODIAL INSTITUTIONS AND LEGISLATION (SPECIALISATION PAPERS –ELECTIVE)

Objectives

- To study and understand the basics concepts, theories and forms of punishment.
- To have knowledge about the history and development of custodial institutions.
- To gain knowledge about the prison system and reforms pertaining to it.
- To understand the various institutional services established for different category of convicts.
- To study an examine the important legislative provisions available for the treatment of offenders

UNIT I. Punishment – definition, nature, meaning, theories of punishment. Types of punishment – corporal and capital punishment.

UNIT II. Imprisonment – emergence and development of custodial institutions.

UNIT III. Prison as a Community, classification of prisoners. Modern objectives of imprisonment. Prison programmes and objectives; Prison reforms committees.

UNIT IV. Administrative functioning, programmes and limitations of open prisons, Borstal schools, certified schools, reformatory schools, remand homes, observation homes, juvenile homes and special homes.

UNIT V. Legislation – Borstal school Act, Juvenile justice Act, Probation of offenders Act, Prison Act, Prisoner's Act, Immoral Traffic Prevention Act. UN Standard minimum rules for the treatment of prisoners.

References

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3. Maguire, M. et. al. (1985). Accountability and Prisons – opening up a closed world, London: Tavistock.
4. Relevant Acts.

406 (d). MEDICAL SOCIAL WORK (SPECIALISATION PAPERS –ELECTIVE)

Objectives

- To acquire a clear understanding of medical Social Work.
- To develop knowledge regarding hospital as a complex social system of organization.
- To acquire skills regarding the role of social workers in relation to patient and family.
- To develop communication skills in hospital settings.
- To acquire a sound theoretical understanding on Health Education.

UNIT I. Medical Social Work – Definition and Meaning: Historical development of medical social work in USA and India.

UNIT II. Hospital: A complex social system of organisation – its goals, social structure and functions. Organisation and Management of social work department in Hospitals.

UNIT III. Role of social worker in relation to patient and family. Role of medical social worker in the field of STD, HIV*/AIDS, TB, Leprosy and Cancer.

UNIT IV. Communication in Hospital – Medical social worker as a communicator and interpreter, Role of medical social worker in treatment plan. Specific social work interventions in a medical setting.

UNIT V. Health education – definition, objectives, principles, content, stages of adoption of new practices. Health education as a tool for social worker; People's participation in health and the role of medical social worker.

References

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2. Dwivedi, R.S. Human Relations and Organisational Behaviour.
3. Fergusion, T. & Machpail, A.N. Hospital and Community.
4. Friedlander, W.A. Introduction to Social Welfare
5. Johnson, J.L. & Grant, G.Jr.(eds.) (2005). Medical Social Work, New York: Pearson, Allyn and Bacon.
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8. Pathak, S.H. Medical Social Work in India.
9. Prasad, L.M. Organisation Theory and Behaviour.
10. Stroup, H.H. Social Work – An Introduction to the Field.

406 (e). CHILD WELFARE

SPECIALISATION PAPER –ELECTIVE)

Objectives

- To have knowledge about fundamental concepts pertaining to child.
- To understand the factors influencing the development of personality among children.
- To study and understand the needs and problems of various categories of children
- To gain knowledge about the provisions related to various categories of children.
- To develop ability to practice strategies to work with vulnerable children.
- To practice social work knowledge, skills, techniques and interventions in different child focused settings.

UNIT I. Child – concept, definition stages, physical, educational, social needs specific to different stages of childhood. Personality development – Influence of heredity and environment – Family, peer group, neighbourhood, and school.

UNIT II. Child Population in India – profile, trends, health, nutrition, literacy, morbidity and mortality rates. Socio-cultural, psycho-social, economic and political perspectives for understanding the problems of children in India and other developing countries.

UNIT III. Problems of Children: Child abuse and neglect – causes and effects, juvenile delinquency – definition, meaning, causes. Theories – the problems of street children, girl child, child labour.

UNIT IV. Child Welfare: Concept, definition, nature, principles. Foster care, adoption, crèche, child guidance clinics. Institutional/Non-Institutional services for those needing special services – orphans, street children, child labour, handicapped and delinquents. Social Work practice with children. ICDS, SOS, CSWB, CRY, UNICEF, CHILDLINE.

UNIT V. Constitutional provisions relating to child welfare; Laws – Juvenile justice Act, Child Labour Prohibition and Regulation Act 1986, Bonded Labour Act, National Policy on Children. UN Declaration of rights of children.

References

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2. Centre for Learning, Innovation (2006): A Basic Introduction to Child Development Theories, New South Wales
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8. Govt of India: Planning Commission Reports, Publication Division, New Delhi
9. Govt. Of India: Rights of the Child: A Committment, Dept. of W&CD, MHRD, New Delhi
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11. Kapoor Malavika (1995). Mental Health and Indian Children, Delhi: Sage Publications.
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13. NIPCCD: Relevant Publications and Reports on Children, New Delhi
14. UNICEF: Relevant Publications and Reports on Children.

407 (a). ORGANISATIONAL BEHAVIOUR

SPECIALISATION PAPER –ELECTIVE)

Objectives

- To acquire a sound theoretical understanding of organizational Behaviour.
- To know how the people at work in an organization could be motivated to work together in harmony.
- To orient the student about how to integrate social sciences as they affect people at work.
- To understand organizations as social systems where people function as total human beings with respect and dignity.

UNIT I. Organisational Behaviour – Definition, fundamental concepts, scope and approaches. Historical perspective of organisational behaviour. Scientific management. Human Relations' Movement, Behaviourism.

UNIT II. Motivation for work: Theories of Maslow, McGnegor, Herzberg and Vroomm, Job satisfaction, stress, fatigue, monotony, boredom, frustration, accident proneness, alienation and anomie. Job enrichment. Job enlargement.

UNIT III. Leadership Theories; Decision making in the organisation. Decision-making – techniques and process. Critical evaluation of contributions of Chris Argwins, Rensis, Likerton, Peter Drucker, Black and Mounton.

UNIT IV. Management of Conflict and related concepts: Role, sources and manifestation. Frustration. The process of model conflict. Diagnosis and intervention, conflict management. Transactional analysis.

UNIT V. Communication: Concept, nature, significance and process. Communication networks. Communication barriers and effective communications system. Organisational change and system development. Nature and levels of change. Managing planned change. Organisational development - characteristics process and intervention.

References

1. Davis Keith. Human Behaviour at work, New Delhi: Tata Mcgraw Hill Publishers.
2. Dwivedi, R.S. Human Relations and Organisational Behaviour, New Delhi: McMillan India Limited.
3. Luthans Fred. Organisational Behaviour, Tokyo: Mcgraw Hill Publishers.
4. Robbins Stephen, P. Organisational Behaviour, New Delhi: Prentice Hall of India.
5. Tyagi Archana. Organisational Behaviour, New Delhi: Excel Books.

407 (b). URBAN COMMUNITY – PROBLEMS AND SERVICES

SPECIALISATION PAPER –ELECTIVE)

Objectives

- To understand the different problems of the urban community.
- To know the concept of migration and its impact on urban community
- To gain knowledge on agencies working for urban community development and services available for the welfare of women, children, slum dwellers, etc.
- To know the scope of professional social work practice in urban community development and acquire knowledge and skills pertaining to it.

UNIT I. Problems of Urban community: Definition and characteristics and growth of slums in urban areas. Causes and consequences of growth of slums.

UNIT II. Migration – concept, types, causes and impact of migration. Urban poverty, housing, civic amenities in urban areas. Pollution – types causes

UNIT III. Agencies working for urban community development: concept, objectives and programmes of Delhi, Hyderabad and Visakhapatnam UCD Projects.

UNIT IV. Programmes for urban community: Programmes for the urban community development – The Government and Government of Andhra Pradesh – JNNURM, SJSRY etc. Programmes for women and children, marginalized sections etc.

UNIT V. Professional Social Work Practice. The scope of social work practice in urban community development. The role of non-governmental agencies in urban community development. Scope and importance of peoples participation in urban community development. Factors hindering or promoting people's participation.

References

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407 (c). CORRECTIONAL ADMINISTRATION AND SOCIAL DEFENCE

SPECIALISATION PAPER –ELECTIVE)

Objectives

- To study and understand the basic elements of correctional methods and approaches.
- To get familiarity with the Indian police system.
- To gain knowledge on the provisions of judicial system.
- To understand various aspects related to Social Defence.
- To study and identify the practices of non-institutional services
- To acquire skills of correctional social work and understand the role of professional social workers in correctional institutions.

UNIT I. Correctional Administration: Definition, philosophy, objectives, methods and approaches of contemporary correctional social work. Origin, development and functions of police in India.

UNIT II. Criminal Justice System: Courts a

nd correctional administration. Hierarchy of courts, functions and powers. Lok Adalats, Lokayukta, Legal Aid, Functions of law commission.

UNIT III. Social Defence: Meaning, development, and functions of social defence. NISD – objectives and functions. The significance of NISD. Crime prevention strategies.

UNIT IV. Probation and Parole: Origin, nature, process and practice of pobation and parole in India. Meaning, development and organisation of aftercare in India.

UNIT V. Correctional Social Work: Correctional Social Work in India. Human Rights and correctional services. The role of professional social workers in correctional institution.

References

1. Alan Vand, K. Criminal Justice System – Readings.
2. Bedi Kiran: (1998). Its Always Possible, Sterling.
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4. Glasser, D. Criminology.
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6. NISD. Social Defence Reports, New Delhi: Author.
7. Shaw Jyostna. Probation Services in India.
8. Smykla, J. Community based Corrections.
9. Tappan Paul, W. Contemporary Corrections.

407 (d). PSYCHIATRIC SOCIAL WORK

Objectives

- Understand the history of psychiatric Social Work
- To develop knowledge about the role of psychiatric social worker in various settings in relation to the patients and their families.
- To appreciate the need for multi disciplinary approach.
- To understand the nature of rehabilitation in a psychiatric setting.
- To have knowledge of various types, techniques of and steps in psychotherapy.
- To understand the concept of community mental health and importance of community mental health as an alternative to institutionalisation.
- To develop knowledge about intervention strategies unique to social work in the field of psychiatry
- To know about mental health programmes and mental health Acts pertaining to India.

UNIT I. Psychiatric Social Work: Definition and its meaning. Growth of psychiatric social work in USA, UK and India. Role of psychiatric social work in child guidance clinic, psychiatric clinics and hospitals for the mentally ill: Role of social worker in relation to patient and family in a psychiatric setting.

UNIT II. The multi dimensional nature of human problems. Concept of team work Multi-disciplinary approach; Rehabilitation – Definition need for and nature of Rehabilitation in psychiatric settings.

UNIT III. Psychotherapy – Types of Psychotherapy – Techniques of psychotherapy – steps in the process of psychotherapy.

UNIT IV. Community mental health – definition – levels of prevention; community mental health as an alternative to institutionalisation.

UNIT V. Approaches unique to social work – case work, supportive treatment, use of resources, building social support, social skill learning, milieu therapy; mental health programmes and related Acts in India.

References

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2. French, Louismeredith (1940). Psychiatric Social Work, London: Geoffrey Cumberlege, Oxford University Press.
3. Herbert, S. Strean. The Social Worker as Psychotherapist.
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6. Sphry, L., Carlson, J. and Diane K.Jose (2003). Becoming an Effective Therapist, New York: Allyn & Bacon.

407 (e). WOMEN AND DEVELOPMENT

SPECIALISATION PAPER – (ELECTIVE)

Objectives

- Understand demography in relation to sex ratio.
- Develop knowledge about sexual division of labour and its various theoretical perspectives.
- Know the difference between sex and gender.
- Acquire knowledge about the issues and problems related to women.
- Understand women in difficult situations.
- To acquire knowledge about various aspects of violence on women.
- Understand provisions- both constitutional and legal for empowering women. Also to understand national and international initiatives with reference to women empowerment.

UNIT I. Demographic composition of women: Sex ratio, Regional variation in sex ratio. Implications of the declining sex ratio. Changing perspectives of the roles and obligations of the women through history.

UNIT II. Sexual Division of Labour. Functional, Marxist and feminist perspectives, concepts of gender and sex.

UNIT III. Issues related to women: Health, Education, Employment, Self-employment – Types and specific problems. Political participation, environment, women in difficult situations.

UNIT IV. Violence against women: Legislation relating to women foeticide, infanticide, child marriage, rape, wife battering, sati, dowry death, sexual harassment.

UNIT V. Empowerment of Women: Constitutional guarantees, legal provisions, Property Rights, Mahila Courts, Women Police Stations, Women's Commissions – National, State, Self help groups – DWACRA, DWACUA, International Initiatives, National State Government Developmental programmes for women, National Policy for the empowerment of Women.

References

1. Brook, E. and Davis Ann (1985). Women, the Family and Social Work, London: Tavistok Publications.
2. Everett, J. Women and Social Change in India.
3. Govt. of India (1974). Towards Equality – a report of the committee on status of women in India, Delhi: Author.
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Field Work Manual For M.A. Social Work

DEPARTMENT OF SOCIAL WORK
ANDHRA UNIVERSITY
VISAKHAPATNAM
ANDHRA PRADESH
INDIA

Effective from 2015-2016 admitted batch

Field Work is an integral part of social work education, and supervised field work is the core of Social Work Education. It aims to sensitize the student to social realities and problems related to individuals, groups, communities and society at large, and develop a humane approach in dealing with the clientele. Field Work training provides practical orientation to the social situations and problems and integrates theories into practice. It helps the student to develop professional skills and practice in the field setting so as to enable the student to acquire professional competencies and values. Social Work practice has been conceived in a wider perspective and includes enabling people in difficult situations to deal with those situations and administering needed welfare services to them. The social work education believes that the professional competence required for such practice, and develops when the student makes an integrated use of knowledge, acquired through various class room instruction and other sources, translates it into appropriate skills and develops an attitude suited to it. This development primarily takes place in the field when the student is involved in working with people at the field level. While doing so, student's total personality is actively involved in trying to meet the various intellectual and emotional demands – relating to clients who are under stress; relating to faculty supervisor who is there to educate the student; and relating to agency personnel and other professional persons, etc., of the situations.

In this dynamic and multidimensional relationship, the student learns to function as a professional person. The students' field work training is oriented wherein social work concepts, values and principles are deepened and broadened. All this makes field work in social work education a pattern setting and growth fostering process. The ways and means of involvement of the student in this process is very significant.

The specific purposes of field work placement regardless of the setting can be defined in terms of essential components of this learning and helping situation. They are:

i. Helping process
ii. Agency structure and functions where social work is practiced, and
iii. Community concern reflected in social policies and practices

The following are the specific objectives set for field instruction in each of these areas mentioned above.

I. Specific objectives of field instruction in a helping process:

1. To give actual experience, and not a just observation to the student but working with or helping people.
2. To enable the student to use, and also to acquire wherever needed, knowledge (including knowledge of himself/herself) in a disciplined way in relationship with another person or persons.

3. To help the student to practice the concepts, principles and values of social work profession in such a way that these are meaningfully related and adapted to the socio-cultural background of a given situation.
4. To test and experience oneself as a helping person in a helping agency so that the student can transform himself/herself as a professional social worker. This experience should be constantly related to broad social purposes and forces.

II. Specific objectives of field instruction in relation to Agency structure and functions:

Agency is an important component of enabling process, of helping people to help themselves. This enabling process consists of intervening in situations through specific inputs in the form of services. As services have to be administered, helping is also a process of administering. The experience of administering services can be given to a student by placing in an agency and help the student to work as part of the agency administration. In this context, the goals set for training of the student are:

1. To understand and evaluate agency structure, functions, policies as well as practices and to relate to them in a positive and imaginative way, in the role of help giver.
2. To give the student an experience of teamwork and to make use of, and respond to the authority of each other. This goal will be achieved when the student is involved in the decision making process of the agency and feels identified with it.
3. To enable the student to work under an administrative setting and to help in carrying out professional task as well in orienting and educating others regarding the profession.
4. To give the student adequate experience of working with voluntary workers and non-governmental agencies, to accept and respect them and to develop capacity for net working with them for professional functioning.
5. To enable the student to relate his/her feelings and understanding to the demands of clients, to the agency policies and procedures, to professional standards, and to learn to understand, and interpret each in terms of the other.
6. In many fields of social work, there are gaps between services available and needs of the clients. Hence, there is a need to organize services, then to administer them. In such situations field work enables students to appraise these gaps and to develop skills in the organization of services.

III. Specific objectives of field instruction in relation to community concerns reflected in social policies and practices:

The existence of a social agency in a community reflects the concern of the people in that community with regard to a social situation or problem or an unmet need. Hence, the social work student must have a 'feel' of the community. Social work practice is highly indigenous as its practice situation emerges from a specific social-cultural milieu. Field placements must help the students to perceive and develop this perspective and enable them to see meanings and correlation in ones work and an understanding appreciation of social policies and practices with reference to the social problem under consideration as well as those in general. In order to achieve this, the goals of field work placement in relation to community concerns reflected in social policies and practices are:

1. To enable the student to continuously relate to professional goals and agency functions in the broad social purposes and practices, to examine their adequacy or otherwise and if needed to assess the need for change.

2. As a natural corollary of this goal, the student should be involved in educating the community, in evaluating social provisions and in contributing to the development of new standards and values.

3. To help students to know various types of community resources, internal and external and develop the competence to appreciate their use and to mobilise the resources in the problem solving task. The student should understand the interrelationships that exist between different agencies in a community and work to promote inter agency coordination and collaboration.

Thus, the above are the core goals of field placement, irrespective of the method used or the area of specialization.

TYPES OF FIELD WORK

The Department organizes field work for the students which include Observational Visits in first semester; Concurrent Field Work in first and second semesters (in first year); Consecutive Field Work in third and fourth semesters (in final year); and Block Field Work at the end of fourth semester. In addition, the Department conducts a ten-day Rural Camp.

Observational visits:

During the first semester, prior to the commencement of concurrent field work, the Department arranges observational visits. The first two-weeks in first semester are spent for providing opportunity to the students to visit various social welfare organizations. This is to enable the students to have an exposure and orientation to the services being offered by various organizations and societies as a response to peoples' needs

The specific objectives of the observational visits are:

1. To get exposed to social welfare organizations.

2. To understand agency's objectives, organizational structure and programmes.

3. To understand the problems and constraints faced by the organization.

4. To develop skills in observation and reporting.

These visits are arranged covering institutions in the fields of mental health, correctional administration, differently abled, family and child welfare, etc. Students are oriented about the nature of organization and importance of observation visits besides, recording.

Concurrent Field Work and Consecutive Field Work:

Concurrent field work (in first year) and Consecutive field work (in final year) provide an opportunity to the students to use social work methods that they learned during classroom teaching. The students are placed for their field work practice in an agency or a community.

Duration of Field Work:

In first and second semester, each student has to do 16 hours of concurrent field work, ie, from Monday to Thursday (4 days), during afternoons. In third and fourth semesters the duration of consecutive field work is four weeks, which is scheduled at the end of theory classes. Consecutive field work will be organized on Monday to Friday.

Attendance:

The students are expected to put in a minimum of 75% attendance for concurrent and consecutive field work, failing which they shall not be evaluated at the end of each semester. However, those students whose attendance is in between 66% and 75% are eligible for field work evaluation only after completing compensatory field work. Those students whose attendance in field work is below 66% have to repeat the total field work specific to that semester.

Leave:

The student can avail 3 days of leave during each semester with prior approval from Faculty Supervisor and Head of the Department, failing which the absence from field is considered as 'absent'. Such absences shall be taken into consideration during evaluation.

Selection of the agency/ community for field placement depends on
(a.) Agency's / community's capacity to provide opportunities for experimental

learning to the students, and

(b) Cooperation extended by the agency personnel/ community in training the

students.

In each semester, before the commencement of field placement, an evaluation of the agencies/ communities will be done and accordingly the Department identifies the new agencies/communities to suit to the needs and changing trends of the profession and provide a comprehensive training to the students.

After the student is assigned a specific agency/community, the student is provided with orientation regarding the agency, its area of operation, goals, organizational structure, programmes etc., and most importantly, what is expected of the student to learn and practice during the placement so as to realize the objectives of field work.

Concurrent field work during first year is based on practice of models and intervention strategies relevant to the methods of social work in relation to individuals, families, groups and communities with a specific emphasis on study, identification of needs, programme planning and implementation. During Consecutive field work in final year the students will be placed in the agencies / communities as per their field of specialization.

Content of Field Work Programme:

A. Understanding field setting with special reference to agency placement:

1 To understand the social context with special reference to the socio-economic and cultural realities, from which the agency draws its clients.
2. To understand the philosophy, objectives, policies and programmes of the agency.
3. To understand the organization pattern including infrastructure, their functions, communication pattern, decision-making patterns etc.
4. To know the type of clients being addressed by the organization.
5. To understand the constitutional safe guards, Government policies, programmes and legislations pertaining to the concerned field work agency and its client group.
6. To understand the type of net working and referral services being extended by the agency for the benefit of its clients.
7. To participate and develop skills in the administrative aspects of the agency.
8. To develop the capacity to establish professional relationship with the agency staff working in the agency.
9. To develop ability to relate and participate fruitfully in the team.
10. To improve the ability to formulate new service delivery system for the agency clientele.
11. To develop ability to plan and organize programmes independently.

B. Working with individuals:

1. To develop ability to establish rapport and empathies with the client.
2. To identify the psycho-social factors responsible for the client's problem, analyse and contextualise the same so as to understand their impact on the client's life.
3. To develop skill in formulating and implementing intervention strategies to enable the client to deal with his/her problem.

4. Identify resources both, internal and external available in the client system and introduce processes so that the client is able to use them for meeting his/her needs.
5. To use the principles and skills of case work while working with clients.
6. To provide appropriate referral services to the clients.

C. Working with groups:

1. To develop ability to form groups around a specific need.
2. To develop skill in assessing the needs of group members.
3. To develop appropriate programmes to meet the needs of the group members.
4. To understand the different phases of group dynamics including relationships, communication, subgroups, patterns of conflict resolution and decision-making and to play required role in each of these phases.
5. Arranging individualized services outside the group when need be.
6. To identify resources needed for group functioning and enable the group to utilize the same.
7. Planning termination.

D. Working with communities:

1. Understanding community in terms of its social-cultural, economic and political realities either through primary or secondary data.
2. To understand the services of the agency in relation to the community.
3. To identify measures to improve agency services through community participation.
4. To identify and analyse community problems.
5. To analyse community perception about problems.
6. To help community prioritize its needs.
7. To involve people at various levels of problem identification,

   implementation and evaluation

Recording and Record submission:

The students are expected to carry a dairy with them to the field and note down briefly in it the work done by them and later a report has to be written in a detailed manner in the field work record specifying the work done on each day of the field work. Process recording is preferred so that the growth of the student in terms of development of professional self, acquisition of skills in social work process, etc., can be closely monitored and the student be advised accordingly. This would also help the Faculty Supervisor in enabling the student to sharpen the skills in observation, identification of appropriate selection of methods, application of principles etc.

Weekly, field work records along with diaries should be submitted before 10.30 a.m. on every Friday by the first and second semester students; similarly before 10.30 a.m on every Saturday by third and fourth semester students. Inability to submit records on time is considered as late submission. Such late submissions again shall have an impact over student field work evaluation.

Supervision:

Supervision is an essential component of social work education and the student should carry out field work under the guidance and supervision of a Faculty Supervisor. During concurrent field work, each student will be supervised by Field work Supervisor. In the consecutive field work, Faculty Supervisor guides and supervises the field work activity of the students as per the field of specialization of each student. Supervision aims at developing core skills in the students such as skills in communication, establishing professional relationship, interviewing, record writing, intervention etc. This enhances the student trainee to the levels of a professional social worker.

Role of Field work Supervisor:

The Field Work Supervisor plays a key role during the period of concurrent field work placement of students in first and second semesters. The role specifications of Field work Supervisor are as follows.

1. The Field work Supervisor plans field placements under the guidance of Head of the Department.
2. Provides orientation to students regarding field work.
3. Keeps in touch with agency personnel and community people to make needed modifications in the field placements.
4. Regularly visits the students in the field to provide needed support to them in the field and to obtain first hand knowledge of agency/community functioning and students' progress.
5. Assists in the evaluation of the students during joint evaluation

Role of Faculty Supervisor:

Under each Faculty Supervisor 3 to 4 students are placed for concurrent field work and consecutive field work for supervisory guidance. The Faculty Supervisor is directly responsible for the student's learning in the field. The following is the role of Faculty Supervisor.

1. Gives orientation to the students regarding the agency/community regarding pattern of field work and assessment of field work done in the agency/community.

2. Assigns work to the student after discussing with him/her and the agency personnel and community people. Similarly, specific tasks are assigned considering the sequential pattern of learning. These tasks may have to be reviewed keeping in view the student's capacities, changing in agency's policies/community needs etc.

3. Makes visits to the field work agencies/communities.

4. The Faculty Supervisor conducts individual and group conferences for the students placed under her/his guidance.

Methods of Supervision and Field work Conferences:

The Faculty Supervisor takes the major responsibility of enabling students in acquiring skills and attitudes required of a professional and in developing professional self. This is done through individual and group conferences. The field work conferences are scheduled to take place in the afternoons of every Saturday.

Records are a tool for field work conferences. Hence, before the field work conference commences, the Faculty Supervisor has to go through the record and make critical assessment of the work done by the student and writes appropriate comments in the margins of the report. This approach gives seriousness to the supervisory process; otherwise the student does not perceive the value of the written record. This exercise helps the student to know the pitfalls of recording as well as the process of field work. The comments of the Faculty Supervisor should be related to the student's learning and the comments should be in the tune of constructive criticism and it should encourage and motivate the students but should not block the growth and make the student defensive. Every week, in all the semesters, each student has to fill the supervisory conference sheet (Appendix) and submit the same to the Head of the Department in the first week of every month.

When the student is found absent for field work without prior permission his/her absence may be reported to the Head of the Department by the Field Work Supervisor and Faculty Supervisor and a memo be issued to the student calling for explanation. In the absence of satisfactory explanation from the student, that will be considered during the field work evaluation. If the student fails to submit the record or did not attend supervisory conference in time inspite of repeated warnings, the same may be informed to the Head of the Department for further action. Group conferences shall also be conducted either for a group of students placed under a particular Faculty Supervisor or for students placed in similar type of agencies.

The focus of the field work conferences be on understanding the following:

- Needs, resources and dynamics of the client systems
- Student's reaction to the client system

- Discussion and analysis of the work done during the previous week and action plan for the subsequent weeks
- The attitude of student toward field instruction and supervision and his/her ability to make use of it
- Linking the theory with field practice
- Analysis of personal problems and or personality of the student that obstruct his/her performance in the field and enabling the student to develop insights into his personality and work pattern.

The Faculty Supervisor visits the agency/community and keeps close contact with the agency personnel and community people. In case of unsatisfactory performance of a student, the Faculty Supervisor has to discuss the same with the student and subsequently with the Head of the Department. The Faculty Supervisor holds an evaluation conference during the semester and discusses the student's performance in each area of learning. The Faculty Supervisor should be an enabler, guide and educator and be a role model for the student in terms of developing professional self.

Rural Camp:

Rural Camp is a non-credit compulsory field work requirement. If any student fails to fulfill this requirement he/she shall not be eligible to get his/her degree. The students are placed in a rural area for a period of 10 days. They stay in the selected rural area throughout the 10-day period. One of the faculty members shall be the Convener of the camp who shall also stay along with the students throughout the camp period. Other staff members shall assist him in conduct of the camp. The basic objective of the rural camp is to orient the students with the rural realities of life and involve in the community development activities including working with weaker sections and women groups.

Block Field Work:

After completion of all course work and examinations, at the end of fourth semester, the Department arranges six weeks of Block Field Work training in the field of his/her specialization. All students have to attend the same. This Block Field Work training provides the students an opportunity to carryout the entire Block Field Work training independently with the help and guidance of Agency Supervisor. The main thrust of the field training should be toward helping the students to gain a comprehensive understanding of the services rendered by various agencies in the field.

Following are the general instructions to students undergoing block field work training:

1. The students shall report to the respective organizations for Block Field Work Training on the date specified.
2. The students should report to the concerned training officer (Agency Supervisor) as per the communications given to them.

3. The student should maintain a dairy of their day-to-day training activities and get it signed by the agency supervisor at the end of every week.
4. The student should dispatch their weekly reports duly signed by the Agency Supervisor on every Monday under certificate of posting.
5. The absence of any student from the agency without prior permission during the training period will be viewed seriously. In case of emergency or sickness, the students have to obtain necessary permission from the agency supervisor and the same should invariably be intimated to the Head of the Department of Social Work.
6. The students are advised to take their identity cards from the Department and submit the same in the agency at the time of reporting. They should take two recent passport size photographs with them. These have to be submitted in the agency for the purpose of obtaining pass from the organization/agency.
7. The Students are expected to acquaint themselves with the policies, procedures and standing orders of the organization/agency.
8. The students are expected to seek opportunities to associate themselves with the activities of the agency.
9. The students should work directly under the control of the agency and should abide by the rules and regulations of the organizations/ agency in which they are undergoing Block Field Work Training. Any negative remark from the organization/agency about the student(s) will be seriously viewed and taken into account during Block Field Work evaluation.
10. At the end of the sixth week the students should submit dairy and a consolidated report of their training to the Department.

Block Field Work Supervision:

One or two Faculty Member(s) will be deputed to conduct Block Field Work Supervision. The Faculty Member(s) shall visit the Block Field Work placements and meet the Agency Supervisors and obtain the needed information related to the students' regularity and performance at the agency, and submit a detailed report to the Head of the Department. While evaluating the Block Field Work performance of the students, this report will be taken into consideration. The report of the Faculty Member shall include the regularity of the students' in attending to Block Field Work and also feed back of the Agency Supervisor about the students.

Consecutive /Block Field Work guidelines for the students specializing in the field of Personnel Management and Labour Welfare:

1. About the Industry:
   a. Objectives of the industry
   b. Nature of activity.
   c. Number of employees (category wise)
   d. Organizational chart (departments dealing with personnel, industrial relations and welfare work)
2. Personnel Management:
   a. Personnel philosophy and objectives of the industry.
   b. Determination of manpower planning and procedures.
   c. Job analysis

d. Job description

3. Recruitment and Selection:

   a. Recruitment policy – Reservations to S.C., S.T's, Displaced persons.
   b. Selection procedure
      i. Advertisement.
      ii. Application Blank
      iii. Constitution of selection committee
      iv. Interview and written test, aptitude test, trade test, medical test etc.
      v. Induction.

4. Personnel Development:

   a. Training and its objectives, policies and programmes, Management and development programmes, supervisory training etc.
   b. Performance appraisal – procedures and uses.
   c. Promotion and transfer-policies and procedures.

5. Wage Administration:

   a. Procedure for wage fixation and revision, payment deductions, increments etc.
   b. Wage agreements, settlements, awards etc.

6. Communication:

   a. Study and analysis of communication methods in the industry.

7. Domestic Enquiry Procedure

8. Committees:

   a. Study of the functioning of works committees, Joint Management Councils, Canteen Committees, Safety Committee etc and other Bi-partite Committee.

9. Grievance Procedure:

10. Disputes and their Settlements:

    a. Collective bargaining.
    b. Conciliation
    c. Arbitration
    d. Adjudication

11. Working conditions, Health Safety and Welfare Programmes:

    a. Canteen and its management.
    b. Crèches and its management.
    c. Recreation facilities.
    d. Education facilities.
    e. Medical facilities.
    f. Housing.
    g. Cooperatives.
    h. Festival Advances.
    i. Provident fund and Family pension

j. Gratuity
k. Transport
l. Leaves.

12. Trade Unionism:

a. Organizations and functions.
b. Activities of the union.

Consecutive/ Block Field Work guidelines for the students specializing in the field of Medical and Psychiatric Social Work

A. Medical Setting:

1. To understand the objectives, administrative set up and functioning of the organization in general and the Department of Medical Social Work / Social Service in particular.
2. To understand the role and functions of Medical Social Worker in the field with special reference to the identification, treatment, surveillance, rehabilitation and health education.
3. To understand the role of health education in the prevention and treatment of stigmatized disorders.
4. To understand the contribution of the organization in the rehabilitation of patients.

Apart from the above, the student has to do the work assigned by the organization and follow the guidance given by the personnel of the organization with regard to field work.

B. Psychiatric Setting:

1. To understand the objectives, administrative set up and functioning of the organization in general and the Department of Psychiatric Social Work in particular.
2. To understand the role and functions of psychiatric social worker in different units such as adult psychiatry, child guidance, community psychiatry and neuro-psychiatry.
3. To understand the importance of occupational therapy and rehabilitation in the treatment of mentally ill.
4. To attend case conferences, book reviews etc.

Apart from the above, the student has to do the work assigned by the concerned Departments/agencies and follow the guidance given by its supervisors with regard to field work.

Consecutive/Block Field Work guidelines for the students specializing in the field of Community Development

1. Study of the organizational structure, functions, philosophy, objectives, programmes of the agency/department.

2. Study of the literature pertaining to the agency/department,
3. Work with the agency in the formulation and implementation of the programmes designed by the agency/department,
4. Seek opportunities to involve themselves in the administration of different programmes, special tasks or assignments such as survey, field visits, case studies etc.
5. Take guidance from the agency any other matter subject related to the practice of social work in community development setting.

Consecutive /Block Field Work guidelines for students specializing in the field of Family and Child Welfare

1. Study the organizational structure, functions, philosophy, objectives, programmes of the agency/department
2. Exposure to the specific areas of work in Family and Child Welfare such as welfare activities for women and children, family life or population education, family planning education, nutrition education and such other educational programmes.
3. While working with the agencies, the students may conduct case studies, and involve in assigned works of the agency related to subject under study.
4. Take part in observational visits organized by the agency. The students should focus on the study of organizational structure, functions, philosophy, objectives, programmes of the agency/department with a purpose to have a comprehensive understanding of the nature and types of programmes of the agency in the field.

Consecutive /Block Field guidelines for the students specializing in the field of Criminology and Correctional Administration:

1. To study and understand the institution/agency in relation to its structure, functions, programmes, policies etc.
2. To study, understand and prepare the profiles of target groups – individuals, groups, institution as a whole etc.
3. To study and analyze the causative factors for the crime, recidivism, legal provisions etc.
4. Conduct of case studies, organizing events, working with the assigned works by the staff of the institute.
5. To study and understand the needs and issues of the target groups both in the institution and out-side.
6. To study institutional classifications, dynamics, institutional discipline, human rights,
7. To study the provisions of welfare, correctional approaches, release procedures, probation, after care, rehabilitation etc.

Evaluation:

Evaluation is an important aspect of field instruction in social work education. The aim of evaluation is to analyse the performance of the students with a view to enable them to develop competencies and attitudes required of a professional social worker, as field work in social work is mainly process oriented than task centered. Evaluation has to concentrate on the process of the development of skills and professional self, required for a competent social worker.

Evaluation is an ongoing activity and is closely related to the supervisory process. During this process the student and the Faculty Supervisor are expected to participate actively in the evaluation of the student's performance in field work. It is implicit in every weekly individual conference. The growth of the student has to be closely monitored during these conferences and student has to be made aware of his/her growth or absence of growth and needed improvement be suggested to the student. The concentration of evaluation during these weekly conferences shall be on 1) Areas of learning 2) Areas of strength 3) Areas needing change 4) Areas of future learning needs and 5) Growth of professional self.

The student should be made clear of what is expected of him/her at the end of field placement and the processes involved in it. The Faculty Supervisor must explain the evaluation process during the orientation.

Each student is evaluated according to the criteria of achievement expected of him/her level of learning. At the end of each semester, the field work of the student is evaluated by both internal and external examiners.

During the joint internal evaluation, the Faculty Supervisor presents the performance of the student, consisting of Head of the Department and all the Faculty Members including the Faculty Supervisor of the student concerned and Field Work Supervisor. On the basis of criteria specified for different levels of growth, the student shall be awarded internal marks.

The external examiner does the external evaluation. The external examiner shall go through the field work records of the students and each student shall appear before the external evaluation to present the work done by him/her in the field. Basing on the reports and their oral presentation, the students shall be awarded marks by the external examiner. The marks of internal evaluation and the external evaluation will be averaged and awarded to the student accordingly. In terms of difference of marks awarded during external evaluation and internal evaluation, a third valuation has to take place as per the University rules.

At the end of the course, the Department conducts viva-voce examination to each student by a committee consisting of Head of the Department, one or two external examiners from outside the University and two

faculty members nominated by the Head of the Department on rotation. The committee as per the performance of the student will award marks.

In order to be more objective in assessing the performance of the students, a standardized procedure i.e., Concrete Level and Behavioural Level evaluation will be followed in the evaluations of Concurrent field work, Consecutive field work and Block field work.

maximum marks for Concurrent field work in first and second semesters are 100 each (15 marks internal; 85 marks internal and external valuation - concrete level- 35 marks and behavioural level- 50 marks). Similarly the maximum marks for Consecutive field work in third and fourth semesters are 100 each (15 marks internal; 85 marks internal and external valuation- concrete level- 35 marks and behavioural level- 50 marks). Block Field Work at the end of fourth semester carries 150 marks ((24 marks internal; 126 marks internal and external valuation- concrete level- 50 marks and behavioural level- 76 marks).

Concrete Level :

The Concrete Level of evaluation in each semester (both internal and external) carries 35 marks in Concurrent and Consecutive field works; and 50 marks in Block field work. Following are the criteria and maximum marks for each criterion.

Criteria	**Maximum Marks**
1. Regularity in attending to Field Work	
a) Concurrent Field Work -I Semester	15
b) Concurrent Field Work -II Semester	20
c) Consecutive Field Work -III Semester	20
d) Consecutive Field Work -IV Semester	20
e) Block Field Work - IV Semester end	10
2. Regularity in submission of Field Work Records/Reports	
a) Concurrent Field Work -I Semester	05
b) Concurrent Field Work -II Semester	05
c) Consecutive Field Work -III Semester	05
d) Consecutive Field Work -IV Semester	05
e) Block Field Work - IV Semester end	10
3. Regularity in attending to Supervisory conferences	
a) Concurrent Field Work- I Semester	10
b) Concurrent Field Work- II Semester	10
c) Consecutive Field Work-III Semester	10
d) Consecutive Field Work- IV Semester	10
4. Agency / Block Field Supervisor Feed back	
Block Field Work-IV Semester end	10
5. Comprehensive Report and Contents of the Six weeks	
Block field Work Reports-- Block Field Work –IV Semester end	20

6. Attending to Observational visits

Behavioural Level:

The Behavioural Level of Evaluation takes into consideration the following:

1. **Consistency in performance:**
    a. Very consistent performance
    b. More or less progressively even performance
    c. Though at times performance may show some degree of regression, over all performance is satisfying.
    d. Performance shows a little uneven movement with periods of improved functioning in response to frequent and specific instructions from the supervisor.
    e. No progress in field work performance.

2. **Ability to analyse client system:**

    a. Superior ability to analyse social situation and superior skill in the social work process.
    b. Very good ability to analyse social situation and very good skill in social work process.
    c. Good ability to analyse social situations and good skill in social work process.
    d. Shows limited ability to analyse social situation and limited skill in intervention strategies.
    e. Very poor or no ability to analyse social situations and formulating intervention strategies.

3. **Ability to integrate theory into practice:**

    a. Superior ability to integrate theory with practice
    b. Good ability to integrate theory with practice
    c. Fairly good ability to integrate theory with practice
    d. Limited ability to integrate theory with practice
    e. Very poor ability to integrate theory and practice

4. **Ability to identify with the profession:**

    a. Strong identification with the profession, an excellent attempt to internalize its values and a clear clarity about the role of social worker in the agency.
    b. Clear identification with the profession, good attempt to integrate values, has clear understanding of the role of social worker.
    c. Identifies with the profession and has attained some clarity about social worker's role.
    d. Though began to identify with profession, still has some inappropriate attitudes.

e. Persistence of inappropriate attitude, inability to internalize the professional values and identify with the profession and lack of clarity about the social worker's role.

5. Ability to be 'other' focused:

a. Strong motivation and total orientation to client system.
b. Strong motivation, minimal pre-occupation with one's needs which do not interfere with the student's field work performance.
c. Has basic motivation to be of help to others. However at times preoccupation with own needs and problems affects field work performance.
d. Frequent preoccupation with own deeds and problems resulting unevenness in productivity. However there are periods when the student is able to motivate to need field work requirement.
e. Preoccupation with own needs could not be affective help-giver.

6. Having commitment and integrity:

a. Very disciplined approach to work. Good sense of responsibility, commitment and team spirit.
b. Disciplined approach to work, good sense of responsibility and commitment, good capacity for teamwork.
c. Shows appropriate professional demeanour, good sense of responsibility.
d. Though shows to be responsible and committed to client system, sometimes needs to be remained of the same. Contributed in a limited way to the team.
e. No responsibility and commitment to client system and unwillingness/ inability to work and contribute to team.

7. Ability to establish professional relationship:

a. Superior capacity to relate purposefully, to empathise and respond appropriately. Superior capacity for involving clients in the problem solving.
b. Good capacity to relate, empathies, and involve clients in problem solving.
c. Has capacity to relate purposefully. Most of the time able to maintain focus on work and involve the clients in the problem solving process.
d. Limited ability to view client system objectively and sensitively, difficulty in disciplining his/her own feelings.
e. Total lack of empathy with client system and evidence of destructiveness with clients.

8. Ability to use social work methods and skills:

a. Superior ability in using all the methods of social work and their various techniques skillfully.

b. Good capacity to use all the methods and skills of Social work.
c. Shows evidence of basic capacity to use all the methods of social work. However, the skilful use of various methods varies from good to average ability.
d. Restricted in capacity to use various methods of social work skillfully and can offer help in a limited way.
e. Lack of capacity to use the methods of social work, only able to use very concrete task oriented skills.

9. Ability to be resourceful:

a. Outstanding initiative and self-direction.
b. Good initiative and self-direction.
c. Has capacity for initiative and self-direction.
d. Restricted capacity for self-direction and resourcefulness. Dependent on the direct, continued guidance from the supervisor.
e. Inability to think and act independently and to maintain time

10. Ability to learn from supervisory/agency guidance:

a. Very often uses constructive criticism for growth and makes positive use of supervision.
b. Shows basic objectivity and openness to learn. Has made positive and constructive use of supervision.
c. Though basically objective and open to learning sometimes, tends to become defensive which affects the student's capacity.
d. Shows limited ability to involve self in learning process. Frequently uses defenses, has difficulty in transferring learning from one situation to another.
e. Inability to use field work as a learning experience

Basing on the performance of the students on the above ten items, each student will be evaluated and will be put in any of the following five categories and marks will be awarded accordingly.

The Maximum marks for Behavioural level (internal and external valuation) for Concurrent field work and Consecutive field work is 50 in each semester; and in Block field work it is 76. Following are the criteria and maximum marks for each criterion

Level of performance	Concurrent Field Work	Consecutive Field Work	Field Block Field Work
	M A X I M U M M A R K S		
Excellent	5	5	7.6
Very Good	4	4	6.6
Good	3	3	5.6

Average	2	2	4.6
Poor	1	1	3.6

Case Presentation:

In each semester, every student has to submit five case presentations. Each case presentation may consist of 5 to 10 pages. The case presentations may be on individual/ group/ community by applying social work methods and its related principles. Each case presentation carries ten marks (a total of 50 marks in each semester- 8 marks internal; and 42 marks internal and external valuation). The method of double evaluation (internal and external) in case presentations (for 42 marks in each semester) will be followed, as in the case of other theory papers.

Appendix:

PROFORMA OF FIELD WORK SUPERVISORY CONFERENCE

Name of the Student :

Name of the Supervisor :

Name of the Agency/Community :

Year & Semester :

Date and time of conference	Major areas covered during Conference	Follow up Plans	Remarks of the Faculty supervisor	Remarks of the Student	Signature of the Student	Signature of the Faculty Supervisor	Signature of the Head of the Department

M. Sc. Psychology

Revised Syllabus

(Regular Stream)

M. Sc PSYCHOLOGY

Revised regulation to be implemented from 2015-16 academic year

Pattern : Semester system

Duration : 4 Semesters in two academic years

Course pattern :

- All the papers in the first three semesters are compulsory.
- Three papers in the semester-IV are compulsory and the student will select two out of four papers as optional papers.
- The student will study a total of twenty papers with five papers per semester.

Scheme of evaluation :

- Double valuation by internal and external examiners
- Two Mid-term examinations will be conducted for 20 marks and average will be calculated
- Maximum marks for each paper – 100 (80 marks for semester end examinations + 20 marks for mid exams).
- Pass mark in theory papers – 30 marks
- Pass mark in Practical, practicum, project reports and case studies – 40 marks
- An aggregate of 40% in each semester is required for the student to be declared as passed in that semester.
- Grading system is followed which is given below:

A student will be given for each paper on the basis of the marks obtained in the respective papers. The grades will be given as follows

S. No.	Range of Marks	Grade	Grade Points
1.	> 85%	O	10.0
2.	75% - 85%	A	9.0
3.	67% - 74%	B	8.0
4.	58% - 66%	C	7.0
5.	50% - 57%	D	6.0
6.	40% - 49%	E	5.0
7.	< 39%	F (Fail)	0.0
8.	Incomplete (Subsequently changed into pass or E to O or F grade on subsequent appearance of the examination)	I	0.0

Calculation of SGPA as given by the office. A copy is enclosed.

Semester Grade point Average (SGPA) will be calculated for each semester and the candidate has to secure a minimum of 5.0 SGPA for a pass in each semester.

The candidate will be declared to have passed in the course only if he/she secures 5.0 CGPA (Course Grade point Average)

Classification of successful candidates is based on CGPA as follows.

Distinction	CGPA	8.0 or more
I Class	CGPA	6.5 or more but less than 8.0
II Class	CGPA	5.5 or more but less than 6.5
Pass	CGPA	5.0 or more but less than 5.5

Paper No.	Title	Credit	Max Marks	Double valuation (Internal & External)	Internal Assessment
	I Semester				
101	Principles of Psychology	4	100	80	20
102	Psychology of Life Span Development	4	100	80	20
103	Physiological Psychology	4	100	80	20
104	Psychological Testing	4	100	80	20
105	Psychological testing practical	6	100	80	20
	Total	22	500	400	100
	II Semester				
201	Personality	4	100	80	20
202	Psychopathology	4	100	80	20
203	Research Methodology	4	100	80	20
204	Cognitive Psychology	4	100	80	20
205	Cognitive Psychology Practicals	6	100	80	20
	Total	22	500	400	100

III Semester

301	Social Psychology	4	100	80	20
302	Community Psychology	4	100	80	20
303	Counseling Psychology	4	100	80	20
304	Health Psychology	4	100	80	20
305	Case Studies	6	100	80	20
	Total	22	500	400	100

IV Semester

401	Clinical Psychology	4	100	80	20
402	Organizational Behavior	4	100	80	20
403	Project	6	100	80	20

Optional papers

The student will select any two subjects from the following (404 to 407) A minimum of 6 students are necessary for a subject to be allotted.

404	Educational Psychology	4	100	80	20
405	Rehabilitation Psychology	4	100	80	20
406	Indian Psychology	4	100	80	20
407	Parapsychology	4	100	80	20
	Total	22	500	400	100

Note: Records/Case studies/Project reports have to be submitted one week before the commencement of the examination failing which the student shall forfeit the allotted marks.

SEMESTER - I
PAPER 101: PRINCIPLES OF PSYCHOLOGY

I. Historical origins of psychology as a science

1. Philosophical antecedents: classical Greek thought (Democritus, Plato, Aristotle); Continental Renaissance (Descartes); British empiricism (John Locke, James Mill and John S. Mill); Nativism (Kant)

II. Beginnings of experimental tradition and emergence of

Schools in psychology

1. Psychophysics (Weber, Fechner, Helmholtz, Wundt) and Scaling

Techniques.

2. Emergence of schools: Structuralism, functionalism, behaviorism, Gestalt, Psychoanalysis

3. Development of psychology in India

III. Emotion

1. Theories of emotion: James-Lange, Cannon-Bard, Cognitive theories

IV Motivation

1. Theories of motivation: Freud's unconscious motivation theory, Maslow's need hierarchy theory, McClelland's achievement motivation theory

V Personality

1. Psychoanalytic theories : Freud, Jung, Adler

2. Type and trait approaches : Eysenck and Cattell

3. Developmental approach : Erik Erikson

Recommended Books:

1. Baron, R.A. (2007). Psychology (Fifth edition) New Delhi: Pearson Prentice-Hall of India.

2. Chaplin, P., & Kraweic, T.S. (1974). System and Theories in Psychology. New York: Holt, Rinehart & Winston.

3. Marx, M.H. & Hillix, W.A. (1987). Systems and Theories in Psychology. New York: McGraw Hill.

4. Schultz, D. (1985). A History of Modern Psychology. New York: Academic Press.

5. Wolman, B.H. (1973). Handbook of Psychology. New Jersey: Prentice Hall.

6. Woodworth, R., & Schlosberg, (1976). Experimental Psychology. New York: Holt and Rinehart.

PAPER 101 : PRINCIPLES OF PSYCHOLOGY
MODEL QUESTION PAPER

Time : 3 hours Max. Marks: 80

SECTION – A

Answer any Three of the following: 3 x 20 = 60

1. Explain various theories of emotion.
2. Give a detailed account of philosophical antecedents of modern Psychology?
3. Critically evaluate Maslow's Hierarchy theory?
4. Explain in detail the psychophysical methods.
5. Write briefly about the schools of psychology you have studied, Explaining how they contribute to the understanding of human behavior.

SECTION – B

Answer any Five of the following: 5 x 4 = 20

1. Explain the concept of Collective Unconsciousness.
2. Write briefly about scaling techniques.
3. Give an account of Erik Erikson's Theory.
4. Describe Pre-independence phase in the development of psychology.
5. Explain Freud's concept of Unconscious motivation.
6. Briefly describe McClelland's achievement motivation theory.
7. Discuss the trait approach to personality?
8. What is John Locke's concept of tabula rasa.

SEMESTER I

PAPER - 102: PSYCHOLOGY OF LIFE SPAN DEVELOPMENT

I. Definition, nature and evolution of the field

Research Methods : Experimental and Non-experimental (Case Studies, Observation, Interviews)

Factors influencing development : Heredity, Environment, Importance of critical periods in development

II. Beginnings of Life : Important aspects of development in the pre-natal and post-natal period

Development in Infancy and Toddlerhood

Physical and motor skills

Learning and Maturation

Cognitive development : Piaget's theory

Language development : Learning and nativism theories (Chomsky)

Personality and social development : Contributions of Freud, Erikson, Bowlby

Development in Early Childhood

Physical and motor skills

Cognitive development : Piagets' theory

Language development : Development of social speech

Personality and Social Development : Contributions of Freud, Erikson, Bandura

Role of rearing practices : Gender roles and gender stereotyping

Gender schema theory of Bem

III. Development in middle childhood

Physical and motor skills development

Cognitive development : Piaget's theory

Moral development : Piaget and Kohlberg

Personality and social development : Freud, Erikson and Bandura

Development of self-concept Influence of peer relationships

Development in Adolescence

Physical development and maturation

Cognitive development : Piaget

Adolescent Ego-centricism

Moral development : Kohlberg

Personality and social development :Contribution of Hall, Mead, Freud and Erikson

Identity formation

IV. Development in young adulthood

Physical development

Sensory and psychomotor functioning

Cognitive development: Schaie's stages of cognitive development

Sternberg's triarchic theory of intelligence

Moral development : Kohlberg's theory

Gilligan's levels of moral development in women

Personality and social development: Normative crisis model and timing-of-events Model

Intimate relationships of Marriage, Parenthood

Vocational development

Development in middle adulthood

Physical changes of Middle age

Aspects of intellectual development

Personality and social development: Jung, Erikson, Peck

Psychological developments critical to adjustment

Issues related to occupation

V. Late Adulthood : Old Age

Physical changes

Issues related to intellectual functioning

Personality and social development::Erikson,

Peck's three adjustments of late adulthood; Vaillant's factors in emotional health

Personal relationships in late life Attitudes towards death, dying and bereavement

Recommended reading:

Hurlock, E.B. (1980). Developmental Psychology: A life span Approach. New Delhi: Tata McGraw-Hill.

Papalia, D.E. & Olds, S.W. (1992). Human Development. New Delhi: Tata McGraw-Hill

Beck, L. (2003). Child Development. New Delhi: Pearson

PAPER - 102: PSYCHOLOGY OF LIFE SPAN DEVELOPMENT

MODEL QUESTION PAPER

Time : 3 hours Max. Marks:80

SECTION – A

Answer any THREE of the following: 3 x 20 =60

1. Explain Piaget's theory of Cognitive Development?
2. Write in detail about Research Methods used to study issues related to Life span development?
3. Give a critical account of Kolberg's theory of Moral development?
4. Describe the role of child rearing practices in the formation of gender identity?
5. Elucidate issues related to family adjustment and occupation during middle adulthood?

SECTION – B

Answer any FIVE of the following: 5 x 4 =20

1. Give a brief account of Freud's Psychosexual stages of development?
2. What are the important aspects of development in prenatal period?
3. Write briefly about Sternberg's triarchic theory of intelligence?
4. Describe Language development during infancy period?
5. Briefly discuss emotional health associated with late adulthood?
6. What are the contributions of Hall for the understanding of adolescent personality?
7. Discuss the aspects involved in learning?
8. Explain the physiological changes in the late adulthood?

SEMESTER-I

PAPER – 103: PHYSIOLOGICAL PSYCHOLOGY

Unit I.

1. Introduction to physiological psychology

2. Neuron : a. Anatomy
   b. Excitatory postsynaptic influences
   c. Inhibitory post synaptic influences
   d. Chemical basis – neurotransmitters
   e. Pre synaptic influences

Organization of Nervous system

1. Structure of Nervous system: Peripheral nervous system, spinal cord and brain.
2. Cerebral Hemispheres, capabilities of Right and Left hemispheres.

Unit II.

Hormones and Behavior

1. Major endocrine glands and their functions
2. Hormones of stress
3. Hormones of growth, Sexual behavior and reproduction.

Unit III.

Physiological basis of perception

1. Vision: Structure of the eye (retina, rods and cones), mechanisms for Pattern vision and color vision.

2. Audition: Structure of the ear, processing auditory information.

Physiological basis of Emotions and Learning and

Amygdala

1. Role of hypothalamus, limbic system in emotionality

2. a. Physiological changes during learning.

   b. Role of hippocampus and cerebellum in learning.

Reference:

Levinthal, C.F.(1996). Introduction to Physiological Psychology, 3rd edition, New Delhi, Prenctice Hall.

Pinel, J.P.J. (2006). Biopsychology, 6th edition. New Delhi, Pearson Education.

Morgan, T.C and Stella, E . (1950). Physiological Psychology

Schwartz, M. (1978). Physiological Psychology, New Jersey, Prentice Hall.

Bridgeman, (1994) The Biology of the Behavior and mind, New York, Prentice Hall.

PAPER – 103: PHYSIOLOGICAL PSYCHOLOGY

MODEL QUESTION PAPER

Time: 3 hours Max.marks:80

Section – A

Answer any of three of the following. **3 × 20 = 60**

1. Explain in detail the pre and post synaptic influences on neural activity and functions?
2. Describe the structure and function of the brain?
3. Give an account of the major endocrine glands and explain their functions?
4. Discuss the relationship of Hormones with stress?
5. Write about the mechanisms for pattern and color vision?

Section – B

Answer any five of the following **5 × 4 = 20**

1. Give a brief account of the neurotransmitters.
2. State the functions of Right and Left hemispheres of the brain.
3. Explain the role of hormones in reproduction.
4. Function of thalamus
5. Describe the process of auditory information.
6. What is the role of hippocampus in learning.
7. Write the functions of spinal cord.
8. Discuss the hormones of stress.

Semester I

Paper - 104: Psychological Testing

I **Historical development of psychological testing**

Nineteenth Century to the present

Nature and use of psychological tests

Nature of a psychological test

Uses and varieties of psychological tests

Control in the use of a psychological test

Examiner and situational variables

Test-taker's perspective

Psychometry

a) Theory of test scores

True score, error score

Test score and factor theory

b) Item writing

Meaning and types of items

Difference between essay type tests and objective type tests

General guidelines for item writing

General methods of scoring objective test items

c) Response sets in test scores

Meaning and types of response sets.

Implications and elimination of response sets.

d) Item analysis

Meaning and purpose of item analysis

Item difficulty

Index of discrimination

Effectiveness of distracters or foils

Factors influencing the index of difficulty and the index of discrimination

Speed and power tests

Problems of item analysis

II. Psychometry continued

e**) Reliability**

Meaning of reliability

Types of reliability

Factors influencing reliability of test scores

How to improve reliability of test scores

Index of reliability

f) Validity

Meaning of validity

Types of validity

Statistical methods for calculating validity

Factors influencing validity

Relation of validity to reliability

g) Norms and test scales

Meaning of Norm-referencing and criterion referencing

Steps in developing norms

Types of norms and test scales

Attitude scale construction

a) Method of equal-appearing intervals

b) Method of summated ratings

c) Method of cumulative scaling

III. Psychological Testing

a) Measurement of Intelligence

Definition, types and theories of intelligence

Seguin Form Board, Binet scales, Weschler's scales, Culture Fair Tests, Progressive Matrices

Psychological issues in ability testing

b) Measurement of Aptitude, Achievement and Interest

Aptitude and achievement

Distinction between aptitude tests and achievement tests

Types of aptitude tests: Differential Aptitude Test (DAT),

David's Battery of Differential Aptitude Test (DBDA)

Types of achievement tests: The Strong Interest Inventory (SII)

Thurston Interest Schedule

c) Measurement of personality

Meaning and purpose of personality measurement

Some representative personality inventories (16 PF, MMPI, BAI, EPQ, STAI, BDI, ASEBA, GHQ, etc)

Evaluation of personality inventories

d) Projective techniques

Nature of projective techniques

Inkblot technique

Pictorial technique

Verbal technique

Performance techniques

Evaluation of projective techniques

e) Applications of testing

Major contexts of current test use

Educational testing

Occupational testing

Test use in clinical and counseling psychology

Ethical and social consideration in testing

Ethical issues in psychological testing and assessment

User qualifications and professional competence

Protection of privacy

Confidentiality

Communicating tests results

Testing diverse populations

RECOMMENDED READING

1. Anastasi, A & Urbina S. (1997) *Psychological Testing*. New Jersy : Prentice Hall International.
2. D.Amato, M.R.(1979) *Experimental Psychology, Methodology, Psychophysics and Learning.* New Delhi:Tata Mc Graw-Hill.
3. Freeman, F.B. (1971) *Theory and Practice of Psychological Testing,* New Delhi: Oxford and IBH publishing Company.
4. Gronbach, I.J. (1960) *Essentials of Psychological Testing.* New york: Harper.
5. Guilford J.P. (1954). *Psychometric methods.* New Delhi: Tata Mc Graw-Hill Publishing company Ltd.
6. Gulliksen, H (1965) *Theory Mental tests.* New york: John Wiley.
7. Kaplan, R.M & Saccuzzo, D.P (2007). *Psychological Testing*. Delhi: Cengage Learning India.
8. Kerlinger, H (1978) *Foundations of Behavioural Research* New Delhi: Subject Publications.
9. Nunnally, J. (1967) *Psychological Measurement.* New York: Mc Graw Hill.
10. Singh A.K. (2004) *Tests measurements and Research Methods in Behavioural science* Patna: Bharati Bhavan Publishers and Distributors.

SEMESTER - I

PAPER 104; PSYCHOLOGICAL TESTING

MODEL QUESTION PAPER

Time: 3 hours. Max. Marks: 80

SECTION – A

Answer any THREE of the following: 3x 20= 60

1. Describe the different types of item analysis

2. Describe the major types and uses of psychological tests

3. What is reliability? Describe the different types of reliability

4. What are norms? Why are they important? Describe any two types of norms

5. Discuss the psychological issues involved in ability testing

SECTION – B

Answer any FIVE of the following: 5 x 4 = 20

1. What is construct validity?
2. What are Speed and Power tests?
3. Method of summated ratings.
4. Confidentiality in revealing test results
5. Types of Weschler Intelligence tests
6. ASEBA
7. What is the meaning of I.Q?
8. What are the contributions of Esquirol and Seguin?

SEMESTER I

Paper - 105: PSYCHOLOGICAL TESTING PRACTICAL

Part-A: At least 10 tests have to be conducted and written with a minimum of two from each unit.

I. Ability tests :

1. Ravens progressive matrices tests
2. Weschler's Adult Intelligence test
3. Weschler's Intelligence scale for children
4. Seguine Form Board

II. Aptitude and Interest tests :

1. Differential Aptitude tests
2. Thurstone Interest schedule
3. David's Battery of Differential aptitude test

III. Personality and adjustment scales :

1. **MBTI**
2. Cattell's 16 Personality Factor Questionnaire (16PF)
3. Bell's Adjustment Inventory.
4. State and Trait Anxiety Inventory
5. Minnesota Multiphase Personality Inventory (MMPI).
6. **ASEBA** Problem checklist.

IV. Projective tests :

1. Thematic Apperception Test (TAT).
2. Rorschach Ink Blot test.
3. Rosenweig Picture Frustration test.
4. Rotter incomplete sentence blank.

Part-B: At least two practicals have to be conducted and written.

1. **Educational guidance.**

   On the basis of scores obtained on an intelligence test, an interest test, an aptitude test, school marks and socio economic status assess the educational options of student.

2. **Estimation of Deterioration Quotient.**

   Using WAIS determine the deterioration quotient of a person above 60 years of age. Administer PGI or Weschler memory scale on the same person and compare the results.

3. **Assessing abilities of a child.**
   Assess abilities of a child by administering the WISC, CFIT and SPM and compare the results of the three tests.

4. **Assessing the personality of a child.**
   Assess the personality of a child by administering a personality inventory and CAT. Compare the results of the two tests.

5. **Assessing the personality of an adult.**
   Evaluate the personality of an adult by administering a personality inventory and TAT. Compare the results of the two tests.

6. **Assessing the adjustment and problems of an adolescent.**
   Identify the adjustment problems of an adolescent by administering ASEBA's Youth Self Report (11-18) and Bell's adjustment inventory.

Scheme of examination:

Mid Semester examinations	: **20** Marks
Record	: 50 Marks
Administration of test and Interpretation of test results	: 10 Marks *
Viva voce	: 20 Marks
Total	**: 100 Marks**

Note:

*: The student is required to administer a test on a subject.
The student is given an answered test which he/she has to score and interpret.

RECOMMENDED READING:

1. Anastasi, A. & Urbina,S. (1997) *Psychological Testing.* New Jersey : Prentice Hall International Inc.
2. Freeman, G.B. (1971) *Theory and Practice of Psychological testing* . New Delhi : Oxford and IBH Publishing Co.
3. Kaplan, R.M & Saccuzzo, D.P (2007). *Psychological Testing*. Delhi: Cengage Learning India.
4. Singh, A.K. (2004). *Test Measurements and Research Methods in Behavioural Sciences.* Patna: Bharat Bhavan Publishers and Distributors.

SEMESTER II

Paper 201: Personality

Unit – I

Psychoanalytic approach

1. Scope and concept of the study of personality
2. Introduction to the psychoanalytic Theory – Freud's Psychoanalytic theory
3. Neo-Freudian theories – Jung, Adler, Mahler's Object Relations object relations theory
4. The organization of personality, ego psychology; liabilities of psychoanalytic approach

Unit – II

A - Dispositional Approach

1. Introduction to the dispositional strategy**.** Heritable aspects of personality: Type approaches to
   Personality – Eysenck's type approach.
2. Trait theories – Allport and Cattell's trait approach
3. The concept of motive, Murray's need theory. The need for achievement – The McClelland – Atkinson Approach; Power
4. Recent trends in trait approach – the Big Five Factor theory. Limitations of dispositional approach.

B – Phenomenological Approach

1. Introduction to Phenomenology and Phenomenological approach
2. Maslow's hierarchical theory of Human Motivation
3. Kelly's theory of personal constructs
4. Carl Rogers's theory. Liabilities of phenomenological approach

Unit III

A – Behavioral and Cognitive Approach

1. Radical and Methodological behaviorism
2. Social learning theories: Miller and Dollard, Rotter and Bandura
3. Mischel's cognitive-behavioral theory
4. Liabilities of the behavioral and cognitive approach. Introduction to personality assessment and change.

B. Issues and ethics in assessment.

Suggested Readings:

1. Liebert, R. M. & Spiegler, M.D. **Personality : Strategies and issues**. Pacific Grove California: Brooks/Cole Publishing Company.

2. Biscoff, L. J. (1970). **Interpreting Personality theories.** New York: Harper & Roe.

3. Hall, C. S. & Lindzey, G. (1978). **Theories of Personality**, 3rd Ed. New York: J. Wiley & Sons.

4. Hjelle, L. A. & Zeigler, D. J. (19910. **Personality Theories: Basic assumptions, research & applications.** 2nd Ed. International Student Edition. McGraw Hill, International Book Co.

5. Pervin, L.A. (1975). **Personality: Theory, assessment and research**. 2nd Ed. New York: Wiley International ed.

6. Sahakian, w. s. (1965). **Psychology of personality: Readings in theory**. Chicago: Rand Mc-Nally College Publication Co.

7. 7. Magnusson, D., & Endler, N. S. (1977). **Personality at crossroads**, New Jersy, Hillsdale: Lawrence Erlbaum Associates.

8. Friedman, H. S. & Schstack, M.W. (2011)**Personality:Classic Theories and Modern Research** (5th Ed.). Needham Heights, M. A.:Allyn and Bacon.

9. John, O.P., Robins, R.W. & Perwin, L.A. (Eds.) (2008). **Handbook of personality theory and Research** (3rd ed) New York. Guilford Publications.

10. Schultz, D. P. & Schultz, S. E. (2009). **Theories of Personality** (9th ed.). Belmont, CA: Wadsworth/congage Learning

11. Mayer, J. D. (2007). **Personality: A Systems Approach**. Boston, M. A.: Allyn & Bacon

MODEL QUESTION PAPER

Time: 3 Hours Max Marks: 80

SECTION – A

Answer any Three of the following: 3x20= 60

1. Define personality. Explain the scope and concept of psychology.
2. Write a note on ego psychology and explain its limitations
3. What are the heritable aspects of personality and briefly discuss Eyesenck's type approach?
4. Explain recent trends in trait approach.
5. Critically examine the Phenomenological approach.

SECTION – B

Answer Any Five of the following 5x4=20

1. Explain Social Learning theories of Rotter and Bandura
2. Discuss the liabilities of behavioral and cognitive approach.
3. Describe Need for Achievement.
4. Explain Mahler's Object Relations
5. Write an essay on Murray's need theory
6. Explain Carl Roger's theory
7. Give a detailed description of Personality Assessment
8. Write an essay on recent trends in trait approach

SEMESTER II

PAPER - 202: PSYCHOPATHOLOGY

I. Definition and criteria of psychological abnormality

Historical views of abnormal behavior and current trends

Theoretical perspectives: Psychodynamic, Behavioral, Cognitive, Humanistic, Classification systems: DSM and ICD

II Causes of abnormal behavior

Biogenic : genetic defects, constitutional liabilities, hormonal and neurotransmitter imbalances, physical deprivation, brain pathology

Psychosocial : parental deprivation, pathogenic family patterns, early trauma, pathogenic interpersonal relations, severe stress

Socio-cultural : War and violence, group prejudice and discrimination, poverty and unemployment

III Clinical picture of disorders

A. Disorders of childhood and adolescence : Hyperkinetic, conduct, anxiety, elimination disorders, learning, communication and co-ordination disorders, Autism, mental retardation

B. Common mental disorders : Generalized anxiety, phobias, obsessive-Compulsive, panic, depression, post-traumatic stress disorder, eating disorders, dissociative disorders, somatoform, psychophysiological disorders, personality disorders, nonorganic sleep disorders, impulse control disorders.

IV. A. Disorders related to substance use : Depressants, stimulants, hallucinogens, cannabis

B.Sexual disorders : Sexual dysfunctions, parphilias

V A. Severe mental disorders:

Schizophrenia

Delusional disorders

Mood disorders

Organic mental disorders of dementia, delirium and due to brain damage

B. Growth of mental hospitals in India

Culture-bound syndromes in India

Eastern and Western perspectives on mental health

Recommended Books:

1. Altrocchi, J. (1980) Abnormal Behaviour. New York: Hartcount brace Jovanovich

2. American Psychiatric Association (1994). Diagnostic and Statistical Manual of Mental Disorders (DSM IV). Washington, D.C. APA.

3. Bootzin, R.R. & Acocella, J.R. (1994). Abnormal Psychology: Current Perspectives. New York: McGraw Hill Publishing Company.

4. Carson, R.C., Butcher, J.N. & Mineka, S. (1996). Abnormal Psychology and Modern Life. New York: Harper Collins College Publishers.

5. Cokerham, W.C. (1996). Sociology of Mental Disorders. New York: McGraw Hill International.

6. Davison, G.C. & Neale, J.M. (1990). Abnormal Psychology. New York: John Wiley & Sons.

7. Duke, M.P. & Nowicki, S. (1986). Abnormal Psychology: A New Look. Tokyo: CES Publishing Japan Limited.

8. Kapoor, M.(1994). Mental Health of Indian Children. New Delhi: Sage.

9. Sharma, S. (1990) Mental Hospitals in India, New Delhi: Directorate General of Health Services.

PAPER – 202: PSYCHOPATHOLOGY

MODEL QUESTION PAPER

Time : 3 hours **Max. Marks : 80**

SECTION – A

Answer any THREE of the following: 3 x 20 = 60

1. Define abnormality and describe some criteria used for distinguishing normal and abnormal behavior.

2. What is the role of learning in the development of abnormal behavior.
3. Delineate some psychological factors which may lead to the development or exacerbation of a medical condition.

4. Describe characteristics associated with attention-deficit and descriptive behavior disorder.

5. What are mood disorders. Differentiate between major depression and bipolar disorders.

SECTION – B

Answer any FIVE of the following: 5 x 4 = 20

1. Give a brief account of the major landmarks in the history of abnormal psychology.

2. Discuss Sigmund Freud's contribution in understanding anxiety.

3. Trace the influence of psychogenic and sociocultural factors in the development of mental illness.

4. Examine the development of obsessive compulsive personality. Describe the cognitive approach to understanding schizophrenic disorders.

5. Define mental health. Discuss the concept of mental health as understood from Eastern perspectives.

7. Describe the eating disorders evident in adolescence.

8. Explain culture bound syndromes in India.

Semester II

Paper – 203: Research Methodology

I. Basic concepts of experimental method

1. Variable

Qualitative and quantitative variables
Independent variables
Dependent variables
Extraneous variables

2. Experimental control

Independent variable control
Extraneous variable control

3. Sampling

Probability sampling methods
Non probability sampling methods

4. Problem and hypothesis

II. Methods of data collection

1.Qualitative methods

a) Observation

Purpose of observation
Types of observation

b) Interview

Types of interview
Major functions of interview
Factors affecting the uses of interviews
Advantages and disadvantages of interview
Important sources of errors in interview

c) Content analysis

Purposes of content analysis
Methods of content analysis
Evaluation of content analysis

2. Quantitative methods

a) Questionnaires

Types of questionnaires
Functions and applicability of questionnaires

b) Rating scales

Types of rating scales
(Numerical, graphical, standard, Q sort, Semantic differential, sociometry)
Errors in ratings
Methods of improving effectiveness of rating scales

3.Types of research

a) Experimental research

Laboratory experiments

Field experiments

b) Non-experimental research

Ex-post facto research

Field study

Survey research

Case studies

Ethnographic studies

III. Statistics

a) Types of scales (Ordinal, Nominal, Interval and ratio scales)

b) Graphic representation of data

c) Measures of central tendency and variability

d) Characteristics, deviations and applications of normal probability curve

e) Standard error for measures of central tendency and variability

f) Correlations -

Pearson Product moment correlation

Rank order correlation

Biserial correlation

Point biserial correlation

Tetra choric correlation

Phi coefficient

Partial correlation

Multiple correlation

g) Regression analysis

h) Factor analysis

i) Multivariate statistics

j) Non parametric statistics

Chi-square

Sign test

Median test

Sign rank test

u test

Kruskal-Wallis H test

Friedman test

IV. Designs

Between subject designs

Two randomized group designs
More than two randomized group designs
Factorial design
Matched group designs
Statistical analysis – t test, F test.

Within subject designs

Two conditions
Several conditions
Evaluation
Statistical analysis – t test, F test

Single subject designs

Paradigm of single subject experimental research
With draw designs
Reversal design
Multiple base line designs
Changing criterion designs
Data analysis
Evaluation

Quasi-experimental designs

V. Writing a research report

Structure and format
Style of writing
Evaluating a research report

Recommended reading:

1. D.Amto, M.R. (1979). *Experimental Psychology, Methodology Psychophysics and Learning.* New Delhi : Tata Mc-Graw Hill.

2. Garrett, H.E. (1966) *Statistics in Psychology and Education.* Bombay : Vakils Feefer & Simon Pvt. Ltd.
3. Guilford J.P. (1965). *Fundamental Statistics in Psychology and Education* (4th Edn.). New Delhi: Subject Publications.
4. Herson, M. & Barlow, D.H. (1980) *Single – Case Experimental Designs* NewDelhi : Prentice – Hall of India Limited.
5. Kerlinger, F.N. (1978) *Foundations of Behavioural Research,* New Delhi : Subject Publications.
6. Kurtz, A.K. & Mayo, S.T. (1980). *Statistical methods in Education and Psychology.* New Delhi : Narosa Publishing House.
7. Mc.Guigan, F.J. (1990) *Experimental Psychology* New Delhi: Prentice Hall of India Limited.

PAPER 203 : RESEARCH METHODOLOGY

MODEL QUESTION PAPER

Time: 3 hours **Max.Marks:80**

Section – A

Answer any Three of the following 3 x 20 = 60

1. State importance of control in behavioural research. Discuss different techniques for controlling experimental variables?
2. Compare and contrast laboratory experiment and field experiment with the help of suitable examples?
3. What are different types of correlations? Discuss any two correlations methods?
4. What is meant by Factorial design. Statistically analyze it with a hypothetical example?
5. Discuss the different important designs of single subject experimental research?

Section-B

Answer any Five of the following 5 x 4 = 20

1. What is an independent variable? Differentiate between type E and type S independent variables?
2. Describe cluster sampling.
3. What are type-1 and type-2 errors?
4. Differentiate parametric tests with nonparametric tests?
5. How is matching variable selected in a matched group design?
6. Explain the importance of sampling research.
7. State two important differences between single subject research and large N research?

8. Discuss the relative advantages and disadvantages of two probability sampling methods?

Semester II

Paper - 204: COGNITIVE PSYCHOLOGY

I. Definition and domain of cognitive psychology
Perception, attention, memory, language, thinking, concept formation and creativity

II. Perception

1. Principles of perceptual organization : figure and ground, Isomorphism, grouping, closure, proximity, similarity, contrast, pregnanz
2. Perceptual processes : Perceptual processes : Pattern Recognition, depth perception, colour, movement, illusions
3. Perceptual constancies : colour, shape, size
4. Plasticity of perception : Innate or learned?
5. Attention and reaction time
6. Extra sensory perception

III. Learning

1. Work of Ebbinghaus, Pavlov, Hull, Tolman, & Skinner
2. Verbal learning – Meaningfulness of material distribution of practice, whole vs part method, active recitation and transfer of training

IV. Memory and forgetting

Long term and short term memory, Retroactive and Proactive Inhibition, Methods of measurement

V. Thinking and Language

1. Concept formation, problem solving, decision making, reasoning and Creativity.
2. Language structure, Language development

Recommended Books:

1. Edward, E. S., & Stephen, M.K. (2007). Cognitive Psychology: Mind and Brain. New Jersey: Prentice Hall India.

2. Baron, R.A. (2007). Psychology (Fifth edition) New Delhi: Pearson Prentice-Hall of India.

3. Chaplin, P., & Kraweic, T.S. (1974). System and Theories in Psychology. New York: Holt, Rinehart & Winston.

4. Marx, M.H. & Hillix, W.A. (1987). Systems and Theories in Psychology. New York: McGraw Hill.

5. Morgan, C.T. (1965). Physiological Psychology (3rd edition) Tokyo: McGraw Hill Kogakusha.

6. Schultz, D. (1985). A History of Modern Psychology.
New York: Academic Press.

7. Wolman, B.H. (1973). Handbook of Psychology. New Jersey: Prentice Hall.

8. Woodworth, R., & Schlosberg, (1976). Experimental Psychology. New York: Holt and Rinehart.

PAPER 204: COGNITIVE PSYCHOLOGY

MODEL QUESTION PAPER

Time: 3 hours Max. Marks: 80

SECTION – A

Answer any Three of the following: 3 x 20 = 60

1. Discuss the pioneering work of Ebbinghaus in the area of learning.
2. Explain the perceptual processes with reference to depth perception and movement.
3. What is verbal learning? Suggest some methods for economy in learning.
4. Explain in detail the factors that affect attention and reaction time.
5. Discuss the causes for forgetting.

SECTION – B

Answer any Five of the following: 5 x 4 = 20

1. Write briefly about the steps involved in creativity.
2. Explain the concepts of thinking and reasoning.
3. Write briefly about the nature of short term memory.
4. Bring out the contributions made by Pavlov in terms of learning.
5. What is extrasensory perception
6. Write briefly about plasticity of perception.
7. What do you understand by figure and ground
8. Explain Concept formation.

SEMESTER II

PAPER – 205 : COGNITIVE PSYCHOLOGY PRACTICALS

PART-A: Experimental Psychology Practicals

At least 8 experiments have to be conducted and detailed reports of the same have to be written.

1. Perceptual constancy of size as a function of distance cues using the method of average error.

2. Effect of practice on space perception using Wiggly Blocks.

3. Assessment of extrasensory perception by telepathic, clairvoyant and precognition tests.

4. Comparison of speed for discriminative and choice reaction time.

5. Effect of muscular tension on mental work.

6. Fluctuation in efficiency of continuous work.

7. Transfer of learning and interference effects (P1 & R1) in verbal paired associated material.

8. Span of attention for unconnected letters and words vs connected letters and words

9. Retention for completed and interrupted tasks

10. Types of errors identifiable in learning tests using Peterson's Tests of Rational learning
11. Assessment of memory using recall, recognition and relearning tests, serial position effects in free immediate and delayed recall.

12. Verbal concept formation using geometrical designs.

13. Assessment of abstract concept formation using Hanfmann-Kasanin Blocks.

14. Effect of set in solving verbal and numerical problems

15. Trial and error vs insightful learning

*

Experiment 3 is compulsory

PART B : CASE REPORTS

The student has to choose at least three cases with different psychological problems, study them and write a comprehensive report of the same.

Case – study includes (a) collecting personal information. (b) Conducting interviews (c) gathering the background factors leading to the present problem (d) making valid observations with respect to grooming, speech, non-verbal communication etc. (e) inference based on the verbal reports and behavioral manifestation. The above information is integrated and written in the form of a report.

Marks:

Mid Semester examination	20 Marks
Record (Experimental Psychology Practicals)	30 Marks
Case Reports	10 Marks
Practical conduction and writing the report (Experimental Psychology)	20 Marks
Viva voce on Experimental Psychology/ Record and case reports	20 Marks
Total:	100 Marks

III Semester

Paper - 301: Social Psychology

I. Definition and focus of Social Psychology.
History of Social Psychology in India.

Research Methods in Social Psychology: Systematic observation, correlation Method and Experimental Method.

II. Social Perception – Non verbal communication.
Attribution Theories – Heider, Jones, Kelley & Davis

Impression formation – Asch's experiments

Social cognition – Effect of schemas and stereotypes

Interpersonal attraction – Friendship, Love and relationships

Social learning theories – Bandura & Rotter

Social Reinforcement theory – Newcomb

III. Attitudes – Definition, formation and change
Theories of Attitude change

Prejudice, discrimination and deprivation

Discrimination against women and other social groups with specific reference to India

Social Influence – Conformity, Influence, Compliance, Ingratiation, Multiple requests and Obedience

IV. Pro-social Behaviour – Helping and Intervening
Aggression – Nature, causes and control

Groups – Effect on individual performance and decision making

V. Social Psychology in action
Leadership, job satisfaction and achievement orientation in world of work Population Psychology – personal space, crowding and territoriality

Environmental Psychology – poverty, violence and environmental health hazards, Ethnic diversity and gender diversity

Recommended Books:

1. Baron, R.A., & Byrne, D. Social Psychology. Pearson Prentice Hall. India.

2. Berkowitz, L. (1986). A Survey of Social Psychology (3rd Edition). New York: Holt, Rinehart and Winston.

3. Brown, R. (1965). Social Psychology. New York. The Free Press.

4. Desai, N. & Krishnaraj, M. (1987). Women and Society in India. Delhi: Ajantha Publications.

5. Lindgren, H.C. (1973). An Introduction to Social Psychology. New Delhi: Wiley Eastern Limited.

6. Matim, T. Social Psychology.

7. Mishra, G. Applied Social Psychology in India.

8. Sinha, D. (1981). Socialization of the Indian Child. New Delhi: Concept Publishers.

9. Sinha, D. (1986). Psychology in a Third World Country. New Delhi: Sage.

PAPER 301 ; SOCIAL PSYCHOLOGY

MODEL QUESTION PAPER

Time : 3 hours Max. Marks:85

SECTION – A

Answer any Three of the following: 3 x 20 = 60

1. Write a brief account of causes of women's subordination.

2. Explain Newcomb's balance theory.

3. What are the aids in making decisions. Give examples.

4. Explain briefly the terms cognitive structures and cognitive processing.

5. Define socialization in the Indian context.

SECTION – B

Answer any Five of the following: **5 x 4 = 20**

1. Give a detailed account of the social influence on the individual.

2. Discuss the role of decision making in the development and personal growth of the individual.

3. Examine the various determinants of interpersonal attraction.

4. Explain in detail the consequences of deprivation in the Indian socio-cultural context.

5. Highlight the current social problems in our country.

6. Explain how the environment affects human behaviour with appropriate examples.

7. Explain role theory and its impact on social psychology

8. Explain achievement orientation in world of work

SEMESTER III
Paper 302 : COMMUNITY PSYCHOLOGY

I. INTRODUCTION TO COMMUNITY PSYCHOLOGY

Community Psychology-The third mental health revolution
A Brief Historical overview of Community Psychology and factors underlying its emergence
Aims, Core Values and Principles of Community Psychology
Work Skills and Work Settings of a Community Psychologist
Methods of Community Psychology-Ecological, Epidemiological and General Systems Approach
Ethical Issues

II. DEVELOPING A COMMUNITY ORIENTATION

Community Psychology and Community Mental Health-The need for Community Mental Health Care Centres
Understanding Human Diversity in Context
Understanding the Individual within his/her environment and community
Mental Health as a complex Community Function

III. COMMUNITY PSYCHOLOGY IN INDIA

Community Psychology in India-The Past, the Present and Future Scope
The Sense of Community in India
Developing Multicultural Competence and sensitivity.
Vulnerable populations requiring Community Intervention- Poverty and Suicides-Farmers and Weavers, The Lower Social Strata, The Unemployed and Underemployed, Alcoholism, Delinquents and Criminals, Problems of Women-Inequality, Dowry, Sexual Harassment, The Role of Media.

IV. THE ROLE OFCOMMUNITY IN CRISIS INTERVENTION

Prevention and Promotion-Implementing the Public Health Orientation
Mental Health Education
Crisis Intervention: developmental crises, accidental crises, life crisis-Necessary conditions, techniques and status of crisis intervention.
Consultation and Use of Non-Professionals
Action research and advocacy for social change-Empowerment and citizen participation, Social Networks
Community Intervention in India-Present Status and Future Scope

Suggested Readings:

1. Koos,B., Hill,J., Thomas,E., Wandersman, A., Elias,M.J., & Dalton, J.H.,(2011) *Community Psychology: Linking Individuals & Communities(3RD ed)*. Belmont, CA: Wadsworth/Cengage Learning.

2. Shanmugham, T.E. (1987) *Community Psychology.* Madras: Utsav Shanmugham.

3. Korchin, S.J.,(2004)*Modern Clincal Psychology: Principles of Intervention in the Clinic and Community.* New Delhi:CBS Publishers

4. Rappaport, J & Seidman,E (2000) *Handbook of Community Psychology*. NewYork: Plenum Publishers

5. Duncan, N., Bowman, B., Naidoo, A., Pillay, J., & Roos, V. (2007). *Community*
   psychology: Analysis, context and action. Cape Town: University of Cape Town

6. Rudkin, J, K. (2003). *Community Psychology: Guiding Principles and Orientation Concepts.* Upper Saddle River, NJ: Prentice Hall.

Paper -302: Community Psychology

Model Question Paper

Time: 3 hours

Max.Marks:80

Section – A

Answer any Three of the following: 3 X 20 = 60

1. What were the factors that contributed to the emergence of community psychology?

2. How is mental health affected by community issues? Explain.

3. Describe the Prevention approach of Community psychology.

4. Discuss the present status and future scope of community psychology in India

5. What are the various techniques of crisis intervention?

Section – B

Answer any Five of the following: 5 X 4 = 20

1. Elucidate the core principles of the field of Community Psychology

2. Discuss the ethical issues involved in the field of Community Psychology.

3. Explain the role of media in community intervention.

4. What are the various work skills of a community psychologist?

5. Discuss the General Systems Approach as a method of Community Psychology

6. Briefly elucidate on the sense of community in India

7. Elucidate on the various factors involved in the use of non-professionals in community psychology.

8. Why is community psychology referred to as the 'third mental health revolution'? Explain.

Semester III

PAPER – 303 : COUNSELLING PSYCHOLOGY

I. Definition and nature of Counselling Psychology
Roots of Counselling Psychology
Goals of Counselling
Roles and functions of counsellor: Characteristics of an effective counsellor
Confidentiality and Ethics in Counselling
Theoretical perspectives: Psychodynamic, Cognitive-behavioral and Humanistic, Yoga, Meditation,Jacobson's Relaxation Technique, Neurobiofeedback, Pet Therapy

II. Methods of securing client information; Case History,
Psycho diagnosis Use of Tests, DSM-V,ICD X
Process of Counselling
Nature and Characteristics of the Counselling Process
Steps in Counselling Process
Relationship techniques: Rapport building, Reflection of Feeling, Acceptance, Silence, Reassurance, Listening,Empathy
Special Relationship problems: Transference, Countertransference, Resistance Interpretation Techniques: Nature and Types ofInterpretation

III. Behavioral Interview
a) The Behavioral Interview
Functions and Characteristics of the Behavioral Interview

The Interview structure
Tactics of Behavioral Interviewing
Handling Obstructionistic Client Behaviors
Common Errors in Interviewing
Validity of the Interview

b) Interviewing Skills
Attending Behavior
Nonverbal Behavior
Open-ended and Closed-ended questions
Summarizing

IV. Behavioral Assessment
a)Self-Monitoring in Behavioral AssessmentApplicability
Methods of Recording Self-Monitored Data
Reactive Effects of Self-Monitoring
b)Psychophysiological Measurement in Behavioral Assessment

Applicability and Functions of Psychophysiological Measurement.

V Family and child Counselling
Counselling for Stress and burnout
Marriage, couple and family counselling and counselling women
Counseling elderly, counseling for special groups- terminally ill, HIV, AIDS, counseling for prison inmates.
Personality disorders- bipolar,schizophrenia
School counseling- children, teenage, adolescents.
Career counseling.

Recommended reading:

Brammer, L.M., Abrego, P.J. & Shostrom, E.L. (1993). Therapeutic Counselling and Psychotherapy. London: Prentice Hall.

Woolfe, R & Dryden, W. (1996). Handbook of Counselling Psychology. New Delhi: SAGE

Anastasi, A. & Urbina,S. (1997) *Psychological Testing.* New Jersey : Prentice Hall International Inc Anastasi, A. & Urbina,S. (1997) *Psychological Testing.* New Jersey : Prentice Hall International Inc

Geldard, K. & Geldard, D. (1997) Counselling Children: A Practical Introduction. London: SAGE.

Bergin, A.E. & Garfield, S.L. (Eds.) (1994). Handbook of Psychotherapy and Behaviour Change. New York: John Wiley & Sons.

Bhatnagar, A. & Gupta, N. (1999). Guidance and Counselling: A Theoretical Perspective. New Delhi: Vikas Publishing House.

Gilbert, P. (1992). Counselling for Depression. London: SAGE.

Hallam, R. (1992). Counselling for Anxiety Problems. London: SAGE.

Krumboltz, J.D. & Thorensen, C.E. (Eds.) (1969). Behavioral Counselling: Cases and Techniques. New York: Holt, Rinehart and Winston.

Lee, C. (1998). Women's Health. London: Sage.

Schloss, P.J., Smith, M.A. & Schloss, C.N. (1995). Instructional Methods for Adolescents with Learning and Behavior Problems. Boston: Allyn and Bacon.

Paper 303: Counselling Psychology

Model Question Paper

Time: 3 hours **Max.Marks:80**

Section – A

Answer any three of the following: **3 X 20 = 60**

1. Trace the roots of counseling psychology?
2. Describe the various steps in the counseling process?
3. What are the transference and counter transference feelings?
4. Describe the nature of interpretation and the various types of interpretation techniques in counseling?
5. What is career counseling?

Section – B

Answer any five of the following: **5 X 4 = 20**

1. Examine various relationship techniques used for the establishment and progress of a counseling relationship?
2. What types of adjustment problems do adolescents typically face? How would you counsel them?
3. Describe cognitive behavioral techniques and their application with regard to any three specific psychological problems of your choice?
4. What are the various aspects to be considered by a counselor while planning an educational programme for the mentally retarded?
5. Explain how cognitive behavioral techniques can be applied to alleviate depression?
6. Write an account about the nature of human's problems and how they can be counseled?
7. Write a short note on family counseling.
8. Write a short note on counseling for depression.

SEMESTER III

PAPER – 304: HEALTH PSYCHOLOGY

I. The Mind-Body Relationship:
- A historical review
- Concept of Psychological health in India.
- The development of changed outlook in nature of health and illness.
- Methodological Developments.
- Emergence of Behavioral Medicine
- Scope of Health Psychology.

II. Stress:
- The modern concept
- Stressors: Environmental, social, Psychosocial,
- Developmental and extreme stressors.
- Mediating variables: Physiological, Psychological responses.
- Stress and illness
- Control and Learned Helplessness.
- Control and Stress.

III. Psychophysiological Disorders major forms:
- Asthma
- Headaches
- Neurodermititis
- Peptic Ulcer.
- Insomnia.
- Cardio-vascular Disorders.
- Coronary Heart disease.
- Hypertension.

IV. Immune System defective disorders:
- Cancer
- Aids.
- Appetitive Behaviours:
- Obesity
- Alcoholism
- Smoking
- Behavioral explanations.
- Other stress related disorders:
  - Diabetes
  - Arthritis
  - Sexual dysfunctions
  - Infertility.
  - Speech disorders.
  - Sports Injury

V. Pain and Pain Management Techniques:

Physiology of Pain.
Gate – control theory.
Psychological influences on pain perception.
Specific pain treatment methods.
Medical Settings and Patient Behaviour:
Compliance with medical treatments.
Hospitalization
Coping with chronic illness
Complementary Health-Care systems in India.

Recommended Books:

1. Bakhtaveer, M.S., Rajyadaksha, M.S. (1999). New Biology and Genetic Diseases. Oxford: Oxford University Press.

2. Dimatteo, M. R. & Martin, L.R. (2007). Health Psychology. New Delhi, Pearson Education Inc., & Dorling Kindersley Publishing, Inc.

3. Davidson, P.O. & Davidson, S.M. (1980). Behavioral Medicine: Changing Health Lifestyles. New York. Brunner/Mazel.

4. Gatchel, R.J., Baun, A. & Krantz, D.S. (1989). An Introduction to Health Psychology. Singapore: McGraw Hill.

5. Goleman, D. & Gurin, j. (1993). Mind-Body Medicine. New York: Consumer Reports Books.

6. Pomerlau, O.V. & Brady, J.P. Behavioral Medicine Theory and Practice. Baltimore: Williams & Wilkin's Company.

Paper - 304 : Health Psychology

Model Question Paper

Time: 3 hours **Max.Marks:80**

Section – A

Answer any Three of the following: 3 X 20 = 60

1. Write briefly about the psychosocial and developmental stressors.
2. Explain insomnia with reference to adult psychiatric problems.
3. Explain the etiological criteria for alcoholism and smoking behavior.
4. Briefly outline the salient features of Gate-Control Theory.
5. What are the methods of coping with chronic illness?

Section – B

Answer any five of the following: 5 X 4 = 25

1. Trace the emergence of behavioural medicine an elucidate its scope.
2. What are the different forms of psychophysiological disorders?
3. Explain the major immune defective disorders with reference to etiology.
4. 'Learned helplessness is associated with reduced motivation, emotional disturbances and cognitive impairment'. Explain.
5. Elaborate and analyze the pain treatment methods.
6. Analyze the relationship between loss of control and stress.
7. Analyze the status of psychological health in India.
8. Explain complementary health-care systems in India.

Paper- 305 : Case studies

Individual case studies. Five clients with problems (children, adolescents or adults) have to be diagnosed and the necessary counseling should be provided. The case report should include a description of the diagnosis and the

intervention. Observation reports, verbatim and psychological test results are also to be included in the report.

One of the five cases should compulsorily deal with community psychology.

SCHEME OF EVALUATION

Internal Assessment : 20 marks
Record : 60 Marks
Viva voce : 20 Marks

Total :100 Marks

SEMESTER IV

Paper 401: CLINICAL PSYCHOLOGY

Basic Concepts

Nature and scope of clinical psychology

Body-mind relationship

Psycho-neuro-immunology

New directions in clinical psychology – spirituality, etc.

Research strategies.

Diagnostic Process

Cultural and social aspects of mental illness

Differential diagnosis using decision trees

Problem identification, definition and analysis of the problem, specification of change of goals, relationship establishment, implementing techniques and procedures for change, recording and termination.

Behavioural assessment, analysis and formulations.

Intervention Techniques

Behaviour therapy – systematic desensitization, modelling, assertiveness training, contingency management, operant methods in self-control, extinction procedure, aversive conditioning, cognitive methods, novel uses and applications.

Client-centered therapy

Rational-emotive therapy

Other Techniques

Hypnosis- clinical behaviour and hypnotisability, hypnotisability as related to physical symptoms, as unrelated to physical symptoms, therapeutic failures.

Family therapy – conceptual frame, the clinical home visit, space and action in family therapy, the family crisis.

Marriage therapy for couples

Social skills training

Occupational therapy, Group therapy and Psychodrama

Treatment Methods for Childhood and Adolescent disorders

Play therapy, graphic and plastic material: Essential conditions, process symbolism and evaluation.

Mental retardation – behavioural and emotional problems

Communication disorders – articulation, phonation, language, prosodic

Pervasive developmental disorder – Autism

Attention deficit and disruptive disorders – hyperkinetic children

Elimination disorders – enuresis and encopresis

Conduct disorders – noncompliant, coercive behaviour, aggression and violence, non-attendance. Psychopathic behaviour.

Stress-related Disorders and Treatment Methods

Somatoform disorders – conversion, pain and hypochondriasis

Sexual and gender identity disorders

Eating disorders – anorexia nervosa, bulimia nervosa, obesity

Ethical Issues

Perspectives, decision making, incompetent and unethical behaviour, marketing therapeutic services, ethics in group work, issues in deviance, diagnosis and assessment, value problems, individual conduct.

Problems in psychotherapy – the suspicious patient, the suicidal patient, the patient with somatic symptoms, the patient not ready for behaviour therapy, the distressed parent of the disabled child, the silent patient in the group.

Recommended Reading

1. Achenbach, T.M. (1974) *Developmental psychopathology*. New York: John Wiley and Sons.
2. Bellack, A.S., Hersen, M., & Kazdin, A.E. (1982). (Eds.). *International Handbook of Behaviour Modification and Therapy*. New York: Plenum Press.
3. Bergin, a.E., & Garfield, S.L. (1994). *Handbook of Psychotherapy and Behavioural Change.*
4. Bloch, D.A. (1973) *Techniques of family psychotherapy: A primer*. New York: Grune and Stratton.
5. Bychowski, G & Despert , J.L. *Specialized techniques in psychotherapy*. New York: Basic Books.
6. Carkhuff, R.R. & Berenson, B.G. (1967). *Beyond counseling and psychotherapy*. New York: Holt, Rinehart and Winston.
7. Davidson, P.O. & Davidson, S.N. (1980). *Behavioural medicine: Changing health lifestyles.*
8. Foulkes, S.H. & Anthony, E.J. (1973) *Group psychotherapy training*. Middlesex: Penguin Books.
9. Goleman, D. & Gurin, J. (1993). *Mind-body medicine*. New York: Consumer Reports Books.
10. Haworth, M.R. *Child psychotherapy*. New York: Basic Books Inc.

11. Klopfer, W.G & Reed, M.R. (1974) *Problems in psychotherapy.* New York: John Wiley

12. Korchin, S.J. (1986). *Clinical psychology*. New York: Basic Books.

13. Lachman, S.J. *Psychosomatic disorders*. New York: John Wiley and sons.

14. Lazarus, A.A., Rubin, R.D. & Frank, C.M. (1969) *Advances in behaviour therapy*.

15. Liberman, R.P. (1972) *A guide to behavioural analysis and therapy*. New York: Pergamon Press.

16. Masters, W.H., Hohnson, V.E. & Kolody, R.C. (1992) *Masters and Johnson: On sex and human loving*. Bombay: Jaico Publishing House.

17. Moustkas, C.E. *Psychotherapy with children*. New York: Harper and Row.

18. Phillips, E.L. (1977) *Counseling and psychotherapy: A behavioural approach*. New York: John Wiley and Sons.

19. Pommerlau, O.V and Brady, J.P. (1990) *Behavioural medicine: Theory and practice*. Baltimore: Williams & Wilkins Co.

20. Rimm, D.C & Masters, J.C. (1963) *Behaviour therapy: Techniques and empirical findings*. New York: Academic Press.

21. Rubin, J.A. *Child art therapy*. New York: Van Nostrand.

22. Stewart, L. (1992). *Eric Berne*. Thousand Oaks: Sage.

23. Thompson, T & Dockers III, W.S. (1975) *Application of behavioural modification*. New York: Academic Press.

24. Thorne, B. (1992). Carl Rogers. Thousand Oaks: Sage.

25. Van Hoose, W.H. & Kottler, J.A. (1077) *Ethical and legal issues in counselling and psychotherapy*. San Francisco: Jossey-Bass.

26. Weishaar, M.E. (1992). *Aaron T. Beck*. Thousand Oaks. Sage

27. West, J. & Spike, P. (1988). *Clinical psychology in action: A collection of case studies*. London: Butterworth Co.

Paper 401: Clinical Psychology
Model Question Paper

Time: 3 hours Max. Marks: 80

Section – A

Answer any Three of the following. 3 x 20 = 60

1. Explain the process of using decision trees in making a diagnosis.

2. Why would you consider a pain disorder as related to stress and how would you treat such a disorder?

3. Critically evaluate the use of hypnosis in the treatment of disorders. Where are they likely to be more useful?

4. What are some ethical issues confronting the practitioner in a therapeutic setup in our country?

5. Discuss what is meant by psycho-neuro- immunology in the light of recent research.

Section – B

Answer any Five of the following. 5 x 4 = 20

1. Discuss the new direction in clinical psychology.

2. What is aversive conditioning?

3. What are some of the behavioural problems of mental retardedness?

4. What are some of the techniques employed in group therapy?

5. How is obesity related to stress?

6. What kind of treatment package would be suitable for autistic children?

7. Discuss eating disorders?

8. What are the common substance use disorders in our country?

Semester IV

Paper -402 : Industrial and Organizational Psychology

Description and History of I/O psychology

Definition, Nature and Scope of I/O psychology.
The role and functions of an I/O psychologist.
Perspectives on the nature of human work.
Historical observations.
Indian concept of work.
Emerging perspectives on human work.

Group dynamics

Nature and importance of groups. Group structure (Norms, roles, status, size, composition, cohesiveness). Group decision making

Performance Appraisal

Developing job criteria (job analysis, determining performance criteria). Measurement and evaluation of criteria (Purpose, varieties of job performance data,). Employee comparison procedures. Rating procedures. 360 degree assessment and feedback

Selection, Placement and Training

Principles and methods of selection. PIE model. Theory of placement. Nature and significance of training. Training methods and techniques;

Leadership and Motivation

Theories of leadership (Trait, Behavioral or Style, Contingency theories, Functional Approach). Recent perspectives. Leadership in the Indian context. Content theories of motivation (Maslow, Alderfer, Herzberg and McCleland)

Concepts of Motivtion : Process theories of motivation (Equity, Expectance and Goal theory) Application: Motivating by job design, Employee involvement, Using Rewards

Organizational Change, Development and Effectiveness

Significance of change, Resistance to change,Individual and organizational resistance. Overcoming resistance of change. Approaches to managing organizational change. Contemporary change issues for today' s managers and Performance Management

Personnel Effectiveness

Interpersonal and Organizational Communication.
Coping with conflict and Stress
Employee counseling
Alcoholism and Absenteeism
Time management
Leadership training
Decision making and Team building

References:

Berry, L.M. Psychology at work. (2nd ed.) 1998, McGraw Hill, Boston.

Lawley F.J. The Psychology of Work Behavior. 1989, Books/Cole Publishing Company, Californina.

Rollinson, D., Broadfield, A., and Edwards, D.J. Organizational Behavior and Analysis (An Integrated Approach). 1998, Addison-Wesley, Harlow, England.

Bernardin, H.J. and Russell, J.E. Human Resources Management – An Experiential Approach. 1998, Irwin-McGraw Hill, Boston.

Saal, F.E., Knight, P.A. Industrial and Organizational Psychology – Sciences and Practices. 199 , Brooks Publishing Company, California.

Marvin, B., Dunnette, T. and Leatter, M.H,. Handbook of I/O Psychology (4 vols.). 199 , Jayco Publishing House, Calcutta.

Moorhead, G., and Griffin, R.W. Organizational Behavior. 1989, Houghton Miflin Company, Boston.

Luthans, F. Organizational Behavior. 1992, McGraw-Hill Inc. New York.

Davis, K. Human Behavior at Work. 1994. Tata McGraw Hill Publishing Co. New Delhi.

Tiffin, J., and McCormick, E.J. Industrial Psychology, 1965, Prentice-Hall India Pvt. Ltd. New Delhi.

Robbins, S.P. Organizational Behavior - Concepts, Controversies and Applications. 1993, Prentice-Hall of India, New Delhi.

Lewis, J.A., and Lewis, M.D. Counseling programs for employees in the Workplace. 1986 Brooks/Cole Publishing Company, California.

Gordon, J.R. A diagnostic approach to Organizational Behavior. 1991. Allyn and Bacon, Boston.

Kavita Singh (2007) Counselling Skills for Managers Prentice –Hall of India Pvt Ltd New Delhi

Paper - 402: Industrial and Organizational Psychology

Model Question Paper

Time: 3 hours **Max.Marks: 80**

Section – A

Answer any THREE of the following: 3 X 20 = 60

1. What are the different approaches to study of behavior at work? Discuss?
2. Explain about the ethics of manager in work situation?
3. What is scientific management? How Hawthorne studies helps to understand work behavior?
4. Explain about the emergence of international management by giving more emphasis on cross cultural aspects?
5. Describe the applications of models in I/O psychology?

Section – B

Answer any FIVE of the following: 5 X 4 = 20

1. What are the historical observations about work?
2. Describe the characteristics of organizations?
3. What is the role of Psychologist in industry?
4. Write about the use of research designs in I/O psychology?
5. What are the organizational challenges present in Indian scenario?
6. Explain the importance of groups?
7. How inferential statistics used in Industrial research?
8. Discuss about the contemporary organizational challenges in Indian Industrial scenario?

Semester IV

Paper – 403 : Project

The student shall have to undertake a research project with a sample of at least 50 subjects. The project report should include an introduction to the topic, review of related literature, the methodology adopted (sample, tools, design and analysis of data) and the results of the project.

Scheme of evaluation:

Internal assessment	20 marks
Project report	60 marks
Viva-voce	25 marks
Total	100 marks

Semester IV

Paper - 404: Educational Psychology

1. Nature and scope of Educational Psychology

Contributions of Psychology to education

2. Cognitive development

Piaget's theory of Cognitive development. Vygotsky's sociocultural

Perspective. Language development in the school years. Dialects, bilingualism. Intelligence tests (WISC III and WPPSI-R)

3. Personal, social and emotional development

Erikson's theory. Understanding ourselves and others. Self-concept and Self-esteem. Kohlberg's stages of moral development. Moral behavior.

Socialization. Family, peers and teachers

4. Learner differences, learning needs and disorders

Cognitive and learning styles.

Mild and severe leaning disabilities. Students with health impairments. Deaf and hard of hearing, Low vision and blindness. Hyperactive and Attention disorders. Gifted and talented children

Communication disorders Speech and language disorders

Oppositional-Defiant and Conduct disorders

School phobia

5. Culture and community

Socioeconomic status. Low expectations. Low self-esteem. Learned helplessness. Peer and home environment influences

Gender-role identity. Gender differences in the classroom

6. Interventions to improve Academic problems

Academic productivity

Homework completion

Reading performance

Mathematics performance

Written language

Social studies and science performance

7. Interventions to modify behavior and enhance social competence

Inappropriate behaviour in classroom

Special classes and less structured situations

Verbal and physical aggression

Cooperative behavior

Recommended reading

Woolfolk, A. (2004). Educational Psychology (9th Ed.). Pearson Education, Delhi

Boucher, R. (1999). Students in Discord. Greenwood Press, Connecticut

Rathvon, N. (1999). Effective School Interventions, The Guilford Press. New York

Kaufman, A.S. and Lichtenberger, E.O. (2000) Essentials of WISC III and WPPSI-R Assessment. John Wiley and Sons, New York

PAPER –404 : EDUCATIONAL PSYCHOLOGY

MODEL QUESTION PAPER

Time : 3 hours Max. Marks : 85

SECTION – A

Answer any Three of the following: 3 x 20=60

1. Write the effects of bilingualism on language development.
2. Describe the role of peers on socialization.
3. What are the factors that contribute to school phobia.
4. What is learned helplessness.
5. Examine the relationship between socio-economic status and academic performance.

SECTION – B

Answer any Five of the following: 5X4=20

1. Describe the role of Psychology in Education.
2. Describe the nature of language development in schools with special reference to India.
3. Evaluate Kohlberg's theory of moral development.
4. What are oppositional defiant and conduct disorders. Discuss the interrelation strategies.
5. Describe interventions to improve written language and mathematical performance.
6. Describe intervention to modify inappropriate behaviour in class rooms.

7. What is Dyslexic disorder?

8. Describe verbal and physical aggression.

Semester IV

Paper – 405 : REHABILITATION PSYCHOLOGY

I. Nature and Scope of Rehabilitation psychology

Definition, historical perspective, scope and methods
Functions of Rehabilitation Psychology: General functions and special functions
History and Philosophy of Disability Rehabilitation
Goals and objectives of rehabilitation
Multi-disciplinary approach to rehabilitation: Biological, medical, psychological, educational and social aspects

II. Disabilities

Disability - Concept and definitions
Classification of various disabilities, Incidence and prevalence
Types of disabilities: Visual impairment, Hearing and speech impairment, Locomotor disability,
Mental retardation, Cerebral palsy, Autism , Mental illness
Learning disabilities, Multiple handicaps
Etiological factors; pre-natal, natal and post-natal, chromosomal aberrations and genetic errors
Prevention of disabilities

III Personality Development of Disabled Persons

Factors influencing personality development of disabled individuals
Life span development of people with disabilities
Assessment of personality of disabled individuals

IV Intervention

Screening and early identification of people with developmental disabilities.
Social, Psychological Perspective in Rehabilitation Psychology.
Early intervention: definition, assessment and strategies for intervention.

Intervention packages for various disabilities.
Services and programmes for disabled individuals and their families in India
Special education: – aims, objectives and functions, Emerging trends in special education
Educational assessment and evaluation for persons with disabilities
Educational technology for disabled

V. Psychological Intervention

Planning Intervention: Psychoanalytic Approach, Learning Theories and Strategies, Planning and Designing, Learning Situations, Counselling Strategies.
Therapeutic services and Restorative techniques.
Designing Training Programmes for Professionals: Training Need Analysis, Implementation of Training Programmes
Monitory and Impact Studies.

VI. Organization & Management

Evolution of Non-Government Organizations
Background Characteristics of Organization
Capacity Building of Non-Government Organizations

Recommended Readings:

Bolton B., 1987. Handbook of Measurement and Evaluation in Rehabilitation, Second Edition. Paul H.Brookes, Baltimore, London.

Brown Roy I., & E. Anne Hughson, 1987. Behavioural and Social Rehabilitation and Training. John Wiley & Sons Ltd.

Chadha N.K. & Nath S., 1993. Issue and Trends in Rehabilitation Research. Friends Publication, Delhi.

Gokhale S.D., 1987. Rehabilitation: Attitude and Reality. Rehabilitation Coordination India. Tata McGraw-Hill Publishing Company Limited, New Delhi.

Golden C.J., 1984. Current Topics in Rehabilitation Psychology. Grune & Stratton, London.

Nirbhay N.Singh, 1998. Comprehensive Clinical Psychology: Application in Diverse Populations, Volume 9. Elsevier Science, Pergamon.

Alan Hilton & Ravic Ringlaben, 1998. Best and Promising Practices in Developmental Disabilities. Pro-Ed, Texas.

Ali Baquer & Anjali Sharma, 1997. Disability: Challenges Vs Responses. Concerned Action Now, New Delhi.

Gerald Hales, 1996. Beyond Disability: Towards an Enabling Society. SAGE Publications, New Delhi.

John Swain, Vic Finkelstein, Sally French & Mike Oliver, 1994. Disabling Barriers – Enabling Environments. SAGE Publications, New Delhi.

Jose Murickan & Georgekutty, 1995. Persons with Disabilities in Society. Kerala Federation of the Blind, Trivandrum.

Kundu, C.L., 2000. Status of Disability in India – 2000. Rehabilitation Council of India, New Delhi.

Mark L. Batshaw, M.D., 2000. Children with Disabilities, Fourth Edition. Paul H. Brookes Publishing Co.

Michael Floyd, 1993. Information Technology Training for People with Disabilities, Disability and Rehabilitation Series 4. Jessica Kingsley Publishers, London.

Pandey, R.S., & Advani, L., 1995. Perspectives in Disability and Rehabilitation. Vikas Publishing House, New Delhi.

Rakesh Agarwal, Lal Advani & Rajinder Raina. Handbook on Disability Rehabilitation. Viba Press Pvt. Ltd., New Delhi.

Evans, P. & Verma V. (Eds), 1990. Special Education: Past, Present and Future. The Falmer Press.

Evans, R.C. & MC Laughlin P.J., 1993. Recent Advances in Special Education and Rehabilitation. Andover Medical Publishers, Boston.

Robert A. Paton & James McCalman, 2000. Change Management: A Guide to Effective Implementation. Response Books, New Delhi.

Edward Zigler & Dianne Bennett-Gates, 1999. Personality Development in Individuals with Mental Retardation. Cambridge University Press.

Kundu C.L. 1994. Personality Development. -Indian Studies. Sterling Publication, Delhi.

PAPER 405: REHABILITATION PSYCHOLOGY

MODEL QUESTION PAPER

Time : 3 hours Max. Marks:80

SECTION – A

Answer any Three of the following: 3 x 20 = 60

1. Describe the functions of rehabilitation psychology.

2. Define the concept of disability.

3. Identify the major factors influencing the personality of disabled individuals.

4. What are the aims and objectives of special education.

5. What is meant by training need analysis?

SECTION – B

Answer any Five of the following: 5 x 4 = 20

1. Discuss the multidisciplinary approach to rehabilitation.
2. Prevention of disabilities is better than management of disabilities. Discuss.
3. Describe the life-span development of person with one type of disability.
4. Discuss social, Psychological perspectives of Rehabilitation Psychology.
5. Discuss the counselling strategies appropriate a rehabilitation of person with hearing and speech impairment.

6. Discuss the role of Psychologists in a non-government organization.
7. What is capacity building.
8. Discuss Training Need Analysis.

Semester IV

Paper - 406 - INDIAN PSYCHOLOGY

1. a. Introduction to Indian Psychology: Assumptive base of Indian Psychology. Scope and substance of Indian Psychology, Methods of study, Psychological thought in Ancient India.

b. Indian thought and tradition: Indian Psyche, Indian psychology a myth or reality, origins of sruti and smriti, content of Vedas, systems and schools of Indian Psychology, asu, prana, and manas, Atman and Jiva, models in Indian thought.

2. a. Yoga psychology: Theory and applications

b. Patanjali yoga sutras and sidhis – Basic concepts

c. Yoga psychology and Samkhya Metaphysic

3. Transpersonal Psychology in Bhagavat Gita. Identity and existence, self knowledge, conflict and wisdom, ksetra, Ksetrajna and Ego, Karma and Sanyasa, work, renunciation and yoga, work as meditation, three definitions of yoga (i. sthitha prajna and freedom, ii. Work and freedom, iii. Yoga and happiness).

4. Psychology in the advaita Vedanta: concept of manas, ahamkara, buddhi and citta, person and personality, self realization.

5. a. Jain Psychology: Jain Conscious reality, consciousness and conscious attentiveness, concept of self, cognition, concept of mind, body mind interaction.

b. Buddhist Psychology: Thought (citta), mind (mano), consciousness (vinnana), varieties of knowing – sensory knowing (sanna), extraordinary knowing (abhinna), holistic knowing (parinna), and Insight knowing (panna).

Recommended Readings:

Tart C. T. (1992). *Transpersonal psychologies.(*2nd Ed.). New York ; Harper Collins.

Rao, K.R., Paranjpe, A.C. & Dalal, A.K. (2008). Handbook of Indian Psychology. New Delhi: Cambridge University Press India Pvt. Ltd.

Kuppuswamy, B. (1985). *Elements of Ancient Indian Psychology*, New Delhi-110 002: Vikas Publishing House Pvt. Ltd., t, Ansari Road. (Paper back edition available)

Vyas R. N. (1984). *From Consciousness to Super Consciousness: Fundamentals of Indian Philosophical Psychology,* New Delhi-110 002: Cosmo Publications, 24-B, Ansari Road, Daryaganj. (Paper back edition available)

Ajaya, S. (1983). *Psychotherapy east and west: A unifying paradigm.* Honesdale, Pennsylvania: The Himalayan International Institute of Yoga Science and Philosophy.

Vrinte, J. (1996). *The quest for the inner man – Transpersonal psychotherapy and integral sadhana.* Pondicherry, India: Sri Mira Trust.

REFERENCE BOOKS

Sinha J. (1985). *Indian Psychology Vol. 1 Cognition,; Vol.2 Emotion; and Will; Vol.3 Epistemology of Perception.* New Delhi: Motilal Banarasidas.

Dalal, A.S. (2001). *A greater Psychology: An Introduction to the Psychological Thought of Sri Aurobindo,* Pondicherry: Sri Aurobindo Ashram Publication Department.

Misra G. & Mohanty, A.K.(2001). *Perspective on indigenous psychology.* New Delhi: Sage.

Kim U. & Berry, I.W.(1993). *Indigenous psychologies: Research and experience in cultural context.* New Delhi, India: Sage.

Cortright, B. (2000). *Psychotherapy and Spirit: Theory and practice in transpersonal psychotherapy*. Albany, NY: State University of New York Press.

Paranjpe A.C.(1998). *Self and Identity in modern psychology and Indian thought.* New York: Plenum Press.

Paranjpe A.C.(1994). *Theoretical psychology. Meeting of east and west.* New York: Plenum Press.

Rama, S. Ballentine, R., Ajaya, S. (1976). *Yoga and psychotherapy.* Honesdale, Pennsylvania: The Himalayan International Institute of Yoga Science and Philosophy.

Chaudhury, H. (1992). Yoga Psychology. In C.T. Tart (Ed.). *Transpersonal psychologies*. (2nd Ed.). New York: Harper Collins.

Akhilananda, Swami. Hindu Psychology. London, Routledge, 1947.

Paper - 406 - Indian Psychology

Model Question Paper

Time: 3 hours Max.Marks : 80

Section – A

Answer any Three of the following: 3 X 20 = 60

1. Discuss Indian thought and tradition of Indian Psychology.
2. Describe Psychology in the advaita Vedanta.
3. Write in detail about Buddhist psychology
4. Give an account of Patanjali's yoga sutras.
5. Expound the concept of Bhagavat Gita

Section – B

Answer any Five of the following: 5 X 4 = 20

1. Briefly describe the theory of yoga psychology.
2. Give an account of the content of Vedas.
3. Write about the advaita psychology
4. Discuss the Jain concept of consciousness
5. Define yoga with reference to work.
6. What is holistic knowing from Buddhist perspective?
7. Explain the concept of Budhhi and citta in Buddhist psychology.
8. Describe the systems and schools of Indian Psychology.

Semester – IV
Paper - 407 : Parapsychology

I. Introduction and Evidence of Psi.
Historical background and the beginnings of scientific research.
Spontaneous phenomena.
Problems of method.
Some basic test procedures
Some crucial laboratory experiments.

II. Variables in Psi.
Subject variables
Target variables
Experimental variables.

III. The psychology of Psi
The unconscious nature of Psi
The bidirectionality of Psi
The position effects.

IV. Explaining Psi
"Physical" theories
Field theories
Projection Hypothesis
Theories of precognition

V. Parapsychology and the nature of man
The nature of Psi
The mind body problem
Freedom of will
The problem of survival

VI. Application of Psi

Recommended Reading

1. Beloff, J(1974). New directions in parapsychology. London: Elek Science.
2. Krippner, S. (1979) Advances in Para psychological research. Vols, 1&2. Plenum press.
3. Murphy, G (1961) Challenge of psychical research. New york: Harper & Row.
4. Pratt, J.G. (1973) ESP research today: A study of developments in parapsychology since 1960. New Jersey: The Scarecrow Press.
5. Rao, K.R.(1966). Experimental parapsychology: A review and interpretations. Springfied: Charles C. Thomas.
6. Rhine, J.B. & Pratt, J.G. (1957) Parapsychology : Frontier science of the mind. Springfield: Charles C. Thomas.
7. Rhine, J.B. (1964) New world of the mind. New York: Sloane and Associates.
8. ---------- (1964) Extrasensory perceptions. Boston: Bruce Humphries.
9. Rhine, Louisa, E. (1961) Hidden channels of the mind. New York: Sloane and Associates.
10. ---------- (1967) ESP in life and lab: Training hidden channels. New York: Macmillan company.
11. ---------- (1970) Mind over matter: Psychokinesis. London: Macmillan.
12. ---------- (1975) Psi: What is it? New York: Harper & Row
13. Rogo, S. (1975) Parapsychology: A century of enquiry. Taplinger Publishing company.
14. Roll, W.G. (1972) The poltergeist. New York: Signet Classics.
15. Schmeidler, Gertrude, R. (1969) Extrasensory perception. New York: Atherton Press.
16. Ullman, M. & Krippner, S. (1973). Dream telepathy: Experiments in nocturnal ESP. New York: Macmillan Publishing Company.
17. Wolman, B.J. (1977). Handbook of parapsychology. New York: Van Nostrand.

Paper- 407: Parapsychology

Model question paper

Time: 3 Hours **Max. Marks: 80**

Section – A

3 x 20 = 60

Answer any Three of the following.

1. Why is parapsychology a scientific discipline?
2. Briefly write about the basic test procedure in parapsychology?
3. What are the physical and psychological aspects of target variables in Psi tests?
4. Write a short note on the unconscious nature of Psi?
5. Explain briefly the PMIR model?

Section – B

Answer any Five of the following. **5 x 4 = 20**

1. Describe the ganzfeld technique.
2. Critically examine the nature of spontaneous phenomena as evidence of paranormal events?
3. What are the chief methodological problems in parapsychology?
4. Elucidate the characteristics of Psi?
5. Evaluate the status of experimenter variables in Psi tests?
6. 'Freedom of will" is an essential and element of the nature of man as of parapsychology. Substantiate.
7. Explain the relationship between personality variables and ESP with research findings?
8. Explain position effects.

M.SC. MICROBIOLOGY- SEMESTER SYSTEM

ANDHRA UNIVERSITY **(EFFECTIVE FROM THE ACADEMIC YEAR 2015 -16) SCHEME OF INSTRUCTION AND EXAMINATION**

Paper No.	Title of the Paper	Periods/ Week	Duration of Exam (Hours)	Maximum Marks	Credits
I Semester					
MB 101	General Microbiology	4	3	100	4
MB 102	Virology	4	3	100	4
MB 103	Bio-molecules	4	3	100	4
MB 104	Analytical Techniques	4	3	100	4
Practical					
MBP 105	Microbiological methods & Virology	12	6	100	4
MBP 106	Analytical Techniques	12	6	100	4
Total Marks and Credits for I Semester				**600**	**24**
II Semester					
MB 201	Microbial Physiology & Metabolism	4	3	100	4
MB 202	Enzymology & Cell Biology	4	3	100	4
MB 203	Molecular & Microbial Genetics	4	3	100	4
MB 204	Immunology	4	3	100	4
Practical					
MBP 205	Enzymology & Immunology	12	6	100	4
MBP 206	Microbial Physiology & Genetics	12	6	100	4
MB: 207	Principles of Microbiology *****	4	3	100	4
Total Marks and Credits for II Semester				**700**	**28**
III Semester					
MB 301	Molecular Biology	4	3	100	4
MB 302	Medical Microbiology	4	3	100	4
MB 303	Bio-statistics & Bio-informatics	4	3	100	4
MB 304	Molecular Biotechnology	4	3	100	4
Practical					
MBP 305	Molecular Biology & Molecular Biotechnology.	12	6	100	4
MBP 306	Medical Microbiology & Bio-informatics.	12	6	100	4

MB 307	Applied Microbiology *	4	3	100	4
Total Marks and Credits for III Semester				**700**	**28**
IV Semester					
MB 401	Fermentation Technology & Industrial Microbiology	4	3	100	4
MB 402	Environmental Microbiology	4	3	100	4
MB 403	Food Microbiology & Agriculture Microbiology	4	3	100	4
MB 404	Pharmaceutical Microbiology	4	3	100	4
Practical					
MBP 405	Industrial Microbiology & Environmental Microbiology	12	6	100	4
MBP 406	Food, Agriculture & Pharmaceutical Microbiology	12	6	100	4
Total Marks and Credits for IV Semester				**600**	**24**
Project Work/Dissertation andCredits				**100**	**4**
Grand Total Marks and Credits for 4 Semesters				**2700**	**108**

- Out of 100 Theory and 100 Practical Marks for each paper, 20 marks for internal assessment and 80 marks for semester-end examinations.
- Out of 80 Marks of each practical examination, 15 marks should be allotted for viva-voce and 10 marks for Record.

***** Choice based credit system – for the students of other Departments.

I SEMESTER
MB 101: GENERAL MICROBIOLOGY

UNIT – I:

History, discovery, evolution, development and recent trends in Microbiology. Contributions of Van Leeuwenhock, Joseph Lister, Pasteur, Koch, Jenner, Winogradsky and Beijerinck.Nobel laureates in Microbiology.

Distinguishing characteristics between prokaryotic and eukaryotic cells.Structure and function of cell wall of bacteria, cell membranes, flagella, pili, capsule, gas vesicles, carboxysomes, magnetosomes and phycobolisomes.

Concepts, nomenclature and taxonomic ranks.general properties of bacterial groups. Major characteristics used in Taxonomy-morphological, nutritional(cultural), chemical, biochemical, physiological, metabolic, ecological, immunological, pathogenic properties. Numerical taxonomy, genetic and molecular classification systems; phylogenetic trees.

Identification, characterization and classification of microorganisms- Principles of bacterial taxonomy and classification: - Bergey's manual and its importance, concept of kingdom - Haeckel's three kingdom concept-Whittaker's five kingdom concept-three domain concept of Carl Woese.

UNIT- II:

Methods of sterilization: Physical methods – Dry heat, moist heat, radiation methods,filtration methods, Chemical methods and their application.

Microbial cultures: Concept of pure culture, Methods of pure culture isolation,Enrichment culturing techniques, single cell isolation, and pure culture development.

Chemical structure of peptidoglycon, protoplasts, spheroplasts, microsomes and ribosomal RNAs, Nuclear material/nucleus.

Microscopic identification, characteristics, staining methods – simple staining, differential staining, structural staining and special staining methods.

Microbiological media-Natural and synthetic; autotrophic, heterotrophic and phototropic and prototrophic media: basal, defined, complex, enrichment, selective, differential, maintenance and transport media.

Preservation and Maintenance of Microbial cultures: Repeated sub culturing, preservation at low temperature, sterile soil preservation, mineral oil preservation, deep freezing and liquid nitrogen (cryo) preservation, drying, glycerol cultures, freeze-drying (lyophilization). Advantages and disadvantages of each method

UNIT –III

Types of cultures- stock, batch, continuous and synchronous cultures. Growth measurement methods –Direct methods: viable plate counts, membrane filtration, microscopic counts, electronic counters, most probable number; Indirect methods: metabolic activity (measurements of NAD, ATP, DNA, and Protein, CO_2 liberated O_2 consumed, extra cellular enzymes), dry weight, turbidity. Cultivation of aerobes and anaerobes. Reproduction in bacteria and spore formation.
Morphology, Ultra structure and chemical composition of bacteria, Actinomycetes, Spirochetes, Rickettsiae, Mycoplasma, Chlamydiae – TRIC agents and LGV, Cyanobacteria, Archaebacteria

UNIT- IV

Eukaryotic microorganisms: General characteristics, reproduction and economic importance of fungi. Classification, structure, composition, reproduction and other characteristics of fungal divisions-Zygomycota, Ascomycota, Basidomycota, Deuteromycota and slime & water molds
Structure, reproduction and other characteristics of algal divisions, Distribution of algae.Classification of algae by Fritsch.Characteristics of - dinoflagellates, thallus organization, products of algae and their economic importance. Algal SCP, emphasis on *Spirulina.*
Characteristics of Various protozoa-Morphology, nutritional requirements, reproduction.morphology, Life cycle and Pathology of *Entamoeba histolytica, Plasmodium,* Free Living Pathogenic Amoeba *Naglaria&Acanthamoeba.*

RECOMMENDED BOOKS FOR MB 101:

1. **Microbiology,** 8th Edition International Student Version Jacquelyn G. Black (Marymount University) April 2012, ©2011, Wiley publication.
2. **Understanding Microbes: An Introduction to a Small World**. Jeremy W. Dale December 2012, Wiley-Blackwell
3. **Brock Biology of Microorganisms :Global Edition, 13th Edition, Michael Madigan, John Martinko, David Stahl, David Clark Apr 2011, Paperback, 1152 pages**
4. **William Barry Whitman**, 2004, Bergey's Manual of Systematic Bacteriology (2^{nd} edition) volumes I to VI, American Society of Microbiology. George M. Garrity, Julia A Bell, Timothy G.Lilburn.
5. **GERHARDT**, Methods for General and Molecular Bacteriology (2nd edition).
6. **PELCZAR, CHAN & KRIEG,** Microbiology (5th edition) M.C.Graw Hills.
7. **MADIGAN, MARTINKO &PARKER,** Brock Biology of Microorganism (9th edition) by Introduction to Microbiology by ROSS, Wasley Eductional publisher,1986
8. **VOLK & WHEELER,** Basic Microbiology, Edition 3,Publisher Lippincott
9. **SALLE**, Fundamental Principles of Bacteriology, Mc Grawhills.
10. **Stainier, Deudroff and Adelberg,** General Microbiology
11. **Fritsch, F.E,** Structure and Reproduction of Algae, Vol. I & II, Cambridge University Press.
12. **Morris, I, Hutchon,** Introduction to Algae, Pub 1967.
13. **Zizac,** Products and Properties of Algae.
14. **Smith, GM.**, Fresh water algae of the United States.
15. **Alexopolus, C.J,** Introductory Mycology,Wiley scientific.
16. **Ingold, CT,** Dispersal in Fungi, Oxford university press

17. **R.M.Atlas,** Principles of Microbiology, Wm.C Brown Publications.
18. **K.Talaro and A.Talaro,** Foundations in Microbiology, Wm.C.Brown Publications, 2nd edition.
19. **D.E. Alcamo, Jones and Bartiett, Boston,** Fundementals of Microbiology.
20. **J.G.Black,** Microbiology – Principles & Applications, John Wiley & Sons, New york.
21. **G.J.Tortora, B.R.Funke and C.L. Case,** Microbiology Addison Wesley Longman Inc., 7th edition Pub. Daryl Fox
22. **M.A. Sleigh,** The Biology of the Protozoa, American Elsevier, Newyork.

MB 102: VIROLOGY

UNIT–I:

History and Discovery of Viruses, Nature, origin and evolution of viruses, New emergingand re-emerging viruses, viruses in human welfare.
Properties of Viruses- Biological properties of viruses – host range, transmission-vector,non-vector; Physical properties of viruses – morphology, structure, sedimentation, electrophoretic mobility, buoyant density; Biochemical characteristics – chemical composition of viruses, proteins, nucleic acids, envelope, enzymes, lipids, carbohydrates, polyamines, cations, Antigenic nature of viruses.
Isolation, cultivation, assay and maintenances of viruses – Animal, Plant and Bacterial Viruses: biassay tissue culture – organ culture, primary and secondary cell cultures, suspension and monolayer cell cultures, cell strains, cell lines, embryonated eggs; experimental plant tissue cultures.

UNIT-II:

Nomenclature, classification and structure of viruses – criteria used for naming, classification of viruses, recent ICTV classification of viruses infecting animals, humans, plants, bacteria, algae, fungi. Major characteristics of different virus families/genera/groups-Poxviridae, Hepadnaviridae, Baculoviridae, Adenoviridae, Herpesviridae, Ortho and Paramyxoviridae, Retroviridae, Reoviridae, Parvoviridae, Rhadboviridae, Picornaviridae, Flaviviridae, Potyviridae, Tobamoviridae, Bromoviridae, Bunyaviridae, Geminiviridae, Caulimoviridae.
Algal, Fungal and Bacterial viruses- Phycodnaviridae, Cyanophages, Partitiviridae and Totiviridae. Subviral agents-sat viruses, Sat nucleic acids, Viroids, Prions.

UNIT – III:
Viral replication and genome expression – viral genomes- structure and complexity of viral genomes, diversity among viral genomes – DNA and RNA genomes- linear, circular, double and single stranded; positive and negative sense of RNA genomes, mono, bi, tri and multipartite of genomes. Replication of viruses – an overview of viral replication cycles, replication strategies of DNA, RNA viruses and regulation of viral genome expression-Baltimore strategies.
Virus – host interactions – cytopathic effects of viral infections, inclusion bodies, chromosomal aberrations; Response of host cells to viral infection –interference, immunological responses of the host.

UNIT – IV:

Transmission of viruses – Vertical (Direct) transmission – contact, mechanical,transplacental, transovarial, sexual, fecal, oral, respiratory, seed and pollen. Horizontal (Indirect) transmission-aerosols, fomites, water, food, graft, dodder. Vector-arthropod, non-arthopods, virus and vector relationship.Multiple host infections – viral zoonosis.

Diagnosis of viral diseases – clinical symptoms, immuno diagnosis, molecular methods used in viral diagnosis, prevention and control of viral diseases, sanitation, vector control, vaccines and immunization control – chemoprophylaxis, chemotherapy – anti viral drugs,interferon therapy, efficacy of infection control.

REFERENCE BOOKS FOR MB 102:

1. **John B Carter.2013** Virology: Principles and Applications Reviews , John Wiley & Sons, Limited, 2013 - 400 page
2. **Nicholas H. Acheson**, 2011. Fundamentals of Molecular Virology, 2nd Edition, McGill Univ., Canada.
3. **John Carter, Venetia A. Saunders,** 2007,Virology: Principles and Applications.., John Wiley and Sons.
4. **Frankel-Conrat**, 1994, Virology: 3rd Edition. Prentice-Hall
5. Principles of Virology: 2004 Second Edition, ASM press
6. **S.J.Flint et al.,** 2001, Introduction to Modern Virology:.5th edition. Dimmock et al., Blackwell Sci.Publ.
7. **A.Cann**, 2001, Principles of Molecular Virology, 3rd edition Academic Press
8. **Waginer and Hewelett,** 2004, Basic Virology, Black Well Science Publ
9. **D.O.White and F.J.Fenner,** 1994, Medical Virology, 4th edition. Academic Press.
10. **R.Hull,** 2001, Plant Virology, 4th edition by Academic Pres.
11. **D.M.Knipe and P.M.Howley,** 2001, Fundemental Virology, 4th edition, Lippiacott Williams and Wilkins.
12. **Murphy et al.,** 1999, Veterinary Virology. 3rd edition, Academic press.
13. **R.G.Webster and Allan Granoff,** 1994, Encyclopedia of Virology. Vol I, II, III,
14. **M.V.Nayudu,** 2006, Plant viruses. Prentice Hall Publication.

MB 103: BIOMOLECULES

UNIT – I:

Major Biomolecules: Carbohydrates – Classification, chemistry, properties, and function– mono, di, oligo and polysaccharides. Conjugated polysaccharides– glycoproteins, mureins and lipopolysaccharides.

Lipids – classification, chemistry, properties and function – free fatty acids, triglycerides,phospholipids, glycolipids & waxes. Conjugated lipids – lipoproteins. Major steroids of biological importance – prostaglandins.

UNIT –II:

Amino acids and proteins – classification, structure and function.Essential amino acids &amphoteric nature of amino acids and reactions and functions of carboxyl and amino groups andsidechains.Peptidestructure.Ramachandran’splot.Methods for isolation and characterizationof

proteins. Structural levels of proteins – primary, secondary, tertiary and quaternary,denaturation of proteins. Hydrolysis of proteins.Protein sequencing using various methods.

UNIT – III:

Nucleic acids – structure, function and their properties.Structural polymorphism of DNA, RNA.Structural characteristics of RNA.

Sources, Chemistry and biochemical functions of water-soluble vitamins.

Chemistry of Porphyrins – Heme, Cytochromes, Chlorophylls, xanthophylls, Bacteriochlorophylls& algal pigments, Carotenoides.

UNIT-IV:

Biological oxidation, Biological redox carriers, biological membranes, electron transport ,oxidative phosphorylation and mechanism.

Mineral metabolism – phosphorus, potassium, calcium and Trace elements –molybdenum, zinc, manganese, cobalt and copper. Influence of minerals on the production of toxins. Role of trace elements on microbial enzymes.

RECOMMENDED BOOKS FOR MB 103:

1. **VOET & VOET,** Biochemistry (2nd edition) John Wiley and sons.
2. **CONN, STUMPF, BRUENING & DOI,** Outlines of Biochemistry (5th edition) John Wiley and Sons.
3. **STRYER,** Biochemistry (3rd edition), Free man and company.
4. **ZUBAY,** Biochemistry, Brown Publishers
5. **LEHNINGER, NELSON & COX,** Principles of Biochemistry, 4th edithion , lSara Tenney pulishers
6. **MARTIN, MAYER & RODWELL**, Harper's Review of Biochemistry, Large medical publication
7. **SMITH, HILL, LEHMAN, LEFKOWITZ, HANDLER & WHITE,** Principles of Biochemistry: General aspects, 6th edition , Tata McGraw Hill Publishers.
8. **Davidson,** Biochemistry of Nucleic acids, Wiley scientific publishers
9. **D.R.Caldwell,** Microbial Physiology and Metabolism, Wm.C.Brown Publications.
10. **P.L.P. Adams, J.T. Knowler and D.P. Leader,** Biochemistry of Nucleic acids, Chapman&Hall, London.
11. **E.S.West. W.R. Tood, H.S.Mason and J.T.V. Bruggen,** Text Book of Biochemistry, Oxford & IBM Publishing Company Private Limited, New Delhi.

MB 104: ANALYTICAL TECHNIQUES

UNIT – I:

Microscopy – Principles of light, phase, fluorescent & electron microscopes; Microtomy– sectioning. Microscopic techniques: Basic principles and applications of phase – contrastmicroscopy (phase annulus, phase plate, specimen preparations), fluorescent microscopy (filters,dark field condensor, complex optical system, sample preparations) and electron microscopy(Magnetic lenses, electron beams, condensors, types of electron microscopy – scanning andtransmission, sample preparations - fixing of specimens, preparation of blocks,

microtomyandstaining, negative staining techniques of biological samples), cytometry and flow cytometry.

UNIT – II:
Principles of Centrifugation – Centrifugation techniques-preparative and analytical methods, density gradient centrifugation.
General principles and applications of chromatography – Paper, Column, Thin layer, Gas,Ion exchange, Affinity chromatography, HPLC, FPLC, GCMS and Gel filtration.
Electrophoresis- moving boundary, zone (Paper Gel) electrophoresis. Immunoelectrophoresis. Immunoblotting. Isoelectric focusing, 2-D electrophoresis

UNIT – III:
Principles, Laws of absorption and radiation.Visible, ultraviolet, infrared and mass spectrophotometry. Absorption spectra, fluorescence flame photometry, NMR, ESR, Principles of colorimetry, Turbidometry, Viscometry. Determination of size, shape and molecular weight ofmacromolecules – osmotic pressure, flow birefringence, optical rotatory dispersion.Lightscattering, diffusion, sedimentation and X-ray diffraction.

UNIT-IV:
Radio isotopic tracers – methodology, problems of experimental design, radiometricanalysis, stable and radioactive isotopes, preparation, labeling, detection and measurement of isotopes.RIA.Kinetics of radioactive disintegration.Manometric techniques.

RECOMMENDED BOOKS FOR MB 104:

1. **CHATWAL & ANANAD,** Instrumental Methods of Chemical Analysis, 5th edition revised Himalaya Publishers.
2. **WILSON & WALKER,** Practical Biochemistry: Principles and techniques, Academic publishers
3. **David M Freifelder,** Physical Biochemistry: Application to Biochemistry and Molecular biology (2nd edition) by. Publisher: W. H. Freeman; 2nd Revised edition (6 January 1983)
4. **SADASIVAM & MANICKAM,** Biochemical methods (2nd edition), New age inte.(p)Ltd.
5. **UPADHYAY, UPADHYAY &NATH,** Biophysical Chemistry: Principles and techniques, Himalaya Publishers
6. **OSER,** HAWK'S Physiological Chemistry, Mc Graw Hill Book company.
7. **R.F.Boyer,** Modern Experimental Biochemistry, Benjamin Cummings Publ. Company
8. **Umbtict, Burris and Staffer,** Manometric and Biochemical Techniques, Burgross.
9. **B.D. Williams and K. Wilson,** A Biologist's Guide to Principles and Techniques of Practical Biochemistry.

MBP 105: MICROBIOLIGAL METHODS & VIROLOGY

1. Isolation methods – Enrichment culturing, Pour plate, Spread plate, Streak plate and Dilution methods.

2. Staining methods – Gram's stain, Capsule staining, Cell wall staining. Indian Ink Methodor Hiss's method. Demonstration of granules in bacterial cells – Albert's method, Neisser's method. Acid-fast staining by Ziehl-Neelsen's method. Flagella and spore stain, Negative stain.
3. Calibration of Microscope, Measurement of size of spores and cells
4. Detection of motility by hanging drop method
5. Selective and indicator media – Crystal violet blood agar, Potassium tellurite blood agar, Neomycin blood agar, Salt nutrient agar, Mannitol salt agar, Phenolphthalein phosphate nutrient agar and Esculin bile medium.
6. Enumeration of bacteria – Quantitative estimation of microorganisms – total and viable counts.
7. Growth curves, Bacterial growth measurement, viable count by spread plate method. Measurement by dry weight and turbidometric methods
8. Culturing of anaerobic microorganisms-Pyrogallol tube method, anaerobic jar,thioglycollate media.
9. Metabolic (Biochemical) tests – Catalase and Oxidase tests. Indole reaction. Methyl redand Voges-Proskauer reactions, citrate utilization, starch and gelatin hydrolysis; H_2S production.
10. Isolation & Identification of known & unknown bacteria.
11. Isolation of phage from soil/sewage. Cultivation and preservation of phages, Quantitation of phages by plaque assay.
12. Growth phases of phage and burst size
13. Cultivation of animal viruses by different routes in embryonated chicken/duck eggsYolksac, Allantoic and Chorioallantoic membrane (CAM) routes.
14. Animal cell culture-Sheep kidney cell culture, chicken embryo fibroblast cell culture
15. Mechanical inoculation of plant viruses – Tobacco mosaic virus or cucumber mosaic virus and graft transmission of plant viruses.
16. Isolation and culturing of fungi (yeasts and molds) and algae.
17. Observation of specimen and permanent slides.
    - Fungi: *Aspergillus niger*
    - Yeast: *Saccharomyces cerevisiae*
    - Helminth: *Taenia solium, Enterobius vermicularis*
    - Protozoa: *Plasmodium falciparium, Giardia lamblia*

RECOMMENDED BOOKS FOR MBP 105:

1. **CAPPUCCINO & SHERMAN,** Microbiology: A laboratory manual, Benjamin cummings Science publishing, 5th edition.
2. **Gopal Reddy, M.N.Reddy, D.V.R. SaiGopal and K.V.Mallaiah,** Laboratory Experiments in Microbiology, Himalaya Publishing House.
3. **Reddy S.M. & Reddy S.R.,** Microbiology -Practical Manual, Books Selection Centre,Hyderabad.
4. **S.K. Alexander,D.Strete and M.J. Mily,** Laboratory Exercises in Organismal and Molecular Microbiology, Mc. Graw Hill, USA.
5. **J.G. Cappunico and N.Sherman,** Microbiology – A Laboratory Manual, 4th Edition,AddisonWelsley Longman Inc., England.

6. **V.Kale and K.Bhusari,** Practical Microbiology – Principles and Techniques, Himalaya Publishing House, New Delhi.
7. **P.Gunashekaran,** Laboratory Manual in Microbiology, New Age International PrivateLimited Publishers, New Delhi.
8. **N. Kannan, Panima,** Laboratory Manual in General Microbiology, Publishing Cooperation, New Delhi.
9. **R.C. Dubey and D.K. Maheswari,** Practical Microbiology, S.Chand & Company Limited, New Delhi.
10. **J.G.Holt, N.R.Krieg, P.H.A. Sneath,J.T. Staley and S.T. Williams,** Bergy's Manual of Determinative Bacteriology, Lippincott Williams & Wilkins, Philadelphia.
11. **Barnett,** Microbiology Laboratory Exercises, Mc. Graw Hill, U.S.A.
12. **Benson,** Microbiology applications: a Laboratory Manual in General Microbiology, Mc. Graw Hill, U.S.A.
13. **Chan,** Laboratory Exercises in Microbiology, Mc. Graw Hill, U.S.A.
14. **F.G. Burleson, T.M Chambers, D.L. Wuiedbrauk,** 1992, Virology : A Laboratory Manual.

MBP 106: ANALYTICAL TECHNIQUES

1. Qualitative tests of carbohydrates, lipids, amino acids, proteins & nucleic acids.
2. Estimation of reducing sugar-Anthrone method
3. Estimation of sugar by titration method –Benedict's method
4. Estimation of NH_2 group by Ninhydrin method, organic nitrogen in proteins/amino acids by Microkjeldhal method, Ultraviolet spectroscopy of proteins.
5. Determination of pKa and pI values of amino acids.
6. Quantitation of glycine by formol titration
7. Paper Chromatography of amino acids, sugars, and purine and pyrimidine bases.
8. Colorimetric determination of any one amino acid.
9. Separation of pigments by adsorption chromatography
10. Thin Layer chromatography separation – sugars & lipids
11. Molecular weight determination of enzymes / proteins by Gel filtration, SDS-PAGE.
12. Determination of saponification value of fats
13. Determination of iodine number of oils
14. Determination of acid value of fats
15. Demonstration of GM counter.
16. Determination of molar absorption coefficient of amino acid/protein and estimation of its concentration

RECOMMENDED BOOKS FOR MBP 106:

1. **B. Shashidhara Rao &VijayDeshpande – I.K,** Experimental Biochemistry – A student comparison, International Private Limited, New Delhi.
2. **K. Wilson and J. Walker,** Practical Biochemistry - Principles and Techniques, Cambridge University Press.
3. **D.T. Plummer,** An Introduction to Practical Biochemistry, Tata Mc. Graw Hill Publishing Company Limited, New Delhi.

4. **A. Rameshwar, Kalyani,** Practical Biochemistry – A Basic Course, Publishers Ludhiana.
5. **Jayaraman,** Laboratory Manual in Biochemistry, Wiley Eastern Limited.
6. **Oser,** Hawk's Physiological Chemistry, Mc. Graw Hill, U.S.A.

M.Sc Microbiology- II SEMESTER Syllabus

MB 201: MICROBIAL PHYSIOLOGY & METABOLISM

UNIT– I:

Nutritional types –Autotrophy, heterotrophy and prototrophy. Autotrophic bacteria, chemosynthetic and photosynthetic microorganisms. Heterotrophic bacteria – saprophytes, parasites and mixotrophs. Respiration in bacteria – aerobic and anaerobic types of respiration, obligate aerobes, facultative anaerobes and obligate anaerobes. Toxic effect of oxygen on anaerobes. Bioluminescence in microorganisms. Energy yields. Physiology and biochemistry of sporulation and germination of spores

UNIT-II:

Carbohydrate metabolism in microbes- synthesis of carbohydrates in photosynthetic, chemosynthetic and heterotrophic microbes. Fermentation of carbohydrates by microorganisms – Embden-Meyerhof-Parnas (EMP) pathway, Entner-Doudoroff (ED) pathway, C2-C4 split pathway. Kreb's cycle, glyoxylate cycle, hexose monophosphate (HMP) shunt, gluconeogenesis, anaplerotic reactions, synthesis of peptidoglycans and glycoproteins. Anaerobic respiration – Fermentation, Biochemical mechanisms of lactic acid, ethanol, butanol and citric acid fermentations. Nitrate and sulphate respiration.

UNIT-III:

Metabolism of amino acids –Biosynthesis of amino acids and their regulation with emphasis on tryptophan and histidine by microorganisms. Protein metabolism - Assimilation of inorganic nitrogen and sulphur, Biochemistry of nitrogen fixation. Urea cycle . Signal transduction with reference to nitrogen metabolism. Catabolism of amino acids, transamination, decarboxylation and oxidative deamination. Porphyrin biosynthesis and catabolism.

UNIT –IV:

Lipid metabolism - Biosynthesis of triacyl glycerols, phospholipids and sphingolipids. Oxidation of saturated and unsaturated fatty acids. Microbial metabolism of aromatic and aliphatic hydrocarbons (camphor, 2,4-D and toluene) with emphasis on the role of

monooxygenase and dioxygenase in the ring cleavage (*ortho, meta* and gentsiate cleavage) and reductive catabolism.
Nucleotide metabolism - Biosynthesis of purnine and pyrimidine nucleotides, biosynthesis of deoxyribonucleotides. Regulation of nucleotide synthesis, catabolism of purine and pyrimidines.
Secondary metabolism - Utilization of secondary metabolites for production of vitamins, toxins (aflatoxin and corynebacterial), hormones (GA), and antibiotics (penicillin and streptomycin).

RECOMMENDED BOOKS FOR MB 201:

1. **Moat and Foster,** 2002, Microbial physiology, 4th eidition, Pub. Wiley Liss and son's, Inc.
2. **Price and Stevens,** An introduction to bacterial physiology.
3. **Oginsky and Umbreit,** An introduction to bacterial physiology, Freeman & Company.
4. **Gottschalk,** Bacterial metabolism, University of Texas Medical branch at Galvaston
5. **Ingraham, Lod and Neichardt,** Growth of bacterial cell.
6. **Dawes,** Microbial energetic, Blakie & Sunlted Glasgow.
7. **Lehninger, Nelson and Cox,** Principles of Biochemistry.
8. **Zubay,** Biochemistry, 3rd edition, 1993, Pub. WM.C.Brown Publishers, Melbourne, Australia.
9. Biochemistry by Stryer.
10. **Garrett and Grisham,** 2005, Biochemistry, 3rd edition, Pub. Thomson Brook's and company.
11. **M.Burrows,** Textbook of Microbiology.
12. **D.R.Caldwell,** Microbial physiology and Metabolism, Wm.C.Brown Publ.
13. **K.Talaro and A. Talaro,** Foundations in Microbiology, Wm.C.Brown Publ.
14. **Prescott *et al.*** Microbiology, 7th edition, 2008, Pub. Wm.C.Brown.
15. **Lodish *et al.*,** 1999, Molecular Cell Biology, 4th edition, WH.Greeman and company.
16. **Stainer,** 1958, General Microbiology, Macmillan educational Ltd., 5th edition, Pub. Macmillum Press Ltd..
17. **Madigan M.T., Martinko J.M., and Parker J.,** Prentice Brock Biology of microorganisms, -Hall, Perarson edition.
18. **West E.S and Tood,** 1974, Textbook of Biochemistry, 4th edition, Oxford and IBM Publishing Co.Pvt. Ltd.,New Delhi.
19. **Donald Voet, Judith G.voet,** Biochemistry, John Wiley & Sons, 1999, Pub. John Willeuy and son's, USA.
20. **Harper,** 2006, Biochemistry, Mc.Graw Hill, 27th edition, Pub. McGraw-Hill companies.
21. **Cohn and Stumph,** Principles of Biochemistry, 4th edition, 2008, W.H. Greeman and company.
22. **Davidson,** Biochemistry of Nucleic acids.
23. **Mullar and Cords,** Biological chemistry.
24. **White Handler and Smith,** Biochemistry, Mc Grahills.
25. **Dwelley,** Bacterial metabolism.

MB 202: CELL BIOLOGY & ENZYMOLOGY

UNIT-I:
Organellar Biology: Structure, function & biogenesis of chloroplast and mitochondria, mesosomes, lysosomes and cytoskeletal system. Photosynthesis in bacteria and plants: Organization, apparatus, electron donors & acceptors, energetics.
Physico-chemical properties of bacteria – intracellular osmotic pressure, permeability of the bacterial cell. Nutrient transport – simple diffusion, passive, facilitated diffusion and active. Purple green photosynthetic bacteria
Photosynthesis - Oxygenic and anoxygenic photosynthesis, structure of synthetic pigments, primary photochemistry of PS I and PS II, and photosynthetic electron transport, Carbon dioxide fixation, halo bacterial photosynthesis.

UNIT-II:
Signal transduction in eukaryotes: Protein kinases, phosphorylation cascades, Ras pathway, MAP kinase pathway, Secondry messengers, Cyclic nucleotides, G proteins. Coated vesicles, membrane receptors.

UNIT-III:
Outlines of enzyme classification, nomenclature, assay of enzymes and kinetics of enzyme catalyzed reactions – Michaelis – Menton equation, determination of Km, Vmax and kcat values. Enzyme inhibitors, competitive, uncompetitive and noncompetitive inhibition. Factors affecting enzyme reaction – pH, temperature, radiation, enzyme and substrate concentrations, activators, coenzymes and metalloenzymes. Ribozymes and abzymes

UNIT-IV:
Active site determination. Mechanism of action of ribonuclease, lysozyme and chymotrypsin. Isoenzymes, Regulatory enzymes – covalent modification, zymogen activation, Allosteric enzymes – ATCase, Glutamine synthetase. Hemoglobin & Myoglobin.
Enzyme purification - Methods of isolation, purification. Recovery and yield of enzymes. Criteria for testing purity of enzyme preparations. Immobilized enzymes - Methods of Immobilisation. Comparison of kinetics of immobilized and free enzymes. Application of Immobilized enzymes.

RECOMMENDED BOOKS FOR MB 202:

1. **E.B.P. De Robertis,** 2001, Cell and Molecular Biology, 8th edition, Lippincott Williams & Wilkins.
2. **Lodish & Baltimore,** 2000, Molecular Cell Biology, 4th edition, Pub. W.H.Greeman and company.
3. **Nicholas C. Price, Lewis Stevens,** Fundamentals of Enzymology, 3rd edition, 2003, Pub. Oxford University Press.
4. Trevor Palmer, 2004, Enzymes, Biochemistry, Biotechnology, Clinical Chemistry, Pub. Harward Publishing Limited.
5. Lehninger, 2008, Biochemistry, 4th edition, Pub. W.H. Freeman and company.
6. **Lehninger, Nelson and Cox,** 2008, Principles of Biochemistry, 4th edition, Pub. W.H. Freeman and company.
7. **Lubert Stryer,** 2007, Biochemistry, 6th edition, Pub. W.H. Freeman and company.
8. **Zubay,** 1993, Biochemistry, 3rd edition, Pub. WM. C. Brown Co,,unition, Inc.
9. **White Handler and Smith**, 2004, Biochemistry, 6th edition, Pub. Tata McGraw-Hill Ltd.
10. **Dixon and Webb,** Enzymes, Acadamic Press.
11. **Ahern,** Introduction to Experimental Cell Biology, Mc. Graw Hill, USA.
12. **Metzler,** The Chemical reactions of Living Cells, Vol 1 and 2.
13. **Alberts, Bay Johnson**, Cell Biology, American Society of cell biology. Bay city books.

MB 203: MOLECULAR & MICROBIAL GENETICS

UNIT-I:
Molecular organization of chromosomes in Prokaryotes and Eukaryotes. Centromeres and telomeres. Recombination at molecular level, heteroduplex analysis. Fine Structure analysis. Organisation of genomes – Repeated sequences - C value – cot curves; Multigene families; Molecular markers(RFLP and RAPD). Polymorphisms. Yeast & Drosophila as model organisms. Complementation test and functional allelism.

UNIT-II:
Plasmids – types, plasmid DNA properties. Sex plasmid F and its derivatives, drug resistance (R) plasmids. The Ti plasmid of *Agrobacterium*. Hybridization in yeast, control of mating type loci in yeast. Transposable elements – transposition. Types of bacterial transposons, duplication of target sequence at an insertion site. Deletion and inversion caused by transposons. Transposable elements in yeast and drosophila. Retroposons.

UNIT-III:
Mutations – Terminology, types of mutations, Molecular basis of mutations, isolation & analysis of mutants. Mutagenesis – base analogue mutagens, chemical mutagens, intercalating substances, mutator genes. Site directed mutagenesis, mutational hot spots, Reversion, second site revertants, frame shift mutations, screening of mutants. UV damage of DNA and repair.

UNIT-IV:
Bacterial genetics – Inheritance of characteristics and variability. Phenotypic changes due

to environmental alterations. Genotypic changes. Bacterial recombination. Bacterial transformation, Bacterial conjugation, Transduction – Generalized and specialized transductions. Tetrad analysis in eukaryotic microbes – Neurospora and yeast.
Mapping of bacterial chromosome by interrupted mating and transduction. Recombination in bacteriophages. Benzer's studies on r-II locus of T4 bacteriophage.

RECOMMENDED BOOKS FOR MB 203:

1. **J.D.Watson**. 2004.Molecular Biology of the Gene. 4th Edition. 2004. Pearson Education.
2. **Lodish.** 2003. Molecular Cell Biology. Scientific american books, W.H. Freeman and Company.
3. **E.B.P. De Robertis,** 2001, Cell and Molecular Biology, Lippincott Williams & Wilkins,8th edition,.
4. **Lodish & Baltimore,** 2000, Molecular Cell Biology, 4th edition, Pub Pub. W.H. Freeman and company.
5. **Watson Roberts, Steitx Wainer,** 2004, Molecular Biology of the Gene, The Benjamin/Cummings Publishing Company Inc., 5th edition.
6. **Stanley R. Maloy, John E Cronan Jr.,** 2001, Microbial Genetics, David Freifelder Jones and Bartleh Publishers Inc., 8th edition
7. **Benjamin Lewen.,** Genes I– VII, 1st edition, Pub. Oxpord University Press, New York.
8. **Russell,** Essentials of Genetics.
9. **Larry Snyder and Wendy Champness,** Molecular Genetics of Bacteria, A.S.M. Press. 3rd edition, 2007.
10. **Gardener,** Genetics, 8th edition, Pub. John Wiley and sons, Inc, 1991.
11. **Tamrin,** 2002, Genetics, 7th edition, Pub. Tata McGraw-Hill Publishing company Ltd,.
12. **Strickberger,** Genetics, 3rd edition, 1985, Pub. Asoke K. Ghosh, prentice Hall jof India Pvt. Ltd.
13. **J.W. Dale,** 1998, Molecular Genetics of Bacteria, 3rd Edition. , Wiley Publ.
14. **Griffith,** Modern Genetic Analysis.
15. **E.A. Birge,** Bacterial and Bacteriophage genetics, Springer.
16. **W.Hays,** Genetics of bacteria and their viruses.

MB 204: IMMUNOLOGY

UNIT-I:
History and scope of Immunology, Cells involved in immune system – T-lymphocytes, Blymphocytes, monocytes, macrophages, APC, Neutrophils, mast cells. Types of immunity - Adaptive immunity, innate immunity. Lymphoid organs, Thymus, bone marrow, spleen, lymph nodes. Nature of antigens; antibody structure, classification of antibodies, functions of IgG, IgA, IgM, IgD and IgE; primary and secondary immune response.

UNIT-II:
Antigen-Antibody reactions - Ag-Ab binding, agglutination, blood groups, immunoflourescence, and important immunological diagnostic tests - ELISA, RIA, immuno blot, Immunodiffusion, Immunoelectrophoresis, Complement fixation test (CFT). Serological analysis of antibodies – isotypes, allotypes and idiotypes.
Antibody diversity, antigen receptors on B and T lymphocytes. Phagocytosis, opsination, Opsonins, monoclonal antibody production and polyclonal, Hybridoma techniques – Applications of monoclonal antibodies in biomedical research, clinical diagnosis and treatment. The complement system - components of classical and alternative complement pathways, complement receptors, biological, consequences of complement activation.

UNIT-III:
Humoral and cell-mediated immunity, ontogeny of B and T lymphocytes, generation of memory B cells and affinity maturation. T and B cell interactions, cytokines, lymphocyte mediated cytotoxicity (CTL). Antibody-dependent cell-mediated cytotoxicity. Reactions of immunity – antitoxins, neutralization of toxin with antitoxin. Immune response to infectious diseases: viral infections, bacterial infections, and protozoan diseases.

UNIT-IV:
Graft versus host reactions - Major Histocompatibility Complex (MHC). Human leucocyte antigen (HLA) restriction, Hypersensitive reactions – Auto immunity, transplantation immunity, Tumor immunology, immunological tolerance and immunosuppression.
Immunodeficiency diseases - Primary immunodeficiency (genetic) diseases due to B-cell and T-cell and combined defects (hypogammaglobulinemia, thymic aplasia, SCID). Secondary immunodeficiency (acquired).
Vaccines – development and production, vaccine expression system. Production of DNA vaccines. Immunotherapy of infectious diseases; Principles of immunization; vaccinoprophylaxis, vaccinotherapy, serotherapy.

RECOMMENDED BOOKS FOR MB 204:

1**. Stewart,** Immunology and Immunopathology, 8th edition, Churchill living stone.
2. **Abul K. Abbas *et al.*,** Cellular and Molecular Immunology, Elsvier publication.
3. **Barret,** 2005, Textbook of Immunology, 5th edition, Pub. Elsevier saunders Inc.
4. **Roitt, Brostoff, Male,** Essential Immunology, Harcourt Brace & Company (4th, 5th Edition), Mosby (6th Edition)
5. **J.Kuby, Richard A. Goldsby, Thomas J. Kindt, Barbara A. Osborne,** Immunology, 4th edition, Freeman & Company Mosby publishers. 2009.
6. **Janeway and Travers,** 1994, Immunobiology – The immune system in Health disease.
7. **Tizard,** 1995, Immunology – An introduction, 4th edition, Pub. Saunders college publishing.
8. **Unani and Benacerraf ,** Text book of Imunology.
9. **Paul,** Fundamentals of Immunology, Lippincott Williams & willeins
10. **Benjaini, Sunshine and Lesrowitz,** Immunology – A short course.
11. **Stites, Terr and Parslow**, Basic and Clinical Immunology.
12. **Herman N. Eosen,** Immunology.
13. **Constantin Bena,** Molecular Basis of Immunology.

14. **Jan Klein,** Immunology – The science of self-Non-self discrimination, John wiley & sons.
15. **R.M.Coleman, M.F. Lombard and R.E. Sicard,** Fundamental Immunology, Wm.C.Brown Publishers.
16. **R.M. Hyde,** Immunology, B.I. Waverly Pvt. Ltd.
17. **H.Y.Fan, I.S.Y.Chen, N. Rosenberg and W.Sugden,**Viruses that affect Immune system by American society for Microbiology

MBP 205: ENZYMOLOGY AND IMMUNOLOGY

1) Assay of microbial enzymes (any two) – Amylase, protease, catalase, urease and pectinase.
2) Production, isolation, purification and assay of any one of the above enzymes
3) Enzyme Kinetics: (any one of the above enzymes):
a) Effect of substrate and enzyme concentration on enzyme activity;
Determination of Km and *Vmax* values.
b) Effect of pH, temperature and inhibitors on enzyme activity.
4) Enzyme and Whole cell immobilization.
5) Separation of Serum proteins- Immunoelectrophoresis.
6) Ouchterlony double diffusion.
7) Radial immunodiffusion.
8) Immunoprecipitation and precipitin curve.
9) ELISA.
10) Western blotting.
11) Agglutination inhibition test.
12) Blood grouping, Rh typing, VDRL, WIDAL
13) Raising antiserum.

RECOMMENDED BOOKS FOR MBP 205:

1. **Hudson and Hay**, Practical Immunology.
2. **Harlow and Lane**, Antibodies: A Laboratory manual.
3. **Rose and Friedman,** Manual of Clinical Immunology.
4. **Johnstone and Thrope**, Immunochemistry in Practice.
5. **Weir,** Handbook of Experimental Immunology, Vol I and II.
6. **Plummer,** An Introduction to Practical Biochemistry, 3rd edition, 1988, Pub. Tata McGraw-Hill publishing company limited.
7. **Beedu Sashidhar Rao and Vijay Deshpande, I.K,** Experimental Biochemistry, International Pvt. Ltd., 2005, Pub. I.K. International Pvt.Ltd.
8. Methods in enzymology series, Academic Press.

MBP 206: MICROBIAL PHYSIOLOGY AND GENETICS

1. Estimation of proteins by Biuret method and Folin Ciocalteau method.
2. Estimation of DNA by Diphenyl amine method.
3. Estimation of RNA by Orcinol method

4. Estimation of Inorganic and organic phosphates by Fiske-SubbaRow method.
5. Estimation of Ammonical nitrogen and nitrates.
6. Strain improvement using chemical mutagens.
7. Isolation of mutants using EMS.
8. UV Survival curve of *E.coli.* or any other bacteria.
9. Study of the repair mechanism for the damage caused by UV radiation.
10 Find the effectiveness of disinfectants by Phenol coefficient test.
11. Demonstration of Ames test.
12. Protoplast preparation and regeneration.
13. Chromosome isolation, banding and karyotyping.
14. Bacterial conjugation

RECOMMENDED BOOKS FOR MBP 206:

1. **Jeffrey H Miller,** A short course in bacterial genetics – A laboratory manual and Handbook for *Eschericia coli* and related Bacteria, Cold spring Harbor Laboratory press
2. **S.K. Sawhney and Randhir Singh,** 2001, Introductory practical Biochemistry, Pub. N.K. Mehra for Narasa publishing House.
3.**K.R.Aneja,** Experiments in Microbiology, Plant pathology, Tissue culture and Mushroom Production Technology, New age international Publishers.
4. **T.W. Zyskind and S.I. Bern stein,** Recombinant DNA Laboratory Manual, Academic press.
5. **Benson, H.J. WCB:** Microbiological Applications (A Laboratory manual in General Microbiology) WM C. Brown Publishers.
6. **Capuccino, J.G. and Sherman, N. Addison Wesley,** 2004. Microbiology – A Laboratory Manual, Pub. Pearson Education Private Ltd.
7. **N. Kannan,** Laboratory Manual in General Microbiology, Panima Publishing Corporation.
8. **R.C. Dubey and D.K. Maheswari,** 2002, Practical Microbiology, S.Chand and Company Limited, 1st edition.
9. **Beedu Sashidhar Rao and Vijay Deshpande, I.K,** Experimental Biochemistry, International Pvt. Ltd.

(Non-Core)

II SEMESTER

* MB: 207 PRINCIPLES OF MICROBIOLOGY

UNIT-I - SCOPE AND HISTORY OF MICROBIOLOGY

Scope and History of Microbiology. Microscopy and staining. Characteristics of Prokaryotic and Eukaryotic cells. Growth and culturing of bacteria. An introduction to taxonomy – General characters of Bacteria, Viruses, Algae, Fungi and Protists, Microbiologists and their contributions. Principles of sterilization and Disinfection.

UNIT-II - INFECTIOUS DISEASES OF HUMAN ORGAN SYSTEMS

Diseases of the skin and eyes; wounds and bites. Diseases of the skin-bacterial, viral, fungal and other skin diseases. Diseases of the eyes – bacterial, viral and parasitic eye disease. Wound and bites – wound infection, , anaerobic infections, anthropod bites and diseases. Urological and sexually transmitted diseases – urological diseases usually not transmitted sexually – bacterial and parasitic urogenital diseases. Sexually transmitted diseases – Aquired Immune Deficiency Syndrome (AIDS), bacterial and viral sexually transmitted diseases.

UNIT- III - ANTIMICROBIAL THEROPY AND BASIC PRINCIPLES OF IMMUNOLOGY

General properties of antimicrobial agents 'Determining microbial sensitivities to antimicrobial agents. Antibacterial, antifungal, antiviral, antiprotozoan, antihelminthic agents. Host microbe relations – symbiosis, Koch's posulates. Epidemeology and Nosocomial infections. Basic principles of specific immunity and immunization. Types of immunity, Characters of immune system.

UNIT-IV - MEDICAL MICROBIOLOGY

Laboratory diagnosis of common infective syndromes and parasitic manifestations. Methods of transmission and role of vectors – biology of vectors. 1) House fly, 2) Mosquitoes 3) sand fly, Principles of chemotheraphy. Problems of drug resistance and drug sensitivity. Drug resistance to bacteria. Description and pathology of diseases caused by *Aspergillus, Penicillium, Epidermophyton.*. Description and pathology of diseases caused by bacteria – *Streptococcus, Solmonella*, V*ibrio cholera.*

III SEMESTER
MB 301: MOLECULAR BIOLOGY

UNIT-I:

Proof of DNA & RNA as genetic material; Transformation experiments, Blenders experiments, properties of genetic material. Modern concept of gene structure. Overlapping genes, split genes, constitutive genes, jumping genes, Oncogenes.
Types of tumors, physical, chemical and biological Carcinogens, chromosomal changes induced by Carcinogens.

UNIT-II:

DNA replication – various modes of replication, Meselson-Stahl's studies on replication. Enzymes and Proteins involved in replication; Mechanism of replication – Initiation, polymerization and temination. Topoisomerases, DNA ligases. Procaryotic and Eucaryotic promoters. Mechanism of transcription and transcriptional activators. Posttranscriptional modifications.

UNIT-III:

The genetic code: Deciphering the genetic code; theory of triplet code, elucidation of base composition of codons. Identification of stop and start codons, universality of the code, redundancy of the code, the decoding system.

Protein synthesis: Mechanism and role of various factors involved in Initiation, elongation and termination of Protein Synthesis, Inhibitors of protein synthesis. Mechanisms of protein translocation, Post translational processing of proteins, protein channeling, and role of RNA in protein synthesis.

Unit-4:

Regulation of gene expression at the levels of transcription and translation. Operon concept; Regulatory genes, structural genes and repressors. Negative and Positive regulation. Regulation of lac, ara and trp operons. Catabolite repression. Regulation of gene expression in lambda and nif operon. Regulation of gene expression in eucaryotes.

RECOMMENDED BOOKS FOR MB 301:

1. **B.alberts, D Bray, J.Lewis, M.Raff, K.Roberts and J.D. Watson,** 1983, Molecular Biology of the Cell, Garland Publishing Inc., New York.
2. **J.D. Watson,** 1976, Molecular Biology of the Gene, 3rd Edition, W.A. Benjamin Inc., New York.
3. **Hartwell, L., Hood, L., Goldberg, M.L., Reynolds, A.E., Silver, L.M. and Veres, R.C,** 2000, Genetics: from genes to Genomes, 1st Edition WCB –Mc Graw Hill.
4. **Lodith.H., Berk.A., Zipursky, S.I.Matsudira.P., Baltimore, D and Darnell.** J**,** 2000, Molecular Cell Biology, 4th Edition, W.H. Truman & Co.
5. Lehinger: Principles of Biochemistry (2000) by Nelson D.L. and Cox, M.M., 3rd Edition, Worth Publishers.
6. **Styer,** 2002, Biochemistry, 5th Edition, W.H. Freeman and Co.
7. **Robert F.Weaver,** 1999, Molecular Biology,1st Edition. WCB –Mc Graw Hill.
8. **Glick and Pasternak,** 2001, Molecular Biotechnology Principles and Applications of Recombinant DNA, ASM Press.
9. **Watson Gilman,** Recombinant DNA, Scientific American Books.
10. **James D Watson,** A Passion for DNA Genes, Genomes and Society, CSHL Press.
11. **Cooper,** Cell and Molecular Biology, ASM Press.
12. **David Freifelder,** 2008, Molecular Biology, 2nd Edition, Narosa Publishing House.

MB 302: MEDICAL MICROBIOLOGY

UNIT-I:

Normal microbial flora of human body, host microbe interactions. Infection and infection process- routes of transmission of microbes in the body. Description and pathology of diseases caused by bacteria; *Streptococcus, Pneumococcus, Gonococcus,* Enterobacteriaceae, *E. coli, Salmonella, Shigella, Pseudomonas, Klebsiella, Proteus, Vibrio cholera. Brucella,*

Haemophilus influenzae; Pathogenic anaerobes: *Tetanus, Clostridia*, *Conynebacteria, Mycobacteria, Spirochaetes.*

UNIT-II:

Description and pathology of diseases caused by *Aspergillus, Penicillium*, Mucomycosis, Blastomycosis, Microsporosis, Rhinosporidium, Epidermophyscosis. Description and pathology of diseases caused by hemoflagellates; *Leishmania donavani*, *L.tropica*, *Trypanosoma gambiense*; intestinal flagellates; *Trichomonas, Giardia*, *Entamoeba histolytica*, malarial parasites, Helminthes; *Ascaris lumbricoides*, Hook worm, pinworm, Filarial parasites.

UNIT-III:

Laboratory diagnosis of Common infective syndromes and parasitic manifestations; Methods of transmission and role of vectors- biology of vectors. (1) House fly (2) Mosquitoes (3) sand fly. Need and significance of epidemiological studies. Epidemiological investigations to identify a disease, Principles of chemotherapy, Antibacterial drugs (Penicillin, Streptomycin, Sulfonamides and Polymyxins), Antifungal drugs (Nystatin), and Antiviral agents. (Robovirin) Problems of drug resistance and drug sensitivity. Drug resistance in bacteria.

UNIT-IV:

Viral diseases: pathology and lab diagnosis of diseases caused by pox viruses; herpes virus (chicken pox- zoster); orthomyxo and paramyxo viruses; adenovirus, other respiratory viruses, (Influenza, Rhyno) viruses affecting nervous system (ex: Polio virus, Rabies virus), enterovirus, reovirus, viral hepatitis, HIV. Interferon – Nomenclature, types & classification, Induction of interferon, types of inducers.

RECOMMENDED BOOKS FOR MB 302:

1. **MIMS, Play Fair, Roitt & Mosby**, Medical Microbiology, Publishers, 2nd edition.
2. **Elmer R.Noble & Lea & Fibiger,** Parasitology, Publishers, 5th edition.
3. **D.O. White & F.J. Fenner,** 1994, Medical Virology, Academic press, 4th Edition.
4. **Melnick,** Medical Microbiology.
5. **Ananthanarayan, C.K.J.Panikar**, Textbook of Microbiology, Oreint Longman Ltd., 2000, 6th Edition.
6. **Mackie & Mc. Cauetrey:** Practical Medical Microbiology (14th Edition), edited by J.G.Gollee, Published by: Churchill Livingstone.
7. **Subish.C.Panija,** Textbook of Medical Parasitology, published by 'All India Publishers and distributors'.
8. **C.K.Jaya Ram Paniker,** Textbook of Medical Parasitology, Published by 'Jaypee Brothers', 4th Edition.
9. **Coloratlas,** Textbook of Diagnostic Microbiology (5th Edition), edited by Eimer.W. Koneman, published by Lippinett.
10. **Mosby,** Diagnostic Microbiology by Bailey and Swotts, 10th Edition, published.
11. **David Greenwood, Richard C.B.Slack, John.F.Peutherer,** Medical Microbiology, 16th Edition.

12. **J.B.Sharma,** Medical Microbiology – A Clinical perspective, paras publishing.
13. **Patrick R.Murray, Ken.S.Rosenthal, George.S.Kobayashi, Michael A. Ptaller,** Medical Microbiology, 3rd Edition.
14. **Jawetz, Melnick and Adelberg's,** Medical Microbiology (2004) 23rd Edition, Mc Graw Hill.
15. **W.B. Hugo& A.P. Russell,** Pharmaceutical Microbiology edited, 7th edition, Black well science.

MB 303: BIOSTATISTICS & BIOINFORMATICS

UNIT-I:

Biostatistics: Measures of Central tendency and distribution – mean, median, mode, range, standard deviation, variance. Basic principles of probability theory, Bayes theorem, Normal distribution, statistical inference – Types of errors and levels of significance. Comparison of variance (F-test), small sample test, t-test for comparison of means, chi square test. Analysis of variance – one way and two way, multiple comprises. Correlation and Linear regression.

UNIT-II:

Sequence Analysis: Introduction to hidden Markov models. Introduction to biological databases: NCBI, EMBL, EXPASY, PIR, Pfam. Concept of World Wide Web: HTML, HTPP. Similarity measures - Euclidean, Mahalanobis distance, Edit distance, similarity matrices (PAM, BLOSUM) Searching sequence databases using BLAST. Pairwise sequence alignment using dynamic programming (Needleman – Wunsch & Smith – Waterman algorithms.) Multiple sequence alignment – progressive alignment – profiles – multidimensional dynamic programming.

UNIT-III:

Genomics and proteomics: Molecular phylogenetics: Construction of phytogenetic trees using parsimony method and branch & bound method. Clustering methods – UPGMA & neighbor- joining, Analysis of gene expression data by clustering. Gene prediction – Statistical approaches – Similarity based approaches gene annotation. Fragment assembly, peptide sequencing using mass and spectroscopy data. Comparative genomics.

UNIT-IV

Modeling: Protein secondary structure prediction – Chou Fasman rules – neural networks – discriminant analysis. Prediction of transmembrane segments in membrane proteins. Protein 3D structure prediction – homology – threading – potential energy functions – energy minimization – molecular dynamics – simulated annealing.

RECOMMENDED BOOKS FOR MB 303:

1. **Daniel,** 2006 , Biostatistics, Eighth Edition. John Wisley and sons.
2. **Durbin, Eddy, Krogh, Mithison,** Biological sequence analysis.

3. **T.A. Attwood and D.J. parry – smith,** 2001, Introduction of Bioinformatics.
4. **A.D.Baxevaris,** 1998, Bioinformatics: A practical guide to the analysis of genes and proteins, (Edited) B.F.Publication.
5. **David W,** 2005, Bio-informatics ; sequence and Genome Analysis, 2nd Edition by Mount CBS publishers

MB 304: MOLECULAR BIOTECHNOLOGY

UNIT-I:

r-DNA technology- Isolation of nucleic acids, DNA sequencing, maxam-Gilbert and Di-deoxy methods. Restriction endonucleases, restriction maps, Southern, Northern blotting and western blotting. DNA finger printing, PCR- principle, types, application.

UNIT-II:

Cloning vectors- Plasmids, Cosmids and bacteriophages. Ligases- DNA ligases, ligation of fragments with cohesive ends & blunt ends; homopolymer tailing, Cloning strategies – shot gun experiments, gene libraries. Isolation of poly mRNA, synthesis of c-DNA, cloning of c-DNA in bacteria. Isolation of cloned genes, identification of recombinants, structural and functional analysis of recombinants.

UNIT-III

Gene expression- expression of cloned genes in bacteria, yeast, plant and animal cells. Application of recombinant DNA technology in biology, plant, medicine, genetic diseases, gene therapy. Nanotechnology: Basic Principle and Applications: Biosensors, drug and gene delivery systems, chip technologies, nano imaging, Nanomedicine and Cancer diagnostics and treatment.

UNIT-IV

Nucleic acid probe technology, DNA micro array – printing of oligonucleotides and PCR products on glass slides, nitrocellulose paper. Whole genome analysis for global patterns of gene expression using fluorescent-labelled c-DNA or end labeled RNA probes. Analysis of single nucleotide polymorphisms using DNA chips. Protein micro array, advantages and disadvantages of DNA and protein micro arrays.

RECOMMENDED BOOKS FOR MB 304:

1. **Glick & Palturah,** 2003, Molecular Biotechnology, 3rd Edition.
2. **Primrose,** Modern Biotechnology, Black well scientific publication Oxford.
3. **Lodish et al.,** Molecular Cell Biology, Mac Millan education.
4. **R.Twyman,** Advanced Molecular Biology: A concise reference, Springer.
5. **Old & Primrose,** Principles of Gene Manipulation: An introduction to genetic engineering.
6. **J.D. Watson et al.,** Recombinant DNA, Wiley scientific
7. **J.M. Walker,** Molecular Biology &Biotechnology, Roya society of chemistry.

8. **H. Krenzer,** Recombinant DNA & Biotechnology.
9. **M.Schena,** DNA micro arrays.
10. **David Freifelder,** 2008, Molecular Biology, 2nd Edition, Narosa Publishing House.
11. **Watson**, Molecular Biology of Gene.
12. **Tampion &Tampion,** Immobilized cells: Principles and Applications.
13. **David Goodsell,** Nanobiotechnology, John Wiley
14. **Nalwa HS,** 2005, Handbook of Nanostructured biomaterials and their applications in nanobiotechnology, American scientific publishers
15. **Niemeyer CM & Mirkin CA,** 2005, Nanobiotechnology,Wiley Intersci

MBP 305: MOLECULAR BIOLOGY & MOLECULAR BIOTECHNOLOGY.

1. Isolation of genomic DNA (from bacteria/fungi/plants)
2. Isolation of plasmid DNA.
3. Isolation of RNA.
4. Restriction Enzyme digestion – ligation of lambda DNA.
5. Transformation and Induction of ®-galactosidase in *E.coli*
6. Bacteriophage titration – Plaque forming Units (PFU)
7. Polymerase Chain Reaction (PCR).
8. Recovery of DNA from gels – Electro elution and extraction of DNA from low melting gels.
9. Southern blotting.
10. Problems on DNA characteristics.
11. Preparation of Nanosilver By Wet reductionMethod(Chemical),using Neem Extact(plants) &Bacteria(Microbiological)
12. Characterisation of Nanosilver by UV spectrometry and microscopic methods
13. Antimicrobial effect of Ionic silver and Nanosilver prepared by above methods.

RECOMMENDED BOOKS FOR MB 305:

1. **Sambrook and Russell**, Molecular Cloning – A Laboratory Manual, 3rd Edition, Volumes I to III, CSHL Press.
2. **Ausbel et al.,** 2000, Current Protocols in molecular biology.
3. Genome analysis, 2000, 4 volumes, ESHL Press.
4. **David Goodsell,** Nanobiotechnology, John Wiley
5. Handbook of Nanostructured biomaterials and their applications in nanobiotechnology
6. **Nalwa HS,** 2005, American scientific publishers
7. **Niemeyer CM & Mirkin CA**, 2005 Nanobiotechnology,Wiley Interscience.

MBP 306: MEDICAL MICROBIOLOGY, BIOSTATISTICS AND BIOINFORMATICS

1. Preparation of different media used in diagnostics Microbiology(culture media/observation): Blood Agar, Chacolate Agar,Mannitol salt agar, Blair Parker medium, MacConkey agar, Lowensten-Jension medium,Wilson Blair Bismuth sulphite medium, Biochemical media: TSI,Laboratory examination of sputum: collection of sputum. Microbiological examination of sputum for pus cells and predominant bacteria. Ziehl-Neelson staining to detect AFB culturing the specimen.

2. Collection of throat swabs – culturing the specimen.Laboratory examination of pus and skin specimens for *staphylococcus aureus, streptococcus pyogenes* and *Pseudomonas aeruginosa*.
3. Examination of urine for pathogenic microorganisms –collection of urine, microscopic examination of urine, comparison of normal specimen with urinary tract infection sample. The Enterobacteriaceae – *Escherichia coli, Klebsiella pneumonia and proteus mirabilis*. Urine cultures, single colonies, seeding in peptone water and Christensen's urea medium. Examination of blood agar, nutrient agar and Mac conkey plate cultures.
4. Mycology – Laboratory diagnosis of fungal diseases. Direct microscopy – cultures using Sabouraud's Dextrose agar medium – Fungi pathogenic for humans – Filamentous fungi, yeasts, yeast like fungi and dimorphic fungi. *Aspergillus niger, Nocardia, candida albicans.*
5. Medical Parasitology – *E. histolytica, G. lamblia, Trypanosomas, Leishmania and Plasmodium* (Permanent Slide Observation)
6. Laboratory diagnosis of common helminthes infections (permanent slide observations of helminthes)
7. Microscopic studies of viruses infected materials (demonstration)
8. Examination of blood smear by Leishman stain for Malarial parasites
9. Serological Tests: Hemoglobin estimation, RBC Count, WBC Count, Bleeding time, Clotting tie, Erythrocyte Sedimentation Rate (ESR), Packed Cell Volume (PCV)
10. Immunodiagnostics - Tridot test for HIV, Hepatic test for HBV,
11. Use of Internet/software for sequence analysis of nucleotides and proteins: Studies of public domain databases for nucleic acid and protein sequences.
12. Determination of protein structure (PDB).
13. Genome sequence analysis
14. Problems related to measures of central tendency, dispersion, t-test and chi square test.

RECOMMENDED BOOKS FOR MB 306:

1. **Mackie,** Practical Medical Microbiology.
2. **Cruichshank et al.** Practical Medical Microbiology Vol-II.
3. **J.G.Cappucinno and H.Sherman,** Microbiology: A laboratory manual, 4th Edition.
4. **K.R.Aneja,** Experiments in Microbiology, Plant pathology, Tissue culture and Mushroom cultivation, 3rd Edition.
5. **Alcamo,** Laboratory Manual in Microbiology.
6. **Bailey and Scott,** Diagnostic Microbiology.
7. **Cruckshanak et al.,** Medical Microbiology, Vol I & II
8. **Monica Cheesbrough,** Medical laboratory Manual for tropical countries Vol I & II.
9. **Mitchal hasking ,** Virological Procedures.
10. **Wilson and Topley,** Virologoy.
11. Baxevanis, Bioinformatics-A Practical Guide to the Analysis of Genes and Proteins. 2nd Edition.
12. **Higgis,** Bioinformatics: Seqence, structure and Data Bank: A Practical Approach.
13. **Misener,** Bioformatics Methods and Protocols.
14. www.geneprot.com; www.hybrigenis.com; www.mdsprotemics.com; www.stromix.com; www.syrrx.com.

(Non-Core)

III- SEMESTER

*MB: 307 APPLIED MICROBIOLOGY

UNIT-I - MOLECULAR BIOLOGY

Molecular nature of Microbial genes – Genetic elements in prokaryotes – genetic elements in viruses, phenotypic changes in bacteria, transcription, translation, replication of prokaryotes, replication of viruses and bacteriophages: gene transfer in prokaryotes. Operon concept. Regulation of gene expression in prokaryotes and Eukaryotes.

UNIT- II - FERMENTATION TECHNOLOGY

An introduction to fermentation processes – the range of fermentation processes – Types of fermentors, Microbial growth kinetics, batch culture, continuous culture, fed batch culture and dual or multiple fermentations. Production of ethyl alcohol. Microbial leaching – role of microorganisms in the recovery of minerals (uranium, copper) from ores.

UNIT – III - ENVIRONMENTAL MICROBIOLOGY

Basic concepts of Ecology and Environment. Ecosystem concepts, components, food chains, food webs and tropic levels. **Aquatic environment**, Freshwater micro organisms, their zonation and characters. Marine microorganisms and their zonation and characteristes. **Atmospheric Environment**. Dispersal of airborne microorganisms. Diurnal periodicity patterns. Bioremediation - Biofouling.

UNIT – IV - FOOD AND AGRICULTURAL MICROBIOLOGY

Microbiology of foods – Microbial flora of fresh foods, grains, fruits, vegetables, milk, meat, eggs and fish and their infestation by bacteria, fungi and viruses. Methods of food preservation. Microorganisms

as food – single cell protein, yeast, algae and fungal biomass production. Biofertilizes – Algal biofertilizers, Bacterial biofertilizers, mycorrhizae - Biopesticides.

IV SEMESTER

MB 401: FERMENTATION TECHNOLOGY & INDUSTRIAL MICROBIOLOGY

UNIT-I:

An introduction to fermentation processes – the range of fermentation processes. Microorganisms used in industrial microbiological processes – the isolation, maintenance and strain improvement of industrially important microorganisms, screening methods, isolation of autotrophic mutants. Media and materials required for industrial microbiological processes, Antifoams.

UNIT-II:

Microbial growth kinetics, batch culture, continuous culture, fed batch culture and Dual or multiple fermentations. Inoculum development for large-scale processes. Design of fermentor: Construction and maintenance of aseptic conditions. Control of various parameters. Sterilization of media and Containment facility. Types of fermentors and fermentations. Computer application in fermentation technology. Recovery and purification of fermentation products (downstream process). Fermentation Economics.

UNIT-III:

Production of ethyl alcohol, beer & wine. Biofilms, biosurfactants, Biotransformation with reference to steroids and non steroids, Petroleum Microbiology. Microbial leaching- role of microorganisms in the recovery of minerals (uranium, copper) from ores.

UNIT-IV:

Microbial products from genetically modified (cloned) organisms ex: insulin. Microbial groups involved in biogas production, design of digester. Patenting: Concept and its composition & protection of right and their limitation, intellectual property rights (IPR); patenting biotechnology inventions.

RECOMMENDED BOOKS FOR MB 401:

1. **Pandey,** Solid State fermentation in Biotechnology.
2. **Waiter,** Industrial Microbiology.
3. **Mansi,** Fermentation Microbiology and Biotechnology.

4. **Patel,** 2008, Industrial Microbiology.
5. **Greger,** Biotechnology: A text book of Industrial Microbiology.
6. **Whitaker. (Stanbury),** 1997, Principles of Fermentation technology, 2nd Edition.
7. **Prescot & Dunn,** 1982, Industrial Microbiology, 4th Edition., AVI publishing company
8. **J.H. Peppler & D. Perlman,** Microbial Technology.
9. **L.E.Casida.,** 2007, Industrial Microbiology, New age International
10. **B.M. Miller & W.Litsky,** Industrial Microbiology.
11. **Rose,** Economic Microbiology, Vol-I to V.
12. **Ed.Perlman,** Advances in Applied Microbiology, Series of volumes.

MB 402: ENVIRONMENTAL MICROBIOLOGY

UNIT-I:

Basic concepts of Ecology and Environment – Biological spectrum at levels of organization & realm of ecology. Ecosystem – Concept, components, food chains, food webs and tropic levels. Energy transfer efficiencies between tropic levels. Biological factors influencing the growth and survival of microorganisms- inter reactions of microbial population and community dynamics – Growth in closed environments and in open environments. The kinetic properties of competition between microbial populations. Kinetic principles of preypredator relationship.

UNIT-II:

Aquatic environment: Fresh water microorganisms, their zonation and characteristics. Salt water, oceans, estuaries, microorganism their zonation and characteristics. Faecal pollution of waters – water borne diseases, indicator organisms. IMVIC test, Determination of water potability by MPN and sanitary examination. Atmospheric Environment: Dispersal of airborne microorganisms. Air Sampling principles and techniques. Air spora: Concepts and components, indoor and outdoor air spora. Diurnal periodicity patterns. Seasonal periodicity patterns. Vertical profiles.

UNIT-III:

Microorganisms and chemical pollutants: methyl mercury, trimethyl arsine, hydrogen sulphide, acid rain water, carbon monoxide, ammonia, nitrate, nitrogen oxides, nitrosamines, Eutrophication, algal toxins. Microorganisms and sewage treatment: COD, BOD & DO, trickling filters, activated sludge process, oxidation ponds; sludge treatment (anaerobic digestion).

UNIT-IV:

Bio-magnification and Bioremediation Technology – Microbial degradation of oil spills, pesticides and detergents, Biofouling; Bioplastics PHB, PHA. Fate of genetically engineered microorganisms in the environment. Environmental impact assessment studies. Deterioration of materials – paper, textiles, painted surfaces, prevention of microbial deterioration.

RECOMMENDED BOOKS FOR MB 402:

1. **B.N.Johri,** 2000, Extremophiles, Springer Verlog, New York.
2. **D.Cdwd,** 1999, Microbial Diversity, Academic press.
3. **C.J. Hurst,** Manual at Environmental Microbiology, 2nd edition, Editor in Chief, 2002,

ASM Press.
4. **Atlas, RM & Barta, R,** 1998, Microbial Ecology: Fundamentals and Applications,
5. **Tilak,** 1997, Aerobiology,.
6. **Ralph Mitechell**, Environmental Microbiology.
7. **Eweis,** Bioremediation principles.
8. **Buruage,**Techniques in Microbial Ecology.
9. **W.P. Grant and P.E. Long,** 1981, Environmental Microbiology.

MB 403: FOOD MICROBIOLOGY & AGRICULTURAL MICROBIOLOGY

UNIT-I:

Microbiology of foods – Microbial flora of fresh foods, grains, fruits, vegetables, milk, meat, eggs and fish and their infestation by bacteria, fungi and viruses. Microbiological examination of foods-microscopic techniques and cultural techniques. Direct microscopic examination, total colony counts and differential enumeration. Identification of specific groups – Bacteria, Viruses, Fungi and Protozoa. Microbial spoilage of milk, food, types of spoilage organisms, food poisoning, mycotoxins and bacterial toxins.

UNIT-II:

Food processing & preservation: Methods of food preservation, Aseptic handling, pasteurization of milk, refrigeration and freezing, dehydration, osmotic pressure, chemicals –
organic acids, nitrates, nitrites and cresols; Radiation – UV light, Y-irradiation. Fermented foods – preparation of Yogurt, Streptococcus species, *Lactobacillus bulgaricus*; Manufacture of cheese; *Penicillium roqueforti*. Fermented soybean products. Microorganisms as food – single cell protein, yeast, algae and fungal biomass production.

UNIT-III:

Soil Environment- Microorganisms, soil structure, soil profile, Physico-chemical conditions, Microbial composition, sampling techniques, role of Microorganisms in organic matter decomposition (cellulose, Hemicellulose, Lignins) Bio-geo chemical cycles – Carbon cycle, Nitrogen cycle – Nitrogen fixation, nitrification, denitrification, sulpher, iron and phosphorus cycles. Rhizosphere – Rhizosphere Microorganisms, Biochelators (Siderophores).

UNIT-IV:

Biofertilizers – Introduction, biofertilizers using nitrogen fixing microbes – phosphate solubilization- Rhizobium, Azatobacter, Azospirillum, Azolla; Anabaena Symbiosis, blue green algae, Mycorrihiza, Biopesticides – toxins from *Bacillus thuringiensis, Psuedomonas syringae*, Biological Control – Use of Baculovirus, NPV virus, protozoa & fungi in biological control.

RECOMMENDED BOOKS FOR MB 403:

1. **M.P. Dayle et al,** 2001, Food Microbiology: Fundamentals & Frontiers, 2nd edition, ASM press.
2. **Adams, M.R. and Moss M.O.** 1995, Food Microbiology, Royal Society of Chemistry Publication, Cambridge.
3. **Frazier W.C. and West haff D.C,**1988, Food Microbiology, Tata Mc.Graw Hill Publishing Company Limited, New Delhi.

4. **Stantury, P.F., Whitekar, A. and Hall, S.J.,** 1995, Principles of Fermentation Technology.
5. **Banwart, GJ,** 1989, Basic Food Microbiology, CBS Publishers and Distributors, Delhi
6. **Hobbs BC and Roberts.D,** 1993, Food Poisoning and Food Hygiene, Edward Arnold (A division at Hodder and Strong hton) London.
7. **G.Rangaswamy and Bagyaraj,** Agricultural Microbiology, Prentice Hall India.
8. **N.S. Subba Rao,** 1995, Bio-fertilizers in Agriculture and Forestry.
9. **N.S. Subba Rao,** 1995, Soil Microbiology and Plant Growth.

MB 404: PHARMACEUTICAL MICROBIOLOGY

UNIT-I:
Chemical disinfectants, antiseptics and preservatives and their industrial significance. Production of antibiotics – Penicillin, Streptomycin, Erythromycin, bacitracin and tetracycline. Mechanism of action of antibiotics – the bacterial cell wall, protein synthesis, chromosome function & replication, folate antagonis, the cytoplasmic membrane, Assay of antibiotics – Penicillin, Streptomycin.

UNIT-II:
Good manufacturing and Good Laboratory practices, Regulatory aspects and quality control, Quality assurance and quality management in pharmaceuticals ISO, WHO, US FDA, Documentation, Validation. Personal management, training, Personal Hygiene and Health.

UNIT-III:
Industrial Production of Enzymes – amylases, Proteases, organic acids- lactic acid, citric acid, vinegar, aminoacids – L-lysine, L-glutamic acid; Food supplements and hormones. Production of Vitamin B_{12}. Analytical Microbiology – microbiological assays of Vitamins (Riboflavin, B_{12}), amino acids (lysine, tryptophan).

UNIT-IV:
Ecology of Microorganisms as it effects the pharmaceutical industry; Microbial spoilage & preservation of medicines using antimicrobial agents; Control of microbial risk in medicines microbial limit tests and endotoxin tests, Contamination of non-sterile pharmaceuticals in hospital & community environments.

RECOMMENDED BOOKS FOR MB 404:
1. **W.B. Hugo & A.D. Russell,** Pharmaceutical Microbiology edited, 6th Edition, Black well science.
2. **Shanson D.C.,** Microbiology in clinical practice, 2nd edition, London; Wright.
3. **T Sammes Ellis Horwood**, opics in Antibiotic chemistry Vol I to V.
4. **Wulf Crueger,** Biotechnology – A textbook of Industrial Microbiology, 2nd Edition, Panima publishers
5. A.H. Patel, 1984, Industrial Microbiology , Macmilan India Limited.
6. **Coulson C.J., London; Taylor and Francis,** Molecular mechanisms of drug action.
7. **Denyes S.P. & Baird R.M. Chichester, Ellis Horwood,** Guide to microbiological control in Pharmaceuticals.

8. **Murray S. Cooper**, Quality control in in the Pharmaceutical Industry- Edt., Vol- II, Academic press, New York.
9. **Sydney H. Willin, Murray M. Tuckerman, William S. Hitchings IV,** Good Manufacturing practices for pharmaceuticals, second Edt., Mercel Dekker NC Nework
10. **Rajesh Bhatia, Rattan lal Ihhpunjani**, Quality assurance in Microbiology, CBS Publisher & Distributors, New Delhi.

MBP 405: INDUSTRIAL MICROBIOLOGY & ENVIRONMENTAL MICROBIOLOGY

1. Production of citric acid by *A.niger*. Recovery & Fermentation.
2. Production of Ethanol by fermentation, recovery and estimation by dichromate method.
3. Preparation of Wine from grapes by fermentation.
4. Production of glutamic acid by fermentation.
5. Estimation of bacteria, actinomycetes and fungi in soil by dilution – Plating method.
6. Observation of air-borne microflora by petriplate exposure.
7. Effect of pesticides on soil microbes.
8. DO Estimation.
9. BOD Estimation.
10. COD Estimation
11. Determination of potability of drinking water by MPN & coliform test

RECOMMENDED BOOKS FOR MB 405:

1. Srivastava, Handbook of milk Microbiology.
2. Demain, Manual of Industrial Microbiology and Biotechnology.
3. Aneja.,2001, Experiments in Microbiology, Plant Pathology, Tissue Culture & Mushroom production technology, 3rdEdition, New age international
4. **Mc. Niel & L.H. Harvey,** Fermentation: A practical Approach.
5. **C.J. Hurst,** Manual of Environmental Microbiology, 2nd Edition.
6. **Burns & Slater,** Experimental Microbial Ecology.
7. **Peppler, Gerba & Brendecks,** Environmental Microbiology: A Laboratory manual.

MBP 406: FOOD, AGRICULTURAL & PHARMACEUTICAL MICROBIOLOGY

1. Microbiological examination of milk & milk products.
2. Determination of efficiency pasteurization by milk phosphatase test
2. Preparation of Yoghurt
3. Microbiological examination of fresh & canned foods.
4. Microbiological quality testing of milk by MBRT test and Resazurin test
5. Isolation of yeasts from grapes, observation of culture characteristics and morphology.
7. Isolation of Rhizobium from root nodules.
8. Isolation of Azotobacter from soil.
9. Microbiological Assay of antibiotics.
10. Microbiological Assay of Vitamin B_{12}.
11. Preparation and observation/ evaluation of Bio-fertilizer
12. Preparation and observation/ evaluation of Biopesticide

RECOMMENDED BOOKS FOR MB 406:

1. **Srivastava,** Handbook of Milk Microbiology.
2. **W.F. Harrigan,** Laboratory methods in Food Microbiology.

3. **C.J. Hurst,** Manual of Environmental Microbiology, 2nd Edition.
4. **Aneja,** 2001, Experiments in Microbiology, Plant Pathology, Tissue Culture & Mushroom production Technology, 3rdEdition, New age international