1.1.2 The Programmes offered by the Institution focus on Employability/ Entrepreneurship/ Skill Development

Courses Focusing on Entrepreneurship

Total Number of Courses: 79

SEMESTER- III			
SKILL BASED ELECTIVE- ECONOMICS OF ENTREPRENEURSHIP			
Code: 15UECS31	**Hours / week :2**	**Hrs / Semester: 30**	**Credits :2**

Objective

Students can have a glimpse of a few aspects of entrepreneurship

UNIT-I INTRODUCTION **6 Hrs**

Entrepreneurs - Concepts and qualities - Barriers - Structures - Traits and types - Functions - Formulation of Network and Project Design - E-commerce and entrepreneurship

UNIT-II STEPS FOR STARTING A SMALL SCALE INDUSTRY **6 Hrs**

Steps for starting a small scale industry - selection of types of organisation - - Small Scale Industry - Problems and sickness of small scale industry - Government Policy

UNIT-III WOMEN ENTREPRENEUR **6 Hrs**

Women Entrepreneur - Concept of women entrepreneur - Growth and Development of entrepreneurs - Functions - Problems of Women Entrepreneur - Role of Women's Association

UNIT-IV SOURCES OF PROJECT FINANCE **6 Hrs**

Sources of Project Finance - Institutions helping entrepreneurs - Role of Commercial Banks - New Entrepreneurial Development Agencies - Entrepreneurs in Tamilnadu

UNIT-V ENTREPRENEURIAL DEVELOPMENT PROGRAMME (EDP) **6 Hrs**

Entrepreneurial Development Programme (EDP) - Development Strategy - Backward Area Development - Accounting for small enterprises - International Business - Small Companies "going global"

Reference Books:

Entrepreneurial Development – Saravanavel

Entrepreneurial Development – C.B.Gupta & N. P.Srinivasan

Fundamentals of Entrepreneurship – H.Nanthan

Semester- III			
Core Skill Based- Entrepreneurial Development			
Code: 18UECS31	**Hours / week :4**	**Hrs / Semester: 60**	**Credits :4**

Unit I Introduction **10 Hours**

Entrepreneurship – Meaning and definition – Importance – Types and functions of an entrepreneur – Qualities of a successful entrepreneur – Distinction between an Entrepreneur and a Manager-

Unit II Entrepreneurs and Economic Development **10 Hours**

Role of Entrepreneurs in Economic Development – Factors affecting entrepreneurial growth – (Social, Economic, Cultural and Psychological factors)

Unit III Project Analysis **10 Hours**

Business Ventures- Steps for starting small Industry – significance - problems of small scale industry - industrial policy on small scale industries - incentives – subsidies-Proposal Writing

Unit IV Sources of Finance **15 Hours**

Financial Planning- Needs- Sources-Internal sources-External Sources- Role of DIC TIIC,SIDBI, SIDICO, SIPCOT, and Industrial Estate – Commercial Banks- Micro Finance.

Unit IV Entrepreneurship Development Programme **15 Hours**

Entrepreneurship Development Programme (EDP) – need – objectives – phase– Institutions conducting EDP in India – Institutional support to entrepreneurship Development (NSIC, SIDO, SSIB, SSICS, TIIC, TCO).– Institutions assisting entrepreneurship development in Tamil Nadu

Text Book

VassantDeasi. *Dynamics of Entrepreneurship Development.* Himalaya Publishing, 2013

Books for Reference:

1. Khanka S. S, *Entrepreneurial Development*, S.Chand and Company, 1993

2. Jose Paul, *Entrepreneurship Development.* Himalaya Publishing House, 2001

3. Gupta, C.G.Srinivasa. *Entrepreneurship and Small Business Management*, Sultan Chand and Sons, 1991.

Semester- IV			
Core Skill Based- Women and Economic Development			
Code: 18UECS41	**Hours / week :4**	**Hrs / Semester: 60**	**Credits :4**

Unit I Status of women in India **15 Hours**

Position and status of Women in Indian society and religion - Sex ratio in India - Factors responsible for adverse sex ratio in India - Consequences of adverse sex ratio - Measures to achieve the balance between the sexes

Unit II Women and Economy **10 Hours**

Role of women in economic development - Female labour force in India - Labour force participation by economic status - Causes, measures to improve work-participation rates-work life balance- flexi working hours- facilities for women& children- Sexual harassment at work place- Wage discrimination

Unit III Women and Politics /Governance **10 Hours**

Women's participation in Political process- Women as voters, candidates, party leaders bureaucrats - Women's representation in Local bodies, State assemblies, & Parliament, critical analysis of their performance-Capacity Building of women leaders

Unit IV Women Empowerment **15 Hours**

Women empowerment: Ist and 2nd Status of Women Report Ministry for women and child development -Legal Perspective - Fundamental Rights for Women – Constitutional Provisions -Personal laws –Women Empowerment: Economic, Social and Political Spheres – Women Development Corporation, Tamil Nadu

Unit - V Women Entrepreneurs **10 Hours**

Functions and role of women entrepreneurs – Types and characteristics of women Entrepreneurs - Problems of women entrepreneurs – Development of Women Entrepreneurship in India

Text Book

Kartick Das (Editor), Women Empowerment & Socio-Economic Development, New Century Publications, 2016

Books for Reference:

1. Dhulhasi MadhaVize. *Women Entrepreneurs in India.* New Delhi: Mittal Publication, 1987
2. Ester Boserup. *Woman's Role in Economic Development.*Routledge, 1 edition, 2007
3. Dr. Sanjoy Roy. *Women in contemporary India-Realities and Perspectives.* New Delhi: Akansha Publishing House, 2010.
4,AmiteshwarRutra. *Working and Non-working Women*. New Delhi: Mittal Publications, 2006.

Semester – V			
Part III Core XI (Common Core) Human Resource Management			
Code:18UMCC51	**Hrs/Week: 6**	**Hrs/Sem: 90**	**Credit : 4**

Vision:

To enable students to understand the basic concepts in HRM

Mission:

To familiarize students on the various aspects of HRM

Course Outcome:

CO No.	Upon completion of this course, students will be able to:	PSO addressed	Cognitive Level
CO – 1	gain knowledge on the basic concepts of planning human resource and help them to understand basic techniques of business.	1,2	Un
CO – 2	understand the basic selection process in HR.	1,2,3	Un
CO – 3	know the importance of training and development in HR.	2,3,4	Ap
CO – 4	know about the transfer policies	2,3,5	Un, Re
CO – 5	gain knowledge on compensation methods.	3,4	Un, An
CO – 6	understand the promotional policies in business	3,4	Un, Re
CO – 7	know about the significance and problems in performance appraisal.	3,4,5	Ap
CO – 8	know about the methods of performance appraisal	3,4,5	Ap

Semester V			
Part –III	**Core – XI (Common Core) Human Resource Management**		
Code: 18UMCC51	**Hrs/Week: 6**	**Hrs/Sem: 90**	**Credits: 4**

Unit-I: Introduction **15 Hours**

Human Resource Management: Meaning - Objectives - Nature and Scope - Importance – Functions - and Problems of HRM - Personnel Management Vs. HRM - Qualities and Qualifications of Human Resource Managers.

Unit-II: Human Resource Planning, Recruitment and Selection **20 Hours**

Human Resource Planning: Meaning - Need and Importance - Objective - Problems - Process – Recruitment: Meaning - Factors Influencing Recruitment - Sources of Recruitment - Problems in Recruitment – Selection: Meaning - Factors Affecting Selection Decisions - Selection Policy - Steps in Selection.

Unit-III: Training and Development **20 Hours**

Training: Need and Importance - Objective - Types - Steps in Training Programme – Methods of Training - Evaluation of Training Programmes – Development: Meaning - Concept and Essentials of Management Development Programmes.

Unit IV: Transfer, Promotion and Compensation **15 Hours**

Transfer: Objective - Transfer Policy - Promotion: Purpose - Promotion Policy – Demotion - Compensation: Objective – Principles.

Unit-V: Performance Appraisal **20 Hours**

Performance Appraisal: Meaning - Need and Importance - Objective - Problems in Performance Appraisal - Factors Influencing Performance Appraisal – Methods of Performance Appraisal.

Text Book:

Chitra,Atmaram, Naik. *Human Resource Management.* Ane Books Pvt., 2016.

Books for Reference:

1. Dr.C.B.Gupta. *Human Resource Management.* New Delhi: Sultan Chand & Sons, 2018.
2. C.P.Memoria, *Personnel Management*, Himalaya Publishing House, 2011
3. L.M.Prasad., *Human Resources Management.* New Delhi: Sultan Chand & Sons,2014.
4. Gary Dessler. *Human Resource Management.* Prentice Hall, 2013.
5. Michael Armstrong. *A Handbook of Human Resource*

Management Practice. KoganPage,2012.

SEMESTER IV			
Core Skill Based Media Writing			
Course Code: 21UENS41	**Hrs/ Week: 4**	**Hrs/Semester: 60**	**Credits: 4**

Objectives:

To prepare students for employability in mass media.
To facilitate students to innovatively use the various forms of media.

Course Outcome:

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO – 1	understand the requirements for appropriate journalism	4	Un
CO – 2	update learning of recent trends in media writing	1	Cr
CO – 3	distinguish the writing style for print and broadcast media	1	An
CO – 4	develop media ethics and contribute to social transformation	4	Ap
CO – 5	acquire the ability of editing, reporting and writing for media	1	Ap
CO – 6	analyze well, debating views, news, issues and events	2	An
CO – 7	review the different standards of the varied media components	1	Ap
CO – 8	evaluate different kinds of media content.	1	Ev

SEMESTER IV			
Core Skill Based Media Writing			
Course Code: 21UENS41	**Hrs/ Week: 4**	**Hrs/Semester: 60**	**Credits: 4**

Unit I Mass Media

Characteristics and Techniques, Ethics for Media Writing

Mass Communication and Society: Uses, Effects and Representations

Unit II Print Media

Language and Style

Writing Headlines, News Features, Advertisements

Writing Reviews- Book and Film

Unit III Visual Media

News Anchoring

The Indian Newsreel

The Art of Interviewing

Design an online literary Newspaper (Mini Project)

Unit IV e-Media

Creating a blog

Writing Scripts

Unit V Social Media

Writing Mobile-Friendly Web Stories

Facebook Profile, Twitter,

Youtube-Create Studio, LinkedIn Profile

Create Your Youtube Channel/ Create a LinkedIn Profile (Mini Project)

Text Books:

Adornato, Anthony. "Writing Mobile-Friendly Web Stories." *Mobile and Social Media Journalism: A Practical Guide*, CQ Press, Washington D.C., 2018.

Ahuja, B. N. "The Art of Interviewing." *Theory and Practice of Journalism: Set to Indian Context*, Surjeet Publ., Delhi, 1988.

Kumar, Keval J . *Mass Communication in India*. Jaico Publishing House, 2013.

Meera, Raghavendra Rao N. *Feature Writing*. PHI Learning Private Limited, 2009.

Miller, Daniel. "What Is Social Media?" *How the World Changed Social Media*. UCL Press, 2016.

Parthasarathy, Rangaswami. "Language and Style." *Basic Journalism*, Macmillan, 2012.

Books for Reference:

Kuehn, Scott A., and Andrew Lingwall. *The Basics of Media Writing: A Strategic Approach*. SAGE, 2018.

Nick, Ceramilla and Lee Elizabeth. *Cambridge English for the Media*. Cambridge University Press, 2008.

Schiff, Richard. *Foreword. Writing for TV and Radio: A Writers'& Artists' Companion.* Sue Teddem and Nick Warburton. Eds. Carole Angier and Sally Cline. Bloomsbury, 2016.

E- Resources:

https://bizfluent.com/facts-6852659-introduction-print-media.html

https://communications.tufts.edu/marketing-and-branding/social-media-overview/

https://sendpulse.com/support/glossary/mass-media

6. Michael J. Pery, *The Constitution The Courts and Human Rights*, New Delhi, 1982.

Semester – III			
Skill Based Subject	**Tour Operations**		
Code : 15UHIS31	**Hrs / Week : 2**	**Hrs / Sem : 60**	**Credits : 2**

Objectives

- To make the students familiar with the origin and development of tourism in India.
- To motivate the students to understand the importance of tourism.
- To educate the students about different factors of tourism.

Unit – I Origin and development of Travel – Types of Travel Agency and Tour Operation.

Unit – II Rule of Tour Operators – Income of Tour Operators – Tour Wholesalers - Input and Output of Tour Operation.

Unit – III International Time Calculator – Tour Costing and Pricing.

Unit – IV Tour Planning.

Unit – V Tour Operational Techniques.

Text Book

1. Bhatia, A.K., *Tourism Development,* Sterling Publishers Private Limited, Delhi, 1982.

Books for Reference

1. Bhatia, A.K., *International Tourism*, Sterling Publishers Private Limited, Delhi, 1991.
2. Seth, Pran Nath, *An Introduction to Travel and Tourism,* Sterling Publishers Private Limited, Delhi, 2003.
3. Sethi, Praveen, *Nature and Scope of Tourism*, Rajat Publications, Delhi, 1999.

5. Xavier, C., *Introduction to Computers and Basic Programming,* New Age International (P) Limited Publishers, New Delhi, 1996.

Semester – V	
Self Study Course (Compulsory) Beach Tourism	
Code : 15UHISS3	**Credits : 1**

Objectives

- To enable the students to study the impact of the Vijayanagar rule.
- To make the students aware of the contribution of the Nayaks to administration and architecture.
- To make the students know about the early resistance against the British.

Unit – I A brief Introduction to Tourism - Definition – India a land of a seasons – beach Tourism – shore – beach – estuary – lagoons - different types of beach tourism, Beach activities: beaches at East and West Coast.

Unit – II Beach Tourism Centers**:** Maharashtra – Gujarat – Karnataka – Kerala – Goa – Diu – Daman - Lakshadweep.

Unit – III Tamilnadu – Marina – Mamallapuram – Pitachayvaram – Tuticorin - Kanyakumari - Pondicherry.

Unit – IV Andaman, Andrapradesh – Orissa – West Bengal.

Unit – V Beach Tourism Trade: Fisheries, trade, handicraft, coral, shell, pearl.

Text Book

1. Rama Charya – Tourism and Cultural Heritage of India

Books for Reference

1. Aruna Despande, India – A travel Guide
2. Kailash Hariharan Iyer – Tourism Development in India
3. Pran Nath Seth, Sushma Seth Bath – An Introduction to Travel and Tourism
4. Pran Seth-India – A Travelers Companion
5. Pushpinder S. Gill – Tourism Planning and Management
6. Ratandeep singh – Introduction of Tourism in India.

Semester – V	
Self Study Course (Compulsory) Beach Tourism	
Code : 18UHISS3	**Credits : 1**

Vision: To enhance beach tourism significance.

Mission: To learn the beach tourism spots and its vital role in the growth of economy.

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	know the different types of beach tourism	1 ,2	Un, Re
CO-2	understand beach activities	1,2	Un, Re
CO-3	identify the beach tourist spots and its development	3	Ap
CO-4	estimate the economical factors of beach tourism	4	An
CO-5	ensure the significance of handicraft and fisheries	1,2	Un,Re
CO - 6	assess the impact of beach tourism	4	An
CO-7	evaluate the uses of beach tourism	4	An
CO-8	analyse the importance of beach tourism in present scenario	4	An

Semester – V	
Self Study Course (Compulsory) Beach Tourism	
Code : 18UHISS3	**Credits : 1**

Unit – I A brief Introduction to Tourism - Definition – India a land of a seasons – beach Tourism – shore – beach – estuary – lagoons - different types of beachtourism, Beach activities: beaches at East and West Coast.

Unit – II Beach Tourism Centers**:** Maharashtra – Gujarat – Karnataka – Kerala – Goa –Diu – Daman - Lakshadweep.

Unit – III Tamilnadu – Marina – Mamallapuram – Pitachayvaram – Tuticorin -Kanyakumari - Pondicherry.

Unit – IV Andaman, Andrapradesh – Orissa – West Bengal.

Unit – V Beach Tourism Trade: Fisheries, trade, handicraft, coral, shell, pearl.

Text Book:

1. Rama Charya – Tourism and Cultural Heritage of India

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1. Aruna Despande, India – A travel Guide
2. Kailash Hariharan Iyer – Tourism Development in India
3. Pran Nath Seth, Sushma Seth Bath – An Introduction to Travel and Tourism
4. Pran Seth-India – A Travelers Companion
5. Pushpinder S. Gill – Tourism Planning and Management
6. Ratandeep singh – Introduction of Tourism in India.

SEMESTER – II			
Core IV	**Monuments in India**		
Course Code:21UHIC22	**Hrs / Week: 5**	**Hrs / Semester: 75**	**Credits: 4**

Objectives:

- To familiarize the Historical Monuments with proper understanding of history.
- To know and respect our historical Monuments and its heritage.
- To appreciate the pride of our historical Monuments and to preserve it.

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand and take pride of historical monuments.	1, 2	Un, Re
CO-2	know the historicity of historical monuments	1, 2	Un, Re
CO-3	appreciate the workmanship of artisans.	1, 2	Un, Re
CO-4	know the means to preserve historical monuments.	1, 2	Un, Re
CO-5	analyse the preservation of monument art.	4	An
CO-6	analyse the influence of foreign invasions.	4	An
CO-7	evaluate the significance of historical monuments.	5	Ev
CO-8	examine the patronage of kings.	4	An

SEMESTER – II			
Core IV	**Monuments in India**		
Course Code:21UHIC22	**Hrs / Week: 5**	**Hrs / Semester: 75**	**Credits: 4**

Unit – I **Monuments**

Definition – Etymology – Significance – Types -

Ancient Monument PreservationAct of 1904 -

AMSAR Act 1958 – AMSAR Amendment Bill 2017.

Unit – II **Archaeology**

Adichanallur – Arikkamedu – Rakhigarhi – Keezhadi – Kinnimangalam – Sivakalai

Unit III **Religious Monuments**

Sanchi Stupa – Tanjore Brahadeswara Temple – Dilwara Jain Temple – Golden Temple Amritsar

– Nagoor Dargha – Velankanni Basilica

Unit IV **Secular Monuments**

Hawa Mahal Palace – Red Fort – Gandhi Museum - Vivekananda

Rock Memorial – Tipu SultanPalace

Unit V **Colonial Monuments**

Basilica of Bon Jesus – Victoria Memorial Hall – Cellular Jail – St.

George Fort - Our Lady ofSnows Basilica – Gateway of India

Text Book:

1. Khurana K.L. *History of India from Earliest to 1526. Agra :* Lakshmi Narain Agarwal, 1995.

Books for Reference:

1. Rao, Hanumantha, B., and Rao, Basaveswara K. *Indian History and Culture*, Guntur : Sri VignanaManjusha, 1973.
2. Anil Chandra Banerjee. *New History of Medieval India*. New Delhi : S. Chand & Company Pvt. Ltd.,1983.
3. Khurana, K.L. *History of India from 1526 to 1967.* Agra: Lakshmi Narain Agarwal, 1995.
4. Majumdar, R.C. *An Advanced History of India*, London : Macmillan Company Ltd, 1983.
5. Percival Spear. *Delhi- Its Monuments and History*. New Delhi : Oxford University Press, 1994.

SEMESTER III			
Core Skill Based	**Archives and Museums**		
Course Code: 21UHIS31	**Hrs/Week : 4**	**Hrs/Sem : 60**	**Credits : 4**

Objectives :

- To familiarize to Archives and Museums for proper understanding of History.
- To analyse and appreciate history and its heritage through archives and museums.
- To enhance the interpretative and collaborative approach in history.

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	visit of Archives and Museums.	1,2	Un, Re
CO-2	understand the organisations and functions of Archives and Museums.	1,2	Un, Re
CO-3	highlight the primary sources of Archives and Museums.	1,2,4	Un, An, Ev
CO-4	apply the uses of Archives and Museums in historical writings.	1,2	Un, Re
CO-5	respect and preserve Archives and Museums.	1	Un
CO-6	witness the evidences of History.	2,4	Un, Ev, Re
CO-7	develop more collaborative approaches in history.	2,4	Un, An, Ev
CO-8	identify good practice and skills of professionals.	1,2	Un, Re

SEMESTER III			
Core Skill Based	**Archives and Museums**		
Course Code: 21UHIS31	**Hrs/Week : 4**	**Hrs/Sem : 60**	**Credits : 4**

Unit I Meaning & Definitions

Genesis & Evolution of Archives & Museums

Unit II Kinds of Museums

Archaeology museum - Art Museums - Biographical museum-Palace museum – Site

Museum – Memorial Museum – Temple Museum – Museum Architecture

Unit III Prominent Museums

Indian Museum, Calcutta – Salar JungMuseum, Hyderabad - National Museum, New Delhi, Chhatrapati Shivaji Maharaj Vastu Sangrahalaya, Mumbai - - Government Museum, Chennai - Saraswathy Mahal Library Museum, Thanjavur.

Unit IV Kinds of Archives

Private Archives – Public Archives **-** National Archives of India, Delhi – TamilNadu Archives, Chennai – Shenbaganoor Archives, Kodaikanal - Kerala State Archives, Trivandrum.

Unit V Preservation & Conservation

Palm leaves – Books – Paintings – Sculptures – Ivory – Textiles – Metals - Stone

Text Books:

1. Jeyaraj, V. *Hand Book on Conservation in Museums*. Chennai : Commissioner of Museums, 1995.
2. Thiyagarajan J. *Archives Keeping.* Madurai: Prabha Publications, 2007.

Books for Reference:

1. A Guide to the National Museum. New Delhi: National Museum, 1997.

2. Agarwal, O.P. *Essentials of Conservation and Museology*. Delhi: Sundeep.Prakasan, 2007.

3. Edson & David Routledge. *Handbook for Museum.* 1986.

4. Macdonald Sharon (ed). *A Companion to Museum Studies*. UK: BlackwellPublishing Ltd, 2006.

5. Hari Narayana, N. *The Science of Archives keeping*. New Delhi : Penguin, 1997.

Semester – III	
Self Study Paper Development of Tourism Department in India with Special Reference to Tamil Nadu	
Course Code : 21UHISS1	**Credits : 2**

Objectives :

- To familiarize the Tourist Spots in Tamil Nadu.
- To know and analyse the tourist income and employment opportunities.
- To preserve the environment in tourist spots.

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	become aware of peaceful mobilization across culturalboundaries.	1	Un, Re
CO-2	analyse powerful agent for change.	4	An
CO-3	be rejuvenated physically and intellectually.	3	Ap
CO-4	promote international understanding.	2	Un
CO-5	make aware of conservation of eco-system.	1	Un, Re
CO-6	enumerate the economic and environmental goals.	1	Un, Re
CO-7	generate income and find employment opportunities.	1	Un, Re
CO-8	driving force to relieve civilization stress and storm.	3	Ap

Semester – III	
Self Study Paper Development of Tourism Department in India with Special Reference to Tamil Nadu	
Course Code : 21UHISS1	**Credits : 2**

Unit I **Definition & Evolution**

Origin & Growth of Tourism in India – Components of Tourism – 10 p's of Tourism – Kinds of Tourism.

Unit II **Tourism P r o m o t i o n**

Sargent Committee – Tourist Traffic Division – Tourist Administration – Tourist Publicity – Tourist Distribution

Unit III **Ministry of Tourism**

Formation, Functions and Responsibilities – Department of Tourism – Tourist Information Offices.

Unit IV **India Tourism Development Corporation (ITDC)**

Genesis – Objectives – Range of Services – Five Year Plans and Tourism – Government Schemes.

Unit V **Tamil Nadu Tourism Development Corporation (TTDC)**

Formation and Objectives – Important Tourism Spots in Tamil Nadu – Mamallapuram, Kanchipuram, Trichy, Nagoore, Rameswaram, Madurai, Kanyakumari, Thoothukudi, Thanjavur, Vellore, Velankanni, Ooty, Kodaikanal and Courtalam

Text Book:

1. Rai, Lajipathi. *Development of Tourism in India.* New Delhi: Rupa Publications,1993.

Books for Reference:

1. Bhatia A.K. *Tourism Development.* New Delhi: Sterling Publishers, 1993.
2. Gill S. Pushpinder. *Tourism Economic and Social Development*. New Delhi:Anmol Publications, 1997.
3. Kambra K. Krishnan. *Basics of Tourism Theory.* Operation and Practice, NewDelhi: Kanishka Publishers, 2004.
4. Thandavan R. *Tourism Product.* New Delhi : Dominant Publishers, 2006.
5. Singh, Amit Kumar, and Rana Parvin Singh. *Tourism Geography*. Lucknow: New Royal Book Co.,2006.

Semester – IV	
Self Study	**Modern Tourism**
Course Code : 21UHISS2	**Credits : +2**

Objectives :

- To familiarize tourism concepts and process.
- To acquaint with the components and various aspects in the tourism sector.
- To give an understanding of the different organizations in the Tourism Industry.

Course Outcome:

CO. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	identify career and educational options in the field of Tourism.	1,2	Un, Re
CO-2	learn additional skills needed for a Tourist Guide.	1,2	Un, Re
CO-3	recognise the importance and practice ethical behavior in atour.	1, 3	Un, Ap
CO-4	use creativity and self reflection and produce meaningful conclusions.	1, 2	Un, Re
CO-5	perform tourism related businesses such as front desk operations, accommodation.	3	Ap
CO-6	develop guiding skills.	6	Cr
CO-7	practice self – marketing in the tourism agency.	3	Ap
CO-8	aware of the basic knowledge of starting one's own business.	1,2	Un, Re

Semester – IV	
Self Study	**Modern Tourism**
Course Code : 21UHISS2	**Credits : +2**

Unit I **Tourism**

Definition, Nature and Scope of Tourism – Tourism through the Ages - Components of Tourism – Concept of Domestic and International Tourism — Motivation for Travel.

Unit II **Kinds of Tourism**

Social – Economic - Cultural - Environmental - Impacts of Tourism

Unit III **Tourist Resources in India**

Types of Resources - Natural – Historical - Heritage - Religious Resources

Unit IV **Tourism Planning and Administration in India**

Ministry of Tourism in India: Aims, Objectives and Functions – India Tourism Development Corporation (ITDC) – Future Prospects of Tourism – Role of Media – Promotion of Tourism – Incredible India.

Unit V **Places of Tourist interest in India**

Shimla – Kashmir- Delhi – Agra – Kolkata – Mumbai – Goa – Mysore – Bangalore- Kochi – Alappuzha - Pitchavaram.

Text Book:

1. S. Gill Pushpinder - *Tourism: Economic and Social Development.* New Delhi : Anmol Publications, 2007.

Books for Reference:

1. Singh, Amit Kumar, and Rana Parvin Singh. *Tourism Geography*. Lucknow: New Royal Book Co., 2006.
2. Jayapalan, N. *An Introduction to Tourism*. Delhi : Atlantic Publishers, 2013
3. Misra, P.K., Varmna, J.K. *Tourism in India* : Potential Problems and Prospets. Tirunelveli : New Century Publications, 2018.
4. Robinet Jacob. *Places of Touristic Interest in India*. New Delhi : Abhijeet Publications, 2013

SEMESTER –VI			
Part III Core Integral III Financial Services			
Code:18UCOI61	**Hrs/Week: 5**	**Hrs/Sem: 75**	**Credits : 4**

Vision:
To familiarise on different financial services available.

Mission:
To analyse the principles of financial services.

Course outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	know the framework of Financial Markets in India.	1,3	Un
CO-2	be familiar with the functions of Financial Services.	2,4	An
CO-3	gain knowledge on the avenues of financial services	3,6	Un
CO-4	be an expertise in various Financial markets and its Services	1,8	Ev
CO-5	understand the term Merchant Banking	1,8	Ap
CO-6	know Lease Financing	4,6	Un
C0-7	understand the activities and scope of venture capital and also the functions of credit rating	5,7	Ap
CO-8	understand Mutual Funds and its application	1,7	An

SEMESTER –VI			
Part III Core Integral III Financial Services			
Code:18UCOI61	**Hrs/Week: 5**	**Hrs/Sem: 75**	**Credits : 4**

Unit I Introduction:

Introduction to Financial Services – concept – objectives – characteristics –classification of financial services-Scope-Causes– constituents - growth of Financial Services in India – new Financial products and services, Innovative Financial Instruments- Financial Service sector in India - problems faced. Regulatory framework.

Unit II Merchant Banking:

Merchant Banking - meaning - definition - scope- functions - merchant banker's code of conduct – qualities for merchant bankers- SEBI guidelines-Merchant banker's commission . Merchant bankers in market making process-Progress of merchant banking in India-Scope - Problems of merchant bankers.Securitization-features-need-process of securitization Securitization in India.

Unit III Lease Financing:

Lease Financing - definition, characteristics, types of lease, financial lease vs. operating lease-test for financial lease- participants - leasing process - services of the lessor - advantages of leasing - limitation of lease financing – the Indian leasing scenario. Hire purchasing - Definition and features –Concept of hire purchasing - Rights of hirer– Bank credit for hire purchase-difference between Hire Purchasing and Lease Finance.

Unit IV Venture Capital:

Venture capital- meaning- features-scope of venture capital- importance- origin-Venture capital guildelines- stages of venture capital financing- The Indian Scenario: methods of venture financing-Suggestions for growth of venture capital. Credit Rating – Functions- origin – credit rating in India – benefits - credit rating Agencies in India: CRISIL - ICRA – CARE.

Unit V Mutual Funds:

Mutual Funds - meaning – Fund unit vs. share- origin -types of mutual fund- importance Functions, advantages and growth. Factoring: Meaning, terms and conditions-Functions benefits-Cost of factoring-types of factoring-Discounting-Difference between factoring and discounting – Advantages and Disadvantages of factoring. Derivatives: Meaning, definition, importance, kinds of financial derivatives-Forward vs. Future derivative.

Text Book

Gordon K.Natarajan.*Financial Markets and Services.*Mumbai: Himalaya publishing House. 2014 (Revised Edition).

Books for Reference:

1 Joseph Anbarasu, Boominathan. V.K, Manoharan. P and Gnanaraj.G. *Financial Services.*New Delhi:Sultan Chand & Sons Current Edition.

1. Gurusamy. *Financial Markets and Services.*Chennai: Vijay Nicole Imprints Pvt Ltd. 2014 (Revised Edition).

SEMESTER –I			
Part III **Allied I** **Business Information System**			
Course Code: 21UCOA11	**Hrs/Week: 4**	**Hrs/Sem: 60**	**Credits : 4**

Objectives

- To equip the students on the use of computers in business.
- To acquire hands-on experience in the use of Micro soft office programs.

Course Outcomes :

CO. No.	Upon completion of this course, students will beable to	PSO addressed	CL
CO – 1	gain thorough knowledge about the fundamentals of MS Word	2,4,5	Un
CO – 2	practice the applications of computer inadministration level	1,2,3	Ap
CO – 3	familiarize the calculations made in excel sheets	1,2,4	Ap
CO – 4	present skills with power point	1,3,5	Ap
CO – 5	design the documents with various formats and designs	1,3,4,5	Ap
CO – 6	exhibit knowledge on important application in Internet and email	2,3,5	Ap
CO – 7	analyse the importance of MS Office in business enterprises.	1,2,6	An
CO – 8	create the methods of forming MS Access	1,3,5	Cr

SEMESTER –I			
Part III Allied I Business Information System			
Course Code: 21UCOA11	**Hrs/Week: 4**	**Hrs/Sem: 60**	**Credits : 4**

Unit I – MS-Word (12 hours)

Basic Computing Skills: Word Insert Menu - Comment, Header, Footer, Page Number, Text Box, Quick parts, Word Art, Date and Time -Design and Page Layout Themes, Colors, Fonts, Paragraph Spacing, Effects, Water Mark, Page Color, Page Border - Introduction to mail merge-Mail Merge with labeling.

Unit II – MS – Excel (12 hours)

MS – Excel: Entering and Editing Cell Entries- Applications of Formula, Calculations of Commission and Inserting chart – Chart types - Working with Numbers– Changing - Worksheet Layout.

Unit III – MS- PowerPoint (12 hours)

MS- Power Point: Creating a basic presentation – Formatting and checking text- Applying Transition and Animation effects.

Unit IV – MS- Access (12 hours)

Introducing Access: Database – Tables, Queries, Forms, and Other Objects - Creating a Database Table – Opening and Viewing Tables – Entering and Altering Table Fields – Field Properties for Making Sure that Data Entries are Accurate – Finding and Replacing Data.

Unit V – Internet and Email (12 hours)

Creating an E-mail account- Sending and Receiving messages with attachments - Mail merge - Multimedia and its Applications in various sectors advantages – Emerging technologies in Multimedia.

Practical: 30 hours

Text Book:

Vikas Gupta.*Comdex Computer Course Kit,Windows XP with Office* ,New Delhi: Dreamtech Press 1st Edition 2017.

Books for Reference:

1. Srivastava T. N. *Introduction to Computers and their Applications to Banking,* New Delhi:Macmillan India, Ltd. , 1st Edition 2000.
2. Sanjay Saxena. *MS Office XP to Everyone* ; *1st Edition*, Chennai: Vikas Publishing HousePvt. Ltd., 2009.

SEMESTER – IV			
Part III Allied IV	**Financial Services**		
Course Code: 21UCOA41	**Hrs/Week: 4**	**Hrs/Sem: 60**	**Credits : 4**

Objectives:

- To familiarise on different financial services available in India.

Course outcome:

CO.No.	On completion of this course, students will be able to	PSO addressed	Cognitive Level
CO – 1	appraise the services offered by Indian Financial Sectors.	1,3	An
CO – 2	analyse the functions of Financial Services	2,4	An
CO – 3	discuss on the avenues of financial services	3,6	Un
CO - 4	examine Merchant Banking	1,8	Ap
CO – 5	understand the duties and qualifications of Merchant Banker	1,8	Ap
CO – 6	use Lease Financing	4,6	Ap
CO – 7	differntiate functions of venture capital and scope of venture capital.	5,7	Ap
CO - 8	appraise Mutual Funds and credit rating institutions	5,7	An

SEMESTER – IV			
Part III	**Allied IV**	**Financial Services**	
Course Code: 21UCOA41	**Hrs/Week: 4**	**Hrs/Sem: 60**	**Credits : 4**

Unit I Financial Services **(12 Hrs)**

Financial Services – Concept – Objectives – Characteristics – Classification of Financial Services – Scope – Causes – Constituents. New Financial Products and Services - Innovative Financial Instruments- Financial Service Sector in India – Growth – Problems.

Unit II Merchant Banking **(12 Hrs)**

Merchant Banking - Meaning - Definition - Scope- Functions - Merchant Banker's Code of Conduct – Qualities of a Merchant Banker- Merchant Banker's Commission - Problems of Merchant Bankers. Merchant Banking in India: Scope.

Unit III Lease Financing and Hire Purchase **(12 Hrs)**

Lease Financing – Definition - Characteristics - Types of Lease - Lease Participants - Leasing Process - Services of the Lessor - Advantages of Leasing - Limitation of Lease Financing. Hire Purchasing - Definition and Features – Concept of Hire Purchasing - Rights of Hirer – Bank Credit for Hire Purchase - Difference between Hire Purchasing and Lease Finance.

Unit IV Venture Capital **(12 Hrs)**

Venture capital – Origin – Meaning – Features - Scope of Venture Capital – Importance - Venture Capital Guidelines - Stages of Venture Capital Financing - The Indian Scenario: Methods of Venture Financing -Suggestions for Growth of Venture Capital.

Unit V Mutual Funds and Credit Rating **(12 Hrs)**

Mutual Funds – Origin - Meaning – Fund Unit vs. Share - Types of Mutual Fund - Importance, Functions, Advantages and Growth. Credit Rating: Origin - Functions – Credit Rating in India – Benefits - Credit Rating Agencies in India: CRISIL - ICRA – CARE.

Text Book:

Gordon K. and Natarajan, *Financial Markets and Services*. Mumbai: Himalaya publishing House (Revised Edition) 2014.

Books for Reference:

1. Joseph Anbarasu., Boominathan V.K., Manoharan P. and Gnanaraj G. *Financial Services.*New Delhi:Sultan Chand & Sons Edition-2007.
2. Gurusamy S. *Essentials of Financial Services.* Chennai: Vijay Nicole Imprints Pvt Ltd. Revised Edition 2014.

SEMESTER –III			
Part III Core-VI	**Modern Banking**		
Course Code: 21UCOC32	**Hrs/Week: 6**	**Hrs/Sem: 90**	**Credits : 4**

Objective :

To impart basic knowledge on banking theory and practice and modern banking techniques to make the learners to use the technological banking services in day to day life.

Course Outcomes:

CO. No.	Upon completion of this course, students will be able to:	PSO addressed	Cognitive Level
CO-1	discuss the constitution, management and functions of RBI and commercial banks.	1,2,3	Un
CO- 2	know about banker, customer relationship	1,2,3	Un
CO-3	assess the duties, responsibilities and statutory protection to paying and collecting banker.	1,2,5	Ev
CO-4	appraise the e-banking.	1,2,5,6	An
CO-5	demonstrate and appraise the usage of technology in banking	1,2	Ev
CO-6	examine the uses of Automated Teller Machine, Point of Sale and Cash Deposit Machine.	1,8	Ap
CO-7	appraise banking transactions through internet.	1,8	An
CO-8	assess the mode of operation of mobile banking.	1,2,5	Ev

SEMESTER –III			
Part III Core-V	**Modern Banking**		
Course Code: 21UCOC32	**Hrs/Week: 6**	**Hrs/Sem: 90**	**Credits : 4**

Unit I – Introduction to Banking **(18 Hours)**

Bank – Banking - Banking System in India - Origin of Bank – Classification of Banks – RBI - Functions – Commercial Banks – Functions – Customer – Types of Customers – Relationship between Banker and Customer - Rights and Duties of a Banker.

Unit II – Cheque **(18 Hours)**

Cheque – Features – Specimen of a Cheque - Material alteration – Crossing – Types- Endorsements – Kinds – Cheque Vs. Bank Draft – Paying Banker – Precautions before Honoring a Cheque - Reasons for Dishonoring Cheques – Collecting Banker – Statutory Protection – Negligence - Duties.

Unit III – E- Banking **(16 Hours)**

E-Banking – Meaning - Definition – Steps to open bank account through online - Electronic Delivery Channels – National Electronic Fund Transfer – Real Time Gross Settlement - Advantages – Disadvantages – E-Banking in India.

Unit IV – ATM, PoS and CDM **(19 Hours)**

Automated Teller Machine - Origin of ATM – Types of Card – Steps to use ATM – Advantages – Disadvantages – Point of Sale – Steps to use PoS - Advantages – Disadvantages – Cash Deposit Machine - Origin – Steps to use CDM– Advantages – Disadvantages – Growth of ATM, PoS and CDM in India

Unit V – Internet and Mobile Banking **(19 Hours)**

Internet Banking - Meaning – Definition – Procedure to activate internet banking – Steps to access banking transactions - Fund Transfer through NEFT and RTGS through online - Advantages – Disadvantages – Security Issues in Internet Banking

Mobile Banking - Meaning – Definition – Procedure to login mobile banking – Steps to access banking transactions - Fund Transfer - Advantages – Disadvantages – Security Issues in Mobile Banking – Latest Payment Apps -Top Five Apps in India

Text Book:

1. Gordon and Natarajan. *Banking theory Law and practice*, Delhi: Himalaya Publishing House. 29th Edition 2015
2. Gurusamy S. *Banking Theory Law & Practice*. Chennai: Vijay Nicole Imprints Private Ltd. 4th edition 2017

Books for Reference:

1. Sundaram S.M. *Banking Theory Law and Practice.* Karaikudi: Sree Meenakshi Publications. 1st edition 2014
2. Maheshwari S.N. and Maheshwari S.K. *Banking Theory Law and Practice* Ludhiana: Kalyani Publishers. 1991 First Edition reprint 2009

SEMESTER - III			
NMEI	**Plant Resource Utilization**		
Course Code:21UBON31	**Hrs/week: 2**	**Hrs/Semester:30**	**Credit:2**

Objectives:

- To provide knowledge on distribution, cultivation, harvesting techniques and uses of crop plants
- Toknowthecommercialvaluesofplantsresources
- Toappreciatetherelevanceofcropplantstotheeconomyofthepeople

CourseOutcomes:

CO. No.	Upon completionof thiscourse,studentswillbeableto	PSO addressed	CL
CO-1	comprehend history of agriculture and scope of agricultural crops	3	Re
CO-2	acquiretheknowledge ongeographicalareaofcultivation, productionandmarketing of various foodcrops andtheirfinishedgoods	1	Un
CO-3	graspimportanceoftropicalandtemperate fruitsforhumanwellbeing	3	Ap
CO-4	accessthevalueofspices,condimentsand beverage ininternationaltradesandconfectioneryindustries	3	Ev
CO-5	understandthewealthofcashcropsinIndiaandtheir importanceinimprovingtradeandindustrialgrowth	3	Ev
CO-6	substantiate fibersareanalternativesourceofplastics	5	Un
CO-7	explaintheuseofbeveragesandtheirproduction	6	Un
CO-8	learnaboutthecultivationpracticesandextractionof oilfromoilcrops	6	Cr

SEMESTER - III			
NMEI	**Plant Resource Utilization**		
Course Code:21UBON31	**Hrs/week: 2**	**Hrs/Semester:30**	**Credit:2**

UNIT I: Botanical description, distribution, cultivation, harvesting and economic and nutritional valuesof cereals:rice, wheat, maize.

UNIT II: Botanical description, distribution, cultivation, harvesting and economic and nutritional values of legumes:soyabean ,blackgram, green gram and bengalgram. Vegetables: stem– potato, garlic, herbage– cabbage, cauliflower, fruit-tomato, brinjal.

UNIT III: Botanical description, distribution, cultivation, harvesting and economic and nutritional valuesof fruits: tropical fruits – banana and papaya.

UNIT IV: Botanicaldescription, distribution, cultivation, harvesting and economic and nutritional values of spices and condiments: roots – asafoetida, stem – ginger, bark –cinnamon, leaf – curry leaves, flower bud – clove, fruit – capsicum, coriander and blackpepper.

UNIT V: Beverages: botanical description, distribution, cultivation, harvesting and economic and nutritional values ofteaand wine preparation from fruits. Oil extraction techniques

– lemon grass oil and cinnamon oil.

Textbook:

1. PandeyB.P.EconomicBotany. New Delhi: S. Chand. 1999.

Books forReference:

1. ChrispeelsM.JandSandavaD.*Plants,FoodandPeople*.SanFancisco: W.H.Preeman& Co.,1977.
2. KoccharS.L.*Economic BotanyoftheTropics*. India:MacMillanLtd. Fourthedition, 2012.
3. SammbamurtyA.V.S.S and SubrahmanyamN.S.*AtextbookofModernEconomicBotany.*India: CBSpublishers and Distributors.2008.
4. SharmaO.P.*HillsEconomicBotany*. NewDelhi:Tata Mc Graw Hill.Co.Ltd., 1996.
5. SunidhiMiglani.*TextBookofEconomicBotany*.Delhi: ABSBooks. 2016.
6. SwaminathanMandKocharS.L.*PlantsandSociety*.Macmillan Education., 1989.
7. WickensG.E.*Economic Botany.PrinciplesandPractices*. New York:
8. Springer, Kluer Academic Publishers, 2004.

SEMESTER IV			
Core IV	**Taxonomy of Angiosperms and Economic Botany**		
Course Code: 21UBOC41	**Hrs/week: 4**	**Hrs/Semester: 60**	**Credit: 4**

Objectives:

- To recall and outline the system of classification and scientific contribution done by naturalist/ taxonomist
- To gain the art of plant collection, identification and prepare herbaria to secure plant repository for type species.
- To describe the diagnostic features of different plants in technical terms to infer the evolutionary significances and to assign the hierarchical rank of plant species.

Course Outcomes:

CO. No.	Upon completion of this programme, students will be able to	PSO addressed	CL
CO-1	describe the general principles of classification and outline the systems of classification	1	Cr
CO-2	apply binomial nomenclature for species naming	4	Un
CO-3	learn floristic features in technical term and provide an illustrious explanation on floral components of the flower.	6	Ap
CO-4	familiarise and evaluate the economic importance of angiosperms	6	Ev
CO-5	attain field experience and preparation of herbaria for digital database	6	An
CO-6	develop skill in plant identification.	6	Ap
CO-7	gain the art of plant collection and protection	8	Cr
CO-8	compare and contrast the diagnostic features of different families of angiosperms prescribed in the syllabus	1	An

SEMESTER IV			
Core IV	**Taxonomy of Angiosperms and Economic Botany**		
Course Code: 21UBOC41	**Hrs/week: 4**	**Hrs/Semester: 60**	**Credit: 4**

Unit I: Taxonomy: definition and scope. Contribution of Mathew and Santappa. Modification of root and stem. Leaf: venation, leaf apices, leaf margins, leaf arrangements. Stipules: types and modification. Inflorescence: types of inflorescence (simple, compound and special). Flower: terms used in description of calyx, corolla, androecium and gynoecium.

Unit II: Floral formula: symbols employed in floral formula. Floral diagram: important features and sequential drawing of floral diagrams. Systems of classification: natural (Bentham and Hooker) and phylogenetic (Engler and Prantl's system). Botanical nomenclature: vernacular names, binomial. Principles of ICBN.

Unit III: Vegetative, floral characters and economic importance of Annonaceae, Rutaceae, Caesalpiniaceae, Myrtaceae, Cucurbitaceae.

Unit IV: Vegetative, floral characters and economic importance of Rubiaceae, Sapotaceae, Apocynaceae, Asclepiadaceae and Acanthaceae.

Unit V: Vegetative, floral characters and economic importance of Lamiaceae, Amaranthaceae, Euphorbiaceae, Orchidaceae, Arecaceae and Poaceae.

Text Books:

1. Pandey B.P. *Taxonomy of Angiosperms*. New Delhi: S.Chand & Company Ltd., 2005.
2. Shukla P. and Misra S.P. *An introduction to Taxonomy of angiosperms*. New Delhi: Vikas Pub. House Ltd., 1997.
3. Vashista P.C. *Taxonomy of Angiosperms*. New Delhi: Vikas Publications, 1985.

Books for Reference:

1. Gurcharan Singh. *Plant Systematics.* New Delhi: Oxford &IBH Publishing Co. PVT. Ltd., 2004.

2. Naik V.N. *Taxonomy of Angiosperms*. New Delhi: R. Chand & Co., 1984.
3. Rendle. *The classification of flowering plants vol. II & I.* Sahibabad U.P.: VikasPublishing House Pvt. Ltd., 1979.
4. Sharma O.P. *Plant Taxonomy*. New Delhi: Tata MC Graw – Hill publishing CompanyLtd., 1996.
5. Singh V. and Jain. *Taxonomy of Angiosperms*. New York: Rastogi publications, 1997.
6. Pandey B.P. *Economic Botany.* New Delhi: S.Chand & Company Ltd.,1999

Practical Hrs per Week: 2

- Dissect and display the floral parts of the typical members of the families prescribed inthe syllabus.
- Survey of locally available plant species belonging to the families prescribed in thesyllabus and preparation of digital herbarium.
- Field trip: submission of 2 herbarium sheets and 10 photographs.
- Study of various modifications and record of economically important products from themembers of the families prescribed in the syllabus.

Submission: Record note book/ Herbarium / Field note book

Taxonomic manuals for Reference:

1. Ashok Bendre and Ashok Kumar. *Text Book of Practical Botany II*. Meerut: RastogiPublications, 2008.
2. Gamble J.S. *Flora of Presidency of madras, Volume I to III.* London: Adlard and SonLtd., 1997.
3. Henry A.N., Chitra, V. and Balakrishnan N.P. *Flora of Tamil Nadu, India, Volume III.* Coimbatore: Botanical Survey of India, Southern circle, 1989.
4. Henry A.N., Kumari G.R. and Chitra V. *Flora of Tamil Nadu, India, Volume II.* Coimbatore: Botanical Survey of India, 1987.
5. Mathew K.M. *The flora of Tamil Nadu, Carnatic. Volume I to III.* Tiruchirapalli: Rapinet herbarium, St. Joseph's College, 1981 to 1984.

SEMESTER - IV			
Skill Based Elective	**Organic Farming and Biofertilizer**		
Course Code: 21UBOS41	**Hrs/Week 2**	**Hrs/Semester 30**	**Credits: 2**

Objectives

- To create knowledge on organic farming practices.
- To sensitizes the values and needs of organic farming.
- To develop organic farming management skills.

Course Outcomes:

CO. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand overall perspective on organic farming.	7	Un
CO-2	realize the advantages of traditional organic farming over modern system of farming	4 & 7	An
CO-3	identify and formulate mechanical and biological managements of insects/pests/ weeds.	8	An
CO-4	prioritize good water management system, fertilizer choices and application	7	Un
CO-5	recognize the importance of composting and bio fertilizers over chemical fertilizers for soil sustainability	7	Ev
CO-6	understand and implement crop protection techniques of fruits and vegetables	4 & 6	Un
CO-7	know the process of food certification and to assess the socioeconomic benefit of organically grown foods	6	Ap
CO-8	enhance self employability and improve their economy	6	Ap

SEMESTER - IV			
Skill Based Elective	**Organic Farming and Biofertilizer**		
Course code: 21UBOS41	**Hrs/Week 2**	**Hrs/Semester 30**	**Credits: 2**

UNIT I: Introduction: need of organic farming, benefits of organic farming. Organicfertilizers: introduction, need of organic fertilizer, benefits of organic fertilizer.

UNIT II: Preparation of organic fertilizer: Animal waste (bone meal, blood meal, FYM and vermicompost), Plant based fertilizer (seaweed liquid fertilizer, greenmanure and biocompost). Panchakavya.

UNIT III: Organic pesticide: introduction, types and uses. Insecticides: Neem leaf,Onion and Garlic spray, *Chrysanthemum* flower tea.

UNIT IV: Organic weedicides: vinagreen and DIY safe organic weed killer. organicfungicide: organic homemade natural fungicides

UNIT V: Preparation of organic growing structure. Growing medium for plants: coirpeat and vermiculite. Growth hormone from kitchen waste. Guidelines for organic farming certification.

Text Books

1. Arun K Sharma. *Hand book of organic farming*. Jodhpur: Agrobios (India) Publisher,2005.
2. Chandrasekaran B., Annadurai K. and Somasundaram E. *Text book of agronomy*. NewDelhi: New Age International (P) Ltd. Publishers, 2010.

Books for Reference:

1. Fred C. Blank. *Essential aspects of agricultural crop production*. Jodhpur:Agrobios (India) Publisher, 2006.
2. Palaniappan S.P. and Annadurai. *Organic farming-Theory and Practice.* New Delhi:Scientific Publishers Journals Dept., 2010.
3. Sharma J.P. *Organic crop production (Principles and practices Vol-I: Principles andGeneral Aspects)*. New Delhi: KP publisher, 2017.
4. Balasubramanian R., Balakrishnan K. and Sivasubramanian K. *Principles and practicesof organic farming.* New Delhi*:* Satish Serial Publishing House, 2017.

SEMESTER IV			
Skill Based Elective II - Herbal health care products			
Code: 15UBOS41	**Hrs/week: 2**	**Hrs/semester: 30**	**Credit: 2**

Objective:

To give the students hands on training on preparation of herbal heath care products for day to day life.

Unit I: Hair care: Botanicals for hair care (*Cocos nucifera, Eclipta alba, Acacia concinna, Phyllanthus emblica and Hibiscus rosa-sinensis* -morphology of the useful part, common name, family and uses) - Preparation of hair oil.

Unit II: Skin care: Plants used for skin care (*Phaseolus radiates, Cicer arietinum, Curcuma aromatica, Curcuma zedoaria, Trigonella-foenum graecum, Citrus lemon, Acorus calamus* and *Rosa indica* - morphology of the useful part, common name, family and uses) -Preparation of bathing powder.

Unit III: Dental care: Herbs used for dental care (*Azadirachta indica, Syzygium aromaticum, Eucalyptus globulus, Mentha piperita, Psidum gujava* and *Allium sativum* - morphology of the useful part, common name, family and uses) - Preparation of tooth powder.

Unit IV: Eve care: Plants used for eve care (*Aegle marmelos, Achyranthus aspera, Saraca asoca, Asparagus racemosus* and *Boerhaavia diffusa*- morphology of the useful part, common name, family and uses) - Preparation of uterine decoction.

Unit V: Pulmonary care: Plants used for pulmonary care (*Zingiber officinalae, Piper nigrum, Piper longum, Cinnamomum zeylanicum, Abies spectapilis, Maranta arundinacea, Elettaria cardamomum* and *Saccharum officinarum* - morphology of the useful part, common name, family and uses))- Preparation of powder and pain balm.

Books for Reference:

1. John Jothi Prakash, E. 2001. Medicinal and Aromatic Plants, JPR Publications, Vallioor.

2. John Jothi Prakash, E., K. Venkataraman, 2001. The science of Medicinal Botany, JPR Publications, Vallioor.

3. Kokate C.F., A. P. Purohit and S.R. Gokhale, 2004. Pharmacognosy. Nirali Prakashan.

4. Moshrafuddin Ahmed. 2010. Medicinal Plants. MJP Publishers, Chennai.

5. Wallis, T. E. 2000. Test book of Pharmacognosy. CBS Publishers.

Practical

- Preparation of hair oil
- Preparation of bathing powder.
- Preparation of tooth powder
- Preparation of uterine decoction
- Preparation of powder for cough
- Preparation of pain balm

SEMESTER V			
Skill Based Elective – Horticulture			
Code: 15UBOS51	**Hrs/week: 4**	**Hrs/semester: 60**	**Credits: 3**

Objectives:

- To provide knowledge and skills in horticultural techniques.
- To make the students acquire basic skill in gardening.

Unit I: Horticulture and its importance. Division of Horticulture. Garden implements. Training, pruning, transplantation and irrigation.

Unit II : Methods of propagation - seedage; cutting –stem, leaf and root cutting, layering – simple, compound and air layering.

Unit III: Grafting – tongue, cleft and approach grafting, budding – 'T'- budding, chip and patch budding, Vegetative propagules – bulbs, tubers, corms and rhizomes.

Unit IV: Gardening – landscaping, formal and informal gardens. Components of garden –hedges, edges, flowerbeds, arches, rockery, pergola, lawn, water garden topiary and hanging basket.

Unit V Kitchen garden –selection of site, lay out and choice of plants. Indoor gardening. Floriculture - cut flowers, flower arrangement Bonsai and terrarium.

Text Books:

1. Kumar, N.1988. Introduction to Horticulture, Rajalakshmi Publications, Nagercoil.
2. Manibhusan Rao, K.1991. Text book of horticulture, Mac Millan, India.

Books for Reference:

1. Hartmann and Kester, 1989. Plant propagation. Prentice- Hall of India Pvt.Ltd, New Delhi.
2. Randhawa, G.S.1986. Floriculture in India. Allied Publishers Pvt. Ltd. New Delhi.
3. Sadhu, M.K. 1989. Plant Propagation. Wiley Easten Ltd. New Delhi.

SEMESTER - III	
Self Study (Optional)	**Organic Farming**
Code: 18UBOSS1	**Credits: 2**

Vision:

- To create knowledge on organic farming and practices.

Mission:

- Sensitizes the values and needs of organic farming.
- To develop organic farming management skills.

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	to understand overall perspective on organic farming.	7	Un
CO-2	to realize the advantages of traditional organic farming over modern system of organic farming	4, 7	An
CO-3	to identify and formulate mechanical and biological managements of insects/pests/ weeds.	8	An
CO-4	to prioritize good water management system, fertilizer choices and application	7	Un
CO-5	to recognize the importance of composting and bio fertilizers over chemical fertilizers.	7	Ev
CO-6	to understand and implement crop protection methods of fruits and vegetables	4, 6	Un
CO-7	to follow the certification of their produce	6	Ap
CO-8	to enhance self employability and improve their economy	6	Ap

SEMESTER - III	
Self Study (Optional)	**Organic Farming**
Code:18UBOSS1	**Credits: 2**

Unit I	Organic farming-Introduction, Concept, Need of organic farming, Development of organic farming, Scope and status of organic farming in India.
Unit II	Types of organic farming- Pure organic farming, Integrated organic farming and mixed organic farming; Soil management
Unit III	Organic plant protection- Mechanical, Biological pesticides, Bio control agents, Weed management.
Unit IV	Organic plant nutrient management- soil tillage, Crop rotation, Inter cropping: Water management, Green manuring , Composting- methods, Bio fertilizers, Concentrated organic manures.
Unit V	Organic crop protection and organic certification- Organic crop methods of rice, coconut, vegetables and fruits; life stock components and management in organic farming; Organic farming and socio economic impact, guidelines for organic farming certification.

Books for Reference:

1. Arun K Sharma (2005) Hand book of organic farming.
2. Chandrasekaran B, Annadurai K and Somasundaram E., Text book of agronomy.
3. Fred C. Blank, (2006) Essential aspects of agricultural crop production.

Semester V	
Self Study (Compulsory)	**Economic Botany**
Code: 18UBOSS3	**Credit: 2**

Vision

- To understand the utilization of crop plants as food and their commercial application

Mission

- To study the cultivation practices and uses of crop plants as food
- To know the commercial value of plants resources

Course Outcome

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	acquire knowledge of useful plants	3	Re
CO-2	describe the distribution, cultural practices and processing of harvested products for commercial purpose of cereals	1	Un
CO-3	know the nutrient potential of legumes	3	Ap
CO-4	discuss the types, production, keeping quality and marketing of tropical and temperate fruits	3	Ev
CO-5	evaluate the medicinal and confectionery value of spices and condiments	3	Ev
CO-6	understand the chemical composition of plant products and their application both as food and medicine	5	Un
CO-7	explain the use of beverages and their production	6	Un
CO-8	Learn about extraction of oil from oil crops	6	Cr

Semester V	
Self Study (Compulsory)	**Economic Botany**
18UBOSS3	**Credit: 2**

Unit I : Botanical description, distribution, cultivation, production, harvesting and marketing of Cereals and millets - Rice, Wheat, Maize, Oat, Pearl millet, Italian millet, Finger millet

Unit II : Botanical description, distribution, cultivation, production, harvesting and marketing of Legumes: Soyabean, black gram, green gram and Bengal gram
Vegetables: Stem – Potato, garlic, Herbage – Cabbage, Cauliflower, Fruit - Tomato, Brinjal

Unit III : Botanical description, distribution, cultivation, production, harvesting and marketing of Fruits: Tropical fruits – Mango, banana, guava and papaya, Temperate fruits – Apple and grape

Unit IV : Botanical description, distribution, cultivation, production, harvesting and marketing of Spices and Condiments: Roots – asafoetida, stem – ginger, bark – cinnamon, leaf – curry leaves, flower bud –clove, fruit – capsicum, coriander and black pepper.

Unit V : Bevarages - botanical description, distribution, cultivation, production, harvesting, processing and marketing of tea; wine preparation from fruits; Oil –groundnut, coconut and Eucalyptus oil, extraction techniques of oil

Books for Reference:

1. Chrispeels M.J. and Sandava. D. 1977. *Plants, Food and People*. San Fancisco.W.H. Preeman &Co.
2. Kocchar S L. 1998. *Economic Botany of the Tropics. II Edn.* Mac Millan India Ltd.
3. Pandey B. P. 1999. *Economic Botany*, S. CHAND
4. Sammbamurty A.V.S.S., Subrahmanyam N.S. 2008. *A text book of Modern Economic Botany* CBS publisher
5. Sharma O. P. 1996. *Hills Economic Botany*, Tata McGraw Hill. Co. Ltd. New Delhi
6. Sunidhi Miglani, 2016. *Text Book of Economic Botany*, ABS Books. Delhi
7. Swaminathan M and Kochar S. L. 1989. *Plants and Society*, Macmillar Publisher. Ltd.
8. Wickens G E 2004. *Economic Botany. Principles and Practices*, Springer, Kluer Publishers. Dordecht The Netherlands.

SEMESTER V			
Core Integral II	**Pharmacognosy**		
Code:18UBOI52	**Hrs/week:4**	**Hrs/semester: 60**	**Credit: 4**

Vision:

- To provide knowledge on significance of medicinal plants and their medicinal potency.

Mission

- To understand the characterization , production and standardization of crude drugs
- To deal with methods for sustainable production of crude drugs and their therapeutic value.

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	define and identify the more valuable medicinal plants based on their pharmaceutically active compounds	3	Ap
CO-2	formulate medicinal product and apply the knowledge for proper storage and distribution	8	Ap
CO-3	assess and evaluate the purity of herbal medicine.	7	Ev
CO-4	elaborate the cultural practices of important medicinal plants.	6	Re
CO-5	assess the trade opportunities of medicinal plants.	6	Ap
CO-6	define, classify and explain the importance of herbal medicine.	6	Re
CO-7	identify the crude drugs by morphological, organoleptic and histological characters.	6	Un
CO-8	know and expain the important phytoconstituents of therapeutic value.	6	Un

SEMESTER V			
Core Integral II	**Pharmacognosy**		
Code:18UBOI52	**Hrs/week:4**	**Hrs/semester: 60**	**Credit: 4**

Unit I : Definition, scope and applications of herbal medicine. Classification (morphological. therapeutic, chemical. taxonomical and chemotaxonomic classifications) and identification of drugs

Unit II : Drug adulteration. Methods of drug evaluation (morphological, micoroscopic, physical, chemical and biological).

Unit III : Botanical name, family, useful part, chemical constituents, adulterants anduses of the following drug.

Glycosides – Senna, Aloe,
Digitalis, Liquorice Terpenoids
– Coriander, Fennel, Lemon,
CinnamomAlkaloids – Datura,
Opium, Vinca, Pepper
Lipids - Castor, Neem, Sesame oil.

Unit IV Methods of collection, process and storage of medicinal plants; purification of raw drugs; factors causing drug contamination, methods of storage of drugs

Unit V Extraction methods and medicinal uses of *Eucalyptus*, Castor and Lemongrass oil. Conservation of medicinal plants – *in-situ* and *ex-situ* methods

Text book:

Roseline. A. 2011. *Pharmacognosy*, MJP Publishers, Chennai.

Books for Reference

1. Anonymous. 1978. *The Ayurvedic Formulary of India.* Govt. of India, New Delhi
2. Anonymous. 1989. *Formulary of Siddha Medicine.* The Indian Medical Practitioners'Co-operative Pharmacy and Stores Ltd., Chennai
3. Anonymous. 1999. *The Ayurvedic Pharmacopoeia of India. Vol. I (1 & 2).* Ministry ofHealth and Family Welfare, Govt. India, New Delhi.
4. Chauhan, M.G. and A.P.G. Pillai. 2005. Microscopic Profile of Powdered Drugs Used inIndian Systems of Medicine. *Institute of Ayurvedic Medicinal Plant Sciences,* Jamnagar.
5. Daljithsimha, K. 1974. *Unani Dravyaguna Darshana*. Ayurvedic and Tibbi Academy,Lucknow
6. Kumar, N.C. 1993. *An Introduction to Medicinal Botany and Pharmacognosy*. EmkayPublications, Delhi.

7. Gokhale, S.B., Kokate, C.K. and Purohit, A.P. 2004. *A Text book of Pharmacognosy*.Nirali Prakashan, Pune.
8. Murugesh, N. 2002 *A Concise Text Book of Pharmacognosy*. Sathya Publishers, Madurai.

SEMESTER III			
Part III	**Non-Major elective**	**Chemistry of consumer products**	
Code :15UCHN31	**Hrs/Week : 2**	**Hrs/ Sem : 30**	**Credits : 2**

OBJECTIVES:

- To know the chemical aspects of soap and detergents
- To learn about the various pigments and perfumes.
- To provide information about the importance of the drugs in day-to-day life.

UNIT I SOAPS AND DETERGENTS

Soap – definition and types – manufacture of different types of soaps (toilet soaps, transparent soaps and liquid soaps) and their uses – cleansing action of soaps. Detergents – classification of detergents (cationic, anionic and non-ionic) – comparison of soaps and detergents.

UNIT II PIGMENTS AND PERFUMES

Outline of the preparation of white lead, lithopone, titanium dioxide and ultramarine blue. Red lead , chrome green. Ingredients of perfumes- Isolation of essential oils- Artificial flavours- apple, grape, banana, pineapple, jackfruit (Naming of a few compounds only)

UNIT III PHARMACEUTICAL CHEMISTRY

Drugs- Definition- Importance of some common drugs with examples – mouth washes – antacids – analgesics – antipyretics – sedatives and hynotics. Anaesthetics – Basic requirements of anaesthetics – Classification with examples – distinction between antiseptics and disinfectants

BOOKS FOR REFERENCE

1. Jayashree Ghosh, Fundamental concepts of Applied chemistry, Edition 2006, S.Chand & Company Ltd. New Delhi.
2. P.C. Jain and Monika Jain, Engineering chemistry, Dhanpat Rai & Sons, New Delhi.
3. B.K.Sharma, Industrial Chemistry Goel Publishing House, 2003, Meerut.
4. B.S. Bahl and Arun Bahl, Advanced Organic Chemistry, 2005.
5. Jayashree Ghosh, Text Book of pharmaceutical chemistry 2003 S.Chand and company, New Delhi.

SEMESTER III			
Core Skill Based	**Agricultural Chemistry and Water Management**		
Code :18UCHS31	**Hrs./Week:4**	**Hrs/ Sem : 60**	**Credits:4**

Vision

Facilitate the students to know the basic knowledge about agriculture and soil

Mission

- Realize the importance of agriculture
- Understand the chemistry behind fertilizers and pesticides
- Idea to create vermincompost
- Analyze the quality of drinking water

Course Outcome

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO - 1	understand the importance of soil its constituents, fertility and to promote agriculture.	1, 7	Un
CO - 2	know the preparation and importance of fertilizers in agriculture	1, 7	Re
CO - 3	realize the importance of pesticides and insecticides	1, 7	Ap
CO - 4	understand the water quality standards and water quality parameters.	2, 3, 7	Un
CO - 5	aware of the harmful effects of pollutants Produce vermi compost and gobar gas	2, 3, 8	An,Cr
CO - 6	understand the processes used for purification of municipal water	4	Un
CO - 7	treat waste water by using different methods	4, 7, 8	Cr
CO - 8	estimate the amount of carbonate, chloride, nitrate, phosphate, zinc and calcium present in soil.	4, 7	Ap

SEMESTER III			
Core Skill Based Agricultural Chemistry and Water Management			
Code :18UCHS31	Hrs/Week:4	Hrs/ Sem 60	Credits:4

Unit I Soil Nature and Plant Nutrients

Saline, alkali and acid soils. Buffering capacity of soil - Soil reclamation. Liming of soil – measurement of soil pH - Soil fertility – essential plant nutrients and their functions – deficiency symptoms – macro and micro nutrients & their functions. Natural and synthetic manures-qualities of a good fertilizer- classification of fertilizers – nitrogeneous fertilizers - Preparation and importance of urea, calcium cyanamide - phosphatic fertilizers - preparation and importance of super phosphate, triple super phosphate- potash fertilizers - preparation and importance of potassium chloride and potassium nitrate -complex fertilizers - preparation and importance of DAP, mixed fertilizers (NPK) and human effluent from gobar gas plant as a manure. Vermiculture -vermi compost.

Unit II Pesticides

Pesticides, Insecticides, Repellants, Fungicides- Definition-classification – on the basis of their mode of action, target organisms they control, method of application- environmental hazards - preparation and uses of DDT, BHC, lead arsenate, bordeaux mixture, dithiocarbamates.

Unit III Water Quality Parameters

Water quality standard for drinking water (WHO)- Water quality parameters-pH, EC, alkalinity, Total acidity, hardness, DO, BOD, COD, salinity, nitrate (Methaemoglobinemia), phosphate and fluoride content – Eutrophication- Toxic metals - Heavy metal pollution –Hg, As, and Cd. Case studies (Minamata, arsenic poison in West Bengal, Itai-itai)

Unit IV Water Treatment

Waste water treatment-methods and equipments used-preliminary treatment (screening, skimming) - primary treatment (sedimentation, coagulation) - secondary treatment (trickling filters, oxidation pond, anaerobic digestion)-tertiary treatment (adsorption, ion-exchange, reverse osmosis, electrodialysis, disinfection)-treatment of water of municipal purposes-domestic sewage treatment-industrial waste water treatment.

Unit V LABORATORY WORK (Using Water analyzer and HPLC)

(Internal Evaluation Only)

1. Analysis of carbonate, chloride, nitrate, phosphate, zinc and calcium in soil.
2. Determination of Total Organic Carbon (TOC) in soil.
3. Determination of pH and conductivity of water from different sources.
4. Determination of DO, COD and hardness of water.
5. Samples will be collected from agro ecosystem. Presence of pesticides are recorded / Analysis using HPLC

Industrial Visit

A visit may be made to an industry or a premier institution.

*A report of the industrial visit may be submitted as an assignment.

Text Books

1. Text Book of pharmaceutical chemistry Jayashree Ghosh S.Chand and company, New Delhi 2003

2. K.Bagavathi Sundari, Applied Chemistry , MJP Publishers.2008

Books for Reference

1.B.K.Sharma, Industrial Chemistry, Goel Publishing House, Fifth Edition., 1993-94

2.P.S. Sindhu, Environmental Chemistry, New Age International Publishers.2010

Semester – III			
Part III Core Skill Based Numerical Aptitude and Arithmetic Ability			
Code :18UMAS31	**Hrs/week : 4**	**Hrs/ Semester : 60**	**Credits :4**

Vision:

To bring out the mental ability and skill of the students

Mission:

To train the students for competitive and professional examinations

Course outcome

CO. No	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	acquire the ability to understand and analyze the problem	2	Un
CO-2	develop their calculating and computing skills.	5	Ap
CO-3	solve mathematical problems using shortcut methods.	4	Cr
CO-4	build confidence to face the competitive examinations.	5	Cr
CO-5	solve the questions with accuracy and within the given time limit.	3	Cr
CO-6	enhance logical skills, arithmetic skills and aptitude skills.	5	Ap
CO-7	simplify and evaluate algebraic expressions.	3	Ev
CO-8	use mathematical concepts in real world situations.	4, 8	Ap

Semester – III			
Part III Core Skill Based Numerical Aptitude and Arithmetic Ability			
Code:18UMAS31	**Hrs/week :4**	**Hrs/ Semester :60**	**Credits :4**

Unit I

Percentage– Time and Work – Time and Distance

(Chapters 10,15,17, pages 179-218, 309-330, 343-360)

Unit II

True discount and Banker's discount – Ratio and Proportion

(**Chapters 26, 27, 12, Pages 485-489, 490-493, 248-276)**

Unit III

Average – Chain rule - Calendar – Trains – Boats and Streams

(Chapters 6,14,18,19, Pages 123-142, 291-308, 361-370)

Unit IV

Simplification – profit and loss

(Chapters 4,11, Pages 68-95, 219-247).

Unit V

Line Graphs-Pie charts - Bar Diagrams

(Chapters 33,34,35, Pages 525-536, 537-542, 543-549)

Text Book

1. Aggarwal R.S., Arithmetic Subjective and Objective for Competitive Examinations, S.Chand and Company Ltd. , Ram Nagar, New Delhi - 55. Revised Edition 2014

Books for Reference

1. Aggarwal R.S., Quantitative Aptitude , S.Chand and Company Ltd. , Ram Nagar, New Delhi.
2. Abhijit Guha, Quantitative Aptitude for Competitive Examinations, Tata McGraw-Hill Publishing Company Ltd., New Delhi.

SEMESTER – V			
Core Integral – II- Vermitechnology			
Code:18UMII52	**Hrs/ Week: 4**	**Hrs/ Sem: 60**	**Credit:4**

Vision

To educate the students by ensuring the production of healthy food in a healthy way, we want to contribute to live in a healthy world.

Mission:

To contribute to global ecological economic recovery, profitable and sustainable way to produce high quality organic products and a healthy and positive results in agriculture is to be achieved.

Course Outcome:

CO No	Upon completion of this course, students will be able to	PSO addressed	CL
CO- 1	select from, use and interpret results of descriptive vermi technology methods effectively.	6	Ev
CO -2	demonstrate an understanding the scientific and technological benefits to the rural sector by equipping them with the latest technology and to create the model for the nation	6	Ev
CO- 3	gain knowledge about the various morphology of earthworms	1	An
CO -4	communicate the awareness of field sampling using vermi compost	5	Un
CO- 5	make appropriate awareness of parasites and predators in vermi composting	5	Un
CO- 6	understand the awareness among the present status and importance of composting methods and vermi composting	4	An
CO- 7	understand the waste reduction in vermi composting	4	Un
CO -8	explain the nutrient availability in the vermi compost	6	Ev

SEMESTER – V			
Core Integral – II- Vermitechnology			
Code:18UMII52	**Hrs/ Week: 4**	**Hrs/ Sem: 60**	**Credit:4**

Unit-I:

Earth worm classification – Morphology and Anatomy. Biology of *Lumbricus terrestris*.Vermicomposting - Definition, introduction and scope - The nature of earthworms-soil environment - basic environmental requirements.

Unit-II:

Vermicomposting materials and their classification. Physical, chemical and biological changes brought by earth worm in soil structure-carbon, nitrogen and phosphorous transformations

Unit-III:

Vermicomposting methods - Optimal conditions for Vermiculture - temperature, moisture, pH, soil type, organic matter. Nutrient availability in vermi Compost.

Unit-IV:

Vermicomposting in Homes, Maintenance of vermicomposting beds. Harvesting the worms. Earth worm predators, parasites and pathogens. - Vermi wash. Vermi culture for waste reduction.

Unit-V:

Composting - Vermicomposting - Required conditions - Advantages - Role of vermicompost in plant growth and other applications, Field sampling- passive methods.

Text Book:

Mary Violet Christy. A., 2014, *Vermi Technology* - MJP Publishers, Chennai.

Books for Reference:

1. Edwards, C.A. and Bohlen, P.J. 1996, *Ecology of earthworms*-3rd Edition, Chapman and hall.
2. Jsmail, S.A., 1970, *Vermicology. The Biology of Earthworms.* Orient Longman, London.
3. Lee, K.E., 1985. *Earthworms - Their ecology and relationship with soil and land use*, Academic Press, Sydney.
4. Ranganathan L.S. 2006. *Vermibiotechnology from soil health to human health*.Agrobios India.
5. Gupta P.K. 2008. *Vermicomposting for sustainable Agriculture*. Agrobios. India.

SEMESTER – IV			
Allied – IV – Mushroom Technology			
Course Code: 21UMIA41	**Hrs/Week : 4**	**Hrs/Sem : 60**	**Credit : 3**

Objectives

1. To facilitate the students with wide knowledge about the mushroom technology.
2. To inculcate the deep knowledge on mushroom technology.

Course Outcome:

CO N0	**Upon completion of this course, students will be able to**	**PSO addressed**	**CL**
CO-1	explain about the detailed information of edible and non – edible mushroom.	4	Un
CO-2	compare the cultivation of various types of mushrooms.	5	Un
CO-3	construct the mushroom house.	6	Cr
CO-4	compare different types of mushroom cultivation techniques and pure culture preparation.	7	An
CO-5	explain about economics of mushroom cultivation and their precaution.	6	Un
CO-6	interpret about the different modes of storage of mushroom.	5	Un
CO-7	illustrate about the various nutrition content present in mushroom.	4	Un
CO-8	make use of various types of foods prepared from mushroom.	6	Ap

SEMESTER – IV			
Allied – IV – Mushroom Technology			
Course Code: 21UMIA41	**Hrs/Week : 4**	**Hrs/Sem: 60**	**Credit : 3**

Unit – I : Mushroom morphology

Different parts of a typical mushroom & variations in mushroom morphology. Key to differentiate edible from poisonous mushrooms. Button, Oyster and King mushroom (*Ganoderma)*- General morphology, distinguishing characteristics, spore germination and life cycle. Historical account on mushroom cultivation.

Unit - II: Cultivation Technology

Infrastructure, spawn lab, equipments and substrates in mush- room cultivation: Casing; raw material used for casing, preparation of casing material; important sanitation during various stages of mushroom cultivation. Precautions in mushroom cultivation – area selection, spawn preparation, spawn run, harvesting, pest management.

Unit – III: Cultivation of mushrooms

Steps involved in cultivation - Button Mushroom, Oyster mushroom and King mushroom (*Ganoderma)*

Unit –IV: Storage and nutrition

Short time storage, Long term storage, Drying , Storage in salt solutions. Nutrition – Proteins, Amino acids , Mineral elements; Carbohydrate , Vitamins , Crudefibre content.

Unit – V: Health benefits of Mushroom & Value added products

Health benefits of Mushroom: Antiviral value, antibacterial effect, antifungal effect, anti-tumour effect, hematological value cardiovascular & renal effect, in therapeutic diets, adolescence, for aged persons & diabetes mellitus.

Value added products - Mushroom - Soup, Pickles, Powders, Jams ,Cutlet, Omelette , Samosa , Curry, mushroom biscuits, mushroom ketchup, mushroom chips, mushroom candy.

Text Books:

1) Marimuthu, T. Krishnamoorthy, A.S. Sivaprakasam, K. and Jayarajan. R, *Oyster Mushrooms, Department of Plant Pathology,* Coimbatore: Tamil Nadu Agricultural University, 1991.
2) Nita Bahl, *Hand book of Mushrooms,* II Edition, Vol. I & Vol. II: 1988.

Books for Reference:

1. Biswas S., Datta M. and Ngachan S.V. *Mushrooms: A Manual for Cultivation,* PHI. 2012.
2. Zadrazil F. and Grabbe K. *Edible Mushroom, Biotechnology* Vol. 3, Berlin: Wein- heim: Verlag Chemie, 1983.
3. Changs T. and Hayanes W.A. (Ed.) *Biology and Cultivation of Edible Mushrooms.* New York: Academic Press. 1978.
4. Tewari, Pankaj Kapoor, S.C., *Mushroom cultivation*, Delhi: Mittal Publications, 1988.

SEMESTER-III			
NME I - Food Microbiology			
Course Code:21UMIN31	**Hrs/Week:2**	**Hrs/Sem:30**	**Credit:2**

Objectives

To highlight student that microorganisms are importance of food, food hygiene, sanitation and food safety

Course Outcome:

CO. No	Upon completion of this course, students Will be able to	PSO addressed	CL
CO-1	To provide knowledge on the importance of Food microbiology	1,4	Un,An
CO-2	Acquire brief knowledge on food microbes And their importance.	1	Un
CO-3	Acquire knowledge on various types of preservation.	6	Co
CO-4	Provide information about the principles of preservation.	1,6	Un
CO-5	Acquire knowledge on contamination and Spoilage problems	1,6	Un
CO-6	Provide interpretation of laboratory tests in the Diagnosis of infectious diseases.	2	Co
CO-7	To understand the mode of transmission of food Poisoning and food infections	6	Co
CO-8	Provide information about the quality control Principles and importance.	1,2	Un

SEMESTER-III			
NME I-Food Microbiology			
Course Code: 21UMIN31	**Hrs/Week:2**	**Hrs/Sem:30**	**Credit:2**

Unit-I : Food as a substrate for microorganisms

Food as a substrate for microorganisms - factors affecting the growth of microorganism in food. Mold, yeast and bacteria- general characteristics & importance.

Unit-II: Principles of food preservation

Principles of food preservation – Methods of food preservation – asepsis, removal of microorganism anaerobic conditions, high temperature- low temperature, drying and food additives – Canning.

Unit–III: Contamination and spoilage

Contamination and spoilage of milk and milk products, meat and meat products, fish

and fish products, vegetables and fruits and canned food.

Unit-IV: Food Borne diseases

Food Borne diseases: Mode of Transmission –Food Poisoning –Food infection-Bacterial (*Staphylococcal*), Fungal (*Aspergillus*) and Viral infection (*Hepatitis*)

Unit-V: Quality Control

Food Laws and Regulations. Export Act- AGMARK -FPO, FAO-WHO-HACCP- Principles and Importance. intellectual property rights, Introduction to patents

Text Book:

1. Frazier, W.C and Westhoff, D.C *Food microbiology*, 4th edition, New Delhi. Tata Mac Graw Hill, 2008.
2. Adams, M.R and Moss M.O *Food Microbiology* New Age International (p) Limited Publishers. 1995

Books for Reference:

1. Banwart, G.J., Basic *Food Microbiology*, New Delhi. CBS Publishers and Distributors, 2nd Edition 1989.
2. Robinson R.K *Dairy Microbiology*, London. Elsevier Applied science, 1990.
3. Edward Arnold, Hobbs BC Roberts D *Food Poisoning and Food Hygiene*, London., 1993.

SEMESTER–III			
Skill Based Elective - Vermitechnology			
Course Code:21UMIS32	**Hrs/Week:2**	**Hrs/Sem:30**	**Credit:2**

Objectives

1. To get the thorough knowledge on making Vermicomposting and vermiculture.
2. To learn about species used in Vermicomposting and Culture techniques of earthworms
3. To study the Vermicomposting production
4. To encourage the self-employment practice and save the human being by the way of minimizing the use of chemical fertilizers.
5. To understand the interaction of earthworms with other organisms

Course Outcome:

CO No	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	Select from, use and interpret results of descriptive Vermitechnology methods	6	Ev
CO-2	Demonstrate an understanding the scientific and technological benefits to the rural sector by equipping them with the latest technology and to create the model for the nation	6	Ev
CO-3	gain knowledge earthworms about the various morphology	1	An
CO-4	Communicate the awareness of field sampling using Vermicomposting	5	Un
CO-5	Make appropriate awareness of parasites and predators	5	Un
CO-6	Understand the awareness among the present status and importance of composting methods and Vermicomposting	4	An
CO-7	Understand the waste reduction in Vermicomposting	4	Un
CO-8	Explain the nutrient availability in the Vermicomposting	6	Ev

SEMESTER–III			
Skill Based Elective –Vermitechnology			
Course Code:21UMIS32	**Hrs/Week:2**	**Hrs/Sem:30**	**Credit:2**

Unit-I: **Earthworm classification**

Morphology and Anatomy. Biology of *Lumbricus terrestris*. – Digestive system–Excretion – Reproduction and Life cycle – Earthworm as farmer's friend.

Unit-II: Vermicomposting materials and their classification

Vermicomposting materials and their classification. Physical, chemical and biological and environmental changes brought by earth worm in soil structure-carbon, nitrogen and phosphorous transformations.

Unit-III: Vermicomposting production

Requirements – Different methods of Vermicomposting – Heap method – Pot method and Tray method – changes during Vermicomposting. Collection and Preservation of earthworms.

Unit-IV: Vermicomposting in Homes

Vermicomposting in Homes, Maintenance of Vermicomposting beds. Earthworm predators, Parasites and pathogens. - Economics of Vermicomposting and vermiwash production. Vermiculture for waste reduction.

Unit-V: Vermicomposting advantages

Role of in plant growth and other applications, Earthworms as animal feed – Medicinal value of earthworm meal– Role of Earthworms in Solid Waste, and Sewage waste management. Earthworms as bioreactors.

Text Book:

Mary Violet Christy. A. *Vermitechnology*– Chennai: MJP Publishers, 2014.

Books forReference:

1. Edwards,C.A .and Bohlen, P.J., *Ecology of earthworms*. Chapman and hall. 3rdEdition, 1996.
2. Ismail,S.A. *Vermicology. The Biology of Earthworms.* London. Orient Longman, 1970.
3. Lee, K.E. *Earthworms-Their ecology and relationship with soil and land use*, Sydney. Academic Press, 1985.
4. Ranganathan L.S. *Vermibiotechnology from soil health to human health*. India: Agrobios, 2006.
5. GuptaP.K. *Vermicomposting for sustainable Agriculture.* India. Agrobios.2008.

SEMESTER – IV			
Skill Based Elective - Practical in Medical Laboratory Technology			
Course Code:21UMIS41	**Hrs/week : 2**	**Hrs/Sem : 30**	**Credit: 2**

Objectives:

The Medical Laboratory Technology graduates excel as innovative practitioners committed to excellence and a collaborative and healthy work environment. These graduates play a vital role in the provision of quality health care and in scholarship for the advancement of self, the profession and society.

Course Outcome:

CO NO.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand the laboratory practices and know how to maintain the laboratory instruments	1,2	Un
CO-2	analyze and distinguish various types of blood groups	2,3,4	An
CO-3	evaluate the culture tests and understand the pathological diseases of humans	2,4	An
CO-4	analyze the physical, chemical and microscopic analysis of culture samples	2,3	An
CO-5	perform various techniques on isolation of microorganisms for various sources	2	Ap
CO-6	understand the ESR and CRP tests for analysis	1,2	Un
CO-7	perform the qualitative tests for carbohydrates and proteins	2	Ap
CO-8	analyze and isolate the microbes from blood	3,4	An

SEMESTER – IV			
Skill Based Elective - Practical in Medical Laboratory Technology			
Course Code:21UMIS41	**Hrs/week : 2**	**Hrs/Sem : 30**	**Credit: 2**

1. Separation of blood and serum
2. Collection and preservation of blood sample.
3. Estimation of glucose
4. Estimation of cholesterol
5. Identification of carbohydrates (Qualitative test)
6. Identification of proteins (Qualitative test)
7. Staining of blood smear
8. Examination of urine- physical, chemical, & microscopic
9. Urine analysis: Glucose, protein, urea, creatinine and billirubin.
10. Culture tests- urine, nasal, throat swab, stool & pus
11. Antimicrobial susceptibility testing
12. Pregnancy test
13. ESR
14. CRP- Demonstration.
15. Testing of malarial parasite.
16. Testing of stool samples for parasites (ova & cysts)
17. Isolation & identification of Mycobacteria- Demonstration
18. Cultivation & identification of protozoa
19. Identification of *Escherichia coli* from urine sample
20. Isolation of bacteria from blood.

Books for Reference:

1. Cappucino.J.G., and Sherman. N. *Microbiology – a laboratory manual.* New York: BenjaminCummins. 1996.
2. Kannan.N. *A laboratory manual in general Microbiology*. Palani: Palani paramount publication, 1996.
3. Gunasekaran. P. *Laboratory manual in Microbiology.* New Delhi: A new age International Ltd.,publishers, 1996.
4. Sundaraj. T. *Microbiology – A laboratory manual.* Chennai: Sundaraj.1st Edition Publication. 2005.
5. Jayaraman. J. *Laboratory manual in Biochemistry*. New Delhi: Wiley Eastern Ltd., 1985.
6. Plummer. D.T. *An introduction to Practical Biochemistry*. New Delhi: Tata McGraw Hill, 1998.
7. Benson. *Microbiological applications – A Laboratory Manual in General Microbiology.* Mc.Graw Hill Higher Education. International Edition, 2002.
8. Renganathan. S., Gkul Shankar S., Ranjit.M.S, Pankajalakshmi.V.,Sivramakrishnan.M., Selvakumar.B.N., and mohhamedaejaz. *Fungal Diseases and Diagnosis*. (Vol I): 2001.
9. Kanai Mukerjee L., *Medical Laboratory Technology – A procedure manual for routine diagnosis tests*- Tata mc Graw Hill Publishing Co. Ltd., New Delhi: Vol III.2005
10. Rajan S., Selvi Christy R., *Experimental procedures in Life Sciences.* Chennai: Anjanaa Publishers, 2010.

SEMESTER V	
Self Study : Vermitechnology	
Code : 18UZOSS3	**Credit : 2**

Vision : To impart knowledge on organic compost and equip the students for self employment

Mission : Acquire knowledge on different techniques in vermitechnology and become the entrepreneurs

Course Outcome

CO.No	**Upon completion of this course, students will be able to**	**PSO addressed**	**CL**
CO-1	classify and choose the suitable species of earthworm for making compost	1	Un
CO-2	examine the suitable physico-chemical parameters required for vermicomposting	2	An
CO-3	explain the different methods of vermicomposting	4	Un
CO-4	understand the preparation, composition and applications of vermiwash	5	Un
CO-5	examine the applications of vermitechnology in various fields	3	Ev
CO-6	describe the use of products of vermiculture	8	Ap
CO-7	demonstrate the vermiculture technique	7	Un
CO-8	develop skills for self employment	6	Cr

SEMESTER V	
Self Study : Vermitechnology	
Code : 18UZOSS3	**Credit : 2**

Unit I **Vermiculture Technique**

Definition- need for vermiculture-species selection -vermiculture process

Unit II **Vermicomposting Technology**

Selection of suitable species of earthworm, preparation of worm bed – maintainance of vermicomposting bed- harvesting the worms

Unit III **Vermicomposting Methods**

Pit method - bin method, windrow method, vermiwash- preparation- composition- applications

Unit IV **Vermicompost**

Vermicompost- chemical composition, physical and biological features- applications.

Unit V **Economic Importance of Earthworm**

Earthworm - as bait- as food - in agriculture - in medicines- in laboratory research purpose- benefits to society.

Books for Reference

1. Talashilkar S.C. and Dosani. 2005. *Earthworm in Agriculture.* First edition Agrobios Publications, Jodhpur
2. Renganathan L. S. 2006. *Vermibiotechnology from Soil Health to Human Health*. First edition, Agrobios, India.
3. Prakash Malhotra. 2008. *Economic Zoology*. First edition. Adhyayan Publishers and Distributers, New Delhi.
4. Gupta P. K. 2012. *Vermicomposting for Sustainable Agriculture.* 2nd Revised Edition, Agrobios, India.

SEMESTER III			
Skill Based Elective	**A. Fishery Products**		
Course Code: 21UZOS31	**Hrs/ Week: 2**	**Hrs/ Sem: 30**	**Credits: 2**

Objectives:

- To obtain knowledge on products of fisheries industry, their processing and preservation process.
- To encourage the students to follow hygiene in fish processing
- To develop entrepreneurial skills in the preparation of sea-food based convenience products in ready-to-eat or ready-to-cook forms

Course Outcome

CO. No.	Upon completion of this course, the graduates will be able to	PSO addressed	CL
CO-1	acquire knowledge on products and by-products of fisheries.	5	Un
CO-2	demonstrate various processing and preservation methods of fishery products	5	Un
CO–3	apply information on processing for the usage of fish by-products for industrial and domestic purposes.	7	Ap
CO–4	carry out study on sea weeds and analyse their usage as food for human consumption	2	An
CO–5	practice the preparation of value added fishery products.	8	Cr
CO–6	implement and discuss sanitation and quality control techniques.	7	Cr
CO–7	update the knowledge of preservation and processing techniques and recommend their use in day to day life.	7	Ev
CO-8	develop advanced techniques on fishery products.	8	Un, Cr

Unit I **Value Added Fishery Products**

Fish pickles, fish sauce, fish cutlets, fish balls, fish soup powder and fish sausage. Battered and braided products-fish finger, fish wafer.

Unit II **Fishery By Products**

Fishery by products - fish oil – isinglass – chitosan – pearl essence – shark fins

Unit III **Seaweed Products**

Uses of agar, algin and carrageenan. Use of sea weeds as food for human consumption.

Unit IV **Techniques of Preservation and Processing**

Freezing - quick, slow freezing; freezer - horizontal plate freezer, tunnel air blast freezer - cryogenic freezing; canning; smoking - hot, cold, electrostatic smoking; pickling; drying – natural, artificial; salting - dry, wet and mixed salting.

Unit V **Quality Control and Sanitation**

Sanitation in processing – environmental hygiene and personal hygiene in processing. Fishery guidelines for HACCP and FSSAI on fish and fish products.

Text Book

1. Dr. Surekha Gupta. *Textbook of Fishery*. New Delhi: Ane Books Pvt. Ltd. 2010

Books for Reference

1. Gopakumar, K. *A Textbook of Fish Processing Technology.* New Delhi: ICAR. 2002.
2. Gupta, S.K. and P.C Gupta. *General and Applied Ichthyology* [*Fish and fisheries*]. Ramnagar New Delhi: Chand and Company Ltd. 2006
3. K.R. Ravindranathan. *A Text book of Economic Zoology*. New Delhi*:* Wisdom Press. 2013.
4. Ayyapar, S. *Handbook of Fisheries and Aquaculture*. New Delhi: 2010
5. Srivastava, C.B.L. *A Text book of Fishery Science – Indian Fisheries.* New Delhi: Kitab Mahal. 2006.

Semester V			
SBE – E- Business			
Code : 15UBAS51	Hrs/Week: 4	Hrs/Semester:60	Credits: 3

Objectives

- **To learn the methodology of doing Business with Internet. Also, the course has been developed to introduce the concept of electronic market space and electronic commerce Infrastructure.**

Unit - I: Introduction

E-Commerce Framework – Traditional vs. E-Business Applications – Architectural Framework – The Internet as Network Infrastructure – Major Categories of E-Commerce – B2C, B2B, C2B and C2C.

Unit - II: Networks

Overview of Communication Network – Communication Processors – Communication Media – Types of Networks – Communication Satellite – Wireless Networks – Wireless Internet Access ISDN – Dial-Up – Broadband.

Unit-III: EDI in Business

E-Commerce and World Wide Web – E-Payment Systems – Electronic Data Interchange (EDI) – EDI Applications in Business, Intranet Application in Business.

Unit-IV: E-Payment Systems

Online Payment – Payments Cards – Electronic Cash – Electronic Wallets – Digital Cards – Types – Stored Value Cards – Internet Technologies – Banking – Net, Mobile.

Unit-V: World Wide Web – Process

Web Hosting Services – Web Servers, Domain Naming Systems (DNS) – Types – POP, IMAP – Accredited Registrars – Country Coded and Top Level Domains – Internet Regulatory Organizations

Text Books:

- Gray Schneider, Electronic Commerce, Thomson Course Technology, Noida, 7th Annual Edition, 2007.
- U.S.Pandey, Rahul Srivastava, Saurabh Shukla, E-Commerce and its applications, S.Chand, New Delhi, 1st Edition, 2007.
- R.Kolkota and A.B.Whinston: Frontiers of Electronic Commerce, New Delhi, Addision Wesley, 1996.

Books for Reference:

- P.T.Joseph: Electronic Commerce: A Managerial Perspective, Prentice Hall of India Learning, New Delhi, 3rd Edition, 2008.
- Efraim Turbon, Jae Lee, David King, H.Michael Chung, Electronic Commerce, A Managerial Perspective, Pearson Education Asia, 2001.

Semester V			
Self Study Course (Compulsory) Entrepreneurial Development Programme			
Code : 15UBASS3	**Hrs/Week: -**	**Hrs/Semester: -**	**Credits: 1**

Objectives

- **To impart knowledge on entrepreneurship and help for setting up own business**
- **To open up avenues for employability**

Unit I

Entrepreneurship – Definition – Need – Functions of Entrepreneur types of Entrepreneur – Role of Entrepreneurs – Entrepreneur – Role of Entrepreneurship in economic development.

Unit II

Qualities of a good Entrepreneur – Concept of women Entrepreneurship – Functions and problems of women Entrepreneurs – Rural Entrepreneurship – Need – Problems – How to develop rural Entrepreneurship.

Unit III

Factors affecting Entrepreneurial growth – agencies dealing with Entrepreneurs – Banks and Service organizations – IDBI – NSIC – SIO – SISI – ITCOT – DIC center for Entrepreneurship development – Industrial Estates – Technical Consultancy organization.

Unit IV

Small Industries – Characteristics – Objectives – Scope – Role of Small Industries in economic development – problems of small industries – Tax concessions to small industries in rural and backward areas.

Unit V

Project identification – selection – meaning of project – signification – report – contents of project report – Entrepreneurship development programmes – need objectives – content – evaluation.

Text Book

- Entrepreneurship Development – N.P.Srinivasan, Sultan Chand & Sons.

Books for Reference:

- Dynamics of Entrepreneurial Development – Vasanth Desai, Himalaya Publishing House. Entrepreneurship Development – S.S.Khanka, S.Chand & CO.
- Entrepreneurship Development – P.Saravanavel

Semester VI			
Core Integral –IV Entrepreneurial Development Programm e			
Code : 18UBAI62	Hrs/Week: 7	Hrs / Sem : 105	Credits : 4

Vision:

To foster entrepreneurial thinking, promote, facilitate the business knowledge and develop the aspiring entrepreneurial thought among the students.

Mission:

Help to realize the entrepreneurial potential of people for the emergence of an enterprising society and vibrant economy.

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	know the basic concept of entrepreneur & their roles.	1	Un
CO-2	understand the importance of entrepreneurship to the society	1,3	Un
CO-3	gain the information on women entrepreneurship and their barriers faced.	4	Re
CO-4	gain knowledge on agencies dealing with entrepreneurs.	2,3	Un
CO-5	understand the roles of small scale industries in economic development.	1,2	Ev
CO-6	analyse tax concessions to small industries in rural and backward areas.	4	An
CO-7	understand project identification and prepare project report.	8	Un
CO-8	know and apply the entrepreneurial development programme.	1,4	Ap

Semester VI			
Core Integral –IV Entrepreneurial Development Programme			
Code : 18UBAI62	Hrs/Week: 7	Credit : 4	Hrs/Sem: 105

Unit - I Introduction:

Entrepreneurship – Definition – Need – Functions of Entrepreneur types of Entrepreneur – Role of Entrepreneurs – Entrepreneur – Role of Entrepreneurship in economic development.

Unit – II Women Entrepreneur:

Qualities of a good Entrepreneur – Concept of women Entrepreneurship – Functions and problems of women Entrepreneurs – Rural Entrepreneurship – Need – Problems – How to develop rural Entrepreneurship.

Unit – III Schemes for Entrepreneurs:

Factors affecting Entrepreneurial growth – agencies dealing with Entrepreneurs – Banks and Service organisations – IDBI – NSIC – SIO – SISI – ITCOT – DIC center for Entrepreneurship development – Industrial Estates – Technical Consultancy organisation.

Unit – IV Small Industries

Small Industries – Characteristics – Objectives – Scope – Role of Small Industries in economic development – problems of small industries – Tax concessions to small industries in rural and backward areas.

Unit – V Project Identification:

Project identification – selection – meaning of project – signification – report – contents of project report – Entrepreneurship development programmes – need objectives – content – evaluation.

Text Book

1. Srinivasan. N.P Entrepreneurship Development, New Delhi: Sultan Chand & Sons.

Books for Reference:

1. Vasanth Desai, Dynamics of Entrepreneurial Development. Mumbai: Himalaya Publishing House.
2. Khanka.S.S.Entrepreneurship Development. New Delhi: S.Chand & CO.

SEMESTER IV			
NME II – Entrepreneurship			
Course Code: 21UBAN41	**Hrs/Week: 2**	**Hrs/Sem: 30**	**Credits: 2**

Objectives:

- To help student to establish their own enterprises.
- To discuss current issues in starting their own business.

Course Outcome:

CO No.	Upon completion of this course, students will be able to	PSO addressed	Cognitive Level
CO-1	know the basic meaning of entrepreneur.	1	Un
CO-2	gain knowledge on classifications of entrepreneurs	1,3	Ap
CO-3	understand about starting a business	3,6	Un
CO-4	familiarize with project appraisal	1,6	Un
CO-5	understand about the functions of DIC.	3,4	Un
CO-6	gain knowledge on project report	3,4	Ap
CO-7	understand the importance of women entrepreneur	1,5	Un
CO-8	know the challenges faced by women entrepreneur	1,6	Un

SEMESTER IV			
NME II – Entrepreneurship			
Course Code: 21UBAN41	**Hrs/Week: 2**	**Hrs/Sem: 30**	**Credits: 2**

Unit I Introduction to Entrepreneurship:

Entrepreneurship – Meaning – definition – need – importance – functions – Entrepreneur – meaning – Qualities – Roles of entrepreneur – Economic development – types – Entrepreneurship as career.

Unit II Business start-up:

How to start business – product selection – forms of ownership – plant location – land, building, water and power – raw materials – machinery – man power – infrastructural facility.

Unit III Institutional support for Entrepreneurship development:

DIC – functions – meaning – importance – contents of project report – project appraisal.

Unit IV Project report:

Project report – meaning – importance – contents of project report – formulation of project report – project appraisal.

Unit V Women entrepreneurship:

Women entrepreneurship in India – women entrepreneurship in economic development – influencing factors – challenges and opportunities.

Text Book:

1. Dr.C.B.Gupta, Dr. N.P.Srinivasan, Entrepreneurship development in India, New Delhi, Sultan chand and sons, 2020.

Books for Reference:

2. Vasath Desai, *Dynamics of Entrepreneurial development*, Mumbai, Himalaya Publishing House, 2009.

3. S.S.Khanka, *Entrepreneurial development*, New Delhi, S.Chand & Co publishing, 2006.

SEMESTER- IV			
ELECTIVE IV – LOGISTICS MANAGEMENT			
Code: 17PECE41	**Hours / Week :6**	**Hrs / Semester: 90**	**Credits :5**

Objective:

To impact knowledge about sea trade, facilities available & services provided. To enable the student to have a knowledge in shipping field

UNIT- I INTRODUCTIONTOLOGISTICMANANGEMENT 15 Hrs

Concepts – Objectives – Logistics with marketing Interface – Relevance of Logistics to Export Management – Importance – Functions of Logistics.

UNIT-II LOGISTICS PROCESSING 15 Hrs

Elements of Logistics – Inventory carrying - Warehousing – Types – Material handling – Order processing.

UNIT- III SHIPPING INDUSTRY 20Hrs

General structure of shipping Industry – Types of ships – Shipping routes – Containerization – Benefits and constraints – Inland Container Depot – Export Clearance at ICD'S – Container Freight Stations.

UNIT– IV TRANSPORT INFRASTRUCTURE 20Hrs

Transportation Infrastructure – Port Infrastructure – Airport Infrastructure – Canal Infrastructure – Rail Infrastructure – Road Infrastructure

UNIT–V PROCEDURES OF PORT 20Hrs

Port procedures – Bill of loading – Demand forecasting – Impact of forecast on logistics management – Insurance aspects of Logistic

Text Book: Krishnaveni Muthiah – Logistics Management – Himalayas Publishing house, New Delhi.

Reference Books

1. D.k. Agarwal, 'Textbook of logistics and supply Chain Management', Mac Milan India Ltd.
2. Martin Christoper, Logistics and supply chain management' Pearson Education, 2003.
3. Ronald h. Ballou, 'Business Logistics and Supply chain Management' Pearson Education, 2004.
4. Doughan Lambert, 'Fundamentals of Logistics Management', Mc Graw Hill, 1998

SEMESTER - II			
Self – Study - WOMEN AND THE ECONOMY (Compulsory)			
Code: 17PECSS1	**Hours / Week:**	**Hrs/ Semester: 75**	**Credits: 2**

Objective

To acquire the Knowledge about the Gender Dimension in the process of Economic Development

UNIT – I INTRODUCTION

Women and economic development – Gender bias in development process; Women's integration in economic development – Women in India – Women through five year plans – Gender Equality and development – Empowerment of women

UNIT – II WOMEN AND POPULATION

Women and Population – Role of women in household economy – Population policy and Remedial measures – Quality population – Women's education – Employment of women – Gender Budgeting

UNIT – III WOMEN EMPLOYMENT AND PROBLEMS

Pattern and level of women employment – Characteristics of women labour – Growth of women employment. Problems of women workers – Economic, Social, Environmental and Psychological Problems – Crimes against women – Domestic violence – Women Welfare Program

UNIT – IV WOMEN ENTREPRENEURES

Development of women Entrepreneurship in India – Problems and Prospects, Need for and Role of women Entrepreneurship – Steps in starting small scale units – Women entrepreneurs at regional level

UNIT – V WOMEN IN HEALTH AND ENVIRONMENT

Health status of women in India – Gender aspects in economic structure – Women participation in economic development – Micro finance for women empowerment through Self Help Groups – Growth of micro environment – Women in conservation of Environment – Women and Political participation

Text Book : B.P. Tyagi, Labour Economics and Social welfare.

Reference Books:

1. C.B. Mamoria, Industrial Labour and Industrial Relations in India.
2. Workshop on Development of Women through Education – Seminar papers – Mother Teresa University, Kodaikanal.
3. Odeyar D. Heggade, Women and Economic Development.

SEMESTER- IV			
CORE - XIII – ORGANISATIONAL BEHAVIOUR			
Code: 17PMCC 41	**Hours / Week :6**	**Hrs / Semester: 90**	**Credits :4**

Objective: To enable the students to understand the various dimensions of Organizational behavior

UNIT – I Introduction to Organizational Behavior and Personality: 15Hrs

Organizational behavior: Definition – Nature and Scope – Objective - Evaluation Models of Organizational Behavior – autocratic – Custodial – Supportive – Collegial. Personality: Definition – Determinants of Personality – Types of Personality – Theories ofPersonality – Sigmund Freud's four stages of Personality - Ericson's eight life stages.

UNIT – II Perception, Attitude and Learning 20Hrs

Perception: Definition – Perception Process – Factors affecting Perception. Attitude: Concepts – Formation of Attitude – Types of Personality – Theories – Classical Learning: Meaning – Definition – Determinants of Learning – Learning Theories – ClassicalConditioning – Operated Learning – Cognitive Theory – Social Learning Theory.

UNIT – III Motivation and Leadership: 15Hrs

Motivation: Meaning – Concepts – Theories of Motivation – Maslow's Hierarchy of Needs – Herzberg's Two Factor Theory – McGregor's Theory X and Theory Y. Leadership: Definition – Functions – Leadership Styles – Leadership Theories – Trait Theory – Behavioral Theory – Managerial Grid Theory.

UNIT – IV Group Behavior and Team Building: 20Hrs

Group Behavior: Definition- Characteristics of a Group – Types of Groups –Group Formation and Development – Group Role – Inter – Group Behavior – Inter – GroupConflict – Group Decision Making. Team Building: Meaning – Types of Team – Team Building Process.

UNIT – V Organizational change, Development and Effectiveness: 20Hrs

Organizational Change and Development: Reasons for Organizational Change –Types of Change – Planned Change – Resistance to Change and Managing Change.Organizational Development (OD): Meaning – Objectives – Models of OD and OD Interventions. Organizational Effectiveness: Definition – Approaches to OrganizationalEffectiveness – Factors Influencing Organizational Effectiveness.

Text Books:

1. S.S. Khanka, Organisational Behavior, S. Chand & Co Ram Nagar, New Delhi.
2. K. Aswathappa, Organisational Behavior, Himalaya Publishing House, Mumbai.

References:

1. Fred Luthans, Organisational Behavior, McGraw Hill International Edition.
2. Stephen P. Robbins, Essential of Organisational Behavior, Prentice Hall of India,New Delhi

Semester- II			
Core - X	**INTERNATIONAL BUSINESS**		
Course Code: 21PECC25	**Hrs/Week: 5**	**Hrs/ Semester: 75**	**Credits: 4**

Objectives:

- To familiarize the students with the theories and postulates of international trade
- To develop analytical skill of the students for identifying international problems and relations providing a frame work for economic growth and development.
- To explain business expansion abroad and key issues related to their operations in other countries.
- To compare and contrast cultures and societies globally using socioeconomic and cultural frameworks.

CO. No	Upon Completion of this course, students will be able to	PSO addressed	CL
CO - 1	compare the advantages and disadvantages of the different types of trade	7	Le
CO - 2	present appropriate techniques to ensure comparability of the measures to accelerate trade.	2	Kn
CO - 3	describe the basic trade rules and regulations in an elaborate way	1	Kn
CO - 4	discuss the key assumptions underlying techniques and tools.	6	Le
CO - 5	describe the relations and calculate indicators in an international trade.	8	Kn
CO - 6	estimate the rate of change in export and import of India.	5	Ap
CO - 7	define and differentiate the relationship existed in the concept trade.	7	Re
CO - 8	develop communications skill through international trade in reality .	3	Kn

Semester- II			
Core - X	**INTERNATIONAL BUSINESS**		
Course Code: 21PECC25	**Hrs/Week: 5**	**Hrs/ Semester: 75**	**Credits: 4**

UNIT-I: General Concepts **15 Hrs**

Special features of international business – reasons for IB – Difference in endowments, cultures, currencies, technologies, wages, tastes, language – understanding world map – location of countries, their capital, currencies.

UNIT-II: Concepts and Institutions **15 Hrs**

Free trade versus protection – arguments for and against Laissez faire – Terms of trade – tariffs – quotas – non-tariff barriers – Phyto-sanitary measures – dumping – exchange rate – foreign exchange reserves – IMF –WB –GATT-WTO – UNCTAD – SAARC – SAAPTA – ASSFTA – NAFTA – ASEAN – MNCs – BOP – BOT – FDI.

UNIT-III: Foreign Trade Documents **15 Hrs**

Need rationale and type of documents – export & import licenses – processing of export order – pre-shipment inspection and quality control – foreign exchange formalities – excise and customs clearance – port procedures

UNIT-IV: Foreign Trade Procedure **15 Hrs**

Claiming duty drawbacks and other benefits – determination of freight – containerization – booking of cargo space – packing and marking for exports – forwarding and clearing agents andtheir operations – cargo insurance

UNIT-V: Exports **15 Hrs**

Role of export – selection of export products – selection of export markets – role of export houses – appointment of agents – payment of agency commission - promotion abroad – participation in trade fairs – export contracts – arbitration and dispute settlements – pre-shipment and post-shipment finance – letters of credit – EXIM bank – international capital markets foreignexchange rates.

Text Book:

T.A.S. Balgopal. *Export Management* .New Delhi: Sultan Chand and Co,2nd edition 2006

References for Book:

1. V K Bhalla and S Shiva Ramu. *International Business.*New Delhi: Anmol Publications PrivateLtd,12th revised and enlarged edition 2009

2.Arun Kumar Jain.*International Business Competing in the Global Marketplace.*New Delhi:TheTata McGraw Hill publishing Company Ltd.6thedition 2008

3. Sanjyot P Dunung. *International Business.*New Delhi: Mason A Carpenter, University ofWisconsin at MadisonGlobal2011

Semester- IV			
Core -XVIII	**FINANCIAL INSTITUTION AND MARKETS**		
Course Code: 21PECC43	**Hrs/Week: 6**	**Hrs/ Semester: 75**	**Credits: 4**

Objectives:

- To understand the role and function of the financial system in reference to the macro economy.
- To provide the students with a thorough knowledge and understanding of the functioning of the financial institutions and markets in India.
- Demonstrate an awareness of the current structure and regulation of the Indian financial services sector.

CO. No	Upon Completion of this course, students will be able to	PSO addressed	CL
CO - 1	explain the role of short-term financial management, and the key strategies and techniques used	4	Le
CO - 2	describe the dimensions of performance and risk relevant to financial firms.	7	Kn
CO - 3	calculate contemporary measures of financial measures of performance and risk.	5	Kn
CO - 4	describe contemporary managerial risk management oversight processes	1	Le
CO - 5	manage cash, marketable securities, accounts receivable and inventory.	4	Kn
CO - 6	identify the major sources of short-term financing available to the firm.	2	Un
CO - 7	analyse financial statements using standard financial ratios of liquidity, activity, debt, profitability, and market value.	3	Re
CO - 8	apply techniques to project financial statements for forecasting long-term financial needs.	2	Ap

Semester- IV			
Core - XVIII	**FINANCIAL INSTITUTION AND MARKETS**		
Course Code: 21PECC43	**Hrs/Week: 6**	**Hrs/ Semester: 75**	**Credits: 4**

UNIT-I: Financial System **15 Hrs**

Nature & Role of Financial System – money and near money – Financial intermediation andfinancial intermediaries – the structure of the financial system – Functions of the financial sector;Equilibrium in financial markets

UNIT-II: Interest Rates **15 Hrs**

Structure of interest rates – level of interest rates – long period& short period rates – term structure of interest rates – spread between lending &deposit rates – administered interest rates – appropriate interest rate policy.

UNIT-III: Non – Bank Financial Institutions **15 Hrs**

Non-bank financial intermediaries, definition and types of non- bank financial institutions - growth and impact on India's economic development-Measures taken to control their operations.

UNIT-IV: Money Market and Capital Market **15 Hrs**

Role and structure of money & capital market – call money market, Treasury bill market-Commercial bill market including commercial paper and certificate of deposits. Discount market
– Government securities market – markets for derivatives: future and options and other derivatives- SEBI, its impact on capital market in India; IDRA and its role in financial markets

UNIT-V: Role of Financial Markets **15 Hrs**

International financial markets – nature, organization and participants – reforms in international monetary system and its impact on developing countries- Euro- dollar and Euro- currency markets; their developmental role and regulation at the international level

Text Book:

Bhole L.M. *Financial Institutions and Markets*. New Delhi: TMH Publications,2nd edition2010

Books for Reference:

1. Bhole L.M. *Indian Financial System*.Allahabad: Chugh Publications, 2010
2. Edminster R.O.*Financial Institutions*, Markets & Management.New York:McGraw Hill,Khan, M.Y.2nd edition 2005
3. Prasad K.N.*Development of India's FinancialSystem*.New Delhi: Arup & Sons,Publications, 2003
4. Chandra. P.*Financial Markets.*New Delhi: TMH Publications, 2nd edition 2000

Semester- III			
Core Elective - II	**HUMAN RESOURCE MANAGEMENT**		
Course Code: 21PECE 31	**Hrs/Week: 4**	**Hrs/ Semester: 60**	**Credits: 4**

Objectives:

- To make student familiar with the principles of Management at business organizations.
- To know administration's functions which lead companies and organizations to success, by focusing on practice in the local environment.

CO. No	Upon Completion of this course, students will be able to	PSO addressed	CL
CO - 1	explain the importance of human resources and their effective management in organizations	7	Re
CO - 2	demonstrate a basic understanding of different tools used in forecasting and planning human resource needs	2	Kn
CO - 3	analyze the key issues related to administering the human elements such as motivation, compensation, appraisal, career planning, diversity, ethics, and training	8	Ap
CO - 4	research the advantages and disadvantages of induction processes for new incumbents in a role	3	Re
CO - 5	develop, analyze and apply advanced training strategies and specifications for the delivery of training programs	4	Kn
CO - 6	describe appropriate implementation, monitoring and assessment procedures of training	6	Le
CO - 7	describe the fundamental concepts and rules of law that apply to business activities, the employment function, and labour	5	Kn
CO - 8	describe trends in the labour force composition and how they affect human resource management	1	Un

Semester- III			
Core Elective -II	**HUMAN RESOURCE MANAGEMENT**		
Course Code: 21PECE 31	**Hrs/Week: 4**	**Hrs/ Semester: 60**	**Credits: 4**

UNIT-I: Nature and Scope **10Hrs**

Human Resource Management: Meaning and scope, functions and objectives - HRMModel - Human Resources planning - Job design and Job analysis.

UNIT-II: Recruitment and Selection **15Hrs**

Recruitment: Definition - Recruitment process and screening - Definition of Selection and role -Selection process - New Methods of Selection – Absenteeism and labour turnover: Determinantsand types – Motivation.

UNIT- III: Training and Development **10Hrs**

Nature and Importance of Training and Development - Impediments - Effective TrainingPerformance Appraisal and Organizational Strategy

UNIT-IV: Employee Remuneration **10Hrs**

Theories of Remuneration - Ideal Remuneration - Factors influencing remuneration - types ofincentives schemes

UNIT-V: Benefits, Safety and Welfare **15Hrs**

Types of Benefits and Services -Principles of Fringes -Empowerment - Quality of Work Life -Welfare Measures - Need for Safety and health -Business ethics - Human Resource Audit

Text Book:

R.D. Agarwal .*Dynamics of Personnel Management in India*. New Delhi:SkylarkPublication. 13th edition 1994

Reference Books:

1. Swathappa.*Human Resources and Personal Management.*New Delhi:Tata McGraw HillPublishing Co.Ltd. 4th edition 2003
2. John Storey. *Human Resource Management*.New Delhi: Rutledge Publications,2nd edition 1995
3. Terry, L. Leap, Michael D. Crino.*Personnel / Human Resource Management*. Chennai:Macmillan Publications, 3rd edition 2012
4. C.S. Venkataratnam and B.K. Srivastav.*Personal Management & Human Resources.*
   a. New Delhi:Tata McGraw Hill Publishing & Co.2nd edition 1991.

SEMESTER – IV			
Core XIII	**English Language Teaching**		
Code : 17PENC42	**Hrs/Week :6**	**Hrs/Sem :90**	**Credits: 4**

Objectives:

- To train students in pedagogic skills required for teaching English
- To equip students with methods of teaching English at different levels

UNIT I Importance of teaching English as a second Language-English as an international, National language – English in post independence India

UNIT II Methods of Teaching – The grammar translation Method, The Direct Method, Approach, Method and technique- The Structural approach- The bilingual Method and the use of the mother tongue

UNIT III The Teaching of Poetry and Prose: Teaching Prose at the School level, Teaching Poetry at the Secondary and tertiary levels

UNIT IV Tests, Testing and Evaluation, The need for evaluation, Types of tests, Characteristics of a test, Testing the four skills, Technology for testing, Analyzing results

UNIT V Practical, Technology enabled teaching- power Point presentation: LCD&ICT enabled teaching

Prescribed Text : Teaching English, Approach, Methods and Techniques-N. Krishnaswamy, Lalitha Krishnaswamy.M (Reprinted 2007, 2008)

Books for Reference

1. Geetha Nagaraj: English Language teaching Approaches, Methods, Techniques. Regional

   Institute of English, Bangalore, Orient Longman.

2. N.Krishnaswamy, Lalitha Krishnaswamy: Teaching English Approaches, Methods and

   Techniques, (CIEFL Hyderabad) Macmillan.

3. C. Paul Varghese: Teaching English as a Second Language, New Delhi; Sterling

   Publishers, 1989.

4. Edmonton Software (Google Drive)

SEMESTER – I			
Elective I	**Computer Application**		
Code : 17PENE11	**Hrs/week : 6**	**Hrs/sem : 90**	**Credits : 5**

Objectives:

- To equip students of literature with basic computer operational skills
- To provide a learning platform through electronic sources

Unit I Fundamentals of Computers – SYSTEM Concepts – Hardware and Software Systems Characteristic Features of Computers – Classification of Computers – History of Computers – Types of Software – Operating System Software

Unit II MS-WORD

Unit III MS-EXCEL – Entering Data – Essential Formulae and Functions
MS-POWERPOINT: Presentation Basics – Creating and Formatting Slides – Inserting Graphics, Film Clips and Sound Clips in Presentations – Printing the Contents of Slide in Presentations

Unit IV Introduction to Computer Networks: LAN – WAN – INTERNET – Major Application of Internet: E-mail and Websites – Creating e-mail addresses – Sending and receiving e-mails – Browsing Websites, including multi-lingual-websites – Using Search Engines like GOOGLE – Downloading information, freeware and software – Video Conferencing

Unit V Creating Website Contents – Technical Writing and Help Contents – Online Journalism and Online Newspapers – WEB as a Teaching- learning platform, Trends in e-Books and e-Readers – Educational Satellites and VSAT Systems

Book for Reference

Peter Norton : Introduction to Computer 2nd Edition, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 1997.

SEMESTER – I			
Elective I	**Computer Application**		
19PENE12 - A	**Hrs / Week: 4**	**Hrs / Semester: 60**	**Credits: 3**

Vision: To equip students of literature with basic computer operational skills.

Mission : To provide a learning platform through electronic sources.

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSOs addressed	Cognitive Level
CO-1	demonstrate basic computer operational skills	7	Ev, Cr
CO-2	update knowledge through electronic resources	3	Cr
CO-3	design the study material and enhance its effectiveness through presentation programme	10	Ap, Cr
CO-4	utilize their operational skills through the e- platform	10	Ev, Cr
CO-5	adapt the application skills in their career in future	9	Cr, Ev
CO-6	gain a working knowledge of computer	8, 10	Re
CO-7	transfer the manuscript into power point presentation mode	9, 10	Ev, Re
CO-8	use the resources of internet in a constructive way	10	U, Ap

SEMESTER – I			
Elective I	**Computer Application**		
Code : 19PENE11-A	**Hrs/week : 4**	**Hrs/sem : 60**	**Credits : 3**

Unit I Fundamentals of Computers – Characteristic Features of Computers – Classification of Computers

Unit II MS-WORD

Unit III MS-EXCEL – Entering Data – Essential Formulae and Functions
MS-POWERPOINT: Creating and Formatting Slides – Inserting Graphics, Film Clips and Sound Clips in Presentations – Printing the Contents of Slide in Presentations.

Unit IV INTERNET – Major Application of Internet: E-mail and Websites – Creating e-mail addresses – Sending and receiving e-mails – Browsing Websites, including multi-lingual-websites – Using Search Engines like GOOGLE – Downloading information

Unit V Creating Website Contents – Online Journalism and Online Newspapers – WEB as a Teaching- learning platform, Trends in e-Books and e-Readers

Book for Reference:

Norton, Peter. *Introduction to Computer 2nd Edition.* New Delhi: Tata McGraw-Hill Publishing Company Ltd., 1997. Print.

Beskeen, David. *Microsoft Office PowerPoint* 2007, *Illustrated Introductory*. June 26, 2007.
Print.

SEMESTER – II	
Elective IV	**English Language Teaching**

Code:19PENE22-A	Hrs/Week :4	Hrs/Sem :60	Credits: 3

Vision : To train students in pedagogic skills required for teaching English

Mission :To equip students with methods of teaching English at different levels

Course Outcome:

CO-No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO-1	compare and contrast language structures and explain relationships between language and literature	1	An
CO-2	originate a uniquely practical and creative grasp of the English language	5	Cr
CO-3	develop pedagogic skills required for teaching English	8	Ap
CO-4	adapt methods of teaching English for different levels	5	Ap
CO-5	appraise the ways in which the content could be taught through whole class activities, pair work and small group or individual activities	3	An
CO-6	prepare themselves for a career	6	Ev
CO-7	develop artistic and innovative use of language	6	Ap
CO-8	enhance their literary and linguistic competence	8	Cr

SEMESTER – II

Elective IV	English Language Teaching		
Code 19PENE22- A	**Hrs/Week :4**	**Hrs/Sem :60**	**Credits: 3**

Unit I Importance of teaching English as a second Language, The Structural Approach, The Bilingual Method and the use of mother tongue.

Unit II Methods of Teaching – The Grammar Translation Method, The Direct Method

Unit III The Teaching of Poetry and Prose: Teaching Prose at the School level, Teaching Poetry at the Secondary and tertiary levels.

Unit IV Tests, Testing and Evaluation, The need for evaluation, Types of tests

Unit V Characteristics of a test, Testing the four skills, Technology for testing, Analyzing results.

Prescribed Text: Krishnaswamy.N., Lalitha Krishnaswamy.M., *Teaching English, Approaches, Methods and Techniques*, (CIEFL Hyderabad) Macmillan. (Reprinted 2007, 2008)

Books for Reference:

Nagaraj, Geetha., *English Language Teaching Approaches, Methods, Techniques*. Regional Institute of English, Bangalore, Orient Longman. Print.

Paul Varghese Paul.C., *Teaching English as a Second Language*, New Delhi: Sterling Publishers, 1989. Print.

SEMESTER –III	
Self-Study Course **Understanding Popular Culture**	
Course Code: 21PHISS1	**Credits:2**

Objectives:

- To promote popular culture through the ages
- To transform the popular culture to the future generation
- To evaluate the popular arts

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	define Popular Culture	1,2	Un,Re
CO-2	understand the culture in historical sequence	1,2	Un,Re
CO-3	enumerate folk arts to promote heritage	1,2	Un,Re
CO-4	analyse the popular appeal of Calendar art and Photography	4	An
CO-5	evaluate the values in different culture	5	Ev
CO-6	trace out the influence of Cinema in Freedom Struggle	1,2	Un,Re
CO-7	assess the fairs and festivals	5	Ev
CO-8	learn the impact of internet and audio-visual media	1,2	Un,Re

SEMESTER - III	
Self–Study Course	**Understanding Popular Culture**
Course Code: 21PHISS1	**Credits:2**

Unit–I Popular Culture

Introduction – Defining Popular Culture - Evolution of Popular Culture.

Unit–II Visual Expressions

Folk Art-Calendar Art-Photography – Modern Paintings – Modern Art

Unit –III Performing Arts

Music – Carnatic- Modern Techniques – Hip Pop- Rap – Indian Pop – Folk Dance -Cinema: Mapping the influence of the National Struggle for independence – M.K.Gandhi – Mangal Pandey – Baji Rao – Urumi

Unit–IV Fairs, Festivals and Rituals

Tamil New Year–Float Festival, Madurai–Boat Festival, Kerala–Summer Festival,Nilgris – Car Festival, Tiruvarur – Jallikattu –Fair Exhibitions.

Unit–V Impact of Globalisation

Popular Culture in a Globalized World - The impact of the Internet and Audio -Visual Media.

Text Book :

1. Mitter. Partha. Indian Art. New Delhi: Oxford University Press2001.

Books for References:

1. Beach. M.C. The New Cambridge History of India. London: CambridgeUniversity Press,1992.
2. Edith Tomory. A History of Fine Arts in India and the West. New Delhi: OrientLongman,1982.
3. Manohar Bharadwaj. Cultural and Traditional History of India. New Delh:Cyber Tech Publications,2008.
4. Sumit Sarkar. Modern Times: India 1880s 1950s: Environment, Economy,Culture. Delhi: Orient Blackswan,2015.

Journals:

1. https://www.tandfonline.com/toc/rcus20/current
2. https://journals.sagepub.com/home/ics
3. https://journals.sagepub.com/home/ecs

E-Learning Resources:

1. https://youtu.be/mt23ZkovEvo
2. https://youtu.be/vTHfAcomaKs

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SEMESTER –II			
Core VIII	E – Commerce		
Code: 17PCOC24	Hrs/Week: 6	Hrs/Sem: 90	Credits : 5

Objective:

To enable the students gain knowledge about e-commerce and its various components.

Unit I - Introduction to E-Commerce:

Meaning and concept, Electronic Commerce Vs. Traditional commerce - Media convergence - E-commerce and e-business - channels of e-commerce - Business application of e-commerce - Need for e-commerce - e-commerce as an electronic trading system - special features.

Business models of E-commerce and Infrastructure: E-commerce models -supply chain management - M-Commerce – Teleshopping - Telemarketing - Point of sales system.

Unit II - Business to consumer E-commerce:

Cataloguing, order planning and order generation - cost estimation and pricing - order receipt and accounting -order-selection and prioritization - order scheduling - order fulfilling and delivery - order billing and payment management - post sales services. Electronic Data Interchange (EDI):- Introduction –Definition – Benefits - EDI Technology - EDI standards- EDI Communication - EDI implementation - EDI Agreements - EDI security.

Unit III - Electronic payment systems:

Special features required in payment systems for e-commerce - Types of e-payment systems - E-Cash and currency servers - e-cheques - credit cards - smart cards - electronic purses and debit cards - Business issues and economic implications - operational credit and legal risks of e-payment systems - Risk management options in e-payment systems - components of an effective electronic payment system.

Unit IV - Internet and E-banking:

Evolution of Internet - Growth of Internet - Gateway to digital world - Internet Governance - world wide web - Dynamics of Internet banking - Intranet and Internet portals - E-sourcing - E-Trading -Advertising and Marketing through Internet.

Unit V- Security issues in E-commerce:

Need for Security – Security Concepts - Areas of Internet Security - Cyber Crimes: - Deception - Intrusion - Bugs - Encryption - Cryptography - Certificate based Security -- Digital Signature - E-Commerce Security Solutions - Security Precautions in E-Commerce - Transaction Security - PKI - Firewalls - Secure Socket Layer (SSL) - Secure Electronic Transaction (SET) - Advantages of SET - Corporate Digital Library, - Regulatory and legal Framework of E-commerce: Cyber laws, aims and salient provisions; cyber-laws in India and their limitations.

Text Book:

DrC.S.Rayudu, E-Commerce, Himalaya Publishing House.

Reference Books:

1 David Whiteley E-commerce, Strategy, Technologies and Applications, Tata McGraw Hill Publishing Company
2 T.M. Bhashin, E-commerce in Indian banking, Authors Press, New Delhi
3 S. Jaiswal, E-commerce – Galgotia Publications Pvt. Ltd

SEMESTER – III			
Self-Study Paper – Web Marketing			
Code : 17PCOSS3			**Credit : 2**

Objective

To enable the students to have in depth knowledge of online marketing

Unit I :

Online marketing – meaning – definition – evaluation – function of online marketing – advantages and disadvantages of online marketing – differences between online and internet marketing.

Unit II:

Strategy and Planning for Internet Marketing - Traditional Offline Businesses in the Online World - Internet strategy: virtual value chain, dis-intermediation, cybermediaries.

Unit III:

Introduction to Internet Marketing - Mapping fundamental concepts of Marketing - Role of the Internet – limitations - technological development, development of ecommerce, different commercial models, diverse roles of websites.

Unit IV:

Email Marketing – meaning – advantages and disadvantages in email marketing – steps in creating email ID for personal and business use – evolution of email marketing and its growth

Unit V:

Trust in Internet Marketing - Ethical and Legal Issues - Internet of the future: "Customerization" – Internet marketing in India - Global Internet Marketing – problems of web marketing in India

Text Book

Philip Kotler, Marketing Management., Tata McGraw Hill., New Delhi.

Reference Books:

1. Dr.C.S.Rayudu, E-Commerce, Himalaya Publishing House.
2. David Whiteley, E-Commerce Strategy, Technologies and applications, Tata McGraw Hill, New Delhi

SEMESTER IV			
Core XII(Common)	**Organisational Behaviour**		
Code: 17PMCC41	**Hrs/Week: 6**	**Hrs/Sem: 90**	**Credits: 4**

Objective:

To enable the students to understand the various dimensions of organizational behaviour.

Unit-I Introduction to Organisational Behaviour and Personality:

Organizational Behaviour: Definition- Nature and Scope –Objectives –Evolution-Models of Organisational Behaviour – Autocratic – Custodial- Supportive - Collegial. Personality: Definition-Determinants of Personality-Types of Personality- Theories of Personality-Sigmund Freud's four stages of Personality - Ericson's eight life stages.

Unit-II Perception, Attitude and Learning:

Perception**:** Definition- PerceptionProcess- Factors affecting Perception.

Attitude: Concepts- Formation of Attitude- Types of Attitude - Measurement of Attitude.Learning: Meaning - Definition- Determinants of Learning- Learning Theories- Classical Conditioning- Operand Learning- Cognitive Theory- Social Learning Theory.

Unit-III Motivation and Leadership:

Motivation: Meaning – Concepts- Theories of Motivation-Maslow's Hierarchy of Needs - Herzberg's Two Factor Theory -McGregor's Theory Xand Theory Y.

Leadership: Definition – Functions- Leadership Styles- Leadership Theories-Trait Theory- Behavioral Theory - Managerial Grid Theory.

Unit-IV Group Behaviour and Team Building:

Group Behaviour: Definition- Characteristics of a Group-Types of Groups- Group Formation and Development- Group Role- Inter-Group Behaviour-Inter-Group Conflict-Group Decision Making. Team Building: Meaning- Types of Team- Team Building Process.

Unit-V Organisational change, Development and Effectiveness:

Organisational Change and Development: Reasonsfor Organistional Change- Types of Change -PlannedChange - Resistance to Change and Managing Change.

Organisational Development (OD): Meaning – Objectives- Modelsof OD and OD Interventions Organisational Effectiveness: Definition - Approaches to Organisational Effectiveness –Factors Influencing Organisational Effectiveness.

Text Books:

1. S.S. Khanka – Organisational Behaviour S.Chand &Co Ramnagar New Delhi

References:

1. K. Aswathappa Organisational Behaviour Himalaya Publishing House , Mumbai
2. Fred Luthans Organistional Behaviour McGraw Hill International Edition
3. Stephen. P. Robbins, Essentials of Organisational Behaviour, Prentice Hall of India,New Delhi

SEMESTER –I			
Core IV Entrepreneurial Development			
Code:19PCOC14	Hrs/Week: 6	Hrs/Sem: 90	Credits : 4

Vision:

To activate entrepreneurial spirit and to know about financial assistance provided by government and private institutions for innovative pursuits.

Mission:

To enable the students to understand the various aspects of Entrepreneurship and to analyse the entrepreneurial traits.

Course outcomes:

Co. No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO-1	Understand the significance of entrepreneurial skills.	1,4	Un
CO-2	Understand the export potential of small entrepreneurs.	2,4	Ap
CO-3	Know the financial assistance to small entrepreneurs	3,4,5	Ev
CO-4	Know the scope for rural industries.	1,4	Un
CO-5	Know the institutional support provided to small entrepreneurs	1,4,8	Ap
CO-6	Understand the procedure for setting up for MSME'S.	1,6	Un
C0-7	Understand the process of preparation of project report for industries.	3,4	Ap
CO-8	Study the impact of Women Entrepreneur in socio economic development	2,6,8	Ev

SEMESTER – I			
Core IV Entrepreneurial Development			
Code: 19PCOC14	Hrs/Week: 6	Hrs/Sem: 90	Credits : 4

Unit I Introduction:

Entrepreneurship – meaning – concepts – importance – Functions - Entrepreneurship and economic development – Factors influencing entrepreneurial growth – Motivation – Meaning – Theories: Maslow's need Hierarchy theory - Achievement Motivation theory- Aquired Needs Theory

Unit II Rural Entrepreneurship:

Entrepreneurship – Competence – meaning – qualities of entrepreneurs– Types – Rural entrepreneurship- need – problems – prospects.

Unit III Institutional support to entrepreneurs:

MSMEs -Institutional support to entrepreneurs- NAYE – ITCOT – SIPCOT – Industrial estates – SISI – NPC, DIC –SIDBI- Functions- Procedure for setting up of MSMEs - Concessions – Incentives and subsidies.

Unit IV Export Potential of Small Entrepreneurs:

Small enterprises— Export potential – Constraints – Institutional set up for export assistance –Director of exihibitions – Director of commercial intelligence – Export promotion council –Trade representatives of India abroad – Trade development authority - Export promotion assistance – Export houses and Trade houses in India –
Export procedure –Types of documents- Export incentives –Tax incentives for exports.Special Economic zone.

Unit V Women Entrepreneurship:

Concept of women entrepreneurship – Functions and role – Trend in the development of women entrepreneurship – Financial assistance – Grant assistance – Marketing assistance – Self Help Group members – Impact of SHGs in socio- economic development.

Text Book

Khanka S.S . Entrepreneurial Development S.Chand&Co Ltd. New Delhi

Books for Reference:

1. Vasant Desai, Dynamics of Entrepreneurial Development and Management, Himalaya Publishing House.Mumbai.
2. Donald F.Kuratko, Entrepreneurship Development and small business, TATA McGraw Hill, New Delhi.
3. RangaRajan L EntrepreneurshipDevelopmentSriRangaPublications,Rajapalayam.
4. Gupta C.B and Srinivasan N.P, Entrepreneurial Development, Sultan Chand & Sons, New Delhi.

SEMESTER II			
Core VI(Common Core)		Organisational Behaviour	
Code: 19PMCC21	**Hrs/Week: 6**	**Hrs/Sem: 90**	**Credits: 4**

Vision: To make the students familiarise with managing the human assets in business and to become an effective manager

Mission: To enable the students to understand the various dimensions of Organizational Behaviour

Course Outcomes:

CO No.	On completion of this course, students will be able to	PSO's addressed	Cognitive Level
CO – 1	Understand the various dimensions of organizational behavior and models.	1,2	Un
CO – 2	Understand the process of perception, concepts of attitude	1,5	Un
CO – 3	Familiarise with the learning theories	5,8	Ev
CO-4	Familiarise with the theories of motivation	4,5,8	Ev
CO-5	Understand the various leadership styles and theories	4,5,8	Un
CO -6	Understand the transactional analysis, group dynamics and conflicts	1,5	Un
Co - 7	Understand the team building process	1,5	Un
Co - 8	Understand the organsational change development and effectiveness	5,8	Un

SEMESTER II			
Core VI (Common Core)		Organisational Behaviour	
Code: 19PMCC21	Hrs/Week: 6	Hrs/Sem: 90	Credits: 4

Unit-I Introduction to Organisational Behaviour and Personality:

Organizational Behaviour: Definition- Nature and Scope –Objectives –Evolution- Models of Organisational Behaviour – Autocratic – Custodial- Supportive – Collegial - Personality: Definition-Determinants of Personality-Types of Personality- Theories of Personality-Sigmund Freud's four stages of Personality - Ericson's eight life stages.

Unit-II Perception, Attitude and Learning:

Perception: Definition- PerceptionProcess- Factors affecting Perception - Attitude: Concepts- Formation of Attitude- Types of Attitude - Measurement of Attitude.Learning: Meaning - Definition- Determinants of Learning- Learning Theories-Classical Conditioning-Operand Learning- Cognitive Theory- Social Learning Theory.

Unit-III Motivation and Leadership:

Motivation: Meaning – Concepts- Theories of Motivation-Maslow's Hierarchy of Needs - Herzberg's Two Factor Theory -McGregor's Theory Xand Theory Y - Leadership: Definition – Functions- Leadership Styles- Leadership Theories-Trait Theory-Behavioral Theory - Managerial Grid Theory.

Unit-IV Group Behaviour and Team Building:

Group Behaviour: Definition- Characteristics of a Group-Types of Groups- Group Formation and Development- Group Role- Inter-Group Behaviour-Inter-Group Conflict-Group Decision Making. Team Building: Meaning- Types of Team- Team Building Process.

Unit-V Organisational change, Development and Effectiveness:

Organisational Change and Development: ReasonsforOrganistional Change- Types of Change -PlannedChange - Resistance to Change and Managing Change.

Organisational Development (OD): Meaning – Objectives- Modelsof OD and OD Interventions

Organisational Effectiveness: Definition - Approaches to Organisational Effectiveness –Factors Influencing Organisational Effectiveness.

Text Book:

S.S. Khanka – Organisational Behaviour S.Chand & Co Ramnagar New Delhi

References:

1. K. Aswathappa- Organisational Behaviour Himalaya Publishing House , Mumbai
2. Fred Luthans - Organistional Behaviour McGraw Hill International Edition
3. Stephen. P. Robbins - Essentials of Organisational Behaviour, Prentice Hall of India, New Delhi.

SEMESTER –II			
Core X Financial Markets and Institutions			
Code: 19PCOC25	**Hrs/Week: 4**	**Hrs/Sem: 60**	**Credits : 4**

Vision:

Enable students to know trading on equity

Mission:

To provide the students with an understanding of the structure, organizations and working of financial markets and institutions in India.

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSO's addressed	Cognitive Level
CO – 1	Understand the various types and features of negotiable instruments like promissory note, bill of exchange and cheque.	1,3	Un
CO – 2	Understand the constitutions, management and functions of RBI and commercial banks.	1,3,4	Ap
CO - 3	Understand the present banking system of E-banking and its merits and constraints.	1,2,6	Ap
CO-4	Familiarise with the capital markets.	1,4	Ap
CO-5	Understand the various mutual funds prevailing in various financial institutions.	1,6	Un
CO – 6	Understand various money market instruments and their utility	1,3,4	Ap
CO – 7	Gain knowledge on merchant banking and services rendered by merchant banks.	1,2,6	Ap
CO - 8	Learn the importance of stock exchange and their functioning	1,3,4	Ap

SEMESTER –II			
Core X Financial Markets and Institutions			
Code: 19PC0C25	**Hrs/Week: 4**	**Hrs/Sem: 60**	**Credits : 4**

Unit I- Introduction:

Financial System - Functions – Concepts of Financial System - Indian Financial System – The post 1951 period – Weaknesses of IFS – Development of financial System in India.

Unit II - Money Market:

Definition – Money Market vs Capital Market – Features of a Money Market – Importance of Money Market- Composition of Money Market – Call Money Market – Commercial Bills Market or Discount Market – Treasury Bill Market – Money Market Instruments – Commercial Papers – Certificate of Deposits (CD) – Inter-bank Participation Certificate – Repo Instruments – Structure of Indian Money Market – Features or Deficiencies of Indian Money Market – Recent Developments.

Unit III - Capital market:

Meaning – Stock Exchange – Distinction and relationship between New Issue Market and Stock Exchange – Functions of New Issue Market – Methods of Floating New Issues – Functions / Services of Stock Exchanges –Listing of Stock Exchanges and Securities – Advantages and Drawbacks of Listing - SEBI guidelines for Primary market and Secondary market.

Unit IV - Mutual funds:

Introduction– Scope of Mutual Fund – Definition – Types of Funds / Classification of funds – Importance of Mutual Funds – Commercial Banks and Mutuual Funds – Mutual Funds in India.

Unit V - Merchant Banking:

Definition – Merchant Banks and Commercial Banks – Services of Merchant Banks – Qualities Required for Merchant Bankers – Scope for Merchant Banking in India.
FDI – types – Factors influencing FDI – FDI in India .

Text Book:

E.Gordon and K.Natarajan, Financial markets and Services – Himalaya Publishing House.(2011).

Books for Reference:

1. Avadhani, Investment and Securities Market in India-Himalaya Publishing House.
2. Reserve Bank of India – Various Reports – RBI Publications.
3. Gurusamy S - Financial Service and System – Vijay Nichole, Chennai (2011)

SEMESTER –I				
Core IV	**Entrepreneurial Training and Development**			
Course Code: 21PCOC14		**Hrs/Week: 6**	**Hrs/Sem: 90**	**Credits : 4**

Objectives

- To activate entrepreneurial spirit and to know about financial assistance provided by government and private institutions for innovative pursuits.

- To enable the students understand the various aspects of Entrepreneurship and to analyse the entrepreneurial traits.

Course Outcomes:

Co. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand the significance of entrepreneurial skills.	1,4	Un
CO-2	know the scope for Rural Entrepreneurship	2,4	Ap
CO-3	study the concept of Women Entrepreneur	3,4,5	Ev
CO-4	training the procedure for setting up for MSME'S.	1,4	Un
CO-5	preparation of Project Report by Entrepreneurs	1,4,8	Ap
CO-6	describe Project Appraisal	1,6	Un
C0-7	evaluate guidance to Entrepreneurs for Export	3,4	Ap
CO-8	identify the institutional support provided to Entrepreneurs	2,6,8	Ev

SEMESTER – I			
Core IV	**Entrepreneurial Training and Development**		
Course Code: 21PCOC14	**Hrs/Week: 6**	**Hrs/Sem: 90**	**Credits : 4**

Unit : I Introduction **15 Hrs**

Entrepreneurship – Meaning – Concepts- Importance- Functions - Entrepreneurship and Economic Development - Factors influencing entrepreneurial growth- Competence- Qualities of entrepreneurs– Types of Entrepreneurs

Unit : II Rural Entrepreneurship, Women Entrepreneurship, MSME **19 Hrs**

Rural entrepreneurship- Need – Problems – Prospects - Concept of Women Entrepreneurship – Functions and Role – Financial assistance – Grant assistance – Marketing assistance – MSME- Procedure for setting up of MSMEs - Opportunities for MSME

Unit : III Project Identification, Formulation, Appraisal **18 Hrs**

Meaning of Project- Project Identification-Project Selection- Formulation of a Project Report- Project Appraisal- Steps in Project Appraisal- Common Errors in Project Appraisal

Unit : IV Export Assistance to Entrepreneurs **20 Hrs**

Export potential – Constraints – Institutional set up for export assistance –Director of exhibitions – Director of commercial intelligence – Export promotion council –Trade representatives of India abroad – Trade development authority - Export promotion assistance – Export houses and Trade houses in India –Export procedure –Types of documents- Export incentives –Tax incentives for exports.

Unit : V Institutional support to Entrepreneurs **18 Hrs**

Institutional support to entrepreneurs- NAYE – ITCOT – SIPCOT – Industrial estates –SISI – NPC, DIC –SIDBI- Functions- - Concessions –Incentives and subsidies.

Text Books

1. Khanka S.S. *Entrepreneurial Development*. New Delhi: S.Chand & Co Ltd, Revised edition. 2020.
2. Gupta C.B and Srinivasan N.P. *Entrepreneurial Development*. New Delhi: Sultan Chand& Sons, 1st Revised edition 2020.

Books for Reference:

1. Vasant Desai. *Dynamics of Entrepreneurial Development and Management*. Mumbai: Himalaya Publishing House, 6th Revised Edition 2018.
2. Donald F.Kuratko. *Entrepreneurship Developmentand Small Business*. New Delhi: Tata McGraw Hill, 9th edition 2004
3. RangaRajan L. *EntrepreneurshipDevelopment*. Rajapalayam:Sri Ranga Publications,2nd edition 2018.

SEMESTER –II			
Core X	**Financial Markets and Institutions**		
Course Code: 21PCOC25	**Hrs/Week: 5**	**Hrs/Sem: 75**	**Credits : 4**

Objectives

- To enable students to understand the concept of financial system.
- To provide the students with an understanding of the structure, organization and working of financial markets and institutions in India.

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSO addressed	Cognitive Level
CO-1	understand the concepts of financial system, money market and its types	1,2	Un
CO-2	understand the constitutions, management and functions of Stock Exchange and SEBI	1,3,4	Un
CO-3	understand the present trading in stock exchanges and its merits and process.	1,2,6	Un
CO-4	examine the capital markets.	1,3	Ap
CO-5	understand the financial institutions that cater the ways of trading in OTCEI, BSE and NSE	1,6	Un
CO-6	understand various money market instruments and their utility	1,3,4	Un
CO-7	examine Depository System and its activities	1,2,6	Ap
CO - 8	examine the importance of stock exchange and their functioning under Depository and NSDL	1,3,4	Ap

SEMESTER –II			
Core X	**Financial Markets and Institutions**		
Course Code: 21PCOC25	**Hrs/Week: 5**	**Hrs/Sem: 75**	**Credits : 4**

Unit I Introduction **10 Hrs**

Financial System - Functions – Concepts of Financial System - Indian Financial System –The post 1951 period – Weaknesses of IFS – Development of Financial System in India.

Unit II Money Market **15 Hrs**

Definition – Money Market vs Capital Market – Features of a Money Market - Importance of Money Market- Composition of Money Market – Call Money Market – Commercial Bills Market or Discount Market – Treasury Bill Market – Money Market Instruments – Commercial Papers – Certificate of Deposits (CD) – Inter-bank Participation Certificate – Repo Instruments –Structure of Indian Money Market – Features or Deficiencies of Indian Money Market – Recent Developments.

Unit III Capital Market **15 Hrs**

Meaning – Stock Exchange – Distinction and Relationship between New Issue Market and Stock Exchange – Functions of New Issue Market – Methods of Floating New Issues – Functions / Services of Stock Exchanges –Listing of Stock Exchanges and Securities – Advantages and Drawbacks of Listing - SEBI Guidelines for Primary Market and Secondary Market.

Unit IV Capital Market Institutions **20 Hrs**

Over The Counter Exchange of India(OTCEI)- Features – Promoters and Participants – Trading in OTCE – National Stock Exchange (NSE) of India – Objectives - Features – Bombay Stock Exchange (BSE) – Segments – Stock Indices. Credit Rating: Meaning – Functions – Benefits – Credit Rating Agencies: CRICIL – IICRA and CARE

Unit V Depository System **15 Hrs**

Definition and Meaning-Activities and Process of Depository – Trading in Depository System – Depository System in India – SEBI (Depositories and Participants) Regulation Act, 1996 – Depository Process in India – Benefits of Depository System – NSDL – CSDL – Drawbacks – Remedial Measures.

Text Book:

1. Gordon E. and Natarajan K.Financial Markets and Services.Mumbai: Himalaya Publishing House, edition.2015, Reprint 2021.

Books for Reference:

1. Reserve Bank of India. Various Reports.RBI Publications, 2021.
2. Gurusamy S. Financial Service and System. Chennai:Vijay Nichole Imprints Pvt Ltd, 2009 Edition, Reprint 2014.

SEMESTER –II			
Elective I B	**Green Marketing**		
Course Code: 21PCOE21	**Hrs/Week: 5**	**Hrs/Sem: 75**	**Credits : 4**

Objective

- Increase the consciousness about Green Products**.**
- Make the students understand the importance of Green Marketing on consumer satisfaction anenvironmental safety.

Course Outcomes:

Co.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	discuss the concept of Green market and Green products.	1,3	Un
CO-2	assess Green Marketing and its significance.	2,4	An
CO-3	Identify the factors that affect purchase decision of consumers.	3,6	Un
CO-4	appraise the laws that promote Green Marketing.	1,8	Ev
CO-5	manage e waste.	1,8	Ap
CO-6	use Eco friendly products.	4,6	Ap
C0-7	Initiate adoption of green initiatives.	5,7	Ap
CO-8	appraise the green environment policies.	1,7	An

SEMESTER –II			
Elective I B	**Green Marketing**		
Course Code: 21PCOE21	**Hrs/Week: 5**	**Hrs/Sem: 75**	**Credits : 4**

Unit I Green Product and Green Marketing **15 Hrs**

Green Product - Green Marketing - Evolution of Green Marketing - Importance of green marketing - Benefits of Green Marketing- Adoption of Green Marketing- Green Marketing Mix – Strategies to Green Marketing

Unit-II Green Marketing Concepts **15 Hrs**

Green Spinning – Green Selling – Green Harvesting – Enviropreneur Marketing - Compliance Marketing – Green Washing – Climate Performance Leadership Index

Unit-III Green Marketing Initiatives **15 Hrs**

Green Firms – HCL's Green Management Policy – IBM's Green Solutions – IndusInd Bank's Solar Powered ATMs – ITCs Paperkraft – Maruti's Green Supply Chain – ONCGs Mokshada Green Crematorium – Reva's Electric Car – Samsung's Eco-friendly handsets- Wipro Infotech'sEco-friendly computer peripherals

Unit-IV Purchase Decision **15 Hrs**

Meaning of Purchase decision – Factors affecting Purchase decision - Steps in the decision making process - Five stages of consumer buying decision process - Models of buyer decision-making

Unit-V Environmental Consciousness **15 Hrs**

Introduction of Environment - Importance of environmentalism - Environmental movement - Benefits of green environment to the society - e-Waste exchange - Extended Producer Responsibility Plan - Guidelines for Collection and Storage of e-Waste - Guidelines for Transportation of e-Waste - Guidelines for Environmentally Sound Recycling of e-Waste

Text Book:

1. Esakki and Thangasamy.*Green Marketing and Environmental Responsibility in Modern Corporations.*Pennyslyvania:IGI Global, First Edition 2017.

Books for Reference:

1. Robert Dahlstrom, Cengage. *Green Marketing Management*, Learning, Mason13th edition 2010.
2. Jacquelyn A. Ottman. *Green Marketing: Challenges and Opportunities for the NewMarketing Age.* NTC Business Books, UK 1993.
3. Jacquelyn A. Ottman,Berrett. *The New Rules of Green Marketing*. Koehler Publishers, San Francisco 2011

SEMESTER –III			
Core XIII	**E – Commerce**		
Course Code: 22PCOC33	**Hrs/Week: 5**	**Hrs/Sem: 75**	**Credits : 4**

Objective:

To familiarise students with the concepts and various issues of e-Commerce like Internet infrastructure, Security over internet and payment systems for e- Business.

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO – 1	explain the concepts, application and models of e-commerce.	1,2,5	Un
CO – 2	examine the concepts and application of e-market	1, 5	Ap
CO – 3	appraise the concepts and application of e-business	1,2,5	Un, Ev
CO – 4	examine the e- payment systems	1,7	Un, Ap
CO - 5	analyse e-Commerce Security solutions for online transactions	1,7	Un, Ap
CO - 6	identify the security issues and regulatory and legal framework in e-Commerce.	1,5,6	Un
CO - 7	appraise the e-commerce laws	1,5,6	An, Ev
CO - 8	examine the taxation issues in e-commerce	2, 6	Ap

Semester – III			
Core XIII	**E – Commerce**		
Course Code: 21PCOC33	**Hrs/Week: 5**	**Hrs/Sem: 75**	**Credits : 4**

Unit I Introduction to E-Commerce (15 Hours)

Introduction – Evolution of E-Commerce - Goals- Scope- Significance – Essentials – Components- Functions – Prospects – Applications – Strategies – Business Models – Major Modes in E-Commerce - Pre-Requisites of E-Commerce - Advantages – Disadvantages – Growth of E-Commerce – Segments – Characteristics of the Economic Model for E-Commerce – E-Commerce in India.

Unit II E-Market and E- Business (15 Hours)

Electronic Market – Three Models of Electronic Market – E-Market Dimensions – Market Category – Interactive Marketing – One to One Marketing – Permission Marketing – Pull and Push Technologies – B2B Hubs - **Electronic Business** – Applications – Indian Scenario for E-Business – Failure for E-Business Projects – Implementation - Success of E-Business – B2B — B2C- Categories of E- Commerce Application - E-Commerce Vs. E-Business – E-Market Vs. E-Business

Unit III E- Payment Systems (15 Hours)

Digital Payment Requirements – Categories of E-Payment Systems – Traditional Payment System – Modern Payment System - Digital Token based e-Payment Systems – Classification of Payment System – Payseal – Process – Advantages - e-Cash – Advantages – Disadvantages – Transaction - Bitcoin as a Cryptocurrency – Risk in e-Payment System – Designing e-Payment System – Digital Signature – Payment Security

Unit IV E-Security (15 Hours)

Introduction to Security – Electronic Security – Attacking Methods – Security Practices – Cryptography – Hackers View – Secure Electronic Transaction (SET) – Payment Enablers – Secure socket Layer (SSL) – Ten Practical Tips to Secure E-Commerce – Internet Security – Privacy Issues – Privacy on the Internet – Corporate e-mail privacy – Computer Crime – Types – Threats – Major Types of Security Problems – Online Crime - Challenges in E- Security.

Unit V E-Commerce Laws and Taxation Issues (15 Hours)

Legal Environment of E-Commerce – Information Technology Act 2000 - IT (Amended) Act, 2008 – Cyber Laws in India – Use and Protection of Intellectual Property (IP) in Online Business – IP Issues in designing a Web Site – E-Commerce and Patents – Trademark Issues - **Taxation Issues** - Issue of Taxing Electronic Commerce – Basic principles of Taxing e-Commerce – Jurisdiction on the Internet - Implied Warranties and Warranty Disclaimers on the Web – Terms of Service Agreements – E-Commerce Taxation Norms in Different Countries.

Text Books

1. Murthy C.S.V, e-Commerce Concepts, Models, Strategies, Mumbai, Himalaya Publishing House, 1st edition 2018.

2. Joseph P.T.., E-Commerce – An Indian Perspective, New Delhi, PHI Learning Private Limited, 6th edition 2019.

Books for Reference

1. David Whiteley. E-commerce, Strategy, Technologies and Applications. New Delhi: Tata McGraw Hill Publishing Company. Revised 5th edition 2010

2. Bhashin T.M..E-Commerce in Indian banking. New Delhi: Authors Press. 13th edition 2013.

SEMESTER IV			
Common core I – Marine Biology			
Code: 17PBCC41	**Hrs/week:6**	**Hrs/Semester : 90**	**Credits: 5**

Objectives

- To make the students realize the potentiality of marine environment
- To understand the marine ecosystem threats and conservation

Unit I **Marine Environment – Zonation and Biota**

Sea as a biological environment. Classification of marine environment.Plankton – classification (size, life, habitat) and adaptations. Inter-tidal, rocky, sandy and muddy shores –features of the flora, fauna and adaptations. Role of marine micro-organisms (bacteria and fungi) in nutrient cycles (nitrate, phosphate and sulphate)

Unit II **Characteristics of Sea Water**

Physical properties: waves, tides, currents- types, causes, and their impact on marine organisms. Illumination, temperature, pressure. Chemical properties: nutrients, (major, minor, and trace elements), salinity, pH, density, dissolved gases (oxygen, carbon-di-oxide).

Unit III **Marine Ecosystems**

Estuaries, salt marshes, mangroves. Coral reef - ecology and types, species interaction, adaptations and importance. Threats and conservation of coastal ecosystems (coral reef and mangroves)

Unit I V **Marine Pollution**

Sources, effects and control measures of heavy metal, radioactive, oil, and thermal pollutions. Algal blooms-sources and effects. Microbial indicators of pollution. Role of microbes in pollution abatement.

Unit V **Wealth of the sea**

Living resources: Fishery products- fish meal and fish oil. Natural pearls: formation, ornamental and medicinal importance. Non-living resources: mineral wealth (manganese nodules, beach placers, glauconite and garnet). Bioactive compounds from marine organisms (bacteria, fungi and macro algae and sponges). Phycocolloids, agar-agar and algin.

Books for Reference

1. Tait, R.V. and Dipper F.A (1998) Elements of marine ecology.-4thed. British Library Cataloguing in Publication Data.
2. Gross, G., 1993.Oceanography: A view of the Earth. Sixth edition. Prentice Hall Inc., New Jersey.
3. McCormick, J.M. and J.V.Thiruvathaakal, 1976. Elements of Oceanography. W.B. Saunders Company, Philadelphia.
4 .Nybakken, J.W. 1997. Marine Biology – An Ecological Approach. Addison Weslay Longman, Inc. California, 477pp.
5. Olivia J.Fernando 1999.Sea water-Properties and dynamics, Dhanesh Publications, Ponnagam,Thanjavur
6. Russel 1970. Marine Ecology, Academic Press- London and New York
7. Nelson and Smith 1973, Oil pollution and Marine Ecology-Plenum press
8. Benjamin- Cummings, Menlo Park, California.Vijaya Ramesh, K. (2004). Environmental Microbiology.MJP Publishers Chennai.
9. MoshrafuddinAhamed and Basumatary. S.K.(2006). Applied Microbiology. MJP Publishers Chennai
10.Daws, C.J.1981. Marine Botany John Wiley and Sons, New York.

PRACTICALS

Hrs / Week : 2

1.Determination of acidity
2 Determination of salinity
3 Determination of alkalinity
4 Determination of total hardness
5. Determination of nitrite
6. Determination of phosphate
7 .Biochemical test for micro-organisms-IMViC
8. Collection and identification of marine plankton (any three phyto and zooplanktons)
9. Identification and remarks of the following
   i. Plankton net
   ii Inter-tidal organisms
      a. Rocky shore :Sea anemone, *Chiton*
      b. Muddy shore:*Uca, Cerithidia*
      c. Sandy shore: *Arenicola, Murex*
   ii.Food fishes*: Cybium,Sardinella*
   iii Sea weeds: *Gracilaria,Sargassum*,
10. Submission: Record Note Book

Semester IV			
Core X – Plant Biotechnology			
Code: 17PBOC41	**Hrs/week:6**	**Hrs/Semester : 90**	**Credits: 5**

Objectives:

- To enumerate the role of 21st century science (biotechnology) in increasing productivity of crop plants and to enhance the production of high value metabolites.
- To develop skill to get employment in biotechnology laboratories and industries.

Unit I: Biotechnology-scope. Principles of plant tissue culture: totipotency, differentiation, dedifferentiation, redifferntiation. Establishment of plant tissue culture lab: equipment, culture vessels, pretreatment of explants. Composition of various tissue culture media and their preparation. Establishing callus: dynamics of callus growth, factors influencing organogenesis, embryogenesis and somatic embryos.

Unit II: Micropropagation: stages of micropropagation, factors affecting shoot multiplication, induction of roots. Synthetic seeds: methods of making synthetic seeds and applications. Production of virus free plants. Somoclonal variation: isolation and characterization of variants -molecular basis and induced mutations, applications and limitations. Cell suspension culture and production of secondary metabolites.

Unit III: Production of haploids (anther, pollen and ovule), detection of haploids - morphology and genetic markers, application of haploids. Protoplast isolation and culture. Protoplast fusion-techniques, selection of fused protoplasts, application. Uses of somatic hybrids and cybrids.

Unit IV Molecular farming **-** Nutritional quality and quality of seed protein. Immuno protective drugs. Gene therapy **–** types of gene therapy, methods of gene therapy, production of antibodies and vaccines, monoclonal antibodies and its application. Biosafety – definition, requirement, biosafety in relation to transgenic research. Intellectual property rights – process of patenting, applications. Farmer's Rights and plant breeder's Rights.

Unit V Biofertilizers: Mass production of *Rhizobium*, *Azospirillum* and Blue Green Algae (BGA), Vesicular Arbuscular Mycorrhizal Fungi (VAM). Single cell protein. Production of antibiotic (Penicillin), organic acid (Citric acid) and vitamin (Vitamin B_{12}). Outline of green synthesis of nanoparticles and their characterization.

Books for Reference:

1. Colin Rattledge and K. Bjon, 2001. Basic biotechnology. Cambridge University
2. Dubey, R.C. 2005. Textbook of Biotechnology. S. Chand & Co. New Delhi
3. George, E.F. and P.D. Sherrington, 1984. Plant propagation by tissue culture. Exegetic Ltd. London.
4. Gupta, P.K. 2000. Elements of Biotechnology. Rastogi publication, Meerut.
5. Kalyan Kumar De. 2004. An Introduction to Plant Tissue Culture. New Central Book Agency, Calcutta.
6. Kumar, H.D. 1993.Molecular biology and Biotechnology. Vikas publishers, New Delhi.
7. Mahesh, 2008. Paddy molecular Biotechnology, New age international, publishers. (p) Limited.
8. Mukhopadhyay S.N, prabhakar Sharma, and Rabindra Narain, 2011. A text book of DNA recombinant technology. Wisdom press. New Delhi.
9. Ramavat, K. G., 2000. Plant Biotechnology, S. Chand & Co., New Delhi
10. Reinort, J and M.M. Yeoman, 1983. Plant cell and tissue culture. Narosa publishing house Delhi.
11. Satyanarayana U. 2006. Biotechnology. Books and Allied (P) Ltd. Kolkatta.
12. Singh, B.D.2005. Biotechnology- Expanding Horizons. Kalyani Publishers, New Delhi.

Practical
Hrs /week: 2
Practical

- Isolation of *Rhizobium*
- Synthesis of nanoparticles
- UV – visible characterization of nanoparticles
- Preparation of synthetic seeds

Set up / pictures / photographs/ demonstration

- Apical meristem culture
- Cell suspension culture
- Protoplast Culture
- Anther Culture

Submission - Record Note Book

Semester II			
Core V	**Horticulture , Plant breeding and Evolution**		
19PBOC21	**Hrs/week:5**	**Hrs/Semester : 75**	**Credits : 4**

Vision:

- To promote, develop and disseminate horticultural and plant breeding technologies through the blend of traditional wisdom and modern scientific knowledge.

Mission :

- To understand the techniques and make significant contribution to an efficient and sustainable production of crops
- To understand the concept of plant breeding and evolution

Course Outcome

CO. No	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	use the garden implements using in horticultural techniques	4	An
CO-2	identify good and healthy plants and seeds for propagation and develop skill in propagation of useful vegetable, fruit and garden plants.	4	Ap
CO-3	understand basic concepts of gardening and able to layout different types of gardens and suggest plant choices	4	Un
CO-4	understand the use of modern technologies on raising horticultural plants for economic benefits and adapt modern methods of irrigation system in order to conserve water	4, 7	Un
CO-5	equip knowledge on disease management, improved production, storage strategies and business practices.	7	An
CO-6	describe various selection techniques and methods that can be used in genetic improvement of self and cross pollinated crops	6	Ap
CO-7	describe various molecular breeding technique and method that could be used for genetic improvements of crops	2	Ap
CO-8	understand the genetic basis of evolution and evolutionary process	1	Ap

Semester II			
Core V	**Horticulture , Plant breeding and Evolution**		
19PBOC21	**Hrs/week:5**	**Hrs/Semester : 75**	**Credits : 4**

Unit I

Horticulture – definition, divisions and importance. Plant growing structures – objectives and types – green houses, hot beds, cold frames and conservatory - green house production system. Plant growth environment- Physical environment, Pest management- chemical and biological. Establishment and cultivation of orchard. Gardening - outdoor garden –types, principles, designing and garden components.

Unit II

Parameters associated with sexual propagation. Asexual reproducion - Natural, artificial methods. Seedage – characteristics of good seed, and seed treatment for germination – Transplanting of seedling. Propagation of horticultural crops – cuttage, layerage, graftage and budding.

Unit III

Indoor gardening - Purpose, plant choices, caring, potting media, disease and pest management of growing succulents, Terrarium, hanging basket. Bonsai -types and training of bonsai. Commercial gardening - cut flowers and economic flowers. Kitchen gardening – selection of site, lay out and choice of plants. Storage and preservation of fruits and vegetables.

Unit IV

Plant breeding: Nature and goals of plant breeding; Methods of Breeding self pollinated, cross pollinated and asexually propagated crops, pure line and mass selection. Plant transformation and genetically modified organisms in Agriculture: Role of *A.tumefaciens* in GMO development. Engineering of plasmids. Molecular marker and their role in plant breeding: RFLP's, AFLP's, SSR's and SNP's.

Unit V

Evolution: Introduction, Evolution and life, The genetic basis of evolution. Evolutionary process: Elemental forces, sources of variation, Role of natural selection and genetic Drift. Evolutionary Divergence: Races, species and isolating Mechanisms. The Origin of species Evolution above the species level.

Books for Reference:

1. AllardJohn, R.W. *Principles of plant breeding* Wiley & Sons, Inc.New York.
2. Chopra, V.L *Plant Breeding Theory and Practice*. Oxford and IBH Publishing Co. Pvt.Ltd. New Delhi.
3. Choudhri D and Amal Metha 2010. *Flower crops cultivation and management* Oxford book company . Jaipur
4. Edmund Senn - Andrew – Halfacre. 1977. *Fundamentals of Horticulture*. Tata Mc. Graw Hill.

5. Hartmann & Kester, 1989 – *Plant propagation*. Prentice – Hall of India Pvt. Ltd. New Delhi.
6. Kumar, N. 1997. *Introduction to Horticulture*. Rajalakshmi Publications, Nagercoil, India.
7. Mallikarjuna Reddy and Aparna rao 2010. *Plant propagation in horticulture*. Pacific book international. New Delhi.
8. Randahawa 1985. *Floriculture in India*. Allied publishers.
9. Sharma, J.R *Principles and practice of plant breeding* TataMcGraw-Hill Publishing Company Limited New Delhi.
10. Utpal Banerji 2008. *Horticulture* Mangal Deep Publication. Jaipur

Practical-
Hrs / Week: 2
Horticulture:

- Knowledge of garden implements and tools - Spade, Sprayer, Water can, Pruning scissor, Tiller, Digging fork, Pickaxe, Budding and Grafting Knife,
- Preparation of nursery and seed bed.
- Propagation -stem, leaf and root cutting.
- Propagation - air layering, budding and grafting technique.
- Designing kitchen garden, Rockery, Hanging basket, terrarium
- Flower arrangement and vegetable carving
- Preparation of potting mixture for different types of garden
- Preparation of natural rooting hormones/ foliage boosters/flowering boosters.

Plant breeding:

- Emasculation, bagging and crossing methods.Demonstration - Molecular breeding
- **Submission -** Record Note Book

Books for Reference: Jean Taylor , 1973. *Practical flower arranging*, The Hamlyn Publishing group Ltd., NewYork

SEMESTER II			
Core VIII	**Biostatistics and Bioinformatics**		
19PBOC24	**Hrs / week: 4**	**Hrs/Semester : 60**	**Credits: 4**

Vision:

- To familiarize in collection of data and analysis of data for scientific solution
- To apply advanced bioinformatics tools in the field of biology

Mission:

- To make them analyze the biological data.
- To introduce the students to the explorations of advanced sciences.

Course Outcome

CO.No.	Upon completion of this course, students will be able to	PSO Addressed	CL
CO-1	understand the fundamentals of statistics and statistical analysis	4	Un
CO-2	apply the learned procedure for collecting data, analyzing and representation of the same	4	Ap
CO-3	calculate the central tendency and dispersion in collected data	4	An
CO-4	do statistical analysis and communicate the results of statistical analyses accurately and effectively	6	Ap
CO-5	apply knowledge of the most important bioinformatics databases and able to identify what information they contain?	4	Re
CO-6	analyze concepts and approaches in bioinformatics and its application in various biological fields	4	An
CO-7	explain the major steps and principles for doing different types of sequence alignments	6	Ap
CO-8	demonstrate the use of bioinformatics tools in biological research	6	Ap

SEMESTER II			
Core X – Biostatistics and Bioinformatics			
Code: 19PBOC24	**Hrs / week: 4**	**Hrs/Semester : 60**	**Credits: 4**

Unit I

Biostatistics: Introduction, collection, classification and presentation of data. **Descriptive statistics:** Introduction. **Measures of central tendency**: Definition, Types (simple arithmetic mean, median and mode) - **Measures of dispersion**: standard deviation, coefficient of variation and standard error (merits and demerits).

Problems: raw data, discrete data, continuous data – direct method only

Unit II

Inferential Statistics: Introduction. **Test of significance:** Chi-square analysis (goodness of fit, test of independence, test of homogencity). Student's t test (estimation of population mean, matched pair data analysis, comparison of means of two small groups). ANOVA: (one way and two way).

Problems: chi-square, student t test, ANOVA

Unit III

Correlation: Definition. Relationship (mutual dependence, cause and effect relationship), types. Methods of correlation: scatter diagram, correlation graph, Karl Pearson's coefficient of correlation. **Regression**: definition, regression equations, properties of regression lines, difference between correlation and regression.

Problems: Karl Pearson's coefficient of correlation, regression coefficient.

Unit IV

Bioinformatics: definition, scope. **Biological databases:** Nucleotide databases – NCBI, EMBL, Genbank and DDBJ. Protein databases – PDB, SWISS PROT. **Bioinformatics tools** – BLAST, FASTA.

Unit V

DNA sequence analysis: Global alignment, local alignment, gap penalty alignment, affine gap penalty alignment. Pairwise sequence alignment – dot matrix. Scoring matrices - PAM and BLOSUM. Multiple sequence alignment – sum of pairs method and progressive method.

Books for Reference:

1. Attwood T.K and D. J. Pary Smith. 2006. *Introduction to Bioinformatics* Pearson Education, Ltd.
2. Gurumani N. 2005. *An Introduction to Biostatistics.* 2nd edition. M.J.P. Publishers, Chennai.
3. Jin Xiong, 2006. *Essential Bioinformatics*. Cambridge University Press.
4. Rastogi, S.C., Namita Mendriata and Parag Rastogi, 2005. *Bioinformatics methods and applications*. 4th edition. PHI learning Pvt Ltd.
5. Satguru Prasad, 2003. *Fundamentals of Biostatistics*. 4th edition. Emkay Publications.
6. Veera Bala Rastogi, 2009. *Fundamentals of Biostatistics*. 2nd e dition. Ane Books Pvt. Ltd. Chennai.

Practical
Hrs / week:2
Biostatistics using excel

- **Descriptive statistics:** mean, median, mode, standard deviation, standard error, confidence interval.
- **Graphing data:** scatter graphs, bar graphs, error bars, lines
- **Association statistics:** Pearson coefficient, linear regression
- **Comparative statistics:** paired and unpaired t-test, Mann-Whitney U-test ANOVA
- **Frequency statistics:** χ^2 – test, χ^2 – test of association

Bioinformatics

- **W**eb browsing
- Retrieving data from biological database
- Bibliographic searching
- Sequence alignment and similarity searching
- Gene finding
- Protein prediction
- Structural Visualization of DNA, Proteins by using rcsb website.

Submission - Record Note Book

Books for Reference

1. Palanisamy, S. and M. Manoharan, 1994. *Statistical methods for biologists.* II Edition. Palani paramount publishers.
2. Murthy C.S. V. 2004. *Bioinformatics*. 1st edition. Himalaya Publishing House.

SEMESTER-I			
Core IV	**Histology, Embryology and Morphogenesis**		
19PBOCI4	**Hrs/week:5**	**Hrs/Semester : 75**	**Credits :4**

Vision: To have comprehensive idea on histology, reproductive biology and morphogenetic events in Angiosperms.

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Mission: This course is aimed at understanding the structure and functions of reproductive organs associated with seed development and the internal morphology of Angiosperms

Course Outcome

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	classify the shoot and root apical meristems	1,2	Ev
CO-2	explain the function and types of epidermal tissue systems	1,2	Ap
CO-3	Identify different types of cells through micro preparation and microscopic observation	4	An
CO-4	Give illustrious explanation and differentiate the primary and secondary structure of plant.	1,2	Un
CO-5	understand the mode of development of reproductive structures identify the different stages of dicot and monocot embryo	3,6	Ap
CO-6	explain the fertilization process including pollen pistil interaction and self incompatibility	1	Ev
CO-7	recognize different types of endosperm and their role in seed development	4	Re
CO-8	identify the different stages of dicot and monocot embryo	4	Ap

SEMESTER-I			
Core IV – Histology, Embryology and Morphogenesis			
Code:19PBOCI4	**Hrs/week:5**	**Hrs/Semester : 75**	**Credits :4**

Unit: I

Meristem- classification, shoot apical meristem and root apical meristem. Simple permanent tissues- parenchyma, collenchyma and sclerenchyma. Epidermal tissue system- Functions and types: Anomocytic, anisocytic, diacytic and paracytic. Trichomes - Stinging hairs, glandular hairs and peltate hair.

Unit: II

Complex permanent tissues- Components of xylem - Tracheids, Fibres, vessels, parenchyma. Wood anatomy: Xylem- Primary xylem, secondary xylem. tyloses-reaction wood, heart wood and sap wood, growth rings. Phloem- components, sieve elements, fibres, parenchyma. Cambium - origin, structure and function-seasonal activity of the cambium.

Unit: III

Secondary growth in dicot stem- *Polyalthia, Boerhaavia, Achyranthus, Antigonan,* dicot root - *Azadirachta.* Aerial root - *Tinospora* and *Vanda.* Dicot leaf - Dorsiventral and isobilateral leaf and monocot leaf.

Unit: IV

Microsporogenesis - Pollen wall, Pollen development Pollen storage, Pollen allergy,Megasporogenesis. Fertilization - barriers of fertilization. Endosperm - Types and haustoria. Organogenesis of dicot and monocot embryo. Apomixis and Polyembryony

Unit: V

Plant Morphogenesis - Definition – Polarity - as expressed in external and internal structures and in isolated cells. Symmetry - types. Differentiation as expressed in structure- effect of environment on differentiation - Factors controlling morphogenesis.

Books for Reference:

1. Bhojwani S S, S. P. Bhatnagar 2000. *The Embryology of Angiosperms* McGraw Hill
2. Catherine Easu, 1972, *Plant Anatomy*. 2nd Edition . Wiley Eastern Private ltd.
3. Chandurkar P. 1977. *Plant Anatomy* Oxford and IBH
4. Cutter, E.G. 1978.*Plant Anatomy*, Edward Arnold Publishers Ltd; London
5. Elezabeth G. Cutter, 1978- 2d ed., *Plant Anatomy*, Reading, Mass: Addison - Wesley Pub.Co.
6. Fahn A. 1990. *Plant Anatomy* Pergamon Press
7. Maheshwari P 1971 *An introduction to the Embryology of Angiosperms* Tata McGraw Hill Publishing Co New Delhi
8. Pandey B P 1978 *Plant Anatomy* S Chand Co
9. Pandey S N A Chadha. 2009. *Plant Anatomy and Embryology* Sangam Books Ltd

Practical
Hrs / week: 2
Anatomy

- Examination of different cells and tissue types
- Examination of Structural detail and identification of wood of some common Indian timbers (any four)
- Anomalous activity of cambium in *Polyalthia, Boerhaavia, Achyranthus, Antigonan,* dicot root -*Azadirachta.* Aerial root - *Tinospora* and *Vanda.*
- Double staining technique to study the stem and root prescribed in the syllabus.
- Study of leaf anatomy.

Microsporogenesis

- Pollen germination and pollen tube growth.
- Dissection of dicot embryo (globular, cordate and mature stage).
- endosperm haustorium from suitable seed.

Submission - Record Note Book

Books for Reference:

- Lamesh Rao and K E S Juneja, 1971. *Field Identification of fifty important timbers of India*, The manager of publications.

- Dnyansagar V R, 1986. *Cytology and Genetics*, Tata McGraw – Hill Publishing Company Ltd., New Delhi

Semester I			
Core IV	**Phytochemistry and Pharmacognosy**		
Course Code: 21PBOC14	**Hrs/week: 5**	**Hrs/Semester: 75**	**Credits: 4**

Objectives:

- Exploring the plant resources as pharmaceuticals and nutraceuticals.
- To acquire knowledge on identification, extraction and utilization of phytochemicalconstituents through teaching and training.

Course Outcomes:

CO. No.	Upon completion of this course, students will be able to	PSO's addressed	CL
CO-1	confirm the promising role of the phytoconstituents as cytotoxicity and substantiate them for the treatment of fatal diseases	8	Re
CO-2	understand the importance of secondary metabolites and relate them in treating the ailments	6	Un
CO-3	identify and categorize medicinal potential of herbs based on their chemical constituents and therapeutic applications	1	Un
CO-4	associate the medicinal compounds with their natural resources	2	An
CO-5	analyse of qualitative and quantitative medicinal compounds in herbal drug preparation.	2	An
CO-6	extract essential oils from natural resources and utilize them effectively as pharamaceuticals and cosmeticals	7,8	Av
CO-7	evaluate the purity of the drugs and able to detect adulterations and substitutions	2,4	Ev
CO-8	screen and elucidate various pharmacologically important phytoconstituents to ascertain its medical quality	5	Ev

Semester I			
Core IV	**Phytochemistry and Pharmacognosy**		
Course Code:21PBOC14	**Hrs/week: 5**	**Hrs/Semester: 75**	**Credits: 4**

UNIT I: Phytochemistry, Histochemistry, Biosynthetic pathway for secondary metabolites. Secondary metabolites - definition, classification, preliminary phytochemical screening. Glycosides: Definition, properties, classification, natural sources, pharmacological and toxicological effects of glycosides. Terpenoids- β-Sitosterol, Glycyrrhizin. Phenolics - Coumarins and Tannins. Steroids and alkaloids.

UNIT II: Flavonoids: Definition, properties, classification, natural sources and therapeutic applications offlavonoids. Medicinal uses of resins.

UNIT III: Extraction methods – Maceration, infusion, percolation, Decoction, soxlet extraction, supercritical fluid extraction, distillation, Counter-current Extraction, and cold extraction. Volatile oils - source, constituents, properties, extraction and utilization of Lemon grass oil, Vetiver oil, Clove oil and Eucalyptus oil. Intellectual property rights and trade of medicinal plants.

UNIT IV: Pharmacognosy: Definition, scope and applications of herbal medicine. Classification (morphological, therapeutic, chemical. and chemotaxonomic classifications): Collection and processing of crude drugs - adulteration of crude drugs. Pharmacognostical standards, synergy and polyvalent action of secondary metabolites.

UNIT V: Evaluation of crude drugs – Physico-chemical, organoleptic analysis. Botanical name, family, useful part, chemical constituents, adulterants and uses of the following drug Glycosides – Senna, Aloe, Digitalis, Liquorice; Terpenoids – Coriander, Fennel, Cinnamom; Alkaloids – Datura, Vinca, Pepper; Lipids - Castor, Neem, Sesame oil.

Books for Reference:

1. Agarwal S.S. and Paridhavi M. *Crude Drug Technology*, Hyderabad: Universities Press, 2007.
2. Evens W.C. *Pharmacognosy Medicinal and Aromatic Crops,* Singapore:Harcourt Brace and company Asian Pvt. Ltd., Universities press, 1987.
3. Farooqui A.A and B.S.Sreeramu B.S. *Cultivation of medicinal and aromatic crops,*Pune: Universities press, 2001.
4. Gurdeep Chatwal. *Organic Chemistry of Natural Products,* Mumbai: Himalaya Publishing house,1983.

5. Kokate C.K. Purohit A.P. and Gokhale S.R, *Pharmacognosy,* Pune: Nirali PrakshanPublishing House Ltd., 2004.
6. Tewari K.S, Vishogi N.K and Mehrotra S.N. *Text Book of Organic Chemistry* ,Uttaarpradesh:VikasPublishing House Ltd., 1998.
7. Trivedi P.C. *Medicinal Plant conservation and utilization*, Jaipur: Aavishkarpublishers,2004.
8. Trivedi P.C and Sharma N.K. *Ethomedicinal Plants,* Jaipur: Pointer Publishers , 2004
9. Wallis. *Text Book of Pharmacognosy,* New Delhi: CBS Publishers, 2003.
10. Yohanarasimban S.N. *Medicinal plants of India,* Jodhpur: 2004.

Practical: Hrs/Week: 2

- Morphology, histology and Powder characteristics, extraction and detection ofCinnamon,Clove, Fennel and Coriander.
- Isolation and detection of active principles:Caffeine from Tea dust Sennosides from Senna Curcumin from Turmeric
- Analysis of crude drugs by chemical tests for the detection of Glycosides - Senna, *Aloe*, LiquoriceTerpenoids – Coriander, Fennel, Cinnamom Alkaloids – *Datura, Vinca*, Pepper Lipids - Castor, Neem, Sesame, Groundnut oilResin – Ginger, Asafoetida. Volatile oil – Lemon and clove
- Distillation of Volatile oils and detection of phytoconstituents by TLS Jasmine and *Eucalyptus*

Books for Reference:

1. Kokate K.C and Gokhale S.B. Practical Pharmacognosy, Pune: 2008.
2. Chauhan M.G. and Pillai A.P.G, Microscopic Profile of Powdered Drugs Used in IndianSystems of Medicine. Jamnagar: *Institute of Ayurvedic Medicinal Plant Sciences,* 2005.

SEMESTER - IV			
Core Elective	**Entrepreneurship Botany**		
Course Code: 21PBOE41	**Hrs / Week: 4**	**Hrs /Semester: 60**	**Credits: 4**

Objectives:

- To able to understand the available natural resources and explore the greatest opportunity to increase and achieve sustainable competitive business advantage.
- To introduce organizations and agencies that can backup entrepreneurial initiatives.
- To expose students to various business opportunities emerging from the plant resources.

Course Outcomes:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	C L
CO-1	adapt the methods of preservation of vegetables and fruits and identify the industrial scope of these resources	6	Un
CO-2	determine the quality of oil and prepare aesthetic product to find out good marketing capacity	6	Ap
CO-3	understand contemporary opportunities in business situations of value added products and develop skills needed to successfully convert them into entrepreneurial ventures	6	Un
CO-4	explore how the value added products can enhance the profitability of local farmers	6	Un
CO-5	acquire knowledge on primary forest product, wood products and secondary wood products and infer wood industries are major sector in many economy	2,6	Un
CO-6	able to differentiate natural and synthetic wood able to dictate the their pros and cons	3	Un
CO-7	develop ideas that will lead them to start their own business and enable them to be professionally competent	6	Ap
CO-8	able to start entrepreneurship (small scale/medium scale industries) , extract the financial support available and manage the targeted customers to enhance profitability	6	Re

SEMESTER - IV			
Core Elective	**Entrepreneurship Botany**		
Course Code: 21PBOE41	**Hrs / Week: 4**	**Hrs / Semester: 60**	**Credits: 4**

UNIT I: **Fruits and Vegetables preservation:** Fruits and vegetables preservation methods: Dehydrating, canning, salting, pickling and freezing. Fruits and Vegetables Products: tutti frutti, health drink, mango pulp, pickle, jam, jelly, amla candy and raisin. Factors influencing the growth of microorganisms in food. Sources of contamination of fruits. Types of spoilage.

UNIT II: **Bioventure:** Industry, overview of *Spirulina*, *Pleurotus* sajor-caju, *Ganoderma*, *Lentinus edodes*, drumstick and coconut. Straight Vegetable Oil (SVO) and Pure Plant Oil (PPO): methods and marketing. Fresh and dry flowers for aesthetics.,

UNIT III: **Value added plant based products:** Mushroom recipes (soup, omelette, pakoda and briyani). Preparation of - Coco peat, Banana products, Palm products, fiber products; Packing techniques – low, trans wrap, deep drawing, doy, sachet, top seal, vacuum: Cost management and estimation.

UNIT IV: **Commercial Wood products:** Natural durability of wood. Wood preservation: Nonpressure processes, Pressure process, Chemical processing of wood. Commercial wood species and identification, Synthetic woods, Marine plywood, Fuel wood, pulp and paper making woods, matchstickwood. Economic importance of pulp and wood

UNIT V: **Marketing and trade :** Steps for starting a small scale industry. Registration as SSI. Role of SIDBI. Advantages and problems of SSI. Government Schemes for SSI: NABARD, NCDC, MSME, NSIC. Marketing and entrepreneurship: different types of marketing, identification of types of consumer and their needs, building consumer relationship. FSSAI, FAO, ICDS, import and export businessdevelopment and strategies.

Text Books:

1. Bahi N. *Hand Book on Mushrooms*. New Delhi: Oxford and IBH Publishing Co. Pvt. Ltd. Print, Fourth edition, 2015.

2. Desrosier N.W. and Desrosier J.N. *The Technology of Food Preservation*. New Delhi: CBS Publishers & Distributors. Fourth edition, 1987.

3. Narayanaswami R.V. and Rao K.N. *Outlines of Botany*, Chennai: India: Esvee Press, 1976.

Books for Reference

1. Taneja S. and Gupta S.L. *Entrepreneurship development*, New Delhi: New venture creation, Galgeha Publication Company, 2015.

2. Desai V. *Entrepreneurship development*, Mumbai: Himalaya publication house, First edition, 2015.

3. Khanna S.S. *Entrepreneurial development*. New Delhi: S. Chand Company Ltd., 2016.

4. Manohar D. *Entrepreneurship of small scale industries*, New Delhi: Deep and deep publication, 1989.

5. Lal G., Siddhapa G.S. and Tandon G.L. *Preservation of fruits and vegetables*. New Delhi: Indian council of Agricultural Research (ICAR), 2009.

6. Ranganna S. *Hand book of analysis and quality control of fruits and vegetable products*. New Delhi: Tata mcgraw hill, Second edition, 2001.

7. Cruses W.V. and Fellows P.J. *Commercial fruits and vegetable processing*. United States: CRC press, 2000.

8. Franz F.P. Kollmann. *Wood Science and Technology*. New York: Springer Verlag, 1988.

9. Pearson and Brown. *Commercial Timbers of India*. New Delhi: Government of India Publication, 1984.

10. Tieuran H.D. *Wood Technology*. New York: Pituran Publishing Company, 1951.

Semester – III			
Project			
Code : 17PCHP31	**Hrs / Week : 4**	**Hrs / Sem : 60**	**Credits : 4**

Format for preparation of project report

1. Identification of the problem

Students are given the freedom of choosing the topic of the project. It may be theoretical or practical.

2. Arrangement of contents

The sequence in which the project report material should be arranged and bound should be as follows:

- Cover page and Title page
- Bonafide Certificate
- Abstract
- Table of contents
- List of Tables
- List of Figures
- List of Symbols, Abbreviations & Nomenclature
- Chapters
- Appendices
- Books for Reference

3. Page dimension and binding specifications

- The dimension of the project report should be in A4 size. The project report should be bound using flexible cover of the thick white art paper. The cover should be printed in black letters and the text for printing should be identical.
- Total number of pages should not exceed 70.

4. Typing instructions

- The impression on the typed copies should be black in colour.
- One and a half spacing should be used for typing the general text. The general text shall be typed in the Font style “Times New Roman” & Font size 12.

Semester – I			
Elective I B	**Chemical Instrumentation**		
Code : 19PCHE11	**Hrs / Week : 4**	**Hrs / Sem : 60**	**Credits : 4**

Vision:

To impart the students with basic principles and concepts in Instrumental techniques.

Mission:

- To understand the nature and Choice of methods of measurements.
- To learn the limits of detection and amplification.
- To demonstrate the concepts of Operational amplifiers.

Course outcome:

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO - 1	demonstrate automatic operation and computer control	1,5	Ap
CO - 2	precise control of current and voltage.	6,8	Ap
CO - 3	differentiate modulation and demodulation	5	An
CO - 4	point out limitation on amplifier performance	1	Cr
CO - 5	predict binary logic concepts, logic gates and multi-vibrators	7	Un
CO - 6	distinguish visual, filter and spectrophotometers.	6	Ap
CO - 7	control noise level in a system.	1,7	Cr
CO - 8	interpret the optimal value of adjustable parameters	7,8	Ev

Semester – I			
Elective I B Chemical Instrumentation			
Code : 19PCHE11	**Hrs / Week : 4**	**Hrs / Sem : 60**	**Credits : 4**

Unit I Measurement and Instrumentation

Introduction - The nature of a measurement - Choice of a method of measurement - Control of variables - Basic design patterns - General properties of modules - Propagation of uncertainity - Single channel design - Limit of detection and amplification - Automatic operationand computer control.

Unit II Operational amplifiers

The operational amplifiers - Limitations on amplifier performance - Mathematical operations - Differentiation - Integration - Measurement of current and voltage - Precise control of current and voltage.

Unit III Signal-to-Noise Optimisation

Sensitivity and detection limits - Noise - Minimising Noise in a system - Signal averaging - Modulation: Chopping - Demodulation: Phase sensitive detection - Other methods ofOptimising Signal-to-Noise ratio.

Unit IV Digital Electronics

Binary logic concepts - Logic gates - Multivibrators - Counters - Wave shaping - Analog to digital convertors - Instruments and Digital computers.

Unit V Instrumentation for Optical Absorption Spectrometry

Visual Photometres - Filter Photometers - Spectrophotometer - Double beam Spectrophotometer - Recording Spectrophotometers - Optimal value of adjustable parameters - Multiple internal reflection assembly - Rapid scanning spectrometer - Non dispersive Photometers - Photometric titration equipment - Fourier transform Spectrometers.

Text book:

1. Strobel H A, Chemical instrumentation - A systematic approach to Instrumentational analysis, 2nd Edition, Addison- Wesley Publishing company Inc, Phillipines, 1973.

Books for reference:

1. Jeffery G H, Bassett J, Mendham J and Denney R C, Vogels Textbook of Qualitativechemical analysis, 5th Edition, Longman Scientific and technical, Essex, 1989.
2. Skoog D A, Hollar F J, Crouch S R, Principles of Instrumental analysis, 6th Edition, Thompson Brooks/ Cole, Belmont CA, 2007.

UNIT I.

The OSI Model and TCP/IP Protocol Suite

Protocols and standards, The OSI Model, TCP/IP Protocol Suite, Addressing, TCP/IP Versions

Link Layer

ARP –Packet format, Encapsulation, Operation, ARP over ATM, Proxy ARP, ARP Package-Cache Table, Queues, I/O Module, Cache-Control module, RARP-Packet format, Encapsulation, RARP Server, Alternative solutions to RARP.

UNIT II.

ICMP & IP

ICMP overview, Message Types, ICMP Message format.CIDR – Subnetting, VLSM, Supernetting. IP Routing Principles, Routing IP Datagrams, Dynamic Routing Protocols – RIP, OSPF, HELLO, BGP, PING program, Traceroute program.

UNIT III

UDP & TCP

UDP-Process to Process Communication, User datagram, Checksum, Operation, Use of UDP, UDP Package, TCP-Services, Features, Segment, TCP connection, State Transition Diagram, Flow-Control-Nagel's Algorithm, Clark's Solution, Error-Control, Congestion Control, TCP Timers-RTT, Karn's Algorithm, Options, TCP Package.

UNIT IV

UDP & TCP Utilities

DNS – Basics, Resolution, Caching, DNS Message Format, Inverse mapping, Pointer Queries.

TELNET – concept, NVT character set, Embedding, Options, Negotiation, controlling the server, Out-Of-Band Signaling, Escape Characters, Mode of Operation, User Interface, Security Issue.

FTP – Connections, Communication, Command Processing, File Transfer, Anonymous FTP.

TFTP – Messages, Connection, Data transfer, UDP ports, TFTP example, Security, Applications. SMTP – Architecture, User Agent, Message Transfer Agent, Message Access Agent: POP and IMAP, Web-based mail. SNMP – SMI, MIB, SNMP.

UNIT V

IP over ATM, Mobile IP and VOIP

IP over ATM-ATM WANs-Layers, Carrying a datagram in cells, Routing the cells, ATMARP, Logical IP Subnet (LIS).

VOIP – Session Initiation Protocol, H.323 architecture and protocols.

Mobile IP – Addressing, Agents, Three Phases Inefficiency in mobile IP.

Text Book:

1. Behrouz A. Forouzan, "TCP/IP Protocol Suite", Tata Mc-Graw-Hill publications, 3rd Edition, 2006.

Books for Reference:

- Comer E. Douglas, "Internetworking with TCP/IP Principles, Protocols and Architectures", Volume 1, Pearson Education, 4th Edition, 2002.
- Siyan S Karanjit and Parker Tim, "TCP/IP Unleashed", Pearson Education Asia, 3rd Edition.

SEMESTER – I			
Core Practical - I J2EE Lab			
Code : 19PCSCR1	**Hrs / Week : 4**	**Hrs / Sem : 60**	**Credits : 2**

1. Write a Servlet to display “Hello World” on browser.
2. Write a Servlet to display all the headers available from request.
3. Write a Servlet to display parameters available on request
4. Write a Servlet to display all the attributes available from request and context
5. Write a Servlet which displays a message and also displays how many times the message has been displayed (how many times the page has been visited).
6. Assume that the information regarding the marks for all the subjects of a student in the last exam are available in a database, Develop a Servlet which takes the enrollment number of a student as a request parameter and displays the marksheet for the student.
7. Develop a Servlet which looks for cookies for username and password, and forwards to a home.jsp in case the cookies are valid and forwards to login.jsp, in case the cookies are not found or the cookies are not valid.
8. Develop a Servlet to authenticate a user, where the loginid and password are available as request parameters. In case the authentication is successful, it should setup a new session and store the user's information in the session before forwarding to home.jsp, which displays the user's information like full name, address, etc.
9. Write a simple JSP page to display a simple message (It may be a simple html page).
10. Write a JSP page, which uses the include directive to show its header and footer.
11. Create a Java class called Product with the following properties: name, description, price. Create a listener that notifies (through System.out) whenever a user adds a product to a shopping cart (i.e. adds an object to the session object) or removes it again. Hint: check out the class HttpSessionAttributeListener. Make it print the name and price of the object (hint: access the session through the HttpBindingEvent object). Also, let the listener print the total price of all objects saved in the session so far (one way to accomplish this could be to keep a collection of all objects saved to the session – or just their keys – in the listener or an associated class).
12. Create a servlet filter that logs all access to and from servlets in an application and prints the following to System.out: a. the time the request was received b. the time the response was sent c. how much time it took to process the request d. the URL of the resource requested e. the IP address of the visitor
13. Develop a interest calculation application in which user will provide all FACULTY OF COMPUTER APPLICATIONS information in HTML form and that will be processed by servlet and response will be generated back to the user.
14. Develop an application to demonstrate how the client (browser) can remember the last time it visited a page and displays the duration of time since its last visit. (Hint: use Cookie)
15. Develop an application to keep track of one user across several servlet invocations within the same browser session.

SEMESTER- II			
Core Practical IV – Network Simulation Lab I			
Code: 19PCSCR4	**Hrs / week :4**	**Hrs / Sem: 60**	**Credits :2**

1. Implementation of File System Calls
2. Implementation of ICP Techniques – Pipe, Message Queue, Shared Memory
3. Socket Programming
    a) TCP Sockets
    b) UDP Sockets
    c) Applications using Sockets
4. Simulation of Sliding Window Protocol
5. Simulation of Routing Protocols
6. RPC
7. Development of applications such as DNS / HTTP / E-mail / Multi-user chat

SEMESTER – II			
ELECTIVE – II RURAL BIOTECHNOLOGY			
17PMIE21	**Hrs/ Week: 6**	**Hrs/ Sem: 4**	**Credit: 4**

Objectives:

- To impart knowledge on various biotechnological commercial processes and its usefulness.
- To provide hands on exposure to various biotechnological commercial processes such as biogas production, composting methods, mushroom production, spirulina cultivation and ornamental fish cultivation.

Unit-I: Biogas technology.

Introduction and binary – anaerobic digestion – microbes involved – factors influencing methane – production – stages of methane generation – waste used in methanogensis – various bioreactors used for methane generation – advantages and disadvantages. Visit in biogas production units with field demonstration.

Unit-II: Composting technology.

Historical background – waste availability- factors influencing – methods – biomaturity – encrichments of compost and crop productivity. Vermiculture technologies: History – species – life cycles – methods – different types of waste suitable for vermicomposting. Utilization of vermicompost for crop production. Visit to vermicompost industries with field demonstration.

Unit-III: Mushroom technology.

Bioconversion of organic wastes into protein – oyster mushroom technology, paddy mushroom, milky mushroom and button mushroom technology, post harvest technology. Mushroom farming and prospects. Visit to mushroom farms with field demonstration.

Unit- IV:*Spirulina* cultivation technology.

Biology of *spirulina* – cultivated methods, post harvest technology and single cell protein formulation. Visit to *Spirulina* industries with field demonstration.

Unit-V: Ornamental fish culture.

Present status and importance- popular varieties – artificial and live feeds – breeding techniques of egg layers- gold fish, angel fish, fighter and barbs – live bearers – guppy, molly, platy and sword tail – economics . Visit to ornamental fish farms with field demonstration.

Text books:

1) Vonshak, A.2004. Spirulina plantensis – physiology, cell biology and biotechnology. Taylor and frencis, London.
2) Kawl, T.N. 1999. Introduction to mushroom science, oxford and IBM co., Pvt. Ltd., New Delhi.
3) Philip G. Miles, Shu- ting chang, 1997. Mushroom biology , world scientific, Singapore.
4) Bahl, N .1988. Hand book on mushroom. Oxford and IBH publishing Co.,Pvt Ltd., New Delhi.
5) Tripati. G. 2003. Vermiresources technology, 1st Ed., Discovering Publication House, New Delhi.
6) Gaur, A.C., 1999. Microbial technology for composting of Agricultural Residues by Improved Methods, 1st Print, ICAR, New Delhi.
7) Subba Rao, N.S., 1999. Soil Microbiology, 4th Ed, oxford IBH publishing Co. Pvt. Ltd., New Delhi.
8) Chawla O.P. 1986. Advances in Biogas Technology, ICAR, New Delhi.
9) Martin Alexander 1976. Introduction to soil Microbiology, Wiley eastern Ltd., New Delhi.
10) Anita Saxena, 2003. Aquarium management Daya Pub. House , New Delhi.
11) Srivastava, C.B.I., 2002. Aquarium fish keeping. Kitab Mahal, Allahabad.

References:

1. Kumar , H.D., 1991. A textbook on Biotechnology , II Edition , East- west press Pvt Ltd., New Delhi.

2. Chatwal, G.R., 1995. Textbook of Biotechnology, Anmol Publications Pvt. Ltd., New Delhi.

3. Jarsa , O.P., 2002 . Environmental Biochemistry, I Ed., Sarup& Sons, New Delhi, India.

SEMESTER – II			
ELECTIVE – II VERMI TECHNOLOGY			
17PMIE21	**Hrs/ Week: 6**	**Hrs/ Sem: 4**	**Credit: 4**

OBJECTIVES:

To impart advanced level knowledge in vermicomposting

UNIT-I:

Earth worm classification – Morphology and anatomy. Biology of *Lampitomaruitii.* Vermicomposting - Definition, introduction and scope- The nature of earthworms-soil environment-basic environmental requirements.

UNIT-II:

Vermicomposting materials and their classification. Physical, chemical and biological changes brought by earth worm in soil structure-carbon,nitrogen and phosphorous transformations

UNIT-III:

Veermicomposting methods - Optimal conditions for Vermiculture - temperature, moisture, pH, soil type, organic matter,

UNIT-IV:

Vermicomposting in Homes, Maintenance of vermicomposting beds. Harvesting the worms. Earth worm predators, parasites and pathogens. - Vermi wash.

UNIT-V:

Composting - Vermicomposting - Required conditions - Advantages - Application of vermicomposting, Field sampling- passive methods.

REFERENCES:

1. Edwards, C.A. and Bohlen, P.J. 1996, Ecology of earthworms-3rd Edition, Chapman and hall.

2. Jsmail, S.A., 1970, Vermicology. The biology of earthworms. Orient Longman, London.

3. Lee, K.E., 1985. Earthworms - Their ecology and relationship with soil and land use, Academic Press, Sydney.

4. Ranganathan L.S. 2006. Vermibiotechnology from soil health to human health. Agrobios India.

5. Gupta P.K. 2008. Vermicomposting for sustainable agriculture. Agrobios. India.

SEMESTER – II			
ELECTIVE – II MUSHROOM TECHNOLOGY			
17PMIE21	**Hrs/ Week: 6**	**Hrs/ Sem: 4**	**Credit: 4**

UNIT I:

Mushroom Technology - Introduction, History and Scope –Morphology of mushroom -Vegetative characters - Formation and development of Basidiocarp, structure of basidiocarp - *Agaricus*.Edible and Poisonous Mushrooms.Medicinal and nutritive value of edible mushrooms.Food preparation- soup, cutlet, vegetable curry, samosa, omlette and pickle. Mushroom research centres in India.

UNIT II:

Cultivation of button mushroom (*Agaricusbisporus*), milky mushroom (*Calocybeindica*), oyster mushroom (*Pleurotussajor-caju*) and paddy straw mushroom (*Volvariellavolvcea*).Preparation of Pure Culture and spawn cultivation methods.

UNIT III:

Cultivation technology - Substrates, bed, polythene bag preparation, spawning - casing - Cropping - Mushroom production - Harvest - Storage methods and marketing. Post harvest technology: Storage-Freezing, dry Freezing, drying, canning,.

UNIT IV:

Structure and construction of Mushroom House- Layout of traditional and green house method. Methods of Mushroom cultivation: Bed Method, Polythene Bag Method. Methods of Composting-Long method of composting (LMC) & Short method of composting (SMC).

UNIT V:

Diseases: Common pest, microbes (Bacteria, Fungus and Virus). Diseases of Mushrooms: Brown black disease,yellowing of oyster mushrooms,Bacterial soft rot, fungal brown blotch, wet bubble,dry bubble, cob web, green blotch. Principles of insect pest control: Principles and methods of pest management -chemical control.

SEMESTER - I			
CORE - II	**MATHEMATICAL PHYSICS - I**		
Code : 17PPHC12	**Hrs/Week: 6**	**Hrs/Semester: 90**	**Credits:5**

Course Outcomes

CO No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO 1	Calculate the area of irregular shape by Green's theorem	PSO2	E
CO 2	Design feedback control systems with finite dimensional vector spaces	PSO2	C
CO 3	Apply special functions for Wireless communication and alternating current transmission	PSO5	A
CO 4	Understand the geometry interpretation of complex numbers	PSO6	U
CO 5	Resolve the incompleteness of the statistical interpretations relating to the summing of an infinite number of probabilities to yield a meaningful solutions	PSO2	C
CO 6	Be familiar with the main mathematical methods used in physics.	PSO 7	R

Unit I: Vector Calculus

Review of Vector Algebra – Gradient of a scalar field - Divergence of a vector function - Curl of a vector function – Gauss Divergence theorem – Stokes's theorem – Green's theorem (Proof only). Linear vector space: Liner independence of vector and dimension – Basis of expansion theorem – Inner product and unitary spaces –Orthonormal sets – Schmidt's orthogonalisation method.

Unit II: Linear Algebra

Matrices: Review - Special types - Transpose - Conjugate – Conjugate Transpose - Symmetric and AntiSymmetric - Hermitian and Skew-Hermitian - Determinant - Singular and Non-Singular - Adjoint – Inverse - Orthogonal - Unitary - Trace - Rank - Cramer's rule - Eigen values, Eigen-vectors: Characteristic equation of a Matrix - Cayley-Hamilton theorem.

Unit III: Special Functions I and Partial Differential Equations

Legendre Function: Legendre's Equation - Generating Function – Rodrigue's Formula – Orthogonality - Recurrence Formulae - Bessel Function: Bessel's Function of the First kind – Generating Function – Recurrence Formulae.

Introduction - Laplace equation (Cartesian - 3D only) – Heat flow equation (3D only) - Equation motion for the vibrating string (D'Alembert's solution only).

Unit IV: Complex Analysis

Complex variables– Limits and continuity – Differentiability –Analytic function- Cauchy-Riemann equations(necessary and sufficient condition, polar form)– Cauchy theorem – Cauchy

integral formula – Taylor's theorem – Laurent theorem - Singular points – Residues – Method of finding residues- Residue theorem – Evaluation of definite integrals(unit circle type & evaluation $\int_{-\infty}^{+\infty} \frac{f_1(x)}{f_2(x)} dx$ only).

Unit V: Group Theory

Group, subgroup, classes – invariant, subgroups, factor groups –homomorphism and isomorphism – grouprepresentation - reducible and irreducible representation – Schur's lemmas, great orthogonality theorem – character table.

Continuous Groups: Lie groups and lie algebra – SO (3) group – SU (2) and SU (3) unitary groups.

Books for study:

1. Satya Prakash, Mathamatical Physics, Sultan Chand & Sons, New Delhi.
2. H.K.Dass ,Mathematical Physics, S.Chand & Company LTD, Fourth Revised Edition 2004
3. Mathematical Physics, P.K. Chattopadhyay, New Age International Publishers, Reprint (2001)

Unit	Book No.	Chapters / Sections
I	1	1.1,1.2,1.4,1.5,1.7,1.9,1.12,1.16
II	1	2.2, 2.5-2.11, 2.14, 2.19, 2.23, 2.27, 2.31-2.32
III	1	6.7-6.11,6.17,6.21,6.22,8.2,8.11,8.13
IV	2	7.3-7.10,7.31-7.33, 7.39-7.47
V	3	8.1-8.7, 8.11-8.13

Books for reference:

1. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley and sons (Asia), 8th Edition (2005).
2. B. D Gupta, Mathematical Physics, Vikas Publishing house PVT LTD, Fourth Edition 2010

SEMESTER - II			
CORE IV	MATHEMATICAL PHYSICS II		
Code : 17PPHC21	Hrs/Week: 6	Hrs/Semester: 90	Credits: 4

Course Outcomes

CO No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO 1	Analyse the experimental data with the aid of Fourier transform	PSO5	An
CO 2	Understand the basic of tensor calculus and to describe motion and deformation of body	PSO2	U
CO 3	Recall the basic notations of generating functions and special functions	PSO1	R
CO 4	Apply computational techniques to solve a wide range of numerical problems arising in physics	PSO3	A
CO 5	Explain the concepts of Green's functions and solve boundary value problems	PSO1	E
CO 6	Solve Linear Differential Equations of First and Second order	PSO2	A

Unit I: Probability and Integral Transforms

Probability: Probability – definitions - Binomial distribution, Poisson distribution – Gaussian distribution.

Integral Transforms: Fourier Series- Fourier integral – Fourier transform - Linearity – first and second shifting theorems – Laplace transform – transforms of derivative and integral – inverse Laplace transform – partial fractions.

Unit II: Tensors

Notations and conventions – tensors of second rank – equality and null tensor – addition and substraction – outer product of tensors – inner product of tensors – symmetric and antisymmetric tensor – Kronecker delta – quotient law – metric tensor – Cartesian tensor – isotropic tensor – stress, strain and Hooke's law.

Unit III: Special Functions II

Hermite functions: Hermite Differential Equation – Hermite Polynomials – Recurrence Formulae – Rodrigue's Formula – Orthogonality.Laguerre function: Differential equation – Laguerre polynomial – Generating Function – Rodrigue's Formula – Recurrence Relation – Orthogonal Property.

Unit IV: Numerical methods

Solution of Algebraic and Transcendental equations: Newton – Raphson's method - Solution of Linear Algebraic Equations: Gauss elimination, Interpolation: Lagrange's interpolation– Inverse interpolation – Finite differences– Newton's forward and backward interpolation - Numerical

Integration :Trapezoidal rule - Simpson's $1/3^{rd}$ and $3/8^{th}$ rule - Initial Value Problems:Solving first order differential equations using Runge-Kutta methods.

Unit V: Greens Function and Linear differential equations of first & Second Order

Green's function for one dimensional problems and properties – Green's function in higher dimensions. Application: Poisson's equation.

Linear differential equations –Equations of first order and higher degree-Linear differential equations of second order with constant coefficients – Method for finding the complementary function – Rules to find particular integral.

Books for study:

1. Satya Prakash, Mathematical Physics, Fourth revised Edition 2004, Sultan Chand &Sons.
2. Matrices and tensors in Physics, A.W. Joshi, New Age International Publishers, Revised Third Edition (1995), Reprint 2010.
3. Numerical Methods - A. Singaravelu, Meenakshi Agency, Chennai
4. P.K. Chattopadhyay, Mathematical Physics, New Age International Publishers, Reprint (2001) and [Unit-V Chapter 6].
5. H.K.Dass ,Mathematical Physics, S.Chand & Company LTD, Fourth Revised Edition 2004

Unit	Book No.	Chapters / Sections
I	1	11.2, 11.20, 11.21, 11.22,7.1,7.3, 7.5, 7.6, 7.10, 9.2, 9.3, 9.9, 9.11, 9.12, 9.15, 9.20
II	2	15.2, 15.5, 16.1-16.4, 16.6, 16.7, 17,18.1, 19.3-19.5
III	1	6.29, 6.31 - 6.33, 6.35 – 6.38
IV	3	1.1, 1.16, 1.53, 2.1, 2.13, 2.59, 2.61, 2.75, 3.27, 3.31, 4.54
V	4 5	6.2, 6.5, 6.6, 3.14-3.18

Books for reference:

1. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley and sons (Asia), 8^{th} Edition (2005).
2. B D Gupta, Mathematical Physics, Vikas Publishing house PVT LTD, Fourth Edition 2010

SEMESTER - I			
CORE - II	**Mathematical Physics – I**		
Code : 19PPHC12	**Hrs/Week: 6**	**Hrs/Semester: 90**	**Credits:4**

Vision

To make the students competent and capable problem solvers using techniques that requires mathematical skills and an understanding of limiting cases.

Mission

To analyze and visualize the solution in terms of special functions and how to use in practice the Bessel functions, Legendre polynomial.

Course Outcome:

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO 1	evaluate the area of irregular shape by Green's theorem.	2	Ev
CO 2	recall the basic and the special types of matrices.	1	Re
CO 3	understand the concepts of feedback control systems with finite dimensional vector spaces.	7	Un
CO 4	apply special functions for Wireless communication and alternating current transmission.	2	Ap
CO 5	understand the geometrical interpretation of complex numbers.	1	Un
CO 6	explain the characteristic equation of a matrix using Cayley Hamilton Theorem.	3	Ev
CO 7	recall the incompleteness of the statistical interpretations relating to the summing of an infinite number of probabilities to yield a meaningful solution.	2	Re
CO 8	apply group theory to various disciplines of Physics.	3	Ap

SEMESTER - I			
CORE - II	**Mathematical Physics – I**		
Code : 19PPHC12	**Hrs/Week: 6**	**Hrs/Semester: 90**	**Credits:4**

Unit I: Vector Calculus

Review of Vector Algebra – Gradient of a scalar field - Divergence of a vector function - Curl of a vector function – Gauss Divergence theorem – Stokes's theorem – Green's theorem (Proof only).

Unit II: Linear Algebra

Matrices: Review - Special types - Transpose - Conjugate – Conjugate Transpose - Symmetric and AntiSymmetric - Hermitian and Skew-Hermitian - Determinant - Singular and Non-Singular - Adjoint – Inverse - Orthogonal - Unitary - Trace - Rank - Cramer's rule - Eigen values, Eigen-vectors: Characteristic equation of a Matrix - Cayley-Hamilton theorem.

Unit III: Special Functions I and Partial Differential Equations

Legendre Function: Legendre's Equation - Generating Function – Rodrigue's Formula – Orthogonality - Recurrence Formulae - Bessel Function: Bessel's Function of the First kind – Generating Function – Recurrence Formulae.

Introduction - Laplace equation (Cartesian - 3D only) – Heat flow equation (3D only) - Equation motion for the vibrating string (D'Alembert's solution only).

Unit IV: Complex Analysis

Complex variables– Limits and continuity – Differentiability –Analytic function- Cauchy-Riemann equations(necessary and sufficient condition, polar form)– Cauchy theorem – Cauchy integral formula – Taylor's theorem – Laurent theorem - Singular points – Residues – Method of finding residues- Residue theorem – Evaluation of definite integrals(unit circle type & evaluation $\int_{-\infty}^{+\infty} \frac{f_1(x)}{f_2(x)} dx$ only).

Unit V: Group Theory

Group, subgroup, classes – invariant, subgroups, factor groups –homomorphism and isomorphism – group representation - reducible and irreducible representation – Schur's lemmas, great orthogonality theorem – character table.

Text Books:

1. Satya Prakash, Mathamatical Physics, Sultan Chand & Sons, New Delhi.
2. H.K.Dass, Mathematical Physics, S.Chand & Company LTD, Fourth Revised Edition 2004
3. P.K. Chattopadhyay, Mathematical Physics, New Age International Publishers, Reprint (2001)

Unit	Book No.	Chapters / Sections
I	1	1.1,1.2,1.4,1.5,1.7,1.9,1.12
II	1	2.2, 2.5-2.11, 2.14, 2.19, 2.23, 2.27, 2.31-2.32
III	1	6.7-6.11,6.17,6.21,6.22,8.2,8.11,8.13
IV	2	7.3-7.10,7.31-7.33, 7.39-7.47
V	3	8.1-8.7

Books for Reference:

1. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley and sons (Asia), 8th Edition (2005).
2. B. D Gupta, Mathematical Physics, Vikas Publishing house PVT LTD, Fourth Edition 2010

SEMESTER - II			
Core VIII	**Mathematical Physics II**		
Code : 19PPHC22	**Hrs/Week: 5**	**Hrs/Semester: 75**	**Credits: 4**

Vision:

To introduce students to methods of mathematical physics and to develop required mathematical skills to solve problems in quantum mechanics, electrodynamics and other fields of theoretical physics.

Mission:

To enhance the knowledge in probability, integral transforms special functions, tensors and numerical methods.

Course Outcome

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO - 1	analyse the experimental data with the aid of Fourier transform	4	An
CO - 2	understand the basic of tensor calculus and to describe motion and deformation of body	1	Un
CO - 3	recall the basic notations of generating functions and special functions	1	Re
CO - 4	apply computational techniques to solve a wide range of numerical problems arising in physics	2	Ap
CO - 5	explain the concepts of Laplace Integral	1	Un
CO - 6	solve mathematical problems arising in physics by a variety of mathematical techniques.	2	Cr
CO - 7	employ the knowledge of critical thinking and problem solving	5	Ap
CO - 8	employ correct method to solve a particular problem	2	Ap

SEMESTER - II			
Core VIII	**Mathematical Physics II**		
Code : 19PPHC22	**Hrs/Week: 5**	**Hrs/Semester: 75**	**Credits: 4**

Unit I: Probability and Fourier's Integral Transforms

Probability: Probability– definitions - Binomial distribution, Poisson distribution, normal distribution.

Fourier Integral Transforms: Fourier transform- properties of FT-FT of a derivative-Finite FT

Unit II: Tensors

Notations and conventions–contravariant vector-covariant vector- tensors of second rank – equality and null tensor– addition and substraction – outer product of tensors– inner product of tensors– symmetric and antisymmetric tensor– metric tensor– Cartesian tensor– isotropic tensor– stress, strain and Hooke's law-Moment of inertia tensor.

Unit III: Special Functions II

Hermite functions: Hermite Differential Equation– Hermite Polynomials– Recurrence Formulae– Rodrigue's Formula-Laguerre function: Differential equation– Laguerre polynomial – Generating Function– Rodrigue's Formula– Recurrence Relation.

Unit IV: Numerical methods

Solution of non - linear equation: Newton – Raphson's method - Solution of Linear Algebraic Equations: Gauss elimination, Interpolation: Lagrange's interpolation– Inverse interpolation – Finite differences– Newton's forward and backward interpolation - Numerical Integration: Trapezoidal rule - Simpson's $1/3^{rd}$ and $3/8^{th}$ rule - Runge-Kutta method(Fourth order).

Unit V: Laplace's Integral Transforms

Laplace transform–properties of Laplace transform-Laplace transforms of derivative of a function– Laplace transform of integral - inverse Laplace transform–properties of inverse Laplace transform- Evaluation of ILT by convolution theorem- Method of partial fractions for evaluation of ILT

Unit	Book No.	Pages/sections
I	1	11.2,11.20,11.21,9.2,9.3,9.4,9.7
II	2	15.2,15.3,15.4,15.5,16.1,16.2,16.3,16.4,16.6,18.1,19.3,19.4,19.5,19.7
III	1	6.29,6.30,6.31,6.32,6.34,6.35,6.36,6.37
IV	3	1.1, 1.16, 1.53, 2.1, 2.13, 2.59, 2.61, 2.75, 3.27, 3.31
V	1	9.9,9.10,9.11,9.15,9.17,9.18,9.19,9.20

Text Books:

1. Satya Prakash, Mathematical Physics, Fourth revised Edition 2004, Sultan Chand &Sons.
2. Matrices and tensors in Physics, A.W. Joshi, New Age International Publishers, Revised Third Edition (1995), Reprint 2010.
3. Numerical Methods - A. Singaravelu, Meenakshi Agency, Chennai
4. P.K. Chattopadhyay, Mathematical Physics, New Age International Publishers, Reprint (2001) and
5. H.K.Dass ,Mathematical Physics, S.Chand & Company LTD, Fourth Revised Edition 2004.

1. Kolb, B., &Whishaw, I.Q., (2015). Fundamentals of Human Neuropsychology 7th edition. New York: Worth Publishers Ltd.

Reference books:

1. Beaumont J. G. (2008) Introduction to neuropsychology 2nd edition. The Guilford press, New York.
2. Goldstein, L.H., & McNeil, J. E., (2004). Clinical Neuropsychology. London: JohnWiley and Sons Ltd.
3. Strauss, E., et.al. A Compendium of Neuropsychological Tests. London: Oxford University Press.
4. Lezak M. D. (1998) Neuropsychological Assessment. Oxford University press, London.
5. Laura H. Goldstein (2003); *Clinical Neuropsychology: A Practical Guide to Assessment and Management for Clinicians.* Wiley Publication

SEMESTER IV			
Elective I Rehabilitation Psychology			
Code: 21PPSCE1	**Hrs/Week: 4**	**Hrs/ Sem: 60**	**Credit: 4**

Vision: To impart the knowledge of Rehabilitation Psychology

Mission: To develop the students into confident rehabilitation psychologists

Course Outcomes:

CO. No	Upon Completion of this course, students will be able to	PSO Addressed	Cognitive Level
CO-1	know the nature of the persons with disabilities and biological perspectives of disability	1,2	Le
CO-2	obtain an understanding of the types of disability and its causes	3,1	Un
CO-3	develop the knowledge of the rehabilitation work settings and their roles	2,5	An
CO-4	understand the roles of caregivers and working with families of persons with disabilities	3	Ap
CO-5	gain the knowledge about the psycho diagnostic assessments of persons with disability	1,4	Un
CO-6	develop the thinking of the training programs for rehabilitation psychologist	5,2	Ap
CO-7	develop in depth knowledge about the mental health act	1,5	Ln
CO-8	know the rehabilitation council of india and its role and contribute to the field	1,4	Cr

Unit I: Introduction

Nature and needs of persons with disabilities - Psychosocial and Biological Perspectives of Disability - Concept of rehabilitation - Rehabilitation Psychology - Definition-historical perspective-scope and methods of Rehabilitation Psychology -Functions of Rehabilitation Psychology.

Unit II: Types of Disability

Mental Illness – Definition – nature - types and characteristics of various disabilities as per PWD Act including- Mental Retardation - Learning disabilities - Visual disabilities Hearing and speech disabilities - Orthopedic and Neuromuscular disability Cerebral Palsy-Multiple Disabilities-Autism

-Hanson's disease - Cardiac rehabilitation - Coping with cancer - HIV / AIDS-Incidence

– prevalence - causes and prevention of above mentioned various disabilities.

Unit III: Psychologist in Rehabilitation Setting

Role of psychologist in disability rehabilitation - Work settings of rehabilitation psychologists - Designing training programmes for rehabilitation psychologists- Understanding psychological needs of caregivers -working with families of persons with disabilities.

Unit IV: Psychodiagnostic Assessments of Persons with Disability

Psychodiagnostic Assessments of Persons with Disability - Screening and early identification of persons with disabilities - Developmental Assessment.Psychological Assessment - Intellectual assessment - Assessment of Adaptive Behaviour.

Unit V: Legislations

Mental Health Act - Persons with Disability Act - Rehabilitation Council of India Act - and National Trust Act.

Text Book

1. Robert G. Frank, Mitchell Rosenthal, Bruce Caplan, (2009), *Handbook of Rehabilitation Psychology, American Psychological Association,* Washington, D.C., United States.

References

1. Golden C.J., 1984. *Current Topics in Rehabilitation Psychology:* Grune& Stratton, London.
2. Government of India (1995). *The Persons with Disabilities (Equal Opportunities, Protection of Rights, and Full Participation) Act*, New Delhi: Ministry of Social Justice and Empowerment.
3. Fraser N. Watts & Douglas H. Bennet (1983). *Theory and Practice of Psychiatric Rehabilitation.* John Wiley & Sons, New York.
4. McKay Moore Sohlberg&Catherine A. Mateer (2001). *Cognitive Rehabilitation – An Integrative Neuropsychological Approach*. The Guilford Press. New York. London.
5. Kerkhoff, T., Hanson, S., Guenther, R., &Ashkanazi, G. (1997). *The foundation and application of ethical principles in rehabilitation psychology. Rehabilitation Psychology,* 42 (1),17-30.

SEMESTER II			
Core V Counselling Psychology			
Code: 21PPSC21	**Hrs/Week: 5**	**Hrs/ Sem: 75**	**Credit: 4**

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Vision: To impart different models and ethical principles of counselling psychology.

Mission: To understand the skills to be practiced in a counselling sessions.

Course Outcomes:

CO.No.	Upon completion of this course, students will be able to.	PSO addressed	CL
CO-1	know the emergence of counselling and their ethical principles.	1 & 2	Re, Un
CO-2	understand various theories and techniques applied in counselling sessions.	2 & 3	Un, An
CO-3	understand about the process in which counselling services are provided.	4 & 5	Ev, Un
CO-4	apply the skills described to counsel individuals and master them by practicing.	3 & 4	Un, Ap
CO-5	know about thetwo different models of counselling.	5 & 7	Un, Ev
CO-6	evaluate the differences in the two models of counselling.	5 & 6	Un, An
CO-7	evaluate one's personal difficulties in dealing with clients and also about difficult clients in general.	6& 8	Un, Ev
CO-8	create a wider understanding about the skills and techniques applied in counselling.	1,4 & 8	Cr, An

UNIT I- Introduction

The emergence of Counselling, Definition, Understanding the goals of counselling – Outcome and Process, Ethics in counselling.

UNIT II- Theories and Techniques Applied in Counselling

Theories of counselling – Psychoanalytic, Person centered, Gestalt, Cognitive, Behavioral, and JPMR - Systematic Desensitization.

Techniques to Improve Counselling - Structuring, Leading, Questions, Handling Hesitant Clients, Resistance, Transference and Counter Transference, Commitment to Action and Termination – Process of Goal Setting, Design and Implementation, Termination.

UNIT III- Basic Communication Skills for Counselling

Attending: Being visibly tuned to the clients – The Micro skills of attending, the helper's nonverbal communication, Active Listening, The shadow side of listening to clients, Listening to oneself; Basic empathy –The three dimensions of responding skills, communicating understanding to clients, Basic empathy formula, principles to guide the use of empathy; The art of probing and summarizing – Principle in the use of probe, The art of summarizing

UNIT IV- Egan and Patterson's Model of Counselling

Overview of Egan's skilled helper model – Stage I: The current state of affairs – clarification of the key issues calling for change; Stage II: The Preferred Scenario – Helping client determine what they need and want; Stage III: Strategies for action – Helping clients discover how to get what they need or want; Action: making it all happen – Helping clients turn decisions into problem-managing action;Ongoing evaluation of the helping process;

Patterson's Model – Stages and skills in counselling process: the three stages of counselling in perspective – ways to initiate communication and build counselling relationship; core conditions of counselling; ways to enhance communication; in-depth exploration – goals & methods – advanced empathy, immediacy, confrontation, interpretation; role playing, emotional catharsis, transference and counter transference. The process of goal setting, design & implementation of action plans.

UNIT V- Dealing with Difficult Clients

Client's reluctance and resistance; Working with client's reluctance; Counsellor's emotions towards the ambivalent, indifferent or oppositional clients; Working with ambivalent, indifferent & oppositional clients: Understanding hesitant clients.

Test Book

1. Patterson, L.E.,Welfel, E.R. (2000). *The counselling process*, (5thed). Wadsworth, Brooks/Cole Thomson Learning.

2. Egan, G. (2013). *The skilled helper – A Problem Management Approach to Helping*. Brooks/Cole Publishers

Reference

1. Jones, N., (1982),*"The Theory and Practice of Counseling Psychology"*, Holt Rinehart & Winston, New York.
2. Rosemary A Thompson (2016). *Counseling Techniques-Improving relationships with others, ourselves, our families, and our environment,* 3rd ed. Routledge.
3. Nelson-Jones (2008). *Basic Counselling Skills*. Sage Publications.
4. Jacobs, M. (2004). *Psychodynamic counselling in action*. Sage Publications.
5. Ray Woolfe, Sheelagh Strawbridge Barbara Douglas, Windy Dryden (2010). *Handbook of counselling psychology.* 3rd Ed Sage publication

SEMESTER II

SEMESTER – III			
Core XI	**Statistics for Behavioural science**		
Code : 21PPSC33	**Hrs / Week: 5**	**Hrs / Semester: 75**	**Credit: 4**

Vision: To impart the knowledge of statistics

Mission: To make the students efficient statisticians so that they can be efficient researchers too

Course Outcomes:

CO No	Upon completion of this course, the person will be able to	PSO Addressed	CL
CO 1	learn the basic concepts of statistics	1,5	Re
CO 2	gain knowledge about the various methods of developing and using statistical techniques	1,5	Re, Un
CO 3	analyze the various steps in psychological statistical methods	5	An
CO 4	create new methods of creating and testing behaviour	4,5	Un, Cr
CO 5	learn the skills of administering statistics in psychological tests	5,6	Un
CO 6	understand and analyze various statistical testing methods	5	Un, An
CO 7	gain knowledge on the means of improving and administering statistical skills	4,5	Un, Ev
CO 8	create new statistical and testing techniques	1,5	Cr

UNIT I - Introduction to statistics

Statistics: Definition, Needand application in psychology. Normal distribution – properties of normal distribution curve. skewness and kurtosis – types & measure. Central limit theorem. Scales of measurement – nominal, ordinal, interval & ratio. **Basic terms:**population& samples, variables & data, parameters & statistics, descriptive & inferential statistics, sampling error.

UNIT II – Descriptive statistics

Central tendency – Mean – types, grouped & Median – grouped & ungrouped. Mode – grouped & ungrouped. When mean, median & mode can be used. Central tendency and the shape of the distribution. **Measures of dispersion –** range, quartile deviation, mean deviation, standard deviation, variance. Data type suitable for different types of variability. Standard error. coefficient of variation. Percentile.

UNIT III – Hypothesis testing

The logic of hypothesis testing – four steps of hypothesis test. Errors in hypothesis testing – Type I Type II error – selecting an alpha level. Directional hypothesis tests – hypothesis for a directional test, critical region for a directional test, comparison of one-tailed vs two-tailed test.

UNIT IV – Parametric

Parametric tests– Assumptions. Karl Pearson's correlation. Z test. T statistic – single sample t test, independent sample t test. Analysis of variance – one-way ANOVA & two-way ANOVA. Regression analysis – simple linear regression.

UNIT V – Non- Parametric

Non-parametric tests– Advantage and disadvantage. Difference between parametric & non parametric statistic. The non-parametric tests that are equivalent to parametric tests. Non parametric Statical tests – Chi square test –Sign test – Mann-Whitney U test. Rank order correlation.

Text books:

1. Verma, J. P., &Ghufran, M. (2012). Statistics for Psychology: A comprehensive text. Tata McGraw Hill Education, New Delhi.
2. Gravetter F.J. and Wallnay L.B. (1995) Essentials of statistics for the Behavioural Sciences. N.Y. West Publishing com.

Reference books:

1. Belhekar V. M. (2016) Statistics for Psychology using R. SAGE texts.
2. Garrett, H.E. (1979) *Statistics in Psychology and Education*, 9th Indian Reprint, Bombay, wakils, Feffer and Simons Pvt. Ltd.
3. Elhance, D.N., VeenaElhance& B.M. Agarwal (2007).Fundamental of Statistics. 51st Reprint Edition, Kitab Mahal.
4. Gopal K. Kanji (2006). 100 Statistical Test. Sage Publications. New Delhi.
5. David Howell (2002). Statistical Methods for Psychology. Thomson Learning.

SEMESTER III			
Core XII Psychological Testing			
Code: 21PPSC34	**Hrs/Week:5**	**Hrs/ Sem: 75**	**Credit: 4**

Vision: To impart the knowledge of Psychological testing among students

SEMESTER – III			
Core IX : Aquaculture Biotechnology			
Code : 17PZOC33	**Hrs / week : 6**	**Hrs / sem : 90**	**Credits : 5**

Objectives

- To familiarize and perceive the importance of aquacultural potentials
- To understand the various techniques of seed production and health management
- To acquaint with the techniques in biotechnology as applied to aquaculture industry

Unit I Aquaculture Basics and Management

Scope of aquaculture, aquaculture in India.Farm engineering and equipments: selection of site, lay out , construction ,mechanical and biological filters - role of aeration in culture ponds.

Managementof culture ponds - fertilization,water quality management, control of predatory and weed fishes, aquatic weeds.

Unit II Aquaculture for Stable Environment

Sewage - fed fish culture, sewage treatment , sewage- cum fish culture in India. Recent developments in integrated fish farming - animal husbandry- cum fish culture , paddy cum fish culture, fish culture in cages and pens, race-way fish cultur, culture of air breathing fishes.

Unit III Seed Production and Culture Techniques

Brooders care and management, bundh breeding, hypophysation, in-vitro fertilization, application of synthetic hormones, transport of fish seed and brooders , culture of shrimp, edible and pearl oysters.

Unit IV Nutrition and Health management

Culture of fish feed organisms: diatoms , cladocerans, rotifers, artemia, tubifex , blood worm . artificial feed formulation and management , probiotics in formulated feeds.

Bacterial, viral and fungal diseases, nutritional deficiency diseases, ectoparasites endoparasites, principles of fish health management, fish vaccines.

Unit V **Aquaculture Biotechnology and Economics**

Genetic improvement of stock:selective breeding,hybridization, transgenic fishes, chromosomal manipulation: polyploidy, gynogenesis, androgenesis, production of monosex and sterile fishes, cryopreservation of gametes.Aquaculture economics, fish marketing, involvement of Government organizations in marketing.

Books for Reference

1. Jhingran, U.G. 1997 Fish and Fisheries of India. Hindustan Publ. New Delhi
2. Dubey S. K. and BandandGhosh 2012. Fish Biotechnology. Published by Wisdom Press, New Delhi
3. AmitaSaxena 2011. Fisheries Economics. Daya Publishing House, New Delhi.
4. Schonder, S. L. 1980 Hypophysation in Indian Major Carps. Sathish Book Enterprises Agra.
5. Santhanam R., SukumaranN.and P. Natarajan 1990. A Manual of Fresh Water Aquculture. Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi.
6. Pandian I.D., Abhinandan Kumar and Rajbhushan Prasad. 2009 Aquaculture and Biotechnology. A. K. Publ. New Delhi.
7. Agnihotri S. B. 2013 Aquaculture Management and Technology. Swastik Publication, Delhi.
8. Felix S. 2010. Marine and Aquaculture Biotechnology. Published by Agrobios, Jodhpur, India
9. Santhanam R., Ramanathan N. and G. Jegathesan 1990. Coastal Aquaculture in India 1stedn. CBS Publishers, Delhi.

PRACTICALS

Hrs / Week : 2

1. Estimation of dissolved ammonia in water samples
2. Estimation of alkalinity in water samples.
3. Identification of cultivable food fishes
4. Identification of aquatic weeds, predatory fishes and insects.
5. Study of fish parasites and diseases.
6. Decapsulation technique and hatching of artemia cysts
7. Preparation of artificial feed.
8. Report on field visit to aquaculture farm
9. Report on visit to CMFRI / Fisheries Institute.

SEMESTER – III			
Core X : Aquaculture Practices and Farm Management			
Code : 19PZOC32	**Hrs / week : 6**	**Hrs / Sem : 90**	**Credits : 4**

Vision

To develop a comprehensive knowledge and transferable professional skills for career in aquaculture industry

Mission

To acquaint with technical and general knowledge for competent fisheries management

Course Outcome

CO. No	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	design aquaculture systems	1	Cr
CO-2	develop practical skills for management of culture ponds	3	Ap
CO-3	apply techniques involved in breeding and culture of various organisms	1,2	Cr,Ap
CO-4	demonstrate competency in live feed culture and feed formulation	2,3	Un,Ev
CO-5	evaluate and manage aquaculture diseases, health and safety issues in aquaculture ventures	1,6	Un Ev
CO-6	discuss important factors for performing a sustainable aquaculture	1,3	Un, Ap
CO-7	compare the principles of genetic improvement of fish stock	1	Un
CO-8	analyse aquaculture economics and marketing strategies	1,3	An,Ap

SEMESTER – III			
Core X : Aquaculture Practices and Farm Management			
Code : 19PZOC32	Hrs / week : 6	Hrs / Sem : 90	Credits : 4

Unit I **Aquaculture Basics and Management**

Scope of aquaculture, aquaculture in India, Fishery resources of India in general and Tamil Nadu in particular. Selection of site,construction of fish farm, soil chemistry. Designing layout and construction of different types of fish ponds. Management of culture ponds - fertilization, water quality management, predators and weed management

Unit II **Seed Production and Culture Techniques**

Carp culture : Carp: Brooders care and management seed collection from natural sources, bundh breeding, hypophysation, in-vitro fertilization. Fish seed transport, hatching and rearing techniques. Culture of edible oyster, pearl oyster and seaweed.

Unit III **Nutrition and Health management**

Culture of fish feed organisms: diatoms,cladocerans,rotifers, artemia, artificial feed formulation and management, probiotics in formulated feeds. Bacterial (gill rot & Furunculosis),viral (EUS & Erythrocytic necrosis) fungal diseases (Saprolegniasis & Erythroderma) nutritional deficiency diseases, ectoparasites, endoparasites, principles of fish health management, fish vaccines.

Unit IV **Aquaculture for Stable Environment**

Water pollution, its effect on fisheries and methods of its abatement. Sewage - fed fish culture, sewage treatment , sewage- cum fish culture in India. Integrated fish farming: animal husbandry cum fish culture, paddy cum fish culture, fish culture in cages and pens. Culture of air breathing fishes.

Unit V **Aquaculture Biotechnology and Economics**

Genetic improvement of stock: selective breeding, hybridization, polyploidy, production of monosex, sterile fish, transgenic fish, sex manipulation, gynogenesis, androgenesis, role of biotechnology in conservation of fish. Aquaculture economics, fish marketing, involvement of government organizations in marketing. Role of CMFRI, NIOT,CIBA & NABARD.

Books for Reference

1. Dubey, S. K. and Bandand Ghosh. 2012. *Fish Biotechnology*. Wisdom Press, New Delhi.
2. Amita Saxena, 2011. *Fisheries Economics*. Daya Publishing House, New Delhi.
3. Schonder, S. L. 1980. *Hypophysation in Indian Major Carps*. Sathish Book Enterprises Agra.
4. Pandian, I.D. Abhinandan Kumar and Rajbhushan Prasad. 2009. *Aquaculture and Biotechnology*. A. K. Publ. New Delhi.
5. Agnihotri. S. B. 2013. *Aquaculture Management and Technology*. Swastik Publication, Delhi.

6. Felix, S. 2010. *Marine and Aquaculture Biotechnology*. Agrobios, Jodhpur, India

7. Santhanam, R., Ramanathan, N. and G. Jegathesan. 1990. *Coastal Aquaculture in India.* 1st edn. CBS Publishers, Delhi.

8. Shagufta. 2012. *Fish Health and Diseases*. APH Publishing.,Corpoartion, NewDelhi

9. Yougesh Kumar and Rajeev Tyagi. 2013. *Aquaculture Fisheries Biotechnology and Genetics*. Mangalam Publishers & Distributors, Delhi

10. ChandraSekar. Y.S . 2012. *Fish Nutrition in Aquaculture*. Swasthik Publishers &Distributers, Delhi.

11. Rajendra Kumar Rath. 2011. *Freshwater Aquaculture*. Scientific Publishers, Jodhpur.

12. Singh, V.B. 2010. *Fish Farming*. ALP Books, New Delhi.

13. *Economics of Fish Culture Operations*. FAO- www.fao.org.docrep

PRACTICALS

Hrs / Week : 2 **Credit: 1**

1. Estimation of dissolved ammonia in water samples
2. Estimation of alkalinity in water samples.
3. Analysis of freshwater plankton
4. Decapsulation technique and hatching of artemia cysts
5. Feed formulation exercise – preparation of compound feed Demonstration
6. Identification of cultivable food fishes
7. Identification of aquatic weeds, predatory fishes and insects.
8. Study of fish parasites and diseases.
9. Visit to aquaculture farm – drawing the layout of ponds, dikes and sluices

Books for Reference

1. Methods in Hydrobiology Manual, *Centre for Advanced Studies in Marine Biology*, Published by Annamalai University, Parangipettai, Chidambaram.
2. Felix, N., Ahilan, B. and S. Athithan. 2004. *Fish Nutrition and Feed Technology Manual.* Fisheries College and Research Institute, Tamilnadu Verteinary & Animal Science University, Thoothukudi.
3. FAO Fisheries Technical Paper. No.361; *Manual on the Production and Use of Live food for Aquaculture.* Laboratory of Aquaculture and Artemia Reference Centre, University of Ghent, Belgium.

SEMESTER - IV			
Elective - I B	**Ornamental Fish Culture**		
Code : 19PZOE41	**Hrs / Week : 4**	**Hrs / Sem : 60**	**Credits : 4**

Vision

Impart basic understanding for operating an ornamental fish farm and improve the quality of fisheries education, research and extension activities. Instill competence and confidence among the students for self employment.

Mission

Generate technically skilled man power to work in ornamental fish farms

Augment ornamental fisheries trade and export earnings

Course Outcome:

CO.No	Upon completion of this course, students will be able to	PSO addressed	CL
CO - 1	explain the construction, fabrication and accessories required for setting up an aquarium tank	2,3	Un
CO - 2	apply the knowledge and skills in aquarium management	1	Ap
CO - 3	evaluate the types and culture of live feed organisms and formulate the artificial feed	3	Ev
CO - 4	describe the factor related with taxonomy and biology of ornamental fish	3	An
CO - 5	choose the commercially important fresh water and marine ornamental fishes and their transport	8	Ev, Cr
CO - 6	analyse the different varieties of ornamental fish	2,3	An
CO - 7	acquire confidence to become an entrepreneur in ornamental fish culture	3	Un
CO - 8	develop entrepreneurial skills and make aware of National and International export earnings	2,7	Cr

SEMESTER - IV			
Elective - I B	Ornamental Fish Culture		
Code : 19PZOE41	Hrs / Week : 4	Hrs / Sem : 60	Credits : 4

Unit I Construction of fish tanks

Design and Construction of fish tanks - setting up of tanks - accessories for aquarium tanks - hood, light source, hand net, suction tube, scrapper tool, aerator, gravels, filters and ornamental objects - aquarium plants and its importance.

Unit II Aquarium maintenance

Maintenance of water quality - temperature, water hardness, ammonia, pH, O_2, CO_2. Control of snail and algal growth. Diseases - protozoan - fungal - bacterial and nutritional diseases - diagnosis and treatment.

Unit III Nutritional requirements of ornamental fishes

Different types of feed - artificial and live feed - culture of live feed organisms - infusorians - zooplankton - rotifers - copepods - cladocerans - spirulina - brine shrimp - chironomous - tubifex. Artificial feed - principles of feed formulation - preparation of artificial feed - balanced diets.

Unit IV Popular ornamental fishes

Taxonomy and biology of egg layers - siamese fighting fish, gourami, gold fish, koi, rosy barb, neon tetra, zebra cichlid and angel fish. Live bearers - molly, guppy, sword tail and platy. Breeding and spawning of egg layers and live bearers .

Unit V Marine ornamental organisms

Commercially important marine ornamental fishes - butterfly fish, parrot fish, clown fish, marine angel fish. Transport of ornamental fishes - use of sedatives.

Books for Reference

1. Jameson. J.D. and R. Santhanam, 1996. Manual of Ornamental Fishes and Farming Technologies – Fisheries College and Research Institute TANUVAS, Tuticorin.
2. Santhanakumar. R. and A.M. Selvaraj. 2007. Manual of Freshwater Ornamental Fish Culture, Department of Fisheries Extension, Fisheries College and Research Institute, TANUVAS, Tuticorin .
3. Venkataramani V.K. and N. Jeyakumar. 2004. Biodiversity and Stock Assessment of Marine Ornamental Fishes. Department of Fisheries Biology and Capture Fisheries, Fisheries College and Research Institute, TANUVAS, Tuticorin
4. Tharadevi, C.S. and K. V. Jayashree. 2009. Home Aquarium. Saras Publications, Nagercoil.
5. Santhanam R., Sukumaran N.and P. Natarajan 1990. A Manual of Fresh Water Aquculture. Oxford and IBH Publishing Co. Pvt. Ltd, New Delhi.
6. Gupta, S. K. and P. C. Gupta. 2006. General and Applied Ichthyology 1st Edn. Chand and Company Ltd, New Delhi.
7. Dholakia, A.D. 2009. Ornamental Fish Culture and Aquarium Management. Daya publishing House, Tri Nagar, Delhi.
8. Amita Saxena. 2003. Aquarium Management. Daya Publishing House, Tri Nagar, Delhi.

SEMESTER – III			
Core X	**Aquaculture Practices and Farm Management**		
Course Code: 21PZOC32	**Hrs/Week:6**	**Hrs/Semester:90**	**Credits:4**

Objectives

- To develop a comprehensive knowledge and transferable professional skills for career in aquaculture industry
- To acquaint with technical and general knowledge for competent fisheries management

Course Outcome:

CO. No.	Upon completion of this course, students will be able to	PSO's addressed	CL
CO-1	design aquaculture systems	1	Cr
CO-2	develop practical skills for management of culture ponds	3	Ap
CO-3	apply techniques involved in breeding and culture of various organisms	1,2	Ap
CO-4	demonstrate competency in live feed culture and feed formulation	2,3	Un, Ev
CO-5	evaluate and manage aquaculture diseases, health and safety issues in aquaculture ventures	1,6	Un, Ev
CO-6	discuss important factors for performing a sustainable aquaculture	1,3	Un, Ap
CO-7	compare the principles of genetic improvement of fish stock	1	Un
CO-8	analyse aquaculture economics and marketing strategies	1,3	An, Ap

SEMESTER – III			
Core X	**Aquaculture Practices and Farm Management**		
Course Code: 21PZOC32	**Hrs/ Week:6**	**Hrs/Semester:90**	**Credits:4**

Unit I **Aquaculture Basics and Management**

Scope of aquaculture, Fishery resources of India and Tamil Nadu. Selection of site, construction of fish farm, soil chemistry, construction of different types of fish ponds. Management of culture ponds - fertilization, water quality management, predators and weed management.

Unit II **Seed Production and Culture Techniques**

Carp culture : Carp: Brooders care and management seed collection from natural sources, bundh breeding, hypophysation, fish seed transport, hatching and rearing techniques. Culture of edible oyster, pearl oyster and sea weed.

Unit III **Nutrition and Health Management**

Culture of fish feed organisms: diatoms, cladocerans, rotifers, artemia. Artificial feed formulation and management. Bacterial (gillrot & Furunculosis) viral (EUS White spot disease, Erythrocytic necrosis) fungal diseases (Saprolegniasis & Branchiomycosis) Nutritional deficiency diseases, ectoparasites, endoparasites, principles of fish health management, fish vaccines.

Unit IV **Integrated Aquaculture Management**

Water pollution, its effect on fisheries and methods of its abatement. Sewage – fed fish culture - sewage treatment. Integrated fish farming - animal husbandry cum fish culture, paddy cum fish culture, fish culture in cages and pens. Culture of air breathing fishes.

Unit V **Aquaculture Biotechnology and Economics**

Genetic improvement of stock - hybridization, polyploidy, production of monosex, sterile fish, transgenic fish, gynogenesis, androgenesis. Aquaculture economics, fish marketing, involvement of government organizations in marketing. Role of CMFRI, NIOT, CIBA & NABARD.

Books for Reference

1. Dubey. S.K. and Band and Ghosh. *Fish Biotechnology*. New Delhi: Wisdom Press. 2012.
2. Amita Saxena. *Fisheries Economics*. New Delhi: Daya Publishing House. 2011.
3. Schonder. S.L. *Hypophysation in Indian Major Carps*. Agra: Sathish Book Enterprises 1980.

4. Pandian. I.D. Abhinandan Kumar and Rajbhushan Prasad. *Aquaculture and Biotechnology.* New Delhi: A.K. Publ. 2009.
5. Agnihotri. S.B. *Aquaculture Management and Technology*. New Delhi: Swastik Publication. 2013
6. Felix. S. *Marine and Aquaculture Biotechnology*. Jodhpur, India: Agrobios. 2010.
7. Santhanam. R., Ramanathan, N. and G. Jegathesan. *Coastal Aquaculture in India.* Delhi: CBS Publishers 1st edn. 1990.
8. Shagufta. *Fish Health and Diseases*. New Delhi: APH Publishing Corpoartion. 2012.
9. Yougesh Kumar and Rajeev Tyagi. *Aquaculture Fisheries Biotechnology and Genetics*. Delhi: Mangalam Publishers & Distributors. 2013.
10. Chandra Sekar. Y.S. *Fish Nutrition in Aquaculture*. Delhi: Swasthik Publishers & Distributers. 2012.
11. Rajendra Kumar Rath. *Freshwater Aquaculture*. Jodhpur: Scientific Publishers. 2011.
12. Singh. V.B. *Fish Farming.* New Delhi: ALP Books. 2010.

PRACTICALS

Course Code : 21PZOCR5

Hrs/ Week: 2 **Credit: 1**

1. Estimation of dissolved ammonia in water samples
2. Estimation of alkalinity in water samples.
3. Analysis of fresh water plankton
4. Decapsulation technique and hatching of artemia cysts
5. Feed formulation exercise – preparation of compound feed - Demonstration
6. Identification of cultivable food fishes
7. Identification of aquatic weeds, predatory fishes and insects.
8. Induced breeding in fishes
9. Study of fish parasites and diseases.
10. Visit to aquaculture farm

Books for Reference

1. Methods in Hydrobiology Manual. *Centre for Advanced Studies in Marine Biology*, Published by Annamalai University, Parangipettai, Chidambaram. 2011.

2. Felix, N., Ahilan, B. and S. Athithan. *Fish Nutrition and Feed Technology Manual.* Thoothukudi: Fisheries College and Research Institute Tamilnadu Verteinary & Animal Science University. 2004.

3. FAO Fisheries Technical Paper. No. 361; *Manual on the Production and Use of Live food for Aquaculture.* Laboratory of Aquaculture and Artemia Reference Centre, University of Ghent, Belgium. 1996.

SEMESTER IV			
Core XV	**Commercial Zoology**		
Course Code: 21PZOC43	**Hrs/ Week: 5**	**Hrs/ Sem: 75**	**Credits: 4**

Objectives

- To facilitate self-employment and entrepreneurship in Apiculture and Sericulture.
- To motivate the students to take up careers related to agro-based, rural oriented cottage industry through imparting knowledge in apiary management, mulberry cultivation and silkworm rearing.

Course Outcome

CO. No	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand the behaviour of bees, prevent swarming and manage bee colonies	3	Un
CO-2	identify, choose suitable bees and maintain bee hive successfully	2	Ev
CO-3	inspect bee colony, identify diseases of bees, recognize their enemies and take necessary control measures	4	An, Ap
CO-4	apply their knowledge to implement the procedure to extract honey and other bee products	5	Ap
CO-5	demonstrate an understanding of mulberry cultivation, silkworm rearing and silk reeling	1	Un
CO-6	identify diseases, pests of mulberry, silkworm and adopt control measures	4	Ap, Cr
CO-7	utilize their knowledge in harvesting, marketing cocoons and reeling operations	5	Ap
CO-8	develop practical proficiency in apiculture and sericulture from the lab work as well as visit to the apiary and the sericulture unit.	6	Ap

Unit I **Beekeeping Technology**

Apiculture as a cottage industry - choice of species in apiculture- Indian bee, European bee. Beekeeping equipments - Langstroth hive and Newton's hive- appliances used in apiaries. Swarming – prevention and control. Queen rearing and introduction. Artificial feeding.

Unit II **Management of Bees & Honey Bee Products**

Diseases of bees - brood diseases, diseases of adult bees - nosema and septicemia, enemies and pests - greater wax moth, lesser wax moth, ants, wasps, mites - control measures. Extraction and uses of honey - bee wax - bee venom, pollen, propolis, royal jelly – Agmark index.

Unit III **Silkworm Rearing**

Mulberry silkworm development – silkworm rearing – rearing house – rearing appliances rearing operations. Shelf rearing – floor rearing – shoot rearing. Silkworm diseases – bacterial flacherie, muscardine, grasserie. Pest - Indian uzifly - symptoms and control measures.

Unit IV **Cocoon Mounting and Reeling**

Mounting - cocoons – harvesting and marketing of cocoon. Grading of silk and cost benefit ratio. Silk reeling – reeling operations, reeling appliances – cottage basin – filature units - by-products.

Unit V **Economics of Sericulture**

Sericulture industry – present status – prospects in India; Role of Governmental organizations and NGOs in the development of Sericulture industry – Schemes for Sericulture development – NABAARD, MSME, MUDRA.

Books for Reference

1. Krishnaswami S. *Improved Method of Rearing Young Age Silkworms*. Bangalore: Central Silk Board, 1990.
2. Hisao Aruga. *Principles of Sericulture*. New Delhi: Oxford & IBH Publishing Co. Pvt. Ltd. 1990.

3. Acharya J. *Sericulture and Development*. New Delhi: Indian Publishers Distributers Kamak Nagar, 1993.
4. Pierre Jean – Prost. *Apiculture*. New Delhi: Oxford & IBH Publishing Co. Pvt. LTD, 1994.
5. Raja Instus E. *Economics of Bee Keeping Industry*. Jaipur and New Delhi: Rawat Publications, 1994.
6. Mishra R.C. *Perspectives in Indian Apiculture*. Agro Botanica, 4E 176 J.N. Vyas Nagar, Bikaner, H.S. Offset Printers, Daryagunj, New Delhi: 1997-98.
7. Arthur G. and Carter J. *Beekeeping: A Guide to the Better Understanding of Bees, their Diseases and the Chemistry of Beekeeping*. New Delhi: Biotech books, 2004.
8. Everett Franklin Phillips. *Bee Keeping*. Jodhpur: Agrobios (India), Agro House, Chopasani Road, 2010.
9. Ganga G. and Sulochana Chetty J. *An Introduction to Sericulture*. New Delhi: Oxford & IBH Publishing Co Pvt. Ltd, 2019.

PRACTICALS

Course Code: 21PZOCR8

Hrs / Week : 2 **Credit: 1**

1. Identification of bee species and castes.
2. Mounting of mouth parts and legs of worker bee.
3. Adulteration in honey
4. Beekeeping equipments - Newton's hive, hive tool, smoker, uncapping knife, pollen box, honey extractor.
5. Identification of diseases and enemies of honey bees.
6. Development of silkworm.
7. Mounting of silk gland.
8. Rearing house and appliances.
9. Silkworm diseases and pests.

10. Filling forms for entrepreneurs

11. Visit to an apiary or sericulture unit.

Books for Reference

1. Tammanna N. Sonwalker. 1993. *Hand Book of Silk Technology*. Wiley Eastern Ltd. Chennai.
2. Alka Prakash. 2001. *Laboratory Manual of Entomology*. New Age International (P) Ltd, 4835/ 24, Ansari Road, Daryaganj, New Delhi – 110002.

SEMESTER IV			
Core Elective	**A. Ornamental Fish Culture**		
Course Code: 21PZOE41	**Hrs/ Week: 4**	**Hrs/ Sem: 60**	**Credits: 4**

Objectives

- To impart basic understanding for operating an ornamental fish farm and improve the quality of fisheries education, research and extension activities.

- To generate technically skilled manpower to work in ornamental fish farms, augment ornamental fisheries trade, export earnings and self employment.

Course Outcome

CO. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	explain the construction, fabrication and accessories required for setting up an aquarium tank	1	Un
CO-2	apply the knowledge and skills in aquarium management	2	Ap
CO-3	evaluate the types and culture of live feed organisms and formulate the artificial feed	3	Ev
CO-4	demonstrate the mastery related with taxonomy and biology of ornamental fish	3	Ap
CO-5	identify the commercially important fresh water and marine ornamental fishes and their transport	8	Ap
CO-6	analyse the different breeding techniques employed for varieties of ornamental fish	2,3	An
CO-7	acquire competencies to become an entrepreneur in ornamental fish culture	3	Un
CO-8	develop entrepreneurial skills and make aware of National and International export process and income generation	2,7	Cr

Unit I Construction of Fishtanks

Design and Construction of fish tanks – setting up of tanks - accessories for aquarium - hood, light source, hand net, suction tube, scrapper tool, aerator, heater, gravels, filters and aquarium decor –aquarium plants and its importance.

Unit II Aquarium and Fish Health Management

Maintenance of water quality - temperature, water hardness, ammonia, pH, O_2, CO_2. Control of snail and algal growth. Fish diseases - protozoan, fungal, bacterial and parasitic diseases - symptoms, diagnosis, therapy and prevention.

Unit III Fish Nutrition

Different types of feed - artificial and live feed - culture of live feed organisms - infusorians - zooplankton - rotifers - copepods - cladocerans - spirulina - brine shrimp - chironomous - tubifex. Artificial feed: ingredients of feed formulation – Pearson square method of feed formulation - steps in the preparation of artificial feed – nutritional deficiency diseases.

Unit IV Biology and Breeding

Taxonomy and biology of egg layers - siamese fighting fish, gold fish, koi, rosy barb, neontetra, zebra cichlid and angel fish. Live bearers - molly, guppy, sword tail and platy. Breeding and spawning of egg layers and livebearers – parental care in ornamental fishes.

Unit V Marine ornamental Fishes and Transport

Commercially important marine ornamental fishes - butterfly fish, parrot fish, clown fish, marine angel fish. Transport of ornamental fishes – oxygen packing - use of sedatives - marketing strategies.

Books for Reference

1. Jameson. J.D. and R. Santhanam. *Manual of Ornamental Fishes and Farming Technologies* – Tuticorin: Fisheries College and Research Institute TANUVAS. 1996
2. Santhanakumar. R. and A.M. Selvaraj. *Manual of Fresh water Ornamental Fish Culture*, Tuticorin: Department of Fisheries Extension, Fisheries College and Research Institute, TANUVAS. 2007
3. Venkataramani V.K. and N. Jeyakumar. *Biodiversity and Stock Assessment of Marine Ornamental Fishes*. Tuticorin: Department of Fisheries Biology and Capture Fisheries,

Fisheries College and Research Institute, TANUVAS. 2004

4. Tharadevi, C.S. and K.V. Jayashree. *Home Aquarium*. Nagercoil: Saras Publications. 2009
5. Santhanam R., Sukumaran N. and P. Natarajan. *A Manual of Freshwater Aquculture*. NewDelhi: Oxford and IBH Publishing Co. Pvt. Ltd. 1990
6. Gupta, S.K. and P.C. Gupta. General and Applied Ichthyology. New Delhi: Chand and Company Ltd, 1st Edn. 2006
7. Dholakia, A.D. *Ornamental Fish Culture and Aquarium Management*. Delhi: Daya Publishing House, Trinagar. 2009.

SEMESTER IV			
Common Core	Organisational Behaviour		
Code: 17PCCC41	Hrs/Week: 6	Hrs/Sem: 90	Credits: 5

Objective:

To enable the students to understand the various dimensions of organizational behaviour.

Unit-I **Introduction to Organisational Behaviour and Personality:**

Organizational Behaviour: Definition - Nature and Scope – Objectives – Evolution - Models of Organisational Behaviour – Autocratic – Custodial - Supportive - Collegial.

Personality: Definition - Determinants of Personality - Types of Personality - Theories of Personality - Sigmund Freud's four stages of Personality - Ericson's eight life stages.

Unit-II **Perception, Attitude and Learning:**

Perception: Definition - Perception Process - Factors affecting Perception.

Attitude: Concepts - Formation of Attitude - Types of Attitude - Measurement of Attitude. Learning: Meaning - Definition- Determinants of Learning - Learning Theories - Classical Conditioning - Operand Learning - Cognitive Theory - Social Learning Theory.

Unit-III **Motivation and Leadership:**

Motivation: Meaning – Concepts - Theories of Motivation - Maslow's Hierarchy of Needs - Herzberg's Two Factor Theory - McGregor's Theory X and Theory Y.

Leadership: Definition – Functions - Leadership Styles - Leadership Theories - Trait Theory -Behavioral Theory - Managerial Grid Theory.

Unit-IV **Group Behaviour and Team Building:**

Group Behaviour: Definition- Characteristics of a Group - Types of Groups - Group Formation and Development - Group Role - Inter-Group Behaviour - Inter-Group Conflict -Group Decision Making.

Team Building: Meaning - Types of Team - Team Building Process.

Unit-V **Organisational change, Development and Effectiveness:**

Organisational Change and Development: Reasons for Organistional Change - Types of Change - Planned Change - Resistance to Change and Managing Change.

Organisational Development (OD): Meaning – Objectives - Models of OD and OD Interventions

Organisational Effectiveness: Definition - Approaches to Organisational Effectiveness –Factors Influencing Organisational Effectiveness.

Text Books:

1. S.S. Khanka – Organisational Behaviour S.Chand &Co Ramnagar New Delhi

References:

1. K. Aswathappa Organisational Behaviour Himalaya Publishing House , Mumbai
2. Fred Luthans Organistional Behaviour McGraw Hill International Edition
3. Stephen. P. Robbins, Essentials of Organisational Behaviour, Prentice Hall of India, New Delhi

University Press,2017.

SEMESTER II			
Core VI	Organisational Behaviour		
Code: 19PHRC21	Hrs/Week: 4	Hrs/Sem: 60	Credit: 4

Vision: To enable the students to understand the various dimensions of organisational behaviour.

Mission: To develop the students with the determinants of intra – individual , inter – personnel and inter – group behavior in organisational setting and to equip them with behavioural skills in managing people at work.

Course Outcome

CO No.	Upon completion of this course students will be able to	PSO addressed	CL
CO-1	understand the concept of Organisational behaviour and Personality.	1,3	Un
CO-2	gain insights on Perception and Attitude.	3	Re
CO-3	understand the concept of Learning	3	Un
CO-4	examine the concepts and theories of Motivation and Leadership.	1,3	An
CO-5	understand the Characteristics and types of Group behaviour.	3	Un
CO-6	describe and apply the concept of Team Building.	1,3	Re , Ap
CO-7	evaluate the Organisational change and reasons for Organisation Change.	3	Ev
CO-8	examine the concept of Organisation Development and Effectiveness.	3	An

SEMESTER II			
Core VI	Organisational Behaviour		
Code: 19PHRC21	Hrs/Week: 4	Hrs/Sem: 60	Credit: 4

Unit-I Introduction to Organisational Behaviour and Personality:
Organizational Behaviour: Definition - Nature and Scope – Objectives – Evolution - Models of Organisational Behaviour – Autocratic – Custodial - Supportive - Collegial. Personality: Definition - Determinants of Personality - Types of Personality – Theories of Personality - Sigmund Freud's four stages of Personality - Ericson's eight life stages.

Unit-II Perception, Attitude and Learning:
Perception: Definition - Perception Process - Factors affecting Perception.

Attitude: Concepts - Formation of Attitude - Types of Attitude – Measurement of Attitude. Learning: Meaning - Definition- Determinants of Learning - Learning Theories - Classical Conditioning - Operand Learning - Cognitive Theory - Social Learning Theory.

Unit-III Motivation and Leadership:
Motivation: Meaning – Concepts - Theories of Motivation - Maslow's Hierarchy of Needs - Herzberg's Two Factor Theory - McGregor's Theory X and Theory Y. - Leadership: Definition – Functions - Leadership Styles - Leadership Theories - Trait Theory -Behavioral Theory - Managerial Grid Theory.

Unit-IV Group Behaviour and Team Building:
Group Behaviour: Definition- Characteristics of a Group - Types of Groups - Group Formation and Development - Group Role - Inter-Group Behaviour - Inter-Group Conflict -Group Decision Making.
Team Building: Meaning - Types of Team - Team Building Process.

Unit-V Organisational change, Development and Effectiveness:
Organisational Change and Development: Reasons for Organisational Change – Types of Change - Planned Change - Resistance to Change and Managing Change. Organisational Development (OD): Meaning – Objectives - Models of OD and OD Interventions - Organisational Effectiveness: Definition - Approaches to Organisational Effectiveness –Factors Influencing Organisational Effectiveness.

Text Books:

1.Stephen P. Robbins and Timothy A Judge.Organizational Behaviour. New Delhi: Pearson Education Publishers, 2013.
2.Khanka S.S.Organisational Behaviour. New Delhi: S.Chand & Co,2013.

Books for References:

1. Aswathappa.K. Organisational Behaviour. Mumbai: Himalaya Publishing House, 2010.
2. Stephen. P. Robbins. Essentials of Organisational Behaviour. New Delhi: Prentice Hall of India, 2013.

SEMESTER I			
Core I	Principles and Practices of Management		
Code: 21PHRC11	Hrs/Week: 6	Hrs/Sem: 90	Credits: 4

Objectives:

- To enable the students to learn the basic principles, concepts and functions of management along with the modern trends and apply them to real life situations.
- To develop an understanding of the functions of management and to equip the students with behavioral skills in managing people at work.

Course Outcome

CO No.	On completion of this course students will be able to	PSOs Addressed	CL
CO-1	understand the managerial function, role of manager and managerial skills.	1,3,5	Un
CO-2	gain knowledge on the development of managerial thought.	1	Un
CO-3	examine the concepts of planning to make planning effective.	1,3	An , Cr
CO-4	analyse the concept of organizing and departmentation.	1,3	An
CO-5	gain knowledge on decision making and co-ordinating .	1,3,5	Un
CO-6	apply the techniques of control.	1,3,5	Ap , An
CO-7	analyse the stages of conflict and management of conflict.	1,3	An
CO-8	identify the need, strategy for planned change and organizational development.	3	Un ,Ap

SEMESTER I			
Core I	Principles and Practices of Management		
Code: 21PHRC11	Hrs/Week: 6	Hrs/Sem: 90	Credits: 4

Unit I **Introduction to Management**

Introduction to Management –Meaning- Definition-Evolution- Management Functions –Management Concepts – Early Classical Approaches- scientific management- administrative management -bureaucracy – Neo – Classical Approaches- human relation movement-behavioral approach – Modern Approaches-quantitative approach- system approach-contingency approach-Roles of Manager– Levels of Management -Managerial Skills - Meaning – Conceptual Skill – Technical Skill – Human Relation Skill.

Unit II **Planning and Decision Making**

Planning – Meaning of Planning- Types of Plans- Process of Planning – Making Planning Effective. Decision Making-Meaning of Decisions – Types of Decisions –Steps in rational decision making-Rationality in decision making - Common Difficulties in Decision Making

Unit III **Staffing and Directing**

Staffing-Meaning-Need and Importance-Job Analysis-Job description- Job specification-Manpower planning-Recruitment and Selection-Placement and Orientation-Man power planning in India. Directing- Meaning-Principles-Importance- Requirements of effective direction- Issuing orders-Techniques.

Unit IV **Controlling Techniques**

Controlling – Meaning - Importance – Control Process - Types of Control-Budgetary and Non-Budgetary Control Techniques-Need for Control System-Essentials of effective Control System-Problems of effective Control System.

Unit V **Managerial Ethics and Practices**

Nature- Types- Sources- Importance- Need-Managing ethics- Ethics and HRM-Approaches-Factors influencing ethical behaviour at work- Role of HRM in development of ethical behavior-HR ethical issues-International business ethics.

Text Book:

Aswathappa.K. *Human Resource Management*. New Delhi; Tata. McGraw-Hill Publishing Company Ltd, 7th Edition, 2017.

Books for Reference:

1. Prasad L.M. *Principles& Practice of Management*. New Delhi;Sultan Chand & Sons, 9th Edition, 2016.

2. Tripathi P.C &ReddyP.N.*Principles of Management*. New Delhi; Tata Mc. Graw Hill, 6th Edition, 2017.

3. Pravin Durai, *Human Resource Management*. NewDelhi: Pearson Publications, 2nd Edition, 2016.

SEMESTER III			
Elective II	Business Environment		
Code: 21PHRE32	Hrs/Week: 4	Hrs/Sem: 60	Credits: 3

Objectives:

- To enable students to understand and appreciate the influence of the forces in the external economic, political, legal, social, and technological environment on business.
- To impart theoretical knowledge that provides a framework to understand the existing external environment and help in preparing appropriate strategies for organisations to face the challenges.

Course Outcome

CO No.	Course Outcome On completion of this course students will be able to	PSOs Addressed	C L
CO-1	understand the Overview of Business Environment	4	Un
CO-2	gain knowledge of Business and Its Environment and the influence of the forces in the external environment.	4,6	An ,Ev
CO-3	understand the concept of Economic System.	4	Un
CO-4	understand the concept of Political Environment	4	Un ,Ap
CO-5	gain knowledge of the Economic Environment	4,6	Un , An
CO-6	understand the influence of Social Environment in business.	4,6	Un ,Ap
CO- 7	gain knowledge of the technological developments and the impact of informational technology.	4,6	Un , Ap
CO -8	explain the Economics of development and help in preparing appropriate strategies for organisations to face the challenges	4	Re, Un

SEMESTER III			
Elective II	Business Environment		Credits: 3
Code: 21PHRE32	Hrs/Week: 4	Hrs/Sem: 60	

Unit I **Overview of Business Environment**

Basic Concepts of Functioning of an Economy - National Income - Business and Its Environment – Political, Economic, Socio-cultural, Technological, Legal and Ecological environment - India's Population and Its Impact on the Economy.

Political environment: Government and Business - Role of Government in Business - GDP Trend and distribution and Business opportunities- Monetary System- Social and cultural factors and their implications for business.

Unit II **Technology Environment**

Technology Development - Technology Trade and transfer- Technology Trends in India- Role of Information Technology.

E – Commerce: Essential Components, Strategies, Business Models- Digital payment system – Risk in E payment system – Payment security.

Unit III **Economic System**

Economic System -Capitalism- Socialism - Mixed Economy -Public Policies - Business Economic -Monetary and Fiscal Policies- Foreign Trade Policy. Economic Legislation – FEMA- Intellectual Property Rights.

Unit IV **Business Economics**

Meaning and scope of business economics - Objectives of business firms - Demand analysis: Law of demand; Elasticity of demand and its measurement - Consumer behaviour: Utility analysis; Indifference curve analysis - Law of Variable Proportions: Law of Returns to Scale- Theory of cost: Short-run and long-run cost curves - Price determination under different market forms: Perfect competition; Monopolistic competition; Oligopoly- Price leadership model; Monopoly; Price discrimination - Pricing strategies: Price skimming; Price penetration; Peak load pricing – Competition Act.

Unit V **The Economics of Development**

The Economics of development - Stages and Strategies of Economic Growth - Role of the State in Economic Development-Economic Planning; New World Bank- IMF.

Text Book:

1. Francis Cherunilam.,*Business environment: Text and Cases*. Bangaluru Himalaya Publishing House,2009.

Books for Reference:

1. Fernando. A.C. *Business Environment* . New Delhi; Pearson Education,2011.
2. Paul, Justin .*Business Environment: Text andCases*. New Delhi ;McGraw Hill Education, 2010.
3. Murthy C.S.V, E-Commerce Concepts, Models, Strategies, Mumbai, Himalaya Publishing House. Edition 2016