

DEPARTMENT OF ENGLISH

Course Code	Course Title	C	H	I	E	T
17U5NMC1	Literary Criticism	5	6	25	75	100

Objectives: To enhance the understanding of literacy texts and introducing the students to literary criticism and literary forms.

Learning Outcome: Students will be able to analyse any type of Literary forms with a critical mind.

Unit-I

Introduction to Literary Criticism

Definition of Literature

Aims of Study of Literature

Analysis of Literary Text

Unit-II

(i) Plato

(ii) Aristotle

(iii) Sir Philip Sidney

Unit-III

(i) Dryden

(ii) Dr. Johnson

(iii) William Wordsworth

(iv) S.T. Coleridge

Unit-IV

(i) Matthew Arnold

(ii) T.S. Eliot

Unit-V

(i) F.R. Leavis

(ii) I.A. Richards

(iii) Cleanth Brooks

Reference work:

Prasad, B. An Introduction to English Criticism. Calcutta: Macmillan, 1965.

Web Source : <https://www.shmoop.com>

Course Code	Course Title	C	H	I	E	T
17U5NMC2	Shakespeare	4	5	25	75	100

Objectives: To introduce Shakespearean Theatre and enable reading of select plays of Shakespeare

Learning Outcome : Students will be able to gain an insight into the age of Shakespeare , understand and analyse themes and techniques of Shakespearean works

Unit-I

General Shakespeare: Elizabethan Playhouse, Life and works of Shakespeare , Plays:-Tragedy,Comedy and History,Sources of Shakespearean plays. Audience, Women, the fool in Shakespeare.

Unit-II

The Merchant of Venice

Unit-III

Henry IV (Part I)

Unit-IV

Macbeth

Unit-V

Twelfth Night

Reference Works :

Bradley, A.C.Shakespearean Tragedy, Madras : Macmillian,1919.Print
Gurr, Andrew. The Shakespearean stage. Cambridge CUP,1992.Print.

Web Source : www.shakespeare.mit.edu

Course Code	Course Title	C	H	I	E	T
17U5NMC3	British Drama	4	5	25	75	100

Objective: To enable the study of representative British dramatists from the age of Shakespeare to the twentieth century.

Learning Outcome : Students will have a capacity in critical and creative writing (for stage, screen, radio, television) acting, directing, designing.

Unit-I

Ben Jonson:*Everyman in his Humour*

Unit-II

William Congreve :*The Old Bachelor*

Unit-III

Richard Brinsley Sheridan:*The Rivals*

Unit-IV

G.B. Shaw -*Arms and the Man*.

Unit-V

Agatha Christie – *The Mousetrap*

Reference books:

Boulton, Marjorie. *The Anatomy of Drama*,Luthania:Kalyani,1979,Print Esslin, Martin. *An Anatomy of Drama*. London :Templesmith,1976,Print
 Leech, Clifford. *Tragedy*.Delhi:Methuen.Print

Web Source :<https://en.m.wikipedia.org>

Course Code	Course Title	C	H	I	E	T
17U5NME1	English Phonology	5	6	25	75	100

Objective : To introduce English Phonology for better knowledge of the language.

Learning Outcome : Students will gain knowledge of English sound system, intonation and pronunciation .

Unit -I

Definition of Phonetics - Air Stream Mechanism - The organs of speech

Unit -II

Classification and description of speech sounds -I : English vowels / Diphthongs

Unit –III

Classification and description of speech sounds II : English consonants.

Unit -IV

Syllable - Word Accent - Accent and Rythm in connected speech – Intonation

Unit -V

Practice in Phonetic Transcription of Words .and Sentences

Reference Books :

Jones, Daniel. The Pronunciation of English. 8th ed. Cambridge : CUP, 1956.Print
An English Pronouncing Dictionary .London :EIBS,1968.Print.

Web Source :<https://en.m.wikipedia.org>

Course Code	Course Title	C	H	I	E	T
17U5NME2	Short Stories	5	6	25	75	100

Objective : To enable reading of short stories by representative American, Russian and Commonwealth writers

Learning Outcome : Discuss story content and structure in depth.

Unit -I

O' Henry	The Last Leaf
John Steinbeck	The Chrysanthemum

Unit -II

Somerset Maugham	The Ant and the Grasshopper
Ruskin Bond	The Cherry Tree

Unit -III

Maxim Gorky	One Autumn Night
Leo Tolstoy	Little Girls are wiser than men

Unit -IV

Prem Chand	Resignation
Saki	The Open Window

Unit -V

Lynda Clark	Ghillie's Mum
Harriet Anena	Dancing with Ma

Reference Work :

Nayar, Pramod K. *Studying Literature : An Introduction to Fiction and Poetry*,
Hyderabad : Orient Blackswan,2013.Print.

Web Source : www.online-literature.com

Course Code	Course Title	C	H	I	E	T
17U5NSM1	Creative Writing	2	2	25	75	100

Objective : To inculcate the learners with the skill of creative writing.

Learning Outcome : At the end of the teaching session , students will be able to write any imaginative short story and script for stage drama. Students will be able to write radio and teleplay scripts by using their experiences.

Unit -I - What is Creativity / Definitions:

Creativity - inspiration -art- propaganda-madness-imagination-creative writing-profile of creative writer-empathy observation

Unit –II -Modes of Creativity:

Modes of creative writing -poetry-fiction-drama-creative writing for mass media -radio-television-drama scripts-documentary-scripts-experiences and creative writing-diary writing

Unit-III - Importance of Reading:

Teaching the importance of reading -reading passion-vocabulary list preparation -Reading skill – Speed reading, Silent reading

Unit –IV -Creative Writing materials

Uses of Thesaurus-e-books and conventional books - advantages - disadvantages.

Unit-V - Creative writing skill application

Paraphrasing a given poem - developing hints into a short story-argumentative writing on a given topic - preparing a script for a given scene.

Text Book:

Dev Anjana Neira ,Anuradha Marwah and Swati Pal , Creative writing : A Beginner’s Manual Delhi Pearson Longman ,2009.Print.

Reference Work :

Scholes , Robert , Nancy R. Comleg Carl H. Klaus and Michael Silverman , *Elements of literature.*

Web Source :www.writelife.com

Course Code	Course Title	C	H	I	E	T
17U6NMC1	New Literatures in English	6	6	25	75	100

Objectives: To expose students to the literatures of the Commonwealth and train them to develop comparative perspectives.

Outcome : It enables the students to connect Postcolonial literature and literary traditions in present Context.

Unit-I(Poetry)

Grace Nicholas : Of course, when they ask for poems
 Jessie Mackay : The Noosing of the Sun-god
 A.D.Hope : The Death of a bird
 Derek Walcott : Ruins of a Great House
 F.R.Scott : The Canadian author's meet

Unit-II(Prose)

Ananda Coomaraswami : "Indian images with many Arms"

Unit-III(Fiction)

Sheila Watson : The Double Hook

Unit-IV(Drama)

Sam Selvon : Home Sweet India

Unit-V(Criticism)

Chinua Achebe : Colonial Criticism
 V.S.Naipaul : "A Wounded Civilization" from *India : A Wounded Civilization*

Reference Work :

Benson,Eugene and L.W.Connolly,eds,Encyclopedia of Post-colonial Literature
 English.London : Routledge,1994.Print.
 Brydon , Diana ,ed. Postcolonialism: Critical Concepts. London :Routledge, 2000. Print.

Web Source :www.enotes.com

Course Code	Course Title	C	H	I	E	T
17U6NMC2	History of English Language	4	5	25	75	100

Objective: To understand the historical transformation of the English language.

Learning Outcome: Students can deploy skills in handling information related to language

Unit-I

Nature of language – Human and animal language – flux in language – Language families- Indo – European family – Germanic group- broad characteristics.

Unit-II

Periods in the history of English language – Old English – Celtic, Latin and Scandinavian influence Norman conquest – French influence- growth of a national feeling- adoption of English- Middle English –Decay of inflection –Loss of grammar gender – French influence on the vocabulary – Dialectical Diversity – The Rise of standard English

Unit-III

Modern English- Renaissance and after –General Characteristics of English – Changes in pronunciation and Grammar

Unit-IV

Attempts to reform English – Dr.Johnson’s Dictionary – Slang and standard speech – English Dialects-Evolution of English as a global Language

Unit-V

Word formation and growth of vocabulary–Makers of English – changes of meaning – Semantic Extension , e - English

Text book :

Baugh,A.C.A History of the English Language . Chennai: Allied Publisher,1978.Print.

Reference books

Barber.C.L. The story of the Language .N.P.Penguin 1982.Print Crystal , David. English as a global Language . London: CUP,1997.Print Mugglestone. Oxford History of English.

India: CUP 2009.Print.

Wood ,F.T. Outline History of the English Language .N.P.Macmillian .2008.Print.

Web Source: www.britannica.com

Course Code	Course Title	C	H	I	E	T
17U6NMC3	American Literature	4	5	25	75	100

Objective : To acquaint the learners of literature with the various genres and sensitize them to the themes and styles of American literature.

Learning Outcome: Students can get holistic knowledge about American literature and their cultural elements .

Unit-I -Poetry

Robert Frost - Stopping By The Woods On A Snowy Evening
Walt Whitman - From pent- up aching rivers
Langston Hughes- Negro speaks of rivers
Edgar Allen Poe – The Raven

Unit-II -Prose

Henry David Thoreau – Civil Disobedience
Ralph Waldo Emerson – The American Scholar

Unit-III- Fiction

Henry James - The Real Thing
Abraham Cohen - A Sweat Shop Romance
Ernest Heming Way -The Old Man and the Sea

Unit – IV-Drama

Eugene O’Neil – The Hairy Ape

Unit-V- Criticism

Robert Frost – A Figure a Poem makes
Edgar Allan Poe – The Philosophy of Composition

Reference Books :

Boyers , Robert ,ed. Contemporary Poetry in America.
New York :Schoken .1974.Print
Gould , Jean . Modern American Playwrights.NewYork : Dodd ,Mead<1966.Print.

Web Source:<https://libguides.southernct.edu>

Course Code	Course Title	C	H	I	E	T
17U6NME1	English Language Teaching	5	6	25	75	100

Objective : To enable the students to learn and apply the methods and concepts of English Language Teaching.

Outcome: Enhancing speaking skills, enrichment of vocabulary and more learning skills.

Unit-I

Status of English in India as a second Language -English Language Teaching in India-Importance of acquiring four major skills -LSRW

Unit-II

Motivation and its importance in second language Teaching -Principles of Language Teaching

1. Approaches,
2. Methods,
3. Techniques

Different types of approaches and methods :Grammar Translation method, Direct method, Audio -lingual method.

Unit-III

Curriculum designing -Difference between curriculum and syllabus - some of the language syllabus - structural syllabus - notional functional syllabus-communicative syllabus.

Unit-IV

Evaluation and testing - Definition of test - Characteristics of a good test-types of questions - Error analysis.

Unit-V

Preparing a lesson plan for teaching poetry , prose , one act play , grammar and vocabulary.

Text Books:

- Nagraj, Geetha. English Language Teaching : Approaches, Methods, Techniques, New Delhi: Orient Black Swan, 2010.print.
- Prabhu , N.S. 2017.Second Language Pedagogy, Oxford :OUP,1987.Print.

Reference books:

- Brumfit.C.J. *Problems and principles of English language teaching* .Oxford:OUP,1980.Print.
- Brumfit.C.J. and K. Johnson, eds. *The Communicative approach to Language Teaching*.Oxford.OUP,1979.Print.

Course Code	Course Title	C	H	I	E	T
17U6NME2	One Act Plays	5	6	25	75	100

Objectives: To introduce One -act Plays by master dramatists of earlier times, popular playwrights of early 20th Century.

Outcome: Students will have a capacity in critical and creative writing for stage, screen, radio, television, acting, directing and designing.

Unit-I

Anton Chekhov : *The Swan Song*
George Bernard Shaw : *How He Lied to Her Husband*

Unit-II

Eugene O'Neill : *Before Breakfast*
Tennessee Williams : *Lord Byron's Love letter*

Unit-III

Thornton Wilder : *The Happy Journey*
William Inge : *Picnic*

Unit-IV

J.M.Synge : *The Riders to the sea*
Edmond Rostand : *The Romancers*

Unit:V

Erisa Kironde : *The Trick*
Sajitha.M : *Matsyaganddhi*

Text Book :

Sujatha, K. *On the Stage : One Act Plays* , Chennai : Orient Blackswan.2011,Print.

Reference Book:

Elias M. ed.*Plays in One Act*. Kolkata Orient Blackswan 2010,Print.

Web Source :<https://en.m.wikipedia.org>

Course Code	Course Title	C	H	I	E	T
17U6NSM1	Journalism	2	2	25	75	100

Objective: To enhance student's knowledge of journalism in general and newspaper report writing in particular.

Outcome: To provide the students with quality education in the communication and journalism disciplines.

Unit-I

Introduction – What is News?-Structure of Newspaper --News value –News gathering – Qualities and Aptitudes of a reporter

Unit-II

Ethics of Journalism – media ethics – code of ethics –ABC's of Journalism- parts of news report -5 W s -headline writing –types of leads

Unit-III

Writing of reports – types of reports- basic principles of reporting : Objectivity, accuracy, speed and clarity – Editing- Importance and Significance

Unit-IV

Radio- Growth and development in India- Various types of Radio Services- National, Regional and External- FM Stations

Unit –V

Television – Introduction- What makes Television journalism distinctive?- TV as a socio-cultural force- Various formats of TV programmes

Text Book:

Parthasarathy Rengasamy .*Basic Journalism* .Calcutta :Macmillian ,nd .Print.

Reference Books:

Rosenstein, Tom and Bill Kovach .*Elements of Journalism*.US : Crown,2001.Print.

Boyd Andrew, *Broadcasting Journalism, Techniques of Radio and TV News*, Heinemann, London, 1988. Print.

Web Source : www.newworldencyclopedia.org

DEPARTMENT OF ECONOMICS

B.A. ECONOMICS SYLLABUS – UNDER CBCS PATTERN

Students to be admitted from the academic year **2018-19** onwards

Sl. No.	Course Title	Course Code	Hours per Week	Credit
SEMESTER – III				
1.	Money and Banking (C)	18U3VMC5	4	3
2.	Mathematical Methods – I (C)	18U3VMC6	5	4
3.	Economics of Insurance (SBE)	18U3VSM3	2	2
4.	Elements of Economics (NME)	18U3VNM1	2	2
5.	Financial Accounting (A)	18U3VAC3	5	5 (16)
SEMESTER – IV				
6.	International Economics (C)	18U4VMC7	4	3
7.	Mathematical Methods – II (C)	18U4VMC8	5	4
8.	Soft Skills (SBE)	18U4VSM4	2	2
9.	Elements of Public Finance (NME)	18U4VNM2	2	2
10.	Agricultural Economics (A)	18U4VAC4	5	5 (16)

Ancillary Papers offered by the Department of Economics for B.Sc. Statistics

Sl. No.	Course Title	Course Code	Hours per Week	Credit
SEMESTER – V				
1.	Principles of Economics	17U5SME1	6	7
SEMESTER – VI				
2.	Indian Economy	17U6SME4	5	6

Credits

Major Subjects : 116

Language Subjects : 24

Total : 140

Subjects	Internal		External	
	Time	Marks	Time	Marks
Core	2 hours	25	3 hours	75
Core Elective	2 hours	25	3 hours	75
Non Major Elective	2 hours	25	3 hours	75
Allied	2 hours	25	3 hours	75
Skill Based Elective	2 hours	25	3 hours	75
Environmental Studies	2 hours	25	2 hours	75
Value Education	2 hours	25	2 hours	75

C.I.A. AND END SEMESTER EXAMINATION COMPONENTS FOR B.A. ECONOMICS

I – Components of C.I.A. for B.A. Economics – Maximum 25 Marks

i) Test	-	15 Marks
ii) Assignment	-	5 Marks
iii) Attendance	-	5 Marks
		<hr/>
Total	-	25 Marks
		<hr/>

C.I.A. Test – Maximum 30 Marks – Scale down to 15 Marks

Part – A **(6 X 1 = 6 Marks)**

Answer all objective type – multiple choice questions (6 questions)

Part – B **(4 X 3 = 12 Marks)**

Answer all questions either A (or) B from each question (Paragraph type)

Part – C **(2 X 6 = 12 Marks)**

Answer any 2 questions out of 3 (Essay Type)

II – End Semester Exam Components for B.A. Economics

Time : 3 Hours

Maximum Marks: 75

Part – A **(10 X 1 = 10 Marks)**

Answer All objective type – multiple choice questions (10 questions)

2 Questions from each unit

Part – B **(5 X 7 = 35 Marks)**

Answer All questions either A (or) B from each question

2 Questions from each unit

Part–C **(3 X 10 = 30 Marks)**

Answer Any 3 THREE out of 5 questions (Essay Type)

1 Question from each unit

**Blue Print for Semester Question Paper Setting for B.A. Economics
Core and Core Elective Courses**

Section	Unit – I	Unit – II	Unit – III	Unit – IV	Unit – V	Total Questions
Part – A (Objective Type -Multiple Choice Questions)	2	2	2	2	2	10
Part – B (Either A or B Type)	2	2	2	2	2	10
Part – C (Open Choice Essay Type)	1	1	1	1	1	5

Time: 3 Hours

Maximum Marks: 75

Part – A

(10 X 1 = 10 Marks)

Answer All objective type – multiple choice questions (10 questions)

Question Number starts from 1 to 10

Part – B

(5 X 7 = 35 Marks)

Answer All questions either A (or) B from each question

Question Number starts from 11 (a) or 11 (b) to 15 (a) or 15 (b)

Part – C

(3 X 10 = 30 Marks)

Answer Any THREE questions out of 5 questions (Essay Type)

Question Number starts from 16 to 20.

Department	Economics	Class	II -B.A.		Semester	III
Course Title	Money and Banking	Hours	Credit	CIA	External	Total
Course Code	18U3VMC5	60	3	25	75	100

Objectives

1. To understand the evolution of monetary system
2. To acquire the theories of money
3. To know the banking system, functions and monetary policy

Learning Outcome

Get complete knowledge on monetary and banking system

Unit – I Introduction to Money (12 hours)

Meaning of money – Definitions – Evolution of Money – Types of Money - Functions of Money – Supply of money: Determinants of money supply.

Unit – II Theories of Money (12 hours)

Fisher's Quantity Theory of Money – Cambridge Equations: Robertson, Marshall, Pigou and Keynes.

Unit – III Inflation, Deflation and Trade Cycle (12 hours)

Inflation: Meaning, types, causes, effects, and measures to control inflation – Deflation: Meaning, disinflation and stagflation.

Unit – IV Commercial Banking (12 hours)

Meaning – Functions, Credit creation – Recent advancements in banking sector (Meaning only): E-banking (RTGS, NEFT and Online Banking), Digital Transactions (Cashless transaction, Paytm and BHEEM) and Demonetization.

Unit – V Central Banking and Monetary Policy (12 hours)

Central Bank: Meaning – Functions – Methods of Credit Methods by RBI – Monetary Policy: Meaning and Objectives.

Text Books

1. Jhingan, M.L. (2011), Monetary Economics, Vrinda publications (P) Ltd, Delhi.
2. Paul, R.R. (2011), Monetary Economics, Kalyani publications, New Delhi.

References

1. Hajela, T.N. (2009), Money, Banking and Public Finance – Ane books Pvt.Ltd, New Delhi.
2. Sankaran, S. (2010), Money, Banking and International Trade, Margham Publication, Chennai.
3. Sundharam, K.P.M. (2000), Money, Banking and International Trade, Sultan chand & Sons, New Delhi.

Websites / e-books

1. Ken Hoyle (1982), Money and Banking, <https://www.elsevier.com/books/money-and-banking/hoyle/978-0-434-98505-0>
2. Robert Wright (2012), Money and Banking, <https://open.umn.edu/opentextbooks/textbooks/money-and-banking>

Department	Economics	Class	II -B.A.		Semester	III
Course Title	Mathematical Methods -I	Hours	Credit	CIA	External	Total
Course Code	18U3VMC6	75	4	25	75	100

Objectives

1. To understand the fundamentals of elementary Mathematical tools.
2. To prepare for appearing various competitive examinations.
3. To apply them in higher studies.

Learning Outcome

1. Understanding of mathematical techniques most commonly used in Economic Theory
2. Apply the relevant tools for analyzing economics problems

Unit-I Introduction to Basic Mathematics

(15 Hours)

Uses of Mathematical Methods in Economics- Function and their Graphical Representations: Linear Function- Quadratic function-Cubic function- Power function.

Unit - II Equations

(15 Hours)

Solving equations in one Variable: Linear Equation-Quadratic Equations- Cubic Equations-Simultaneous Linear Equations in Two Variables (solving by factorization and formula method) and Three Variables.

Unit -III Set Theory

(15 Hours)

Meaning- Definition-Types of Set- De Morgan's Law-Venn Diagram- Cartesian product (simple problems)

Unit -IV Analytical Geometry

(15 Hours)

Introduction- Distance between two points- Mid point- Intercept form- point slope form-point of intersection of two straight lines- Perpendicular straight lines-Parallel straight lines.

Unit -V Binomial Theorem

(15 Hours)

Binomial Expression- Binomial Theorem for any positive Integral Index 'n'- Middle Term in Expansion.

Text Books

1. Bose, D. "An Introduction to Mathematical Economics", New Delhi, Himalaya Publishing House, 2000,
2. Chilang, A.C. ., "Fundamental methods in Mathematical Economics", 1984, McGraw Hill, New Delhi

References

1. Agarwal, D.R. “Mathematics for Economists”, Delhi, Vrinda Publications Pvt.Ltd, 2001 .
2. Sundaresan V. and Jeyaseelan S.D. “An Introduction to Business Mathematics”, New Delhi, S.Chand and Company Limited, 1993.
3. Vittal, P.R. “Business Mathematics”, Chennai, Margham Publication, 2003.

Website / e-book

1. Michael Kelein, “Mathematical Methods for Economics”,
www.amazon.in/Mathematical-Methods-Economics-Addison-Wesley/dp/0201726262

Department	Economics	Class	II – B.A.		Semester	III
Course Title	Economics of Insurance	Hours	Credit	CIA	External	Total
Course Code	18U3VSM3	30	2	25	75	100

Objectives

1. To understand principles and practices of insurance
2. To obtain knowledge and skills about different Insurance policies

Learning Outcome

Students get awareness on socio-economic gains from insurance

Unit -I: Introduction (6 hours)

Meaning and Definition of insurance – Functions – Importance – Benefits – Kinds of insurance organizations – Scope of insurance business.

Unit –II: Classification of Insurance (6 hours)

Broad categories of insurance – Classification on the basis of practical point of view – Types of insurance: Life insurance – Marine insurance – Fire – Motor vehicle – Personal accident – Sickness – Health - Crop – Burglary insurance.

Unit –III: Essentials of Contract of Insurance (6 hours)

Essential elements of a contract of insurance – Insurance documents – Proposal forms – Policy forms – Cover note – Certificate of insurance – Endorsements.

Unit – IV: Life Insurance and Classification of Policies (6 hours)

Definition – Differences between insurance and assurance – features – procedure – classification of life insurance policies.

Unit – V: LIC and Finance Services (6 hours)

Aims of LIC – Organization structure – Role of LIC – LICFL – LIC Mutual funds.

Text Book

1. Periasamy P. (2013), “Fundamentals of Insurance”, Vijay Nicole Imprints Pvt. Ltd., Chennai.

References

1. Mishra M. N. & Mishra S.B., (2016) , “Insurance Principles and Practice”, S. Chand & Company Pvt. Ltd., New Delhi.
2. Alka Mittal & Gupta S.L., “Principles of Insurance and Risk Management”, S. Chand & Company Pvt. Ltd., New Delhi.
3. Gupta P.K., “Insurance and Risk Management”, Himalaya Publishing House, Mumbai.

Website / e-book

<http://.insuranceinstituteofindia.com>, www.investopedia.com

Department	Economics	Class	II – UG		Semester	III
Course Title	Elements of Economics	Hours	Credit	CIA	External	Total
Course Code	18U3VNM1	30	2	25	75	100

Objectives

1. To understand the basic definitions and branches of economics
2. To understand the concept of economics
3. To assess the national income and its measurement

Learning Outcome

The student can have a knowledge about basic concepts in economics, it gives the idea about inflation and national income.

Unit – I Introduction to Economics (6 hours)

Meaning of Economics – Definitions of Economics: Wealth, Welfare, Scarcity and Growth – Scope of Economics – Branches of economics.

Unit – II Demand (6 hours)

Concept of Demand – Types of Demand - Law of demand - Determinants of Demand – Consumer’s surplus.

Unit – III Supply (6 hours)

Concept of Supply- Supply Function – Law of Supply – Determinants of Supply –Factors of Production and their features.

Unit – IV National Income (6 hours)

National income concepts – GNP, NNP, GDP, DI, PI – Methods of Measurement – Uses of National Income Data.

Unit – V Inflation (6 hours)

Meaning of Inflation – Types of Inflation – Causes of Inflation – Effects and Control of Inflation – Meaning of Deflation.

Text Books

1. Bose, D. and Marimuthu, A (2002), “An Introduction to Micro Economics”, Himalaya Publishing House, Mumbai.
2. Jhingan, M.L. (2005), “Principles of Economics”, Vrinda Publication (P) Ltd, New Delhi.

References

1. Seth, M.L. (2002), “Principles of Economics”, Lakshmi Narain Agarwal Educational Publishers, Agra.
2. Maria John Kenedy, M. (2014), “Macro Economic Theory”, PHI Learning Pvt. Ltd., New Delhi.

Websites / e-books

<https://www.wallstreetmajo.com>

<https://www.quora.com>>

Department	Economics	Class	II – B.A.		Semester	IV
Course Title	International Economics	Hours	Credit	CIA	External	Total
Course Code	18U4VMC7	60	3	25	75	100

Objectives

1. To understand the theories of international trade.
2. To obtain knowledge and skill about the trade policy and balance of payment position.
3. To have an idea about international economic institutions and impact on the economy.

Learning Outcome

Develops the skill to Understand foreign trade practices and ways to correct the disequilibrium in the trade.

Unit: I Introduction (12 hours)

Meaning of International Trade – Need – Features – Internal VS International Trade – Similarities – Differences.

Unit: II Theories of International Trade (12 hours)

Classical of International Trade – Adam Smith – David Ricardo – Haberler – Modern Theory of International Trade – (H.O. Theory)

Unit: III Trade Policy (12 hours)

Free Trade Meaning – Case for Free Trade – Case against Free Trade – Protection – Meaning - Arguments for Protection – Arguments Against Protection.

Unit: IV Balance of Trade and Balance of Payments (12 hours)

Meaning of Balance of trade and Balance of Payments – Components - Causes for disequilibrium in Balance of Payments – Measures to correct disequilibrium in Balance of Payments.

Unit: V International Economic Institutions and Relations (12 hours)

International Economic Institutions – IMF – WTO - World Bank (IBRD) – Objectives and Functions – Globalisation and its Impact on Indian Economy.

Text Books

1. M.L.Seth (2007), “Money, Banking, International Trade and Public Finance”, Lakshmi Narain Agarwal, Agra.
2. M.L.Jhingan (2011), “International Economics”, Vrinda publications, (P) Ltd, Delhi.

References

1. M.C.Vaish.Sudama Singh(2006), “International Economics”, Oxford & IBH publishing co. Pvt.Ltd, New delhi.

2. K.C.Rana & K.N.Verma (2012), “International Economics”, Vishal Publishing Co.,Jalandar, Delhi.
3. W. Charles Sawyer & Richard L.Sprinkle (2010), “International Economics”, PHI Learning Private Ltd, New Delhi.

Websites / e-books

<https://www.e-booksdirectory.com/> E-Books directory is a daily growing list of links to freely accessible eBooks’,

<https://www.saylor.org>

[https://www/springer.com](https://www.springer.com)

Department	Economics	Class	II -B.A.		Semester	IV
Course Title	Mathematical Methods –II	Hours	Credit	CIA	External	Total
Course Code	18U4VMC8	75	4	25	75	100

Objectives

1. To understand the fundamentals of elementary Mathematical tools.
2. To prepare for appearing various competitive examinations.
3. To apply them in higher studies.

Learning Outcome

Enabled the students to know mathematical techniques most commonly used in Economic Theories

Unit - I Matrices (15 Hours)

Meaning - Types of Matrices - Operations with Matrices: Addition – Subtraction- Multiplication – Transpose of matrices – Inverse of matrices.

Unit - II Differential Calculus - One Variable (15 Hours)

Meaning – Rules of Differentiation-Addition- Subtraction-Product- Quotient- Higher order derivation.

Unit - III Differential Calculus -Two Variables (15 Hours)

Meaning-Rules of Partial Differentiation- Addition-Subtraction- Product-Quotient-partial derivatives of second order- simple problems.

Unit - IV Integral Calculus (15 Hours)

Meaning –Definition-Basic Rules of Integration –Cost functions and Revenue Functions– Definite Integration.

Unit - V Linear Programming (15 Hours)

Introduction – Meaning – Basic Concepts – Mathematical Formulation of L.P.P (simple problems).

Text Books

1. Bose, D. “An Introduction to Mathematical Economics”, New Delhi, Himalaya Publishing House, 2000,
2. Chilang, A.C. .,“Fundamental methods in Mathematical Economics”, 1984, McGraw Hill, New Delhi

References

1. Agarwal, D.R. “Mathematics for Economists”, Delhi, Vrinda Publications Pvt.Ltd, 2001 .
2. Sundaresan V. and Jeyaseelan S.D. “An Introduction to Business Mathematics”, New Delhi, S.Chand and Company Limited, 1993.
3. Vittal, P.R. “Business Mathematics”, Chennai, Margham Publication, 2003.

Website / e-book

Michael Kelein, “ Mathematival Methods for Economics”,
www.amazon.in/Mathematical-Methods-Economics-Addison-Wesley/dp/0201726262

Department	Economics	Class	II -B.A.		Semester	IV
Course Title	Soft Skills	Hours	Credit	CIA	External	Total
Course Code	18U4VSM4	30	2	25	75	100

- Objectives:**
1. To impart knowledge on Soft Skills.
 2. To equip the students to obtain employment.

Learning Outcome:

Students can learn about different life skills and its importance

Unit- I: Soft Skills an Introduction (6 Hours)

Soft Skills: Meaning – Importance – Attributes regarded as Soft Skills- Soft Skills Training – Identification and improving soft skills.

Unit – II: Art of Listening and Reading (6 Hours)

Meaning of listening – factors that hamper listening - Advantages of active listening - Benefits of reading - Kinds of reading – Tips for effective reading.

Unit- III: Art of Writing and Speaking (6 Hours)

Importance of writing – Important writing Tips - Meaning of Communication – Communication Process - Barriers to communication – Tips for Powerful presentation – Art of Public Speaking.

Unit – IV: Group Discussion (GD) (6 Hours)

Meaning of GD – Characters tested in GD – Types of Group Discussion – Skills required in a GD – Dos and Don'ts in a GD.

Unit- V: Preparing Curriculum Vitae (CV) / RESUME (6 Hours)

Meaning of CV – Difference among Bio-data, CV and Resume – CV/ Resume writing tips – The Dos and Don'ts in CV – sample CV/ Resume.

Text Books

1. Dr.K. Alex (2016) “Soft Skills” S.C hand Publishing, Newdelhi-55.

References

1. Prashant sharm (2009), “soft skills” BPB Publication, New Delhi.
2. Gopalsamy Ramesh & mahalevan Ramesh (2010), “The ACE of Soft Skills” person – Publication, Noida.

Websites / e-books

1. www.nationalsoftskills.org
2. www.careerindia.com

Department	Economics	Class	II – UG		Semester	IV
Course Title	Elements of Public Finance	Hours	Credit	CIA	External	Total
Course Code	18U4VNM2	30	2	25	75	100

Objectives

1. To understand the functions of the state.
2. To obtain knowledge about sources of income and public expenditure and public debt.
3. To have an idea about deficits financing and budgetary procedure in the federal system.

Learning Outcome

Students can understand the federal finance systems and gain knowledge about budget.

Unit: - I Introduction

(6 Hours)

Meaning of Public Finance – differences between Public Finance and Private Finance – Functions of State

Unit: - II Public Expenditure

(6 Hours)

Meaning of Public expenditure –Reasons for growth of Public expenditure.

Unit: - III Public Revenue

(6 Hours)

Public Revenue – Meaning – Sources of Public Revenue – Direct and Indirect Taxes – Good and Services Tax

Unit: - IV Public Debt

(6 Hours)

Meaning of Public debt – Causes for increasing public debt-Redemption of public debt.

Unit: - V Budget

(6 Hours)

Budget – Meaning – Types – Budgetary Procedure – Types of deficit in budget (Revenue, Budgetary, fiscal and primary deficit) – Deficit financing-Federal finance –Meaning –Principles-Finance Commission – Local Finance – Sources and revenue functions – fiscal policy-objectives and tools.

Text Book

1. M. Maria John Kennedy, “ Public Finance” 2012 PHI Learning Private Limited, New Delhi.

References

1. Musgrave R.A. & Musgrave P.B.(1976), “Public Finance in Theory and Practice”, McGraw Hill, Kogakusha, Tokyo.
2. Thyagi B.P. (2004), “Public Finance”, Jai Prakash Nath & Co., Meerut.
3. Bhatia H.L. (2006), “Public Finance”, Vikas Publishing House, Pvt. Ltd., New Delhi.

Website / e-book

Chandana Ghosh <https://www.amazon.in> > [publicfinance.com](https://www.publicfinance.com) > www.isec.ac.in
instituteofsocialandeconomicchanges.com

Department	Economics	Class	II -B.A.		Semester	IV
Course Title	Agricultural Economics	Hours	Credit	CIA	External	Total
Course Code	18U4VAC4	75	5	25	75	100

Objectives:

1. To understand the Indian Agricultural problems.
2. To examine the impact of Agricultural Revolutions.

Learning Outcome

Students can obtain the knowledge on Agriculture and its Allied activities.

Unit- I: Introduction to Agricultural (15 Hours)

Definition of Agricultural Economics – Nature and scope of Agricultural Economics – Interdependence of agriculture and industry - Role of agriculture in Economic development.

Unit- II: Agricultural (15 Hours)

Agricultural Production – Trends in agricultural crop Production in India – Causes for low productivity in agriculture – Suggestions for improving agricultural productivity.

Unit- III: Agricultural Problems and (15 Hours)

Agricultural Problems – Causes and Evil effects of Sub – division and fragmentation– Consolidation of Holdings – Financial Constraints – Communication gap – General Problems – Farmer’s Suicide – Measures to overcome agricultural problems.

Unit – IV: Agriculture Allied Activities (15 Hours)

Magnitude of Cattle population – Importance of cattle in national economy – Present Position of Cattle in India – Poultry – Causes of Low Production in Poultry – Dairy Industry – Problems of Dairy Industry – Cattle Insurance.

Unit – V: Revolutions in Agricultural Sector (15 Hours)

Green Revolution - Factors responsible for Green Revolution - Economic benefits of Green Revolution - Problems created by Green Revolution - White Revolution – Blue Revolution – Golden Revolution – Grey Revolution .

Text Books

1. S.Subba Reddy, P. Raghu ram, T.V.Neelakanta Sastry, I. Bhavani Devi (2005) “Agricultural Economics”, Oxford & IBH Publishing co.Pvt.Ltd. New Delhi.

Reference Books

1. S.Sankaran (2017) “Indian Economy” Margham Publications, Chennai-17.
2. R.N. Soni, (2010), “ Leading Issues in Agricultural Economics “, Vishal Publishing Co, Jalandhar.
3. C.B.Memoria, Badri Bishal Tripathi (2008), “Agricultural Problems of India, Kitab Mahal, Alahabad.

Websites / e-books

www.agriculture.gov.in

M.A. Economics Syllabus – Under CBCS Pattern
Students to be Admitted From the Academic Year 2018-19 Onwards

Sl. No.		Course Code	Hours per Week	Credit
	Semester – I			
1.	Advanced Micro Economics – I (C)	18P1VMC1	6	4
2.	Foreign Trade (C)	18P1VMC2	6	4
3.	Mathematical Methods in Economics (C)	18P1VMC3	6	4
4.	Macro Economics – I (C)	18P1VMC4	6	4
5.	Environomics (C)	18P1VMC5	6	4 (20)
	Semester – II			
6.	Advanced Micro Economics - II (C)	18P2VMC6	6	4
7.	Macro Economics - II (C)	18P2VMC7	6	4
8.	Statistical Methods (C)	18P2VMC8	6	4
9.	Agricultural Economics (C)	18P2VMC9	6	4
10.	Monetary Economics (C)	18P2VMC10	6	4 (20)
	Semester – III			
11.	Development Economics (C)	18P3VMC11	5	4
12.	Fiscal Economics (C)	18P3VMC12	5	4
13.	Computer Applications in Economics (C)	18P3VMC13	5	4
14.	Managerial Economics (C))	18P3VMC14	5	4
15.	Economics of Human Resource Development (ME)	18P3VME1	6	5
16.	Indian Economic Development (NME)	18P3VNM1	4	4 (25)
	Semester – IV			
17.	Indian Economy (C)	18P4VMC15	6	5
18.	Economics of Health (C)	18P4VMC16	6	5
19.	Research Methodology (C)	18P4VMC17	6	5
20.	Entrepreneurship Development (ME)	18P4VME2	6	5
21.	Demography (ME)	18P4VME3	6	5 (25)
Total			120	90

Examination	Hours	Marks (Maximum)
Internal	2	25
External	3	75
Total	-	100

C.I.A. and End Semester Examination Pattern for M.A.Economics

I – Components of C.I.A. for M.A. Economics – Maximum 25 Marks

i.	Test	-	20 Marks
ii.	Seminar	-	5 Marks
	Total	-	<u>25 Marks</u>

C.I.A. Test – Maximum 20 Marks

Part – A **(5 X 1 = 5 Marks)**

- Answer all objective type – multiple choice questions (5 questions)

Part – B **(3 X 3 = 9 Marks)**

- Answer all questions either A (or) B from each question (Paragraph type)

Part – C **(1 X 6 = 6 Marks)**

- Answer any 1 question out of 2 (Essay Type)

II – End Semester Components for M.A. Economics

Part – A **(10 X 1 = 10 Marks)**

- Answer all objective type –multiple choice questions (10 questions)
- 2 Questions from each unit

Part – B **(5 X 7 = 35 Marks)**

- Answer all questions either A (or) B from each question
- 2 Questions from each unit

Part – C **(3 X 10 = 30 Marks)**

- Answer any 3 questions out of 5 questions (Essay Type)
- 1 question from each unit

Blue Print for Semester Question Paper Setting for M.A. Economics

Section	Unit – I	Unit – II	Unit – III	Unit – IV	Unit – V	Total Questions
Part – A (Objective Type – Multiple choice Questions)	2	2	2	2	2	10
Part – B (Either A or B Type)	2	2	2	2	2	10
Part – C (Open Choice Essay Type)	1	1	1	1	1	5

Time: 3 Hours

Maximum Marks: 75

Part – A

(10 X 1 = 10 Marks)

- Answer all objective type – multiple choice questions (10 questions)
- Question Number starts from 1 to 10

Part – B

(5 X 7 = 35 Marks)

- Answer all questions either A (or) B from each question
- Question Number starts from 11 (a) or 11 (b) to 15 (a) or 15 (b)

Part – C

(3 X 10 = 30 Marks)

- Answer any 3 questions out of 5 questions (Essay Type)
- Question Number starts from 16 to 20.

Department	Economics	Class	II – M.A.		Semester	III
Course Title	Development Economics	Hours	Credit	CIA	External	Total
Course Code	18P3VMC11	75	4	25	75	100

Objectives

1. To understand Economic, demographic, cultural and political objectives
2. To obtain knowledge about classical, Neo-classical theories and growth models
3. To have an idea about choice of techniques and Foreign capital and MNC's

Learning Outcome

Students can learn domestic and international measures for economic development

Unit I Introduction

(15 hours)

Economic Development-Definition-Distinction between economic growth and economic development-Determinants of economic development- – Measurement of Economic development: Economic and social indicators-Physical Quality Life Index (PQLI)-Human Development Index (HDI).

Unit II Theories of Economic Development

(15 hours)

Schumpeter's Theory – Marxian Theory – Lewis theory of unlimited supply of labour – Critical Minimum Effort thesis.

Unit III Growth Models

(15 hours)

Mahalanobis model: Two sector and four sector - Harrod-Domar growth models – Solow model – Meade's model - Kaldor model.

Unit IV Domestic and International Measures for Economic Development

(15 hours)

Capital formation-meaning-process-reasons for low capital formation- Private foreign investment (MNCs) - Case for and against MNCs –obstacles to Private investment – Measures- Two Gap Model - Choice of Techniques --- Shadow prices – meaning – need – uses.

Unit V Foreign Capital & Economic Development

(15 hours)

Foreign capital and Economic Development - Role and Advantages of Foreign Capital- Dangers and Disadvantages of Foreign Capital- Different types of Foreign Capital - Private Foreign Capital - Public Foreign Capital - Factors Determining the Amount of Foreign Aid for Economic Development - Issues in Foreign Direct Investment - Case for and Against Foreign Direct Investment – Foreign Portfolio Investment (FPI)-Foreign Institutional Investment (FII) –Meaning and its Role - Case for and Against Portfolio Investment.

Text Books

1. M.L.Jhingan (2011), “The Economics of Development and Planning”, Vrindha Publications (P) Ltd, Delhi.
2. Sankaran S. (2016), “International Economics”, Margham Publications, Chennai.

References

1. Taneja M.L. Myer R.M (2010), “Economics of Development and Planning”, Vishal Publishing Company, Jalandhar.
2. Mishra S.K., Puri V.S. (2010), “Economics of Development and Planning – Theory and Practice”, “Himalaya Publishing House, Delhi.
3. Agarwal R.C. (2016), “Economics of Development and Planning”, Lakshmi Narain Agarwal, Educational Publishers, Agra.

Website / e-book

1. Wayne Nafziger, “Economic Development”,
2. <https://www.scribd.com/doc/313271177/Economic-Development-pdf>

Department	Economics	Class	II – M.A.		Semester	III
Course Title	Fiscal Economics	Hours	Credit	CIA	External	Total
Course Code	18P3VMC12	75	4	25	75	100

Objectives

1. To introduce students to the public sector reform agenda with a focus on public finance
2. To introduce tax policy principles, tax reform and law, elements of fiscal system and policy

Learning Outcome

Develops the skill to understand the tax system and expenditure pattern and to know the budget in the economy.

Unit I Introduction

(15 hours)

Definitions of Public Finance –Major Fiscal Functions- Allocation function-Distribution function-Stabilization function-Public Goods And Externalities-Non-rivalry-Non-excludability Market Failure And Externalities- Positive externality in consumption and production-Negative Externality in consumption and production- Coase Theorem.

Unit II Public Expenditure

(15 hours)

Theories Of Public Expenditure – Wagner’s Law of Public Expenditure – Peacock Wisemen’s Hypothesis – Colin Clark (Critical Limit) Hypothesis – Principle of Maximum Social Advantage – Limitations – Effect of Public Expenditure: Effects on Distribution-Effects on employment-Effects on Economic Stability and Effects on Economic Development.

Unit III Public Revenue

(15 hours)

Public Revenue – Sources of Public Revenue - Classification of Public Revenue - Adam Smith’s Classification - Seligman’s Classification - Prof. J.K. Metha’s Classification-Canons of Taxation-Goods and Services Tax (GST)-features-Impact of GST.

Unit IV Theories and Principles of Taxation

(15 hours)

Theories Of Taxation – The Cost Theory – The Benefit Theory – The Ability To Pay Theory – Direct taxes-merits and demerits-Indirect taxes-merits and demerits-Types of taxes – Proportional Tax – Progressive Tax – Regressive Tax –Degressive tax- Incidence And Shifting of Taxation – Theories of Tax Shifting – The Concentration Theory – Diffusion Theory – Modern Theory Of Incidence.

Unit V Budget and Fiscal Federalism

(15 hours)

Budget Meaning - Objectives – Budgetary Procedure - Zero Base Budgeting – Performance Budgeting – Fiscal Policy – Instruments of Fiscal Policy – Objectives - Role of fiscal policy - Limitations of fiscal policy-Fiscal federation–Essential Features of Federal System – Principles – Conflict Between Center And States - Local Bodies – Problems of Local Finance-Finance commission – Role.

Text Book

1. M. Maria John Kennedy (2012) “Public Finance” PHI Learning Pvt. Ltd., New Delhi.

References

1. Musgrave R.A. & Musgrave P.B.(1976), “Public Finance in Theory and Practice”,McGraw Hill, Kogakusha, Tokyo.
2. Hajela T.N. (2015), “Public Finance”, Ane Books Private Ltd., New Delhi.
3. Sankaran S. (1999), “Fiscal Economics”, Margham Publications, Chennai.

Websites / e-books

1. Richard Musgrave, <https://www.google.co.in/searchpublicfinancein theory and practice, www.ebooklobby.com>
2. <http://ebooks.kluweronline.com>
3. <https://elsevier.com>books>

Department	Economics	Class	II – M.A.		Semester	III
Course Title	Computer Applications in Economics	Hours	Credit	CIA	External	Total
Course Code	18P3VMC13	75	4	25	75	100

Objectives

1. To understand the applications of computers
2. To obtain knowledge and skill on computer applications in economics
3. To enrich and apply the learned aspects

Learning Outcome

Develops the applications skills through MS-Office and SPSS

Unit I Computer Fundamentals, Software and Operating System (15 hours)

Basic architecture of CPU and its functions – Input device and output device – Primary and secondary memory – Software: Application, System and Utility – Booting process – Machine language and assembly language – Components of OS – OS: DOS, Windows and UNIX – Applications of computer in Economic and other fields.

Unit II Data Communication and Computer Network (15 hours)

Need of data communications – Network concepts – Network types: LAN, MAN and WAN – Network topology – Network Protocol – Network terminologies – Types of signals and transmission – Modem and Multiplexor.

Unit III MS-Word, PowerPoint and Access Applications (15 hours)

MS-Word: Word basics, creation of document, editing, formatting and printing documents MS-PowerPoint: Features, Creation of Slide, Types of view, Slide master, Templates and Slide transition – MS-Access: Data Field, Record, Database file, Types of files, Types of records, Data type, Database evolution.

Unit IV MS-Excel Applications (15 hours)

Basics of worksheet – Data entering in Worksheet – Basic calculations: Sum, Sqrt, Max, Min, Count, Averages, Rank – Conditional and logical functions: IF, AND, OR – Estimation of correlation and regression – Hypothesis testing: t-test, F-test and Z-test - Drawing charts: Area, Bar, Column, Line, Pie, Drought, Scatter, Radar and 3D Charts.

Unit V SPSS Applications (15 hours)

Entering data, data and variable view, create work file, column settings, data editor, data file, save data file and output window – Measures of central tendency: Mean, median and mode – Measures of variability: Range, standard deviation and variance – Procedures of One Way ANOVA – Correlation: Pearson’s co-efficient correlation, Spearmen’s Rank Correlation and Partial correlation

– Regression: Simple linear regression, Least squares estimates, Multiple regression - Interpretation of output.

Text Books

1. Gupta, C.P. (2010), *Computer Applications in Management*, Lakshmi Naryan Agarwal Publishers, Agra.
2. Dhanasekaran, K. (2010), “*Computer Applications in Economics*”, Vrinda Publications, Delhi.

References

1. Ajai S.Gaur and Sanjaya S.Gaur (2008), “*Statistical Methods for Practice and Research*”, Response Books-Sage Publications Pvt. Ltd., New Delhi.
2. Ravichandran, D. (2001), “*Introduction to Computers and Communication*”, Tata Mc Graw Hill Publishing Company Ltd., New Delhi.
3. Kanter (2000), “*Introduction to Computers – Management Information Systems*”, Prentice Hall of India Ltd., New Delhi.

Websites / e-books

1. Frank C.Woykoff, *Computer Applications Economics: Online and Interactive*, <https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1465-7295.1989.tb02023.x>
2. John M.Sumansky, *Computer Applications in Pre-College Economics*, https://www.jstor.org/stable/1805575?seq=1#page_scan_tab_contents

Department	Economics	Class	II – M.A		Semester	III
Course Title	Managerial Economics	Hours	Credit	CIA	External	Total
Course Code	18P3VMC14	75	4	25	75	100

Objectives

1. To introduce managerial economics and its applications in business practices.
2. To study pricing policies and strategies.

Learning Outcome

Managerial Economics helped the students to enrich their knowledge in the field of forward planning and decision making.

Unit I Nature Scope and Methods of Managerial Economics (15 Hours)

Meaning – Economic theory and Managerial theory – Nature of managerial economics – Scope of managerial economics – Methods of managerial economics – Decision types – Logical decision framework – Choice of decision criteria.

Unit II Demand Forecasting (15 Hours)

Meaning – Procedure to prepare sales forecast – Types of forecasting – Durable and Non-Durable consumer goods – Forecasting demand for capital goods – Forecasting demand for new products – Forecasting techniques: Opinion polling method and Statistical method - Criteria of good forecasting method.

Unit III Pricing Policies and Strategies (15 Hours)

Pricing policy – Formulation of pricing policy – Objectives of pricing policy – Factors involved pricing policy – Pricing strategies - Pricing New Product: Skimming pricing and Penetration pricing – Multiple Products – Marginal technique for pricing multi-products – Pricing of multiple products – Product-Line pricing – Pricing over the life cycle of a product – Cyclical pricing – Transfer pricing – Differential pricing – Full cost pricing.

Unit IV Profit and Break-Even Analysis (15 Hours)

Concept of profit – Profit policies – Measurement of profit – Break-even point – Determination of break-even point – Managerial uses of Break-even analysis.

Unit V Capital Budgeting & Inventory Control Management (15 Hours)

Benefit-cost Ratio method – Investment decision under risk – Managerial techniques for investment decision-making – Inventory Control Management – Meaning – Classification – Objectives – Methods.

Text Books

1. M.L.Jhingan and J.K.Stephen (2012), “Managerial Economics”, Vrinda Publications (P) Ltd., Delhi.
2. Varshney and Maheswary (2004), “Managerial Economics”, Sultan Chand & Co., Delhi.

References

1. D.M.Mithani (2006), “Managerial Economics”, Himalaya Publishing House, Delhi.
2. R.Cauvery, U.K.Sudha Nayak, M.Girija and R.Meenakshi (2002), “Managerial Economics”, S.Chand & Co., New Delhi.
3. Branton, Noel and James M.Livingstone (2001), “Managerial Economics in Practice”, Oxford University Press, Delhi.

Websites / e-books

1. Srinivas R.Rao, “Managerial Economics”, <https://www.free-ebooks.net/ebook/Managerial-Economics>
2. M.L.Jhingan and J.K.Stephen, “Managerial Economics”, <https://www.amazon.in/Managerial-Economics-M-L-Jhingan-ebook/dp/B00JS6GH4A>

Department	Economics	Class	II -M.A.		Semester	III
Course Title	Economics of Human Resource Development	Hours	Credit	CIA	External	Total
Course Code	18P3VME1	90	5	25	75	100

Objectives:

1. To impart theoretical knowledge of Human resource development.
2. To provide an understanding of components of Human resource development.

Learning Outcome

Students can learn about basics of Human resource development and its Components.

Unit I Human Resource Development An Introduction (18 Hours)

Human Resource Development –Definitions - Objectives – Functions of Human Resource Development - Theoretical foundations of Human Resource Development - Challenges of HRD - Emerging Dimensions in Human Resource Development.

Unit II HRD and Education (18 Hours)

Education – Definitions -objectives- Education and Economic Development - Grades of Education-Structure and Growth of Education-Potentials of Indian Higher Education-Problems in Higher Education – Sarva Shiksha Abhiyan.

Unit III Health and HRD (18 Hours)

Health- Pre-requisites and Importance - Causes and effects of ill Health- Issues of Health Care Services - Principles of Health Care - Rationality of Cost-Risk - Benefit Analysis- Systems of medical treatment in India– Advantages and Disadvantages of Traditional Health Care – National Health Mission (NHM).

Unit IV Nutrition, Housing and HRD (18 Hours)

Importance of Nutrition- Kinds of Foods-Malnutrition: Kinds, Causes and Effects-Remedies for Malnutrition-Nutritional programmes in India – Housing: Housing Problems in India- Objectives of National Housing Policy -Role of Housing Finance Institutions -Housing Schemes in India.

Unit V Human Capital Formation and Human Development Index (18 Hours)

Meaning and importance of Human Capital Formation – Problems of Human Capital Formation – Human Development Index (HDI) – Gender Development Index (GDI) – Human Poverty Index (HPI) – The Economic Inclusion of youth.

Text Books

1. TapomoyDeb (2006 “Human Resource Development Ane Books India, NewDelhi
2. Kanagasabai C.S., (2003), “Economics of Human Resource Development”, Rasee Publishers, Madurai.

References

1. Stephen Marris, Devlin N. & David Parkin, (2009), “Economic Analysis in Health Care”, Wiley India Edition, New Delhi-02.
2. John P. Wilson, Kogan (2008), “Human Resource Development”, Page, London.
3. National Human Development Report 2018 , United Nations Development Programme, New York, USA.

Website / e-book

1. www.mhrd.gov.in

Department	Economics	Class	II PG		Semester	III
Course Title	Indian Economic Development	Hours	Credit	CIA	External	Total
Course Code	18P3VNM1	60	4	25	75	100

Objectives

1. To introduce basics of Indian Economic Development
2. To outline the importance of macroeconomic indicators on the economics
3. To impart knowledge on public finance and New Economic Policy

Learning Outcome

Understands the basics of Indian Economic Development

Unit I Indian Economy – Overview (12 hours)

Introduction – Basic Characteristics: Economic and Non-Economic factors- Meaning of National Income – concepts – Methods of measuring National Income – Importance.

Unit II Inflation and Deflation (12 hours)

Inflation: Meaning, types, causes, effects and anti-inflationary measures – Deflation: Meaning, causes, effects measures.

Unit III Poverty and Unemployment (12 hours)

Meaning of poverty - Poverty line – Causes of Poverty – Poverty eradication Programmes - Unemployment: Meaning, Nature, Types and Causes of unemployment – Remedial measures.

Unit IV Public Finance (12 hours)

Public Finance – meaning – causes for the growth of public expenditure - sources of revenue – objectives of budget – budgetary procedure — public debt – effects – methods of debt redemption.

Unit V Planning and New Economic Policy (12 hours)

Planning – objectives of Indian Planning – Achievements and failures of Indian Planning – New Economic Policy – WTO and its functions – WTO and India.

Text Books

1. S.Sankaran (2017), “Indian Economy”, Margham Publications, Chennai.
2. A.N.Agrawal (2010), “Indian Economy: Problems of Development and Planning”, Wishwa Prakashan Publishers, New Delhi.

References

1. Gaurav Datt and Ashwani Mahajan (2018), “Indian Economy”, S.Chand & Co. Ltd., New Delhi.
2. Ishwar C.Dhingra (2012), “The Indian Economy – Environment and Policy”, Sultan Chand & Sons, New Delhi.

3. S.K.Misra and V.K.Puri (2005), “Indian Economic Problems”, Himalaya Publishing House, Mumbai.

Websites / e-books

1. Anoop Kumar Atria (2018), Indian Economic Development, <http://www.gkpltd.com/our-books/Economics-Books/indian-economic-development>
2. Uma Kapila (2017), Indian Economy: Economic Development and Policy, <https://www.amazon.in/Indian-Economy-Economic-Development-Policy/dp/9332703744>

Department	Economics	Class	II – M.A.		Semester	IV
Course Title	Indian Economy	Hours	Credit	CIA	External	Total
Course Code	18P4VMC15	90	5	25	75	100

Objectives

1. To give a basic knowledge on subject
2. To study the sectoral contributions to Indian Economy
3. To analyse reforms on Indian Economy

Learning Outcome

Acquires complete knowledge on the Indian Economy

Unit I Structure of the Indian Economy

(18 hours)

India as a developing economy: Meaning, Basic characteristics and major issues of development – Evolution of Indian Economy: Pre-British period, British period and present state – Natural Resources and Economic Development: Resources and economic development, Land resources, Forest resources, Water resources, Fisheries resources, Mineral resources and Mineral Policy, Economic development and environmental degradation and global climate change and India – Infrastructure in the Indian Economy.

Unit II India’s Primary Sector

(18 hours)

Agriculture in the National Economy – Farm size and efficiency – Green Revolution: Achievements and weakness – Food security: Concept, Food self-sufficiency and Public Distribution System – Agriculture production and productivity – Marketing of agricultural produce – Agricultural Prices: Trends, Imports and Government Policy – Co-operative movement: Concept and Role, Meaning and Features, Growth and Structure, Recent trends and Achievements.

Unit III India’s Secondary Sector

(18 hours)

Industrial growth and structural composition – Small Scale and Cottage Industries: Role, Problems and Remedies – Public Sector and Private Sector – Industrial Finance: Role and Performance – Sources of Industrial Finance: IDBI, IFCI, ICICI, and LIC – New Industrial Policy: Objectives and Measures – Industrial Labour: Wages and Welfare Security – Role of MNCs, Merits and Demerits – IT Industry: Major issues, Growth and present state and future prospects.

Unit IV India’s External Sector

(18 hours)

Role and significance of information and technology – Transport, banking and insurance - Foreign Trade of India: Importance, Evolution, Composition, and Direction of India’s Foreign Trade – India’s Trade Policy, India’s Foreign Trade Policy and EXIM Policy - TRIPS and TRIMS - BOP in India – Foreign capital and MNCs in India – State Trading Corporation.

Unit V Reforms in the Indian Economy

(18 hours)

New Economic Policy: Policy response, Assessment and prospects – Liberalization: Meaning and Liberaalisation in India – Privatisation: Meaning, Ways of privatization and Privatisation in India –

Globalisation: Meaning, Background for Globalization in India - Impact of WTO on Indian Economy: Industrial sector, SSI units, Subsidies and agriculture - Demonetization: Meaning, consequences and impact.

Text Books

1. Agrawal, A.N. (2010), “Indian Economy: Problems of Development and Planning”, Wishwa Prakashan Publishers, New Delhi.
2. Gaurav Datt and Ashwani Mahajan (2018), “Indian Economy”, S.Chand & Co. Ltd., New Delhi.

References

1. Ishwar C.Dhingra (2012), “The Indian Economy – Environment and Policy”, Sultan Chand & Sons, New Delhi.
2. Misra, S.K and Puri, V.K. (2005), “Indian Economic Problems”, Himalaya Publishing House, Mumbai.
3. Sankaran, S. (2017), “Indian Economy”, Margham Publications, Chennai.
4. Brahmananda, P.R. and Panchamukhi, V.R. (Eds.) (2001), “Development Experience in the Indian Economy: Inter-State Perspectives”, Bookwell Publishers, New Delhi.

Websites / e-books

1. Ramesh Singh (2017), Indian Economy, <https://www.amazon.com/Indian-Economy-Ramesh-Singh/dp/9352606140>
2. Spectrum Editorial Board (2012), <https://www.amazon.in/Indian-Economy-Spectrum-Editorial-Board/dp/8179304620>

Department	Economics	Class	II -M.A.		Semester	IV
Course Title	Economics of Health	Hours	Credit	CIA	External	Total
Course Code	18P4VMC16	90	5	25	75	100

Objectives:

1. To study the basics of Health Economics.
2. To make an awareness about health problems.
3. To examine the Health care services and Health Finance.

Learning Outcome

Students can acquire knowledge on Health issues and prevention of Health problems.

Unit I Introduction of Health Economics (18 Hours)

Health Economics- Definition – Determinants of Health - Equity in access to healthcare Services – Scarcity: The healthcare dimensions and theoretical approach - Cost concepts of health (Fixed and variable Costs) – Health Measurement Status (Morbidity and Mortality Measures).

Unit II Women’s and Child Health (18 Hours)

Women’s health Problems (Anemic, Depression, Malnutrition, Osteoarthritis, gender based Violence)- Problems of Adolescent Girls –Women’s health and Population Education – Women and age at marriage in India – Health Status of mothers –Child health – Child health strategies – Pulse Polio Immunisation Programme.

Unit III Health Problems and Prevention (18 Hours)

Economic burden of Obesity – Economics of Diabetes – Estimation of Economic Burden – Direct and indirect cost of diabetes – Cost of diabetes in India – Economics of cancer Care – Cardio Vascular Disease and Economic Stability – Economics of HIV/AIDS – Effect of HIV/AIDS on Economic Growth - National Rural Health Mission (NRHM).

Unit IV Health Care Services (18 Hours)

Health care: the state versus the market - Government intervention in health care – Economic evaluation of health services – Classical welfare economics – Cost-benefit analysis – Cost-effectiveness analysis –Measuring health outcomes.

Unit V Finance and Insurance in Health Sector (18 Hours)

Health care finance and Expenditure – Sources of Finance – Organisational Structures and Financing –Aid for Health care – Strategies for mobilizing local Resources - Health insurance – Micro health insurance in India – Community based health insurance – Health Policy.

Text Books

1. A. Kumar (2006), “Health and Nutritional status of Indian Women”, Anmol Publications Pvt. Ltd, New Delhi.
2. Dr. I. Sundar (2012), “Health Economics and Health Care Management”, Serials Publications, New Delhi.

Reference Books

1. Folland, Goodman and Stano (2009), “ The Economics of Health and Health Care” , Pearson Prentice Hall, New Delhi.
2. G. Krishna Mohan and C.N. Krishna Naik (2006), “Health Care Marketing ” , Discovery Publishing House, New Delhi.
3. James Henderson (2008), “Health Economics and Policy”, Cenage Learning India Pvt.Ltd, New Delhi.

Website / e-book

1. <https://mohfw.gov.in>

Department	Economics	Class	II -M.A.		Semester	IV
Course Title	Research Methodology	Hours	Credit	CIA	External	Total
Course Code	18P4VMC17	90	5	25	75	100

Objectives

1. To promote interest in social science research.
2. To educate the students about the research methodology

Learning Outcome

It helped the students to do their research in a most appropriate manner.

Unit I Introduction

(18 Hours)

Introduction to Research methodology- meaning -Definition- Characteristics – Objectives- types of research – significance of research – criteria of good research – problems encountered by researchers in India – research problem – selecting the problem – necessity of defining the problem – technique involved in defining a problem.

Unit II Research Design and sampling

(18 Hours)

Meaning of research design - need for research design - Features of a good design – different research – census and sample survey – steps in sampling design – Different methods of sampling.

Unit III Methods of Data Collection

(18 Hours)

Collection of primary data – observation method – interview method – collection of data through questionnaires – collection of data through schedules – difference between questionnaire and interview schedules - some other methods of data collection – collection of secondary data- selection of appropriate method for data collection.

Unit IV Test of Hypothesis and Scaling in Technique

(18 Hours)

Hypothesis – Basic concept concerning testing of hypotheses – procedure for hypothesis testing – flow diagram for hypothesis testing – measuring the power of a hypothesis test – meaning of scaling - Likert scaling, Thierstone scaling and Garret ranking - classification bases - important scaling techniques.

Unit V Interpretation and Report Writing

(18 Hours)

Meaning of interpretation – technique of interpretation – precautions in interpretation – significance of report writing – different steps in writing report – layout of the research report – types of reports – oral presentation – mechanics of writing a research report – precautions for writing research reports – conclusions.

Text Books

1. C.R. Kothari (2010) “Research Methodology Methods and Techniques”, New Age International Publishers (P) Ltd, New Delhi.
2. R. Panneerselvam (2010), “Research Methodology”, PHI Learning Private Limited, New Delhi.

References

1. P. Saravanvel (2011), “Research Methodology”, Kitab Mahal Publishers, New Delhi.
2. P. Ravilochanan (2005), “Research methodology”, Margham Publication, Chennai.
3. Willkinson and Bhandarkar (1999) “Methodology, and Techniques of Social Research,” Himalaya Publishing House, Mumbai.
4. N. Thanulingom (2010), “Research Methodology”, Himalaya Publishing House, Mumbai.

Websites / e-books

1. C.R.Kothari, “Research Methodology”, <https://www.ebooks.com/431524/research-methodology/kothari-c-r/>
2. Ranjit Kumar, “Research Methodology”, <https://www.ebooks.com/743677/research-methodology/kumar-ranjit/>

Department	Economics	Class	II – M.A.		Semester	IV
Course Title	Entrepreneurship Development	Hours	Credit	CIA	External	Total
Course Code	18P4VME2	90	5	25	75	100

Objectives

1. To assess the interdependent, fast changing and diverse world of entrepreneurship
2. To enhance leadership skill, curiosity to start new enterprise
3. To demonstrate ethical and professional responsibility by starting the business

Learning Outcome

The entrepreneurship in the educational system it helps the students to learn the entrepreneurial skills

Unit I Entrepreneurship (18 hours)

Definition of entrepreneur – characteristics – qualities – types – functions – entrepreneurial competencies – entrepreneurship – environment for entrepreneurship – Phases of entrepreneurship – barriers to entrepreneurship – entrepreneurship and economic development – entrepreneurs in India.

Unit II Rural Entrepreneurship and Women Entrepreneur (18 hours)

Rural entrepreneurship – features of rural industry - types of rural Industry – modern insertion of rural Industry - problems in the growth of rural entrepreneurship – women entrepreneurs – qualities of women entrepreneur – role of women entrepreneur - functions – motivational factors - Problems of women entrepreneur - measures to overcome the problems of women entrepreneur – training programmes for women empowerment.

Unit III Net work Analysis (18 hours)

Introduction to PERT – application of PERT – advantages – limitations - critical Path Method (CPM) - Steps involved in CPM – advantages – limitations – distinction between PERT and CPM. SWOT analysis – usefulness of SWOT analysis.

Unit IV Project Report and Appraisal (18 hours)

Project formulation – factors involved in the project report – guidelines in the Preparation of report – significance of report - contents of report – economic and managerial aspects of report – project appraisal - methods of project appraisal - economic analysis – financial analysis – market analysis – technical feasibility and managerial competence.

Unit V Institutional Support to Entrepreneurs (18 hours)

National level Institutions – Entrepreneurs Development Institute of India (EDI) – National Institute of Small Industry Extension Training (NISIET) - National institute of Entrepreneurship and Small Business Development (NIESBUD), - The National Science and Technology Entrepreneurship Development Board (NSTEDB) – State Level Institutions - Centre for

Entrepreneur Development - Tamil Nadu Small and Tiny Industries Association (TANSTIA) – District Industries Centers (DIC).

Text Books

1. Theenathayalan.S (2016). Entrepreneurship Published by Vergal Publication Madurai.
2. S.Anil Kumar and K. Jayashree Entrepreneurship Development (2003) New Age International Publishers. New Delhi

References

1. E.Gordon and K.Natarajan (2010), “Entrepreneurship Development”, Himalaya Publishing House, Mumbai.
2. K.Ramachandran (2009), “Entrepreneurship Developemnt”, Tata Mc-Graw Hill Educational Publishers Pvt. Ltd., New Delhi.
3. Sami Uddin (1990), “Entrepreneurial Development in India”, Mittal Publications, NewDelhi.
4. Kiran Sankar Chakraborty (2006), “Entrepreneurship and Small Business Development”, Mittal Publications, New Delhi.

Websites / e-books

1. [https:// www. Entrepreneur.com](https://www.Entrepreneur.com).
2. roger cowdrey. www.rogercowdrey.com/https://www.linkedin.com/Profile

Department	Economics	Class	II – M.A.		Semester	IV
Course Title	Demography	Hours	Credit	CIA	External	Total
Course Code	18P4VME3	90	5	25	75	100

Objectives

1. To achieve knowledge about the size, composition and distribution of population
2. To Protect the future demographic evaluation and its probable consequences
3. To gain knowledge about the biological, social and economic theories of population

Learning Outcome

1. Understand demographic measurements like fertility and mortality rates
2. Understand the difference between internal migration, an asylum-seeker and a refugee

Unit I Meaning and Scope of Demography

(18 Hours)

Introduction – Definitions of Demography – Scope of Demography – Relation of Demography with other Social Sciences – Importance of Demography.

Unit II Determinants of Population Growth

(18 Hours)

Fertility: concept and measures of Fertility – Factors affecting fertility – Mortality: concept and measures of mortality – Factors affecting mortality – causes of decline in mortality rates in developing countries – Life Table – Assumptions – Uses – Vital Statistics – meaning – uses of vital statistics.

Unit III Biological Theories of Population

(18 Hours)

Thomas Doubleday's Diet Theory – Joe Castro's Protein Consumption Theory – Michael Thomas Sadler's Destiny Theory – Spencer's Biological Theory- Pearl and Reed Logistic Curve Theory.

Unit IV Social and Economic Theories of Population

(18 Hours)

Dumont's Social Capillarity Theory – Leibenstein's Motivational Theory of Population Growth – Karl Marx's theory of Surplus Population – Malthus Theory of Population – Optimum Theory of Population.

Unit V Migration, Urbanisation and Population Policy

(18 Hours)

Migration: Meaning -Types – Internal Migration: Factors affecting Internal Migration – Factors retarding Internal Migration – Effects of Migration – International Migration: Factors affecting International Migration – Brain Drain – Factors leading to Brain Drain – Measures to reduce Brain Drain- Urbanisation: Meaning – Factors responsible for Urbanisation – problems of Urbanisation – Suggestions – Census 2011 - Composition of Population in India-Recent National Population Policy – objectives.

Text Book

1. Jhingan M.L., Bhatt B.K., & Desai J.N., (2011), “Demography”, Vrindha Publications (P) Ltd., Delhi.

References

1. Srivastava S. (2004), “Studies in Demography”, Anmol Publications Pvt. Ltd., New Delhi.
2. Sinha V.V., Zacharia E., (2002), “Elements of Demography”, Allied Publishers Pvt. Ltd., New Delhi.
3. Choubey P.K., , (2000), “Population Policy in India”, Kanishka Publishers, New Delhi.
4. Bogue D.J., John Wiley, (1961), “Principles of Demography”, New York.

Website / e-book

1. Sarah Harper, “Demography: A Very Short Introduction”,
<https://www.whsmith.co.uk/products/demography-a-very-short-introduction/9780191038686>

Department	Economics	Class	III B.Sc. Statistics		Semester	V
Course Title	Principles of Economics	Hours	Credit	CIA	External	Total
Course Code	17U5SME1	90	7	25	75	100

Objectives

1. To understand the fundamental principles of economics.
2. To study the pricing techniques, National Income and Economic Policies.

Learning Outcome

It enlightened the students to know about basic economic principles.

Unit I Introduction to Economics (18 hours)

Meaning - Definitions of economics - Nature – Scope - Methods – Concepts - Uses and Limitations.

Unit II Demand and Supply Analysis (18 hours)

Meaning – Law of Demand and its determinants – Meaning, types and degrees of Elasticity – Measurement of elasticity of demand - Law of diminishing marginal utility – Law of equi-marginal utility – Consumer’s surplus – Law of supply.

Unit III Costs and Revenue Analysis (18 hours)

Cost analysis – Cost concepts: TVC, TFC, TC, AVC, AFC, AC and MC – Money cost – Real cost – Explicit cost – Implicit cost – Economic cost – Social cost – opportunity cost – Sunk cost – Floating cost – Prime cost – Revenue analysis – Revenue concepts: TR, AR and MR.

Unit IV Pricing Techniques (18 hours)

Full-cost pricing- Marginal Pricing- Target pricing- Peak-load pricing- Going rate pricing- Cyclical pricing- Customary pricing- Product line pricing - Skimming pricing- Penetrating pricing.

Unit V National Income and Economic Policies (18 hours)

National Income - Concepts - Methods and Difficulties in the calculation of National Income- Monetary policy and Fiscal policy and their objectives.

Text Books

1. S.Sankaran, (2011), Micro Economics, Margham Publications, Madras.
2. Ahuja H.L. (1996), Principles of Micro Economics, A New look at Economic Theory, S.Chand, New Delhi.

References

1. Kennedy, Maria John M., (1999). Advanced Micro Economic Theory (Second Edition) Himalaya, Publishing House, NewDelhi.
2. Stigler, G.. (1996). Theory of Price (Fourth Edition) PrenticeHall of India, New Delhi.
3. Jhingan M. L., (1992). Micro Economic Theory, Konark, New Delhi.

Websites / e-books

1. Karl Menger, “Principles of Economics”, <https://www.free-ebooks.net/ebook/Principles-of-Economics>
2. N.Gregory Mankiw, “Principles of Economics”, <https://www.amazon.in/Principles-Economics-N-Gregory-Mankiw-ebook/dp/B07D6Pjq6L>

Department	Economics	Class	III B.Sc. Statistics		Semester	VI
Course Title	Indian Economy	Hours	Credit	CIA	External	Total
Course Code	17U6SME4	75	6	25	75	100

Objectives

1. To enlighten the students about the performance of Agriculture, Industries and Service Sector in India.
2. To understand the recent economic reforms.

Learning Outcome

It helped the students to take decisions in business

Unit I Introduction to Indian Economy (15 hours)

Economic growth and development – Meaning – Differences - Features of Indian Economy – Economic and Non-Economic factors – Demographic composition in India - India as Developing Economy.

Unit II Agricultural Sector in India (15 hours)

Nature and Importance of Agriculture – Green Revolution - Agricultural Production and Productivity - Factors Influencing Agricultural Development - Agricultural Marketing - Sources of Agricultural Finance - Agricultural Labour in India – Recent Developments in Agriculture - Traditional Farming – Organic Farming - Precision Farming – Corporate Farming – Genetically Modified Seeds – Sustainable Agriculture-Second Green Revolution.

Unit III Industrial Sector in India (15 hours)

Pattern of Industrialization - Industrial Policy: 1948 and 1991 – MSMEs and Large scale industries: Problems - Measures and their pros and cons - Role of Industry in Economic Development.

Unit IV Services Sector in India (15 hours)

Role of Service Sector in Economic Development – Banking – Insurance – Telecommunications – IT Industry – Education and Health – Health Tourism.

Unit V Economic Reforms in India (15 hours)

New Economic Policy 1991: Objectives - Liberalization, Privatization and Globalization – WTO – MNCs: Role and objectives – Second Generation Reforms – Demonetisation and its impact – GST salient features – FDI and economic development.

Text Books

1. Ruddar Datt, K.P.M.Sundharam(2011), “Indian Economy”, S.Chand & Company Ltd, New Delhi.
2. A.N.Agarwal(2011), “Indian Economy-problems of Development and Planning”, New Age International Publishers (P) Ltd, New Delhi.

References

1. H.S.Agarwal (2007), “Simple Indian Economics”, Lakshmi Narain Agarwal, Agra.
2. Misra & Puri (2016), “Indian Economy”, Himalaya Publishing House, Mumbai.
3. Ishwar c.dhingra(2010), “ The Indian Economy”, Sultan Chand & Sons, New Delhi.

Websites / e-books

1. Anoop Kumar Atria (2018), Indian Economic Development,
<http://www.gkpltd.com/our-books/Economics-Books/indian-economic-development>
2. Uma Kapila (2017), Indian Economy: Economic Development and Policy,
<https://www.amazon.in/Indian-Economy-Economic-Development- Policy/dp/9332703744>

DEPARTMENT OF MATHEMATICS

The Madura College (Autonomous), Madurai – 625011
Department of Mathematics
CBCS Pattern for B.Sc., Mathematics – Major Course Structure

Semester	Sub. Code	Title of the Paper	Hours	Credits	
I	17U1MMC1	Calculus	4	4	
	17U1MMC2	Trigonometry and Theory of Equations	4	4	
	17U1MES1	Environmental Studies	2	2	
	17U1MSM1	Major Skill Based Elective– I : Switching Theory	2	2	
II	17U2MMC3	Analytical Geometry (3D) and Vector Calculus	4	4	
	17U2MMC4	Discrete Mathematics	4	4	
	17U2MVE1	Value Education	2	2	
	17U2MSM2	Major Skill Based Elective – II: Fourier Series and Z-Transforms	2	2	
III	17U3MMC5	Groups and Rings	6	6	
IV	17U4MMC6	Sequence and Series	2	2	
	17U4MMC7	Mathematical Statistics	2	2	
	17U4MSM3	Major Skill Based Elective – III : Fourier Transforms	2	2	
V	17U5MMC8	Real Analysis	6	6	
	17U5MMC9	Differential Equations	6	6	
	17U5MMC10	Mechanics	6	6	
	Major Elective – I (one to be chosen)				
	17U5MME1	Probability Theory	6	7	
	17U5MME2	Theory of Numbers and Inequalities			
	17U5MME3	Mathematical Modelling			
VI	17U6MMC11	Complex Analysis	4	4	
	17U6MMC12	Linear Algebra	4	4	
	17U6MMC13	Graph Theory	4	4	
	17U6MSM 4	Major Skill Based Elective – IV(Quantitative Aptitude)	2	2	
	Major Elective – II (one to be chosen)				
	17U6MME4	Optimization Techniques	5	6	
	17U6MME5	Astronomy			
	17U6MME6	Fuzzy Mathematics			
	Major Elective – III (one to be chosen)				
	17U6MME7	Numerical Methods	5	6	
	17U6MME8	Automata Theory			
17U6MME9	Integral Equations				

Course Code	Course Title	C	H	I	E	T
17U5MMC8	Real Analysis	6	6	25	75	100

Learning Objectives

- To provide a strong foundation in basic concepts of Real Analysis which will enrich them to have a good knowledge in Pure Mathematics.
- To impart the knowledge of Metric space, Continuity, Connectedness and Compactness.

Learning Outcomes

On satisfying the requirement of this course, students will

- Have good knowledge of the fundamental mathematical concepts in Real analysis which is very essential for Higher Mathematics.
- Be familiar with Geometric behavior of continuous and discontinuous functions and able to point out the discontinuities on the graph of a function.
- Be able to prove statements and to formulate precise mathematical arguments.
- Demonstrate the ability to solve mathematical problems in Real analysis.

Unit I Metric Spaces

Introduction – Countable sets – Uncountable sets – Inequalities of Holder and Minkowski – Definitions and examples of metric space – Bounded sets in a metric space – Open ball in a metric space – Open sets.

Unit II Metric Spaces (Continued) and Complete Metric Space

Subspaces – Interior of a set – Closed sets – Closure – Limit point – Dense sets – Completeness –Baire’s category theorem.

Unit III Continuity

Continuity – Homeomorphism – Uniform continuity – Discontinuous functions on \mathbb{R} .

Unit IV Connectedness

Definition and examples – Connected subsets of \mathbb{R} – Connectedness and continuity.

Unit V Compactness

Compact space – Compact subsets of \mathbb{R} – Compactness and continuity.

Text Book:

S. Arumugam and A. Thangapandi Issac, Modern Analysis, 2012, New Gamma Publishing House.

Chapters: 1 (1.1 – 1.14), 2 (2.1 – 2.4, 2.5 – 2.10), 3 (3.1, 3.2), 4 (4.1 – 4.4), 5 (5.1 – 5.3), 6 (6.1, 6.2, 6.4).

Reference Books:

1. Dr. K. ChandrasekaraRao, Dr. K. Narayanan, Real Analysis, Vol. I &Vol. II, 2008, S. Viswanathan (Printers & Publishers) Pvt. Ltd.
2. M.K. Singal and Asha Rani Singal, A First Course in Real Analysis, 2010 Edition, R. Chand & Co Publication.

Course Code	Course Title	C	H	I	E	T
17U5MMC9	Differential Equations	6	6	25	75	100

Learning Objectives

- To enable the students to understand the concepts of Ordinary Differential Equations & Partial Differential Equations and its applications.
- To provide the basic knowledge of solving Ordinary Differential Equations using Laplace Transforms.

Learning Outcomes

After successful completion of this course, students will be able to

- Explain the concepts of Differential Equation and Classify the Differential Equation with respect to their order and linearity.
- Solve Ordinary Differential Equation and Partial Differential Equation using various methods.
- Apply the concepts of Ordinary Differential Equation and Partial Differential Equation in real life problems.

Unit I Ordinary differential equations of the first order

Preliminaries (not included for the examination) – Exact differential equations – Conditions for the equation to be exact – Working rule for solving it – Integrating factors– Equations of the first order and of a degree higher than the first – Equations solvable for p – Solvable for x – Solvable for y – Clairaut's equations.

Unit II Ordinary linear differential equations of second and higher orders

Second and higher order linear differential equations with constant coefficients – Homogeneous linear equation with variable coefficients – Cauchy's Euler Homogeneous equations – Method of reduction of order – Transformation of the equation by change of the dependent variable – Method of variation of parameters – Simultaneous linear differential equations with constant coefficients.

Unit III Partial differential equations of first order

Partial differential equations – Formation of PDE's by the elimination of arbitrary constants – Formation of PDE's by eliminating the arbitrary functions – Lagranges' linear PDE's –Method of grouping and method of Lagrangian multipliers – Solving first order nonlinear PDE's – Standard forms.

Unit IV Higher order homogeneous and non-homogeneous PDE's

Solving second and higher order homogeneous PDE's with constant coefficients – Standard forms – Solving non-homogeneous PDE's.

Unit V Laplace transforms

Definition – Properties of Laplace transforms – Laplace transforms of some standard functions – Inverse Laplace transforms – Transform of derivatives and integrals – Laplace transform of periodic functions – Application of Laplace transforms to solve differential equations with constant coefficients and integral equations only.

Text Book:

M. K. Venkataraman and Mrs. Manorama Sridhar, Differential Equations and Laplace Transforms, 2004, The National Publishing Company.

Chapters:

Section A: 2 (2.6, 2.7), 3, 4, 5, 6, 7 (7.1 – 7.4, 7.7), 9 (9.1 – 9.8, 9.13 – 9.20).

Section B: 1 (1.1 – 1.18, 1.20).

Reference Books:

1. S.Arumugam and A. Thangapandi Issac, Differential equations and applications, Gamma Publishing House.
2. S.Narayanan and T. K. Manicavachagom Pillay, Calculus – Vol. III (Differential equations and Fourier series), Reprint 2002, S. Viswanathan Printers and Publishers Private Ltd.

Course Code	Course Title	C	H	I	E	T
17U5MMC10	Mechanics	6	6	25	75	100

Learning Objectives

To acquire the knowledge of fundamental concepts of Statics and Dynamics and its applications.

Learning Outcomes

On satisfying the requirement of this course, students will

- Understand projectile motion in the earth's gravity & the basic equations describing it.
- Apply Newton's Laws of Motion and principle of conservation of momentum.
- Understand simple harmonic motion & the simple harmonic oscillator. Understand displacement, frequency, & period for simple harmonic motion. Apply these concepts, along with Newton's 2nd Law to simple mass-spring problems.
- Understand frictional forces. Apply Newton's 2nd Law to problems with objects moving in the presence of friction. Understand the basics of motion on an inclined plane.
- Apply theorems of mechanics and interpret their results.
- Analyse mechanics as a systematic tool for problem solving.

Unit I Projectiles

Path of the projectile – Motion of the projectile – Velocity of the projectile – Range on the inclined plane.

Unit II Collision of elastic bodies

Newton's experimental law – Principle of conservation of momentum – Direct impact of two smooth spheres – Loss of kinetic energy due to direct impact – Oblique impact – Loss of kinetic energy due to oblique impact.

Unit III Simple Harmonic Motions

Composition of the Simple Harmonic Motion of the same period and in the same straight line and in two perpendicular direction – Motion of the particle suspended by a spiral spring – Simple pendulum – Motion under the action of central forces – Velocities and acceleration in polar coordinates – Differential equation of central orbits – Pedal equation – Velocities in a central orbit.

Unit IV Forces acting at a point

Parallelogram of forces – Triangle of forces – Lami's theorem – Resultant of any number of coplanar forces acting at a point – Parallel forces and momentum – Varignon's theorem on moments.

Unit V Friction

Laws of friction – Equilibrium of a body on a range inclined plane under a force parallel to the plane – Equilibrium of a body on a rough inclined plane under any force – Problems.

Text books:

1. M.K. Venkatraman, Dynamics, 13th Edition 2009, Agasthiar Publications.
Chapters: 6(6.1 – 6.16), 8(8.1 – 8.9), 10(10.1 – 10.13), 11(11.1 – 11.11).
2. M.K. Venkatraman, Statics, 13th Edition 2010, Agasthiar Publications.
Chapters: 2(1 – 15), 3(1 – 12), 7(1 – 13).

Reference Books:

1. P. Duraipandian, LaxmiDuraipandian, Mechanics, 2005 Edition, S. Chand.
2. N. P. Bali, Dynamics, Golden series, 2011, Firewall Media Publisher.

Course Code	Course Title	C	H	I	E	T
17U5MME1	Probability Theory	7	6	25	75	100

Learning Objectives

- To impart the knowledge of fundamental concepts in Probability & Statistics to solve applied problems.
- To acquire the knowledge of various distributions and its applications.

Learning Outcomes

On satisfying the requirement of this course, students will be able to

- Extend and formalise knowledge of the theory of probability and random variables.
- Compute conditional probabilities directly and using Baye's theorem and check for independence of events.
- Perform probability calculations relating to probability distributions for discrete random variables.
- Perform probability calculations relating to probability density functions for continuous random variables.
- Compute Mathematical Expectation and variance.
- Apply various distributions to solve real life problems.

Unit I Probability

Introduction– Sample space – Events– The probability of an event– Some rules of probability – Conditional probability– Independent events–Baye's theorem – Problems.

Unit II Probability distribution & Probability density function

Introduction– Probability distribution – Continuous random variables – Probability density functions – Multivariate distribution – Marginal distributions – Conditional distributions.

Unit III Mathematical Expectations

Introduction – Expected value of random variable– Moments –Chebychev's theorem – Moment generating functions – Product moments – Moments of linear combination of random variables – Conditional expectations.

Unit IV Special Probability Distribution

Introduction – Discrete uniform distributions, Bernoulli's distribution –Binomial distribution – Negative binomial and Geometric distribution– Hyper geometric distribution– Poisson distribution – Multinomial distribution – The Multivariate Hyper geometric distribution.

Unit V Special Probability Densities

Introduction – Uniform distribution – Gamma, Exponential and Chi-square distribution – Beta distribution– Normal distribution – Normal approximation to Binomial distribution.

Text book:

John E. Freund's, Irwin miller, and Marylees Miller, Mathematical statistics with applications, 7th Edition 2007, Pearson.

Chapters: 2(2.1– 2.8), 3(3.1– 3.7), 4(4.2– 4.8), 5(5.2– 5.7), 6(6.2– 6.6).

Reference Books:

1. T. Veerarajan, Probability and Random Processes, 11th Reprint 2007, Tata McGraw – Hill Publishing Company limited.
2. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical statistics, 1996, S. Chand & Sons.

Course Code	Course Title	C	H	I	E	T
17U5MME2	Theory of Numbers and Inequalities	7	6	25	75	100

Learning Objectives

- To acquire knowledge in basic fundamentals of Theory of Numbers and Inequalities which will helpful for them to improve their ability of mathematical thinking.
- To enable the students to understand the basic structure and properties of integers.

Learning Outcomes

On satisfying the requirement of this course, students will have the knowledge and skills to

- Solve intellectual and fascinating questions in elementary Number Theory.
- Prove results involving divisibility and greatest common divisors.
- Apply Euler – Fermat’s theorem to prove relations involving prime numbers.
- Apply the concepts of congruence arithmetic to construct a method of encrypting messages in Public key Cryptography.
- Apply the acquired knowledge of elementary Number Theory in various fields.

Unit I Theory of Numbers

Prime and Composite number – The sieve of Eratosthenes – Divisors of a given number – Problems.

Unit II Euler’s Functions

Euler’s Functions $\phi(N)$ – Integral Part of a Real Numbers – Simple problems – The highest power of a prime p contained in $n!$ – The product of r Consecutive integers is divisible by $r!$

Unit III Congruence

Definition of Congruences – Problems – Criteria of Divisibility of a number – Simple Problems – Numbers in Arithmetical Progression – Fermat’s Theorem – Problems.

Unit IV Theorems of Fermat and Wilson

Generalization of Fermat’s theorem – Wilson’s Theorem – Lagrange’s Theorem – Problems.

Unit V Inequalities

Introduction – Geometric and Arithmetic means – Simple problems – Weirstrass inequalities – Cauchy’s inequality – Simple problems – Applications of maxima and minima – Problems.

Text Book:

T.K. Manicavachagom Pillay, T. Natarajan and K.S Ganapathy, Algebra – Vol. II, Edition 2010, S. Viswanathan (Printers & Publishers) Pvt. Ltd.

Chapters: 4 and 5.

Reference Books:

1. M.K Venkataraman and Mrs. ManoramaSridhar, Theory of Numbers and Inequalities, Edition 2002, The National Publishing Company.
2. Kumaravel and SusheelaKumaravel, Elements of Number Theory, Edition 2002, SKV publishing company.

Course Code	Course Title	C	H	I	E	T
17U5MME3	Mathematical Modelling	7	6	25	75	100

Learning Objectives

- To study the different mathematical models on ODE and Difference equations.
- To study the graph theoretical models.

Learning Outcomes

On satisfying the requirement of this course, students will have the knowledge and skills to

- Demonstrate a working knowledge of core techniques behind mathematical modelling.
- Develop a basic ability to quantify certain phenomena associated with physical sciences.
- Understand the objectives of mathematical modelling within the physical sciences.

Unit I

Mathematical Modelling through Ordinary Differential Equations of First order

Linear Growth and Decay Models–Non-Linear growth and Decay Models–Compartment Models–Dynamic problems– Geometrical problems.

Unit II

Mathematical Modelling through Systems of Ordinary Differential Equations of First order

Population Dynamics–Epidemics – Compartment Models – Economics–Medicine, Arms, Race, Battles and International Trade–Dynamics.

Unit III

Mathematical Modelling through Systems of Ordinary Differential Equations of Second order

Planetary motions–Circular motion and Motion of Satellites–Mathematical Modelling through Linear Differential Equations of Second order–Miscellaneous Mathematical Models.

Unit IV

Mathematical Modelling through Difference equations

Simple Models–Basic Theory of Linear Difference Equations with constant coefficients–Economics and Finance–Population Dynamics and Genetics–Probability Theory.

Unit V

Mathematical Modelling through Graphs

Situations that can be Modelled through Graphs – Mathematical Modelling in terms of Directed Graphs, Signed Graphs, Weighted Digraphs and unoriented Graphs.

Text Book:

J.N. Kapur, Mathematical Modelling, Reprint 2009, New Age International publishers, New Delhi.

Chapters:2, 3, 4, 5, 7

Reference Books:

1. J.N.Kapur, Mathematical Models in Biology and Medicine, Affiliated East-West Press Pvt Limited, New Delhi.
2. Mark M. Meerschaert,Mathematical Modelling, 4th Edition, Elsevier.

Course Code	Course Title	C	H	I	E	T
17U6MMC11	Complex Analysis	4	4	25	75	100

Learning Objectives

To provide a strong foundation in fundamental concepts of Complex Analysis which will enrich them to have a good knowledge to apply in real life problems.

Learning Outcomes

On satisfying the requirement of this course, students will

Determine whether the given function is Continuous / differentiable / analytic, and find the derivative of a function.

- Use Cauchy's integral theorem and formula to compute line integrals.
- Find the Taylor's series of a function and determine its circle or annulus of convergence.
- Classify singularities, examine the theory, compute the residue of a function and able to apply the concepts of the calculus of residues in the evaluation of integrals.

Unit I Analytic Functions

Functions of complex variable – Limits – Theorems on limit – Continuous functions – Differentiability – The Cauchy-Riemann equations – Analytic functions – Harmonic functions.

Unit II Bilinear Transformations

Elementary transformations – Bilinear transformations – Cross ratio – Fixed points of bilinear transformations.

Unit III Complex Integration

Definite integral – Cauchy's theorem – Cauchy's integral formula – Higher derivatives – Problems.

Unit IV Series Expansions

Taylor's series – Laurent's series – Zeros of an analytic function – Singularities.

Unit V Calculus of Residues

Residues – Cauchy's residue theorem – Argument theorem – Rouché's theorem – Fundamental theorem of Algebra.

Text Book:

S. Arumugam, A. T. Issac and A. Somasundaram, Complex Analysis, Reprint 2010, Scitech Publications (India) Pvt. Ltd.

Chapters: 2 (2.1 – 2.8), 3 (3.1 – 3.4), 6 (6.1 – 6.4), 7 (7.1 – 7.4), 8 (8.1, 8.2).

Reference Books:

1. T. K. ManickavachagomPillay, S. P. Rajagopalan and R. Sattanatham, Complex Analysis, 2007 Edition, S. ViswanathamPrinters & Publishers.
2. Narayanan and T. K. ManickavachagomPillay, Complex Analysis, 1997 Edition, S. ViswanathamPrinters & Publishers.

Course Code	Course Title	C	H	I	E	T
17U6MMC12	Linear Algebra	4	4	25	75	100

Learning Objectives

- This course is to provide a strong foundation in fundamental concepts of Linear Algebra culminating in abstract vector spaces and linear transformations.
- To understand the use of basic concepts of vector algebra including linear dependence / independence, basis and dimension of a subspace, rank and nullity for analysis of matrices and system of linear equations.

Learning Outcomes

After successful completion of this course, students will be able to

- Understand vector spaces and subspaces and apply their properties.
- Characterize a set of vectors in terms of linear combinations, their span and how they are related geometrically.
- Find a basis for the row space, column space and null space of a matrix and understand the change of basis.
- Compute inner product spaces on a real vector space and compute angle and orthogonality in inner product spaces.
- Create orthogonal and orthonormal bases using Gram Schmidt orthogonalization process and use bases and orthonormal bases to solve application problems.
- Identify linear transformations of finite dimensional vector spaces and compose their matrices in specific bases.
- Compute linear transformations, kernel, range and invertible linear transformations.
- Apply linear algebra concepts to model, solve and analyse real-world situations.

Unit I Vector Spaces

Vector Space – Definition and examples – Subspaces – Sum of Subspaces – Quotient Spaces – Homomorphism or Linear transformation.

Unit II Vector Spaces (Continuation)

Linear span – Linearly independence and linearly dependence– Finite dimensional vector space – Dimension of a vector space.

Unit III Inner Product Spaces

Inner Product Space – Definition – Examples – Norm of a Vector – Orthogonality –Orthonormal set – Bessel’s inequality – Gram Schmidt’s Orthogonalization Process.

Unit IV Linear Transformations

Linear Transformations – Algebra of Linear Transformations.

Unit V Linear Transformations (Continuation)

Invertible Linear Transformations – Matrix of Linear Transformations.

Text Book:

- Vijay K. Khanna and S. K. Bhambiri, A Course in Abstract Algebra, 5th Edition (3rd Reprint 2018), Vikas Publishing House Private Limited.
- **Chapters:** 10, 11 (Upto Matrix of a Linear transformation), 13 (Excluding operators on Inner product space)

Reference Books:

1. Surjeet Singh and Qazi Zameeruddin, Modern Algebra, 8th Edition, Vikas Publishing House Private Limited.
2. S. Arumugam and A. Thangapandi Issac, Modern Algebra, July 2006, Scitech Publications Private Limited, India.

Course Code	Course Title	C	H	I	E	T
17U6MMC13	Graph Theory	4	4	25	75	100

Learning Objectives

This course is to provide a strong foundation in Graph Theory which has diverse applications in many areas.

Learning Outcomes

On satisfying the requirement of this course, students will have the knowledge and skills to

- Explain the basic concepts of graph theory.
- Develop a graph theoretical model for a real life situations.
- Describe and solve some real time problems using the concepts of graph theory.

Unit I Graphs and Subgraphs

Definition and examples of graphs – Degrees–Subgraphs – Isomorphism – Ramsey Numbers.

Unit II Matrices and Degree Sequences

Independent sets and Coverings– Matrices – Operation on Graphs – Degree Sequences – Graphic Sequences.

Unit III Connectedness and Eulerian Graphs

Walks – Trails and Paths – Connectedness and Components – Blocks – Connectivity – EulerianGraphs.

Unit IV Hamiltonian and Tree Graphs, Matching's

Hamiltonian Graphs – Characterization of Trees – Centre of a tree – Matching's.

Unit V Planarity and Colourability

Definition and Properties– Chromatic Numbers and Chromatic Index – Chromatic Polynomials.

Text Book:

S.Arumugam and S.Ramachandran, Invitation to Graph Theory, Reprint 2017,Scitech Publications (India) Pvt Ltd.

Chapters: 2(2.1 – 2.6, 2.8– 2.9), 4(4.0 – 4.4), 5(5.1, 5.2), 6(6.0 – 6.2), 7(7.0, 7.1), 8(8.1), 9(9.1& 9.4).

Reference Books:

1. Gary Chartrand and Ping Zhang, An Introduction to Graph Theory, 4th Reprint 2008, Tata McGraw-Hill Edition.
2. Robin J. Wilson, Introduction to Graph Theory, 4th Edition 2012, Pearson Publication.

Course Code	Course Title	C	H	I	E	T
17U6MSM4	Major Skill Based Elective-IV(Quantitative Aptitude)	2	2	25	75	100

Learning Objectives

- The main aim of introducing “Quantitative Aptitude” for mathematics students is to develop skill to meet the competitive examinations for better job opportunity.
- Effort has been made to accommodate fundamental, mathematical aspects to instill confidence among students.
- Enrich their knowledge and to develop their logical reasoning thinking ability.

Learning Outcomes

After successful completion of this course, students will have the knowledge and skills to

- Solve the problems easily by using Short-cut method with time management which will be helpful to them to clear the competitive exams for better job opportunity.
- Analyze the Problems logically and approach the problems in a different manner.

Unit I Problems on Ages – Percentage.

Unit II Profit & Loss – Ratio & Proportion.

Unit III Time & Distance – Problems on Trains.

Unit IV Calendar – Stocks & Areas.

Unit V True Discount – Banker’s Discount.

Text Book:

R. S. Aggarwal, Quantitative Aptitude (Fully solved), Reprint 2016, S. Chand.

Chapters: 8, 10, 11, 12, 17, 18, 27, 29, 32, 33.

Reference Books:

1. R.V.Praveen, Quantitative Aptitude and Reasoning, 2nd Revised Edition 2013, Prentice-Hall of India Pvt.Ltd.
2. G. K. Ranganath, C. S. Sampangiram and Y. Rajaram, A text Book of business Mathematics, 2008, Himalaya Publishing House.

Course Code	Course Title	C	H	I	E	T
17U6MME4	Optimization Techniques	6	5	25	75	100

Learning Objectives

- To impart Optimization Techniques.
- To make the Students become familiar with the basic Principle of LPP and enrich knowledge to formulate and solve an LPP using various methods.
- To make the Students become familiar with Network scheduling by PERT/CPM.

Learning Outcomes

On satisfying the requirement of this course, students will have the knowledge and skills to

- Formulate the LPP for a real life Problems and give the solution for the problem using suitable optimization techniques.
- Solve Transportation Problems by using various methods and solve the Assignment & Travelling Salesman Problem using Hungarian Algorithm.
- Do network scheduling by PERT/CPM.
- Apply Optimization Techniques in Various fields such as Science, Engineering, Industry, Business, etc.

Unit I

Linear programming problem (LPP)

Introduction – Mathematical formulation of the problem – Graphical solution method – Some exceptional cases – General LPP – Canonical & standard form of LPP.

Unit II

Simplex method

Introduction – Fundamental properties of solutions –The Computational procedure (Simplex Method) – Use of artificial variables (Two-Phase method & Big-M method).

Unit III

Duality in LPP

Introduction – General primal – Dual pair – Formulating a dual problem – Primal – Dual pair in matrix form – Duality theorems – Duality & simplex method – Dual simplex method.

Unit IV

Transportation problem and Assignment problem

Introduction – Solutions of transportation problem for finding an initial basic feasible solution & test for optimality (MODI method) – Degeneracy in transportation problem – Introduction to assignment problem – Mathematical formulation and solution – Travelling salesman problem.

Unit V

Network scheduling by PERT/CPM

Introduction – Network and basic components – Time calculation in network – Floats –CPM - PERT calculations – Distinction between PERT and CPM.

Text Book:

KantiSwarup, P.K. Gupta and Man Mohan, Operations Research, 9th Edition 2001, Sultan Chand Publication.

Chapters: 2, 3(3:1 – 3:5), 4(4:1 – 4:4), 5(5:1 – 5:5, 5:7, 5:9), 10(10:1 – 10:13), 11(11:1 – 11:6), 21(21:1 – 21:8).

Reference Books:

1. V. Sundaresan, K.S. Ganapathy Subramanian and K. Ganesan, Resource Management Techniques (Operations Research), 2000, A.R Publications.
2. Harvey M. Wagner, Principles of Operations Research, 2nd Edition, 1975, PHI Publications.

Course Code	Course Title	C	H	I	E	T
17U6MME5	Astronomy	6	5	25	75	100

Learning Objectives

- To enable the students to understand basic physical principles of astronomical concepts.
- To recognize and understand the interdisciplinary aspects of planetary science.

Learning Outcomes

After successful completion of this course, students will

- Become familiar with the appearance of a range of common astronomical objects such as asteroids, comets, satellites, planets, stars and galaxies.
- Be able to utilize the scientific method to explore and to solve problems.
- Demonstrate an understanding of the basic principles of the sun and stars.

Unit I Celestial sphere

Introduction – Duration of motion – Celestial co-ordinates – Conversion of co-ordinates – Relation between Right ascension and longitude of the sun – Longitude of the sun on any day.

Unit II Sidereal times

Introduction – Western hour angle – Latitude of a place – Duration of day time – Azimuth of a star at rising – Morning and evening stars – Circumpolar stars.

Unit III Earth

Zones of earth – Trace the variation in the duration of day and night – Problems – Terrestrial latitudes and longitudes – Radius of earth – Dip of horizon – Twilight – Problems.

Unit IV Refraction

Introduction – Laws of refraction – Horizontal refraction – Geocentric Parallax – Problems.

Unit V Kepler's Laws

Laws of planetary motion – Longitude of perigee – Verification of Kepler's Laws – Mass of a planet – Problems – Equation of time.

Text Book:

S. Kumaravelu and SusheelaKumaravelu, Astronomy, Reprint: 2009, S. Chand.

Chapters: 2 (page no.41 – 55), 2 (59 – 67,77), 3(98 – 111,113,126,135 – 137,144–152), 4(154–167),5(175 – 186), 6(191 – 216),7(220 – 230).

Reference Books:

1. S. BalachandraRao, Indian Astronomy and Introduction, 1999, University Press.
2. G.V. Ramachandran, A Text Book of Astronomy, 3rd Edition 2007, De Nobili Press.

Course Code	Course Title	C	H	I	E	T
17U6MME6	Fuzzy Mathematics	6	5	25	75	100

Learning Objectives

This course is to enable the students to understand the concepts of Fuzzy Logic theory and its applications.

Learning Outcomes

On satisfying the requirement of this course, students will have the knowledge and skills to

- Apply the methods of fuzzy logic in real life problems.
- Decide the difference between crisp set theory and fuzzy set theory.
- Recognize fuzzy logic and fuzzy inference systems.

Unit I Fuzzy Logic

An overview of classical logic – Connectives – Types of sentences – Truth values and truth tables – Tautology – Algebra of statements – Validity of arguments – Logical identities of crisp logic – Well-formed formulas (WFF) – Predicates and quantifiers.

Unit II Fuzzy Logic (Continuation)

Quantifiers and logical operators – Normal forms – Fuzzy logic – Fuzzy connectives – Fuzzy inference – Fuzzy propositions – Fuzzy quantifiers – Linguistic Hedges – Inference from conditional Fuzzy propositions.

Unit III Fuzzy set theory

Fuzzy sets – Definition – Types of Fuzzy sets – General definition of properties of Fuzzy sets – Other important operations – General properties: Fuzzy vs crisp.

Unit IV Operations on Fuzzy sets

Introduction – Some important theorems – Extension principle for Fuzzy sets – Fuzzy compliments – Further operations on Fuzzy sets – t-Norm and t-Conorms – Definition of intersection and union by Hamacher – Yager's union and intersection of two Fuzzy sets – Union and intersection of two Fuzzy sets and defined by Dubois and Prade.

Unit V Fuzzy Relations

Introduction – Projections and cylindrical Fuzzy relations – Compositions – Properties of Min-Max composition – Binary relations on a single sets – Compatibility relations – Fuzzy ordering relation.

Text Book:

S. Pundir and R. Pundir, Fuzzy Sets and their Applications, 4th Revised Edition 2012, PragatiPrakashan Publications.

Chapters : 1 (1.16 – 1.21), 2 (2.1 – 2.9), 4 (4.1 – 4.7), 7 (7.1 – 7.19).

Reference Books:

1. H.J. Zimmermann, Fuzzy set Theory and its Applications, 2nd Edition 1996, Allied Publishers Ltd.
2. S. Nanda and N. R. Das, Fuzzy Mathematical Concepts, 2010, Narosa Publishing House.

Course Code	Course Title	C	H	I	E	T
17U6MME7	Numerical Methods	6	5	25	75	100

Learning Objectives

- To acquire a good knowledge in fundamental concepts of theoretical and practical aspects of the use of numerical methods.
- To enable the students to understand the implications of approximations.

Learning Outcomes

On satisfying the requirement of this course, students will have the knowledge and skills to

- Develop efficient algorithms for solving equations using various techniques.
- Implement Numerical Methods for variety of Multi-disciplinary applications.

Unit I Solutions of Linear equations

Bisection method – Iteration method – Regula-falsi method – Newton Raphson’s method.

Unit II Simultaneous linear equations

Gauss elimination method – Inversion of matrix using Gauss elimination – Method of triangularization–Crout’s method – Iterative methods – Gauss Jacobi method – Gauss seidal method.

Unit III Finite differences

First difference – Differences of a polynomial – Factorial polynomial – Interpolation for equal interval – Newton’s forward interpolation formula – Newton’s backward interpolation formula.

Unit IV Interpolation

Interpolation with unequal intervals – Divided differences – Lagrange’s interpolation formula – Lagrange’s inverse interpolation formula – Numerical differentiation – Newton’s forward difference formula to get the derivative – Newton’s backward difference formula to compute the derivative – Stirling’s formula – problems.

Unit V Numerical integration

Trapezoidal rule – Simpon’s one third rule – Simpon’s three - eight rule – Romberg’s integral – Numerical solution of ODE – Taylor series method – Euler method – Runge-kutta method.

Text Book:

P.Kandasamy, K.Thilagavathy and K.Gunavathi, Numerical Methods, Reprint 2016, S. Chand & Company Ltd.

Chapters:3(3.1 – 3.4), 4(4.1 – 4.5, 4.7 – 4.9), 5(5.1 – 5.4), 6(6.1 – 6.6), 8(8.1,8.2,8.5 – 8.7), 9(9.1 – 9.14), 11(11.1 – 11.5, 11.9 – 11.12).

Reference Books:

1. S. Arumugam, A.T. Isaac & Somasundaram, Numerical Analysis with Programming in C, 2007, New Gamma Publishing House.
2. M. K. Jain, S.R.K. Iyengar and R.K. Jain, Numerical Methods for Science and Engineering Computation, 6th Edition 2012, New Age International Publishers.

Course Code	Course Title	C	H	I	E	T
17U6MME8	Automata theory	6	5	25	75	100

Learning Objectives

- To acquire fundamental understanding of the core concepts in Automata Theory and formal languages.
- To develop an understanding of computation on through finite state machines.

Learning Outcomes

On satisfying the requirement of this course, students will

- Have an ability to design grammars and automata for different language classes.
- Understand the equivalence between non-deterministic finite state automata and deterministic finite state automata.

Unit I Finite Automata

Introduction –Finite Automata– Definition of finite Automaton–Representation of finite Automaton–Acceptability of a string by a finite Automaton–Languages accepted by a Finite Automaton.

Unit II Non-deterministic Finite Automata

Non-deterministic Finite Automata–Acceptability of a string by Non-deterministic Finite Automata–Equivalence of FA and NFA–Procedure for finding an FA equivalent to a given NFA–Properties of regular sets–Decision Algorithm for regular sets.

Unit III Finite State Machines

Finite state machines–The monoid of a Finite-state machine–The machine of a monoid–Phrase structure Grammars–Chomsky Hierarchy of Languages–Finite Automata and regular Languages.

Unit IV Context-free Grammars

Derivation Tress for Context-free Grammars–Normal forms for Context-free Grammars–Ambiguity, Parsing and Polish Notation–Simple presidenceGrammar.

Unit V Pushdown Automata

Pushdown Automata–Definition of Pushdown Automation– Instantaneous Descriptions of a PDA–Important properties of Move relation–Acceptance by PDA–Equivalence of two types of Acceptance by PDA–Context-free Languages and PDAs.

Text Book:

- M. K. Venkataraman, N. Sridharan and N. Chandrasekaran, Discrete Mathematics, Reprint September 2007, The National Publishing Company.
- **Chapter:** XII (1 to 29).

Reference Books:

1. D.P Acariya, Theory of computation, 2010, MJP publishers.
2. Kenneth H Rosen, Discrete Mathematics & its Applications with Combinatorics and Graph theory, 6th Edition, Tata McGraw-Hill Publishing Company limited.

Course Code	Course Title	C	H	I	E	T
17U6MME9	Integral Equations	6	5	25	75	100

Learning Objectives

- To impart analytical ability in solving Integral equations.
- To understand the relation between differential and integral equations, and how to change from one to another.

Learning Outcomes

- After successful completion of this course, the students will be able to
- Understand different kinds of kernels and techniques for solving each kind.
- Understand number of numerical methods for solving integral equations.
- Develop the skills while solving the various problems using integral equations.
- Apply the concepts of Integral equations in real life problems.

Unit I

Conversion of ordinary differential equations into integral equations

Integral equation definition and types – Singular integral equation – Special kinds of kernels
 Solution of an integral equation: Definition and examples – Initial value problem – Method of converting an initial value problem into a Volterra integral equation – Boundary value problem – Method of converting a boundary value problem into a Fredholm integral equation.

Unit II

Homogeneous Fredholm integral equations of the second kind with separable kernels

Characteristic values – Solution of homogeneous Fredholm integral equation of the second kind with separable kernels – Selected examples.

Unit III

Fredholm integral equations of the second kind with separable kernels

Solution of Fredholm integral equations of the second kind with separable kernels – Solved examples – Fredholm alternative, Fredholm theorems, Fredholm alternative theorem – Solved examples – An approximate method.

Unit IV

Method of successive approximations

Introduction - Iterated kernels or functions – Resolvent kernel – Solution of Fredholm integral equation of the second kind by successive substitutions – Solution of Volterra integral equation of the second kind by successive approximations – Neumann series – Some important theorems – Solved examples.

Unit V

Classical Fredholm theory

Introduction – Fredholm first fundamental theorem – Solved examples.

Text Book:

M. D. Raisinghania, Integral Equations and Boundary Value Problems, 7th Revised Edition 2014, S. Chand & Company Pvt. Ltd.

Chapters: 1, 2, 3, 4, 5 (5.1 – 5.9), 6 (6.1 – 6.3)

Reference Books:

1. P.C. Bhakta, Integral Transform, Integral Equations and Calculus of variations, First published 2011, Sarat Book Distributors, Kolkata.
2. D.C. Sharma and M.C. Goyal, Integral Equations, First edition 2017, PHI publishers.

**CBCS Pattern for B.Sc Mathematics –
Ancillary (Computer and Computational Methods)
Course Structure**

Semester	Sub. Code	Title of the Paper	Hours	Credits
III	17U3MAC1	Ancillary CCM – I: Office Automation	2	1
	17U3MAP1	LAB: Practical in Office Automation	2	1
IV	17U4MAC2	Ancillary CCM – II: Programming in C	4	2
	17U4MAP2	LAB: Practical in Programming in C	2	1
V	17U5MSA1	Skill Based Elective (CCM): Combinatorics	2	2
	17U5MAC3	Ancillary CCM – III: Programming with C++	2	1
	17U5MAP3	LAB: Practical in C++	2	1
VI	17U6MAC4	Ancillary CCM – IV: Fundamentals of JAVA Programming	4	2
	17U6MAP4	LAB: Practical in JAVA Programming	2	1

Course Code	Course Title	C	H	I	E	T
17U5MSA1	Skill Based Elective (CCM): Combinatorics	2	2	25	75	100

Learning Objectives

- To impart the knowledge of counting principles which is essential for the students to think critically and apply it in real-world problems.
- To acquire the knowledge of Lattices and its applications.

Learning Outcomes

After successful completion of this course, the students will be able to

- Solve counting problems by applying elementary counting techniques using the sum and product rules, permutations, combinations and pigeonhole principle.
- Apply the ideas of Permutations and Combinations, Combinatorial number theory in various real life situations.

Unit I Counting

Basic Counting Principles – Sum rule principle and product rule principle – Factorial notation – Binomial coefficient – Permutations – Problems.

Unit II Combinations

Combinations with repetitions – The Pigeonhole principle – Problems.

Unit III Ordered partitions

Ordered partitions and Unordered partitions – The inclusion – Exclusion principle – Generation of Permutations & Combinations – Tree diagrams – Problems.

Unit IV Ordered sets

Ordered sets – Hasse Diagrams of partially ordered sets – Consistent enumeration – Supremum and infimum – Isomorphic ordered sets – Well-ordered sets – Problems.

Unit V Lattices

Lattices – Bounded Lattices – Distributive Lattices – Complements and complemented Lattices – Problems.

Text Book:

Seymour Lipschutz and Marc Lars Lipson, Discrete Mathematics (Schaum's Outlines), 3rd Edition, 3rd Reprint 2010, Tata McGraw Hill.

Chapters: 6, 14.

Reference Books:

1. V.K. Balakrishnan, Combinatorics, Schaum's Outlines, 1995.
2. Dr. M. K. Venkataraman, Dr. N. Sridharan and N. Chandrasekaran, Discrete Mathematics, Reprint September 2007, The National Publishing Company.

Course Code	Course Title	C	H	I	E	T
17U5MAC3	Ancillary CCM – III: Programming with C++	1	2	25	75	100

Learning Objectives

- To enable the students to have a good foundation and practical knowledge on Programming with C++.
- To enable the students to understand C++ language which improves C with Object – Oriented features.
- To learn the syntax and semantics of C++ programming language.

Learning Outcomes

On satisfying the requirement of this course, students will

- Have an ability to design C++ classes for code reuse.
- Able to design & implement programs using classes and objects.
- Acquire knowledge of writing inline functions for efficiency and performance.

Unit I Data Types and Functions

Basic Concepts of Object-Oriented Programming – Benefits of OOP – Identifiers and Constants – Basic Data Types– The Main Function – Function Prototyping – Call by Reference – Return by reference.

Unit II Classes and Objects

Specifying a Class – Defining Member Functions – A C++ Program with Class – Making an Outside Function Inline – Nesting of Member Functions – Private Member Functions – Arrays within a Class – Arrays of Objects – Objects as Function Arguments – Friendly Functions – Returning Objects.

Unit III Constructors and Destructors

Introduction – Constructors – Parameterized Constructors – Multiple Constructors in a Class – Constructors with Default Arguments – Copy Constructor – Dynamic Constructors – Destructors.

Unit IV Operator Overloading

Introduction – Defining Operator Overloading –Overloading Unary Operators – Overloading Binary Operators – Overloading Binary Operatorsusing Friends.

Unit V Inheritance

Introduction – Defining Derived Classes – Single Inheritance – Making a Private Member Inheritable – Multilevel Inheritance – Multiple Inheritance.

Text book:

E. Balagurusamy, Object-Oriented Programming with C++, 2nd Edition 2001, Tata McGraw-Hill Publishing Company Limited.

Chapters:1(1.5,1.6),3(3.4,3.5),4(4.2 – 4.5),5(5.3,5.4,5.6–5.9,5.13–5.16),6(6.1 – 6.5,6.7,6.8,6.11), 7(7.1–7.5), 8(8.1–8.6).

Reference Books:

1. D. Ravichandran, Programming with C++, 1996, Tata McGraw-Hill Publishing Company Limited.
2. Yashvant Kanetkar, Let us C++, 2006, BPB publication.

Course Code	Course Title	C	H	I	E	T
17U5MAP3	LAB: Practical in C++	1	2	50	50	100

S.No.	List of Programs
1	Implementation of classes and objects.
2	Developing OOP to print PASCAL triangle.
3	Banking Operation Using Constructors.
4	Adding two times using parameterized constructors.
5	Using the idea of friend function returning object technique to add two complex numbers.
6	Write an object oriented programme with the help of unary operator overloading concept to check whether the given number is Armstrong or not.
7	Develop an OOP to implement operator overloading using friend function.
8	Develop an OOP to implement Single inheritance.
9	Develop an OOP to implement Single inheritance using Private Member.
10	Develop an OOP to implement Multilevel inheritance (Area of a triangle and its internal angles provided the sides of triangle).

Course Code	Course Title	C	H	I	E	T
17U6MAC4	Ancillary CCM – IV: Fundamentals of JAVA Programming	2	4	25	75	100

Learning Objectives

- To enable the students to have a good foundation and practical knowledge on Programming with JAVA.
- To understand the basics of OOP & Object oriented approach to design software.

Learning Outcomes

On satisfying the requirement of this course, students will be

- Able to understand basic concepts of Java such as objects, classes, operators, packages & various keywords.
- Able to design the applications of Java.

Unit I Java evolution

Java history – Java features – Java and internet – Web browsers –Java environment – Overview of Java language: Java program structure – Java statements – Implementing a Java program – Java virtual machine – Command line arguments.

Unit II Java fundamentals

Constants, variables and data types – Operations and expressions – Decision making and branching – Decision making and looping.

Unit III Classes, objects and methods

Defining a class, adding variables – Adding methods – Constructors – Method overloading inheritance – Overriding methods, arrays, strings and vectors – Creating arrays – Strings – vectors – Wrapper classes.

Unit IV Interfaces

Defining interfaces – External interfaces – Implementing interfaces, packages: creating packages – Using a package – Adding a class to a package.

Unit V Multithreaded programming

Multithreaded programming – Creating threads – Extending the thread – Stopping and blocking a thread – Life cycle of a thread.

Text Book:

E. Balagurusamy, Programming with JAVA – A Primer, 2nd Edition 2000, Tata McGraw – Hill Publication.

Chapters: 2(2.1,2.2,2.4,2.9), 3(3.5,3.7,3.8,3.9,3.10),4(4.2–4.4),5(5.2–5.9),6(6.2 –6.8),7(7.2–7.4),8(8.2–8.4,8.7, 8.8, 8.11,8.12),9(9.2–9.7),10(10.2–10.4),11(11.5 –11.8),12(12.2–12.5).

Reference Books:

1. C. Xavier, JAVA Programming with JAVA 2, 2nd Reprint 2003, Scitech Publication.
2. Patrick Naughton, Herbert Schildt, The complete reference, 3rd Edition 1997, Osborne Publishing.

Course Code	Course Title	C	H	I	E	T
17U6MAP4	LAB: Practical in JAVA Programming	1	2	50	50	100

S.No.	List of Programs
1	Program to find out the area of the triangle.
2	Use a command line argument to find out the biggest of three integers.
3	Create a Java program to display student name, roll no. and marks of three subjects where the information is obtained at runtime.
4	Develop a Java program to display all prime numbers between two limits.
5	Develop a Java program to solve a quadratic equation.
6	Develop a Java program to generate sequence of numbers with the following format.
7	Generate Fibonacci sequence using a constructor.
8	Develop a Java program with the idea of multiple constructors to find the area of a triangle.
9	Use a Java program to find the area of a circle, a triangle, a square and a rectangle. Use method overloading if possible.
10	Develop a Java program which will accept the marks of all the students of various subjects in a particular semester. Find out the top scorer and the top score in each subject.
11	Develop a Java program that performs string sorting.
12	Develop a Java program with inheritance to display the area of a triangle and display the altitude of a triangle. Assume that the sides are input.
13	Develop a Java program using interface to display student details.
14	Create a Java program that will implement the usage of more than one package.
15	Develop a Java program using exception handling to find the slope of the line between two points.

Components Of C.I.A And Question Pattern For end Semester Examinations

Components of C.I.A

- | | | |
|-----------------------------|---|----------|
| i) Test | - | 15 marks |
| ii) Assignment/Quiz/Seminar | - | 5 marks |
| iii) Attendance | - | 5 marks |

Total - 25 marks

End Semester Exam Components for U.G.

Time: 3 Hours

Maximum Marks: 75

Part –A (10 X 1 = 10 Marks)

(Answer ALL questions)

- Objective type Questions.
- Two questions from each unit.

Part – B (5 X 7 = 35 Marks)

(Answer ALL questions)

- Either or pattern.
- One question from each unit.

Part – C (3 X 10= 30 Marks)

(Answer any THREE questions)

- Out of FIVE questions, THREE questions to be answered
- One question from each unit.

DEPARTMENT OF BOTANY

THE MADURA COLLEGE (AUTONOMOUS), MADURAI – 625011
DEPARTMENT OF BOTANY
CBCS PATTERN FOR B.Sc., BOTANY (2017 - 18 Onwards)

Year	Semester	Course Code	Course Title	Hours	Credits	
I	I	17U1BMC1	Cryptogams	5	5	
		17U1BSM1	Horticulture	2	2	
		17U1BES1	Environmental Science	2	2	
			Practical*	3		
	II		17U2BMC2	Anatomy and Embryology	5	5
			17U2BSM2	Biodiversity	2	2
			17U2BVE1	Value Education	2	2
			17U2BMP1	Practical -I	3	6
II	III	17U3BMC3	Cell biology and Biochemistry	4	4	
			Practical*	2		
	IV	17U4BMC4	Ecology	2	2	
		17U4BSM3	Crop Diseases	2	2	
		17U4BMP2	Practical - II	2	4	
III	V	17U5BMC5	Phanerogams #	5	6	
		17U5BMC6	Genetics, Breeding and Biostatistics **	5	5	
		17U5BMC7	General Microbiology **	5	5	
		17U5BME1	Applied Microbiology **	3	3	
			Practical*	6		
	VI		17U6BMC8	Plant Physiology #	6	7
			17U6BME2	Molecular Biology and Biotechnology **	6	7
			17U6BME3	Bioinformatics **	4	4
			17U6BSM4	Forestry	2	2
			17U6BMP3	Practical – III #	6	6
			17U6BMP4	Practical - IV **	6	6

* Exams will be conducted by combining the practicals conducted during odd and even semesters at the end of every academic year.

Subjects mentioned here will have practical exam in the paper practical III.

**these subjects will have practical exams in the paper Practical IV

Course code	Course Title	C	H	I	E	T
17U5BMC5	Phanerogams	6	5	25	75	100

Objective:

- To introduce the learner to the salient features and broader diversity of vascular plants
- To give the technical knowledge to identify gymnosperms
- To help the students to appreciate the enormity of variants in flower producing plants.
- To facilitate them to categorize angiosperms into Dicotyledonae (Polypetalae, Gamopetalae and Monochlamydae) and Monocotyledonae
- To help them gain an idea on popular systems of classification (Natural and Phylogenetics)

Learning Outcome:

- Student may gain the identification skill and can understand the importance of phanerogams.

Unit I (15 Hr)

Gymnosperms

Concept of progymnosperms. Classification – Coulter and Chamberlain(1917). Salient features of Cycadales, Coniferales and Gnetales. Structure, reproduction and life cycle of *Cycas*, *Cupressus* and *Gnetum*. Economic importance of Gymnosperms.

Unit II (15 Hr)

Plant Morphology

Leaf types – simple and compound; phyllotaxy : alternate, opposite, ternate and whorled. Anthotaxy : RACEMOSE – simple raceme, spike, umbel; CYMOSE – simple cyme, dichasial and helicoids; SPECIAL TYPES – cyathium and hypanthodium. Technical description of a flower. Fruits : SIMPLE - fleshy e.g. berry and hesperidium ; dry – e.g. capsule, legume and caryopsis. AGGREGATE – e.g. *Annona*; COMPOUND– e.g. Jack fruit.

Unit III (15 Hr)

Angiosperms

Plant Systematics and taxonomy – objectives, goals and aims. Hierarchical stages and categories. Contribution to Indian Botany by J.D. Hooker and J.S. Gamble. Systems of classification – Linnaeus, Bentham & Hooker and Engler & Prantl. Nomenclature – polynomials and binomial system. ICN – principles, typification and nyms.

Unit IV (15 Hr)

Studies of Families

Study of vegetative, floral characters and economic importance of the following families:

1. Nymphaeaceae
2. Capparidaceae
3. Rutaceae
4. Zygophyllaceae
5. Leguminosae
6. Cucurbitaceae
7. Aizoaceae

Unit V Studies of Families (15 Hr)

8. Rubiaceae 9. Apocyanaceae 10. Convolvulaceae 11. Solanaceae 12. Acanthaceae
13. Euphorbiaceae 14. Orchidaceae 15. Poaceae

References

1. Gurucharan Singh (2005). Plant Systematics, 2nd ed. Scientific Publication, Jodhpur.
2. Jones, Jr. and Samuel, B (1987). Plant Systematics. McGraw- Hill International, New York.
3. Lawrence, G.H.M (2012). Taxonomy of vascular plants. Scientific publishers. India.
4. Pullaiah, T and Karuppusamy, S (2018). Taxonomy of Angiosperms. 4th ed. Regency Publication, New Delhi
5. Singh, V. and Jain, D.K. (1981). Taxonomy of Angiosperms. Rastogi Publications. India
6. Sharma, O.P (2017). Taxonomy of Angiosperms. McGraw-Hill Publication, Ltd. New Delhi.
7. <https://WWW.theplantlist.org>
8. <https://WWW.sscstudycentre.files.wordpress.co>
9. www.cSDL.tamu.edu

Laboratory Studies

1. Observation of morphological features of plants discussed in the syllabus.
2. Dissection and description of the floral features of families in the syllabus.
3. Field trip for a minimum of three days
4. Submission of herbarium/plant photo album, field reports and records for evaluation.

Course code	Course Title	C	H	I	E	T
17U5BMC6	Genetics, breeding and Biostatistics	5	5	25	75	100

Objective:

- To understand the physical basis and patterns of inheritance and the interactions at levels of alleles and genes.
- To gain knowledge on the necessity of breeding techniques.
- To apply statistics in various interpretive aspects of biology.

Learning Outcome:

- Students will have a genetic perspective about diseases and disorders.
- Students will acquaint with the techniques involves the production of hybrid crops.
- Students can interpret the research results using biostatistics

Unit I (15 Hr)

Concepts: inheritance, variation, gene, genome, phenotype and genotype. Mendelian laws: Law of segregation and law of independent assortment. Codominance, incomplete dominance and multiple alleles. Gene interactions: Complementary; Epistasis – dominant and recessive.

Unit II (15 Hr)

Linkage and crossing over - mechanisms. Sex determination in *Melandrium*. Sex - linked inheritance, eg. colour blindness in man. Multiple gene inheritance e.g. Kernel colour in wheat. Cytoplasmic inheritance, eg. Antibiotic resistance in *Chlamydomonas*. Population genetics: Gene pool, Gene frequency and the importance. Hardy –Weinberg law.

Unit III (15 Hr)

Plant breeding – objectives; procedures: Selection methods : Mass selection , Pure –line selection and clonal selection; Hybridization procedure, Heterosis. Plant introduction and acclimatization. Polyploidy and its type . Mutation breeding: Mutagens – Physical and chemical. Quarantine law. Plant breeding institutes in India.

Unit IV (15 Hr)

Biostatistics: objectives, population and samples. Types of data; Data collection, sampling methods, frequency distribution, Graphical and diagrammatic representation of data, Measures of central tendency, Measures of dispersion e.g. standard deviation.

Unit V (15Hr)

Probability distribution: normal and binomial distribution. Tests of hypothesis: Students ‘t’ test. Chi-square test. ANOVA – one way. Applications of computer in biostatistics – SPSS software.

References

1. Chaudhary R.S, (1994), Introduction to plant breeding, Oxford and IBH publishing company .
2. Darbeshwar Roy (2012), Plant breeding: A Biometrical approach. Alpha Science international publisher.
3. Gardener EJ *et al.*, (2008). Principles of Genetics. 8th Edition. Wiley-India student edition.
4. Khan, I.A. and Khanum, A (1994). Fundamentals of Biostatistics, Ukaaz publications, Hyderabad, Andhrapradesh –India.
5. Monroe Strickburger, (1985). Genetics, 3rd Edition, Macmilan Publishers
6. Pranab kumar Banerjee, (2004), Introduction to Biostatistics (A Text book of Biometry). S. Chand & Company Ltd.Ram nagar, New Delhi.
7. Verma P.S and Agarwal V.K, (2004) Genetics.. S. Chand Publications
8. <https://podcasts.ox.ac.uk/evolution-genome>.
9. <https://biologydiscussion.com/plantbreeding>

Practicals

1. Solving problems in mono and dihybrid crosses, multiple alleles, incomplete and codominance, complementary gene interactions, sex-linked inheritance.
2. Calculation of standard deviation for different plant sample –leaf length& pod length.
3. Chi –square test
4. Problems on probability

Course code	Course Title	C	H	I	E	T
17U5BMC7	General Microbiology	5	5	25	75	100

Objective:

- To inculcate knowledge on fundamentals of microorganisms
- To learn the structural organization, morphology and reproduction of microbe

Learning Outcome:

- Know on historical perspective of microbiology
- Basic knowledge on different structure of microbes

Unit I : BACTERIA (15 hr)

Introduction: Scope and importance; Five kingdom concept of microbes; Contributions of Pastuer and Koch. Outline classification of bacteria as in Bergeys manual; General characteristics of bacteria; Ultra structure of bacteria; colony morphology, size and shape; structure of cell wall: Gram positive and Gram negative; capsule; cell membrane and appendages. Economic importance of bacteria.

Unit II: FUNGI (15h):

Introduction; structure of mycelium and its modifications; Classification by Alexopoulos and Mims (19); General characteristics of Gymnomycota, Mastigomycota and Amastigomycota; Modes of nutrition; Economic importance of Fungi

Unit III: VIRUSES (10 hr)

Viruses: General characteristics- classification of viruses based on nucleic acids & structure; Lytic and lysogenic cycles; Structure and reproduction of T₄, TMV and HIV.

Unit IV: MICROBIAL PHYSIOLOGY (25 hr)

Bacterial growth phases; generation time; modes of nutrition; Respiratory metabolism: ED pathway - reverse TCA - gluconeogenesis. Fermentation: homo and heterolactic; Bacterial photosynthesis : photobacteria ; pigments ; oxygenic and anoxygenic.

Unit V: CONTROL OF MICROBES (10 hr)

Physical methods: Temperature, filtration, irradiation.
Chemical methods: Alcohols, halogens, iodine, Heavy metals and antibiotics (Penicillin).

References

1. Dubey, R.C. and Maheswari, D.K. (2010). A text book of microbiology. S. Chand and company, New Delhi.
2. Pelezar, M.J., Chan, E.C.S and Kreig , N.R. (1993). Microbiology - concepts and Applications. McGraw Hill, Inc. Newyo.

3. Powar, C.B. and Dagainawala, H.F. (2001). General microbiology, Vol. II Himalaya publishing house, Mumbai.
4. Purohit, S.S. (2012). Microbiology and applications. Student edition, Jodhpur, India
5. Tortara, G., Funke, B.R. and Case, C.L. (2009). Microbiology. 9th edition. Dorling Kindersley (India) Pvt Ltd. Noida

Practicals

1. Cleaning of glass wares.
2. Preparation of media.
3. Ubiquitous nature of microbes.
4. Culture techniques - Streak plate and Spread plate.
5. Bacterial staining –a) Simple b) Gram
6. Biochemical test- Amylase activity and Indole production.
7. Antibiotic sensitive test

Course code	Course Title	C	H	I	E	T
17U5BME1	Applied Microbiology	3	3	25	75	100

Objective

- To understand the critical role played by microbes in different environments, agriculture industries and medicine.

Learning Outcome:

- Students will aim at culturing novel stains of microbes to meet the demands in industries , agriculture and medicine

Unit- I: Food microbiology (9 Hr)

Microbial flora of fresh food: Contamination and spoilage of milk; Cheese Production; Methods of food preservation- Physical Temperature, dehydration) and preservatives..

Unit-II : Environmental microbiology (9 Hr)

Ecological groups of microorganisms (Based on carbon and oxygen requirements), Extremophiles. A brief account on extremophiles. Microbiology of soil and water. Microbiology of biogeochemical cycles. Interactions among microorganisms. Sewage treatment, BOD and COD, Siderophores. Bioremediation

Unit- III: Agriculture microbiology (9 Hr)

Nitrogen fixers; Symbiotic and asymbiotic - Phosphate solubilizers; Biofertilizers

Unit- IV: Industrial microbiology (9 Hr)

Fermentors and their types. Fermentation of primary metabolites (Alcohol,- Beer, citric acid) and secondary metabolites (Penicillin). Dairy industry – Cheese.

Unit- V: Medical microbiology (9 Hr)

Clinical features; Symptoms, diagnosis, prophylaxis & treatment of Tuberculosis, Hepatitis and Ringworm. Vaccines (Principles and types).

References

1. Casida, L.E. (1997). Industrial microbiology, New publishers, New Delhi.
2. Kumar, H.D and Swati kumar, (1999). Modern concepts of microbiology, Vikas publishing House, New Delhi.
3. Rao, A.S.(2001). Introduction to microbiology. Prentice Hall of India, New Delhi.
4. Sharma, P.D. (2005). Environmental biology, Narosa publishers, New Delhi.
5. Subha Rao,N.S. (2000) ,Soil microbiology ,Oxford & IBH publishers, New Delhi

Practicals

1. Antibiosis.
2. Isolation of Rhizobium from root nodules.
3. Milk dye reduction test-Methylene blue and Risazurin.
4. Potable water quality test –MPN method.

Course code	Course Title	C	H	I	E	T
17U6BMC8	Plant Physiology	7	6	25	75	100

Course Objectives:

To help students to,

- Understand the relationship between structure and function as it relates to plant macromolecules, cells and tissues,
- Understand the interaction between the environment and plant growth and development,
- Gain an appreciation of the metabolic and physiological processes unique to plants.

Learning Outcomes

- The main goal is to help students to acquire a comprehension of plant physiology.
- The course explores various topics including primary and secondary metabolism, photosynthesis, respiration, water relations, mineral nutrition, response to environmental stress and role of plant hormones.

Unit I (20 hr)

Concept of diffusion, osmosis and water potential. Translocation of water – mechanisms – ascent of sap. Theories supporting ascent of sap. Transpiration – types and significance. Stomatal movement – chemical and modern theories. Translocation of minerals – theories. Minerals – macro and trace, deficiency symptoms of microelements. Phloem loading and unloading.

Unit II (20 hr)

Photosynthesis – photosynthetic pigments (structure and function); organization of PS I and PS II, photosynthetic electron transport – ATP synthesis. Carbon fixation pathways – C3, C4 and CAM. Photorespiration and significance.

Unit III (20 hr)

Respiration – oxidative electron transport and phosphorylation. Pathways – glycolysis, PPP, TCA and their significance. Alternative respiration – CN resistant respiration. Nitrogen fixation. Biochemistry of nitrogen fixation. Role of nitrogenase.

Unit IV (15 hr)

Growth regulators: concept of phytohormones. Structure and physiological role of auxin, gibberellins, cytokinins and ethylene – brief account on synthetic hormones.

Unit V (15 hr)

Photoperiodism: concept, periodicity, role of phytochromes in flowering. Vernalization and its significance. Dormancy – seed dormancy – basis and methods to overcome. Programmed cell death – (senescence) – Physiological and biochemical changes. Brief account on circadian rhythm.

References

1. Bidwell RGS (1979). Plant Physiology, Mac Millan Publishing Company. New Delhi.
2. Devlin, RM (1974). Plant Physiology, Affiliated East West Press Pvt. Ltd.
3. Jain ,VK. (2007). Fundamentals of plant physiology, S. Chand & Compamy Ltd, New Delhi.
4. Levitt (1972). Responses of plants to environmental stress, Academic press, New York.
5. Noggle, GR and Fritz, GJ (1976). Introductory Plant Physiology, Prentice-Hall, India.
6. Pandey, SN and Sinha, BK (2001). Plant Physiology. Third revised edition, Vikas publishing House Pvt. Ltd, New Delhi.
7. Salisbury, FB and Ross, CW (1986). Plant Physiology. Third edition, CBS Publishers and Distributors, New Delhi.
8. Taiz, L and Zeiger, E (2010). Plant Physiology. The Benjamin/Cummings Publishing company, Inc., California, New York.
9. Verma,V (2008). Text book of plant Physiology, Anne's student edition, New Delhi
10. Bajracharya, D (1999). Experiments in Plant Physiology- A Laboratory Manual. Narosa Publishing House, New Delhi.
11. www.plantphysiol.org
12. www.plantphys.net.
13. www.khanacademy.org

Practicals

1. Determination of osmotic potential by osmolytic method.
2. Determination of stomatal index and frequency of mesophytes, hydrophytes and xerophytes.
3. Effect of light qualities on oxygen evolution – Willmots bubbler.
4. Estimation of chlorophyll by spectrophotometry.
5. Estimation of NR activity by spectrophotometry.
6. Demonstration of plant growth using auxanometer and clinostat.
7. Bell jar experiment.
8. Demonstration of seed germination.
9. Demonstration of seed germination – effect of gibberellins on seed germination.
10. Ganong's photometer.

Course code	Course Title	C	H	I	E	T
17U6BME2	Molecular Biology And Biotechnology	7	6	25	75	100

Objective

- To understand structure and functions of bio molecules.
- To acquire computer knowledge related to biological data bases.

Learning Outcome

- The students will acquire the knowledge about role of bio molecules and will be practiced in analyzing the biological data bases using computer system.

Unit I (20 hr)

Concept of genome, genome organization in prokaryotes. Gene architecture. Transcription and translation events. Regulation of gene expression – operon concept with reference to lac operon.

Unit II (10 hr)

Genetic recombination – transformation, transduction, conjugation and sexduction. Transposable elements in maize and its significance.

Unit III (20 hr)

rDNA technology – origin and concept – importance. Restriction enzymes, polymerases, ligases and alkaline phosphatases. Vectors – salient features, types. Plasmid – natural – Ti plasmid and constructed – pBR 322.

Unit IV (15 hr)

Cloning strategies: PCR, blotting techniques – southern. cDNA and genomic library. Genetic markers – RAPD and RFLP.

Unit V (25 hr)

Gene transfer technology – gene transfer methods – Physical – Biolistics, Electroporation, Liposome mediated. Vector mediated – Agrobacterium. Plant tissue culture – totipotency, regeneration, hardening and plant recovery. Transgenic crops – Bt cotton, golden rice and Flavr Savr tomato. Biosafety.

References

1. David Friefieder., (2010) Essentials of Molecular biology, 4th Edition, Jones and Barlett Publishers, Massachusetts
2. Karp, G. (1999). Cell and molecular biology. Concept and experiments. John Wiley and Sons, Inc, USA

3. Chawla H.S., (2000). Introduction to Plant Biotechnology. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi
4. Gupta P.K., (1999). Elements of Biotechnology. Rastogi Publishers, India.
5. Gamborg O.L & Phillips G.C., (2005). Plant Cell Tissue & Organ Culture. Narosa Publishing House, New Delhi.
6. Kalyan Kumar. D (2008). An Introduction to Plant Tissue Culture. New Central Book Agency, Kolkata.
7. Old, R.W & Primrose, S.B., (1985). Principles of Gene Manipulation-An Introduction to Genetic Engineering. Blackwell Scientific Publication. London.
8. Slater, A., Scott N.W., Fowler, M.R., (2003). Plant Biotechnology, The Genetic Manipulation of Plants. Oxford University Press, New York.
9. [https:// WWW.bio.org](https://WWW.bio.org)
10. [https:// WWW.ncbi.nlm.nih.gov](https://WWW.ncbi.nlm.nih.gov).
11. [https://agrobac.biol.,](https://agrobac.biol.)

Practicals

1. Basics and procedure in molecular biology and tissue culture.
2. Isolation of plasmid DNA
3. Restriction of plasmid using ECoR I
4. Isolation of plant DNA from leaf sample using cTAB method.
5. DNA restriction maps
6. Preparation of MS medium.
7. Explants preparation and sterilization
8. Micropropagation
9. Gene transfer method – charts.
10. Agarose gel electrophoresis

Course code	Course Title	C	H	I	E	T
17U5BME3	Bioinformatics	4	4	25	75	100

Unit I (15 hr)

Scope and objectives of Bioinformatics. Computer – basic components of computers – working – intra and internet – website.

Unit II (15 hr)

Genomics – structural, functional and comparative. Gene sequencing – Maxam-Gilbert method. Sanger method.

Unit III (10 hr)

Proteomics – overview; tools – 2D PAGE; MALDI-TOF

Unit IV (10 hr)

Data bases – types – classification – nucleic acid sequence – data bases – Gene bank: DDBI, EMBL net, Protein data bases – PIR, SWISS PROT.

Unit V (10 hr)

Sequence alignment – pair and multiple – alignment tool – BLAST.

References

1. Attwood, T.K., Parry-Smith, D.J. and Phukan, S. (2008). Introduction to bioinformatics.. Pearson Education Pvt.Ltd., New Delhi. India.
2. Mani, K and Vijayaraj, N. (2002). Bioinformatics for beginners. Kalaikathir Achchagam. Coimbatore. Tamil Nadu. India.
3. Rajadurai, M. (2010). Bioinformatics- a practical manual. PBS Book Enterprises.

Practicals

1. Component of computer.
2. Creation of table & graph using MS Office.
3. Sequence alignment using BLAST.
4. Analysis structure of nucleic acid & protein using Rasmol.

Course code	Course Title	C	H	I	E	T
17U6BSM4	FORESTRY	2	2	25	75	100

Objective

- To sensitise the students about the various aspects of forests.
- To understand the various ways and means to increase the forest cover on the earth.

Learning Outcome

- Students will experience that forests are the most important resource.
- Students will be equipped with the concepts and skills required to develop forests.

Unit- I (6Hr) Silviculture

Definition of forest and forestry. Classification of forests. Afforestation, Reforestation and Deforestation. Natural and artificial regeneration of forests.

Unit- II (6Hr) Plantation forestry

Definition, site preparation, planting pattern, choice of species.

Unit- III (6Hr) Agroforestry and Social forestry

Definition, aims, need, role in the life of people and domestic animals. Traditional agroforestry systems - Shifting Cultivation and its limitations.

Unit- IV (6Hr) Ethnobotany

Definition, scope and role in Indian medicine - Chipko movement- Joint Forest Management.

Unit-V (6Hr) Forest produce

Major-Timber (Teak, Rose wood), Fire wood (Diospyrus).

Minor- Gums (Arabic), resins (Abies) and Oil grasses (Lemon grass).

References

1. Jain. S.K, Manual of Ethno botany, Scientific publishers, India.
2. Negi, S.S, Hand book of forestry. (1986). Publishers, International book distributors, New Delhi.
3. Negi, S.S. (1988). Elements of general silviculture, International book distributors, New Delhi.
4. Sageriya, K.P - Forest and Forestry (1967), National book trust, India.
5. Sageriya, K.P. (1982). Forests and Forestry, National book trust, New Delhi.
6. WWW.forestry.ubc.ca.
7. <https://WWW.botany.org>

DEPARTMENT OF ZOOLOGY



THE MADURA COLLEGE (AUTONOMOUS), MADURAI.11
DEPARTMENT OF ZOOLOGY

Sub. Code	Subject	Hours	Credits
SEMESTER V			
17U5ZMC5	Genetics	5	5
17U5ZMC6	Biodiversity and Conservation Biology	5	5
17U5ZMC7	Animal Physiology and Animal behaviour	3	3
17U5ZME1	Developmental Biology and Evolution	5	6
17U5ZMP3	Major practical 3	3	-
17U5ZMP4	Major practical 4	3	-
17U5ZSA2	Sericulture and Moriculture	2	2
17U5ZAC3	Fundamentals of Physiology and Microbiology	2	1
17U5ZAP2	Ancillary Botany Practical 2	2	-
SEMESTER VI			
17U6ZMC8	Microbiology and Immunology	5	5
17U6ZME2	Biophysics, Biostatistics and Bioinformatics	5	6
17U6ZME3	Biotechnology	6	7
17U6ZSM4	Forensic Science	2	2
17U6ZMP3	Major practical 3	3	6
17U6ZMP4	Major practical 4	3	6
17U6ZAC4	Molecular Biology, Biotechnology and Immunology	4	2
17U6ZAP2	Botany Practical 2	2	2
17U5ZAP2	Ancillary Botany Practical 2	2	-

Course Code	Course Title	C	H	I	E	T
17U5ZMC5	Genetics	5	5	25	75	100

Objectives

- ❖ To acquire knowledge about the basic principles of heredity
- ❖ To assess the practical application of genetics
- ❖ To review the various genetic disorders in man and animals

Learning Outcome

1. Understanding the basic concepts of Heredity
2. Acquiring knowledge on genetic disorders and Human genetics

Unit- I

Genetics-definition, theories of inheritance - preformation, epigenetic, particulate and germplasm, Mendelism-monohybrid and dihybrid experiments, Mendel's laws, Pedigree analysis, Gene interaction: non-allelic – epistasis, complete, incomplete and co-dominance, Pleiotropism and lethal genes, Multiple alleles: Blood grouping in man, Coat color in rabbits, Polygenic inheritance: Skin pigmentation in man.

Unit- II

Linkage in *Drosophila*, types of linkage-complete and incomplete, theories and factors affecting linkage, Crossing over- mechanism, theories, types and significance, Chromosome map-definition, Construction and factors affecting mapping.

Unit- III

Chromosomal theory, sex determination in man, Gynandromorphism, Sex-linked inheritance: color blindness and haemophilia in man, maternal inheritance- coiling of shell in snail and kappa particles in *Paramecium*.

Unit- IV

Mutation: Molecular basis of gene mutation, types of gene mutation, Mutagens: types and their mode of action. Genetic recombination: Bacteria – Transformation, Conjugation and Transduction, Bacteriophages - Lytic and Lysogenic cycle.

Unit- V

Human Genetics: Simple Mendelian traits, twins, chromosomal aberrations, inborn errors of metabolism, Syndromes - Klinefelter's, Turner's and Down's. Population Genetics: Hardy-Weinberg Law, factors affecting gene frequencies, Eugenics, Euthenics and Euphenics.

Text Books

1. Verma, P.S. and V. K. Agarwal. 2009, Genetics, S. Chand & Company Ltd, New Delhi.
2. Bhamrah, H.S. and C.M. Chaturvedi. 2001, A textbook of Genetics, Anmol Publications, New Delhi.
3. Basu, S.B. and M. Hossain. 2006, Principles of Genetics, Books and Allied, Kolkata.

Reference Books

1. Gardner, E. 1975, Principles of Genetics, 5th Ed, Canada, John Wiley and Sons Inc.
2. Strickberger, W. 1991, Genetics, 5nd Ed, Boston, Macmillan Pub. Co. Inc.
3. Sinnott, E.W., L.C. Dunn and T. Dobzhansky. 1973, Principles of Genetics, 4th Ed, Tata Mc Graw Hill Pub. Co. Ltd, New Delhi.

Course Code	Course Title	C	H	I	E	T
17U5ZMC6	Biodiversity and Conservation Biology	5	5	25	75	100

Objectives

- ❖ To learn the basic principles and study techniques of Biodiversity.
- ❖ To study methods of biodiversity conservation and learn about organizations associated with Biodiversity and conservation.
- ❖ To get an exposure on health evaluation of wild animals.

Learning Outcome

1. Acquire basic knowledge on principles and methods of biodiversity conservation.
2. Motivation for taking up research in biodiversity studies.

Unit- I

Biodiversity: Definitions, Levels of biodiversity, Values and significance of biodiversity, Biogeographical zones of India, Global biodiversity, biological diversity at National level, Hotspots of biodiversity, Ecosystem diversity in India, Threats to biodiversity, Endemic and endangered species in India.

Unit- II

Techniques for Biodiversity studies: Sampling techniques for Invertebrates (light traps, pitfall traps, sweep netting, bait traps (aerial attractant traps), Birds (point counts, line transects), Mammals (trapping, dung counting, signs of feeding and foot prints). Radio telemetry, Remote sensing. Diversity indices – Shannon index, Simpson’s index, Morisita Horn Index and Jaccard index (including calculations)

Unit- III

Health condition evaluation of wild animals: Chemical immobilization of wild animals, Physical examination of animal in hand, examination of dead animals. Diseases of wild animals in India (Rinderpest, Foot and mouth disease, diseases among non-primates). Case studies for human dimensions in wildlife management and development in Periyar Tiger Reserve, Gujar and the Chilla Wildlife Sanctuary (Problem, analysis, solutions and results).

Unit- IV

Conservation of Biodiversity: *In situ* conservation – National parks, wildlife sanctuaries and biosphere reserves. *Ex situ* conservation – Gene banks, cryopreservation and captive breeding. Legal aspects: The Indian Forest Act, 1927; Wildlife (protection) Act, 1972; Biological Diversity Act, 2002, CITES, Red Data Book.

Unit- V

Organizations associated with Biodiversity and conservation: IUCN, UNEP, WCMC, WWF. Ministry of Environment and Forest and Climate change, National Biodiversity Authority, ZSI, CES-IISc, SACON, IFGTB, ICAR, WII, and ICFRE.

Text Books

1. Krishnamurthy, K.V. 2003, An advanced Textbook on Biodiversity Principles and Practice, Oxford & IBH publishing Co. Pvt. Ltd, New Delhi.
2. Kumar, V. and M.J. Asija. 2005, Biodiversity Principles and Conservation, Student Edition, Jodhpur.
3. Berwick, S.H. and V.B. Saharaia. 1995, Wildlife Research and Management, Oxford University Press, New Delhi.
4. Sutherland, W.J. 1997, Ecology Census Techniques A Hand book, Cambridge University Press, New Delhi.

References Books

1. Rodgers, W.A. 1991, Techniques for Wildlife census in India A Field Manual, Wildlife Institute of India, Dehradun.
2. Odum, E.P. 1971, Ecology, Amerind Publishing Co. Pvt. Ltd, New Delhi.
3. Benton, A.H. and W.E. Werner. 1980, Field Biology and Ecology, Tata Mc Graw Hill Publishing Company Ltd, New Delhi.
4. Seshadri, B. 1969, The twilight of India's Wildlife, John Baker Publishers. London.

Course Code	Course Title	C	H	I	E	T
17U5ZMC7	Animal Physiology and Animal Behaviour	3	3	25	75	100

Objectives

- ❖ To learn the importance of animal physiology
- ❖ To study the animal behaviour.

Learning Outcome

1. Create awareness in animal physiology and animal behaviour
2. Motivates the students to be placed in clinical laboratories.

Unit-I

Nutrition: Digestion and absorption of carbohydrates, proteins and lipids. Role of gastro intestinal hormones in digestion; calorie requirements, energy requirements of man, Malnutritional diseases (Kwashiorkor, marasmus, ketosis and night blindness). Respiration: Respiratory pigments – Types, properties and function. Exchange and transport of gases (O₂ and CO₂), Respiratory quotient.

Unit-II

Circulation: Composition and functions of blood, cardiac cycle, cardiac rhythm. Cholesterol level, urea level and sugar level in blood. Pace maker. Origin of heart beat and its regulation, Electrocardiogram (ECG). Excretion: Classification of animals based on excretory products, Ornithine cycle. Mechanism of urine formation and hormonal control. Endocrine glands: structure and functions of pituitary, thyroid and gonads.

Unit –III

Osmoregulation: Osmoregulation in fishes (freshwater, marine and migratory fishes). Thermoregulation: Acclimatization; Thermoregulatory mechanisms (hibernation, basking and aestivation).

Unit-IV

Nerve Physiology: Types of neuron, conduction of nerve impulse along a nerve fibre. Muscle physiology: Types of muscles, Ultra structure and properties of muscles. Theories of muscle contraction. Isotonic and Isometric contraction.

Unit-V

Biological rhythms: Introduction and Types of biological rhythms (Circadian, Lunar and Circannual). Biological clock: Definition with examples.

Text books

1. Rastogi, S.C. 2007. Essentials of Animal Physiology, New Age International Publishers.
2. Verma P.S., Tyagi B.S and Agarwal V.K. 1995. Animal Physiology. S. Chand & Co Ltd, New Delhi.
3. Gunadevia, H.S. & Hare Govinda Singh. 2009. Text book of Animal Behavior, S Chand & Co Ltd, New Delhi.

Reference books

1. Hill, R.W., Wyse, G.A. & Anderson, M. 2012. Animal Physiology. Sinauer Associates.
2. Goyal & Sastri. 2017. Animal Physiology. Rastogi Publication, Meerut.

Course Code	Course Title	C	H	I	E	T
17U5ZME1	Developmental Biology and Evolution	6	5	25	75	100

Objectives

- ❖ To learn the Concepts and study techniques of Developmental biology.
- ❖ To study History of evolutionary concepts and evidences for evolution.
- ❖ To get an exposure on human evolution.

Learning Outcome

1. Acquire knowledge on embryonic development, regeneration and aging.
2. Exploring evolutionary concepts

Unit – I (Introduction)

Phases of development, Cell – cell interaction, pattern formation, differentiation and growth, differential gene expression, cytoplasmic determinants and asymmetric cell division.

Unit – II (Embryonic development)

Gametogenesis, Spermatogenesis, oogenesis; Types of eggs, fertilization (external and internal), Parthenogenesis, Planes and patterns of cleavage; types of blastula; Fate maps; Embryonic induction and organizers (Spemann's experiment). Metamorphosis: Changes, hormonal regulation in amphibians and insects; Regeneration, Homeotic genes, Aging and teratogenesis.

Unit – III

Historical review of evolutionary concept: Lamarckism, Darwinism, Neo Darwinism; Evidences of evolution: Fossil records – transitional forms, geological time scale, Molecular basis of evolution – Universality of genetic code and protein synthetic machinery, neutral theory of molecular evolution, molecular clock.

Unit – IV

Natural selection, sources of variation: heritable variations and their role in evolution; product of evolution – species concept, isolating mechanisms; modes of speciation – allopatric, sympatric, adaptive radiation. Darwin finches.

Unit – V

Origin and evolution of man, important hominid fossils, primate phylogeny from *Dryopithecus* leading to *Homo sapiens*, Cultural evolution of Man, Molecular analysis of human origin.

References Books

1. Gilbert, S. F. (2006). *Developmental Biology*, VIII Edition, Sinauer Associates, Inc., Publishers, Sunderland, Massachusetts, USA.
2. Balinsky, B.I. (2008). *An introduction to Embryology*, International Thomson Computer Press.
3. Carlson, Bruce M (1996). *Patten's Foundations of Embryology*, McGraw Hill, Inc.
4. Ridley, M. (2004). *Evolution*. III Edition. Blackwell Publishing
5. Barton, N. H., Briggs, D. E. G., Eisen, J. A., Goldstein, D. B. and Patel, N. H. (2007). *Evolution*. Cold Spring, Harbour Laboratory Press.
6. Hall, B. K. and Hallgrimson, B. (2008). *Evolution*. IV Edition. Jones and Bartlett Publishers
7. Campbell, N. A. and Reece J. B. (2011). *Biology*. IX Edition, Pearson, Benjamin, Cummings.
8. Douglas, J. Futuyma (1997). *Evolutionary Biology*. Sinauer Associates.

Course Code	Course Title	C	H	I	E	T
17U5ZSA2	Sericulture and Moriculture	2	2	25	75	100

Objectives

- ❖ To learn the skill based knowledge.
- ❖ To implement this practice for self employment.

Learning Outcome

1. Gain knowledge on applied Zoology
2. Motivation for entrepreneurship

Unit – I

Sericulture: Importance, Sericulture industry in India and Services of Central Silk Board.

Unit – II

Moriculture: Varieties of mulberry, optimum conditions for mulberry cultivation. Different methods of propagation – seedling, vegetative propagation (cutting, grafting and layering). Harvesting methods and preservation of leaves.

Unit – III

Lifecycle of mulberry silkworm, *Bombyx mori*. Brief account on Eri, Tasar and Muga silkworms.

Unit – IV

Rearing of Silkworm: Rearing house and rearing appliances. Silk reeling. Testing of raw silk -Visual and mechanical tests.

Unit – V

Silkworm disease: Causes and prevention of Pebrine, Flacheric, Septicemia, Muscardine and Grasserie.

Text Books

1. Johnson, M. and Kesary, M. 2008. Sericulture. Fourth Edition. N.M.C. College, Marthandam.
2. Ganga, G. and Sulochanachetty, J. 2000. An Introduction to Sericulture. Oxford & IBH Publishing Company Pvt. Ltd. New Delhi.

Reference Books

1. Ravindranathan, K. R. 2003. Economic Zoology. Dominant publishers and Distributors. New Delhi.
2. Venkatanarasaiah, P. 2013. Sericulture. APH Publishing Corporation, New Delhi.

Course Code	Course Title	C	H	I	E	T
17U5ZAC3	Fundamentals of Physiology and Microbiology	1	2	25	75	100

Objectives

- ❖ To learn the importance of physiology and microbiology.
- ❖ To study the growth of microbes and their role in human.

Learning Outcome

1. Create awareness in human physiology
2. Helps in identifying the nature of living beings
3. Motivates the students to be placed in research and chemical laboratories

Unit– I

Digestive system of Man: Structure of alimentary canal, digestive glands (secretion and its functions only). Respiratory system of Man: Structure of lungs, O₂ and CO₂ transport.

Unit–II

Nervous system of Man: Structure of neuron, conduction of nerve impulse through myelinated and non- myelinated nerve. Excretory system of Man: Structure of kidney, nephrons and formation of urine.

Unit– III

Reproductive system of man: Structure of male and female reproductive system. Menstrual cycle, Oestrogen, Androgen, Prolactin, Relaxin and Birth control methods.

Unit–IV

Microbiology: Five kingdom concept. Sterilization and disinfection, Autoclave, Laminar air flow and Hot air oven. Culture medium (Solid & Liquid) and its composition, types of culture medium. Bacterial growth, growth rate, growth curve. Preservation and pasteurization of milk.

Unit– V

Microbial Diseases: Cholera, Tuberculosis, Botulism, Rabies and AIDS – causative organism, pathogenicity, mode of transmission, symptoms and their preventive measures.

Text books

1. Rastogi, S.C. 2007. Essentials of Animal Physiology, New Age International Publishers.
2. Baveja, C.P. 2017. Textbook of Microbiology, Arya Publications.

Reference books

1. Hill, R.W., Wyse, G.A. & Anderson, M. 2012. Animal Physiology. Sinauer Associates.
2. Surinder Kumar, 2012, Textbook of Microbiology. Jaypee Brothers Medical Publishers P. Ltd, New Delhi.

Course Code	Course Title	C	H	I	E	T
17U6ZMC8	Microbiology and Immunology	5	5	25	75	100

Objectives

- ❖ To learn the importance of microbiology and immunology.
- ❖ To study the role of immune system in animal.
- ❖ To study the growth of microbes and their role in human.

LEARNING OUTCOME

1. Create awareness in microbiology and immunology
2. Helps in identifying the nature of living beings
3. Motivates the students to be placed in research and chemical laboratories

Unit-I

History and Scope of Microbiology, Whittaker's Five Kingdom Concept, Structure of typical bacterium, Virus (T₄phage) and Yeast. Sterilization and disinfection – Autoclave and Laminar air flow, Bacteria - culture, Nutritional requirements, Types, Culture media, growth curve, enumeration and storage.

Unit-II

Dairy Microbiology: Pasteurization, Milk products: Curd and Cheese. Food Microbiology: Food spoilage of meat and fishes. Physico-chemical methods in food preservation, Soil Microbiology: Biological nitrogen fixation - types and mechanism. Water Microbiology: Coli form bacteria, MPN and Estimation of Total Plate Count.

Unit –III

Medical Microbiology: Causative organisms, mode of transmission. pathogenicity, symptoms and their preventive measures of Bacterial diseases (Cholera, Tuberculosis and Typhoid) and Viral diseases (Hepatitis, Polio, Swine flu, Rabies and AIDS).

Unit-IV

Immune System: Types of Immunity – Innate, Acquired Immunity - passive and active; Lymphoid organs - Primary and Secondary Organs (Spleen and Lymphnode); Lymphocytes – T & B Cells; antigens and antibodies – definition, Types of Immunoglobulin, structure, and functions.

Unit-V

Immune Response: Humoral and Cell Mediated Immunity; Complement - Mode of Activation, Classical and Alternate Pathway; Antigen – Antibody reactions. Principles of vaccination and immunization schedule – routes of administration, Immunological techniques: ABO blood testing, Immunoelectrophoresis.

Text books

1. Ananthanarayanan, R & Jayaram Panicker, CK. 1990. Text Book of Microbiology. Orient Longman.
2. Chakravarthy, A. K. 1996. Immunology. Tata Mc Graw, New Delhi.

Reference Books

1. Sharma, P. D. 1998. Microbiology, Rastogi Publications.
2. Pelczer, M. J (2000) Microbiology. McGraw Hill Book Company, Chennai.
3. Meena Kumari, S 2005, Microbial Physiology. M.J.P Publishers, Chennai.
4. Vijaya Ramesh, K. 2005. Environmental Microbiology. MJP Publishers, Chennai.

Course Code	Course Title	C	H	I	E	T
17U6ZME2	Biophysics, Biostatistics and Bioinformatics	6	5	25	75	100

Objectives

- ❖ To learn the basic principles and applications of Biophysics.
- ❖ To study methods of collection, analysis and interpretation of biological data.
- ❖ To motivate the students to learn the basic concepts and applications of bioinformatics.

Learning Outcome

1. Acquire knowledge on principles and applications of biophysics and bioinformatics.
2. Study about handling of biological data for statistical analysis.

Unit- I

Scope of Biophysics: Colloids - Description, properties and types. Diffusion, osmosis, dialysis. Law of thermodynamics - entropy, enthalpy. Protein Structure – Primary, secondary, Tertiary and quaternary

Unit- II

Biostatistics: definition, Types of data (Primary and secondary data), Methods of collection of Primary and secondary data, Classification of data, Tabulation, Organization of data: Individual, discrete and frequency Series. Diagrammatic and graphical presentation of Data: Histogram, frequency curve, bar diagram, pie diagram and pictogram.

Unit- III Measurement of Central tendency (mean, median, mode for individual, discrete and frequency series), Measures of dispersion (Range, standard deviation), Chi-square test, students t test, Correlation, Mann-whitney-U test, Kruskal-wallis test.

Unit- IV

History and Generation of Computer, Basic components of Computer, Input and Output devices, Central Processing Unit, Memory and its types. Brief account on packages - MS Word, MS Excel and MS PowerPoint. Basic ideas about internet: Website, Email and other uses of Internet.

Unit- V

Bioinformatics: Definitions, History and Applications of Bioinformatics, Biological Databases: features, classification of Biological databases, PUBMED, ENTREZ, EMBL, ENSEMBL, GENBANK, Swiss-Prot, PDB, RasMol, DDBJ, BOLD (Barcode of Life Data systems). Sequence alignment: BLAST, FASTA,

Text Books

1. Subramanian, M.A.2005, Biophysics, Principles and Techniques, M.J.P. Publishers, Chennai.
2. Ramakrishnan, P. 1996, Biostatistics, Saras Publications, Nagercoil.
3. Ardert T. 2002, Information Technology, Pitman Publishers.
4. Banerjee, P. 2014, Introduction to Bioinformatics, S.Chand and Company Pvt Limited, New Delhi.
5. Lesk, A.M. 2007, Introduction to Bioinformatics, Oxford University Press, New Delhi.
6. Hepsyba, S.G.H. and C.R. Hemalatha. 2009, Basic Bioinformatics. MJP Publishers. Chennai.

Reference Books

1. Daniel, M. 1992, Biophysics Biologist, Wiley International, New Delhi.
2. Das, D, and Das, A. 2004, Statistics in Biology and Psychology Acad. Publishers, Kolkata.
3. Das, D. 1996, Biophysical and Biological Chemistry, Academic Publishers, Kolkata.
4. Gurumani, N. 2004, Introduction to Biostatistics, M.J.P. Publishers, Ned Delhi.
5. Sokal, R.J. and Rohlf, S.J. 1981, Introduction to Biostatistics, W.H.Freeman, London.
6. Leon F. and Lean M. 2004, Fundamentals of Computer Science and Communications Engineering, Lean Tech World.
7. Mittal C. 2003, Fundamentals of Information Technology, Pragathi Prakasam, Meerut.
8. Piramal, V. 2006. Biophysics. Dominant publishers and distributors. New Delhi.
9. Zar, J.H. 2011. Biostatistical Analysis. Pearson Education Inc. New Delhi.
10. Murthy, C.S.V. 2004, Bioinformatics, Himalaya Publishing House, New Delhi.

Course Code	Course Title	C	H	I	E	T
17U6ZME3	Biotechnology	7	6	25	75	100

Objectives

- ❖ To study the scope and applications of biotechnology
- ❖ To provide a deep and thorough knowledge in the rapidly expanding field of biotechnology.
- ❖ To motivate the students to learn the basic concepts and applications of bioinformatics.

Learning Outcome

1. Expected to have strong appreciation for scientific research in theoretical and experimental areas
2. Motivation for taking up biotechnological entrepreneurship.

Unit – I

History, scope and importance of biotechnology, Biotechnology in India, Enzymes (restriction endonucleases, ligases, linkers and adapters), Vectors (Plasmids, Phage vectors, Cosmids and artificial chromosomes) Basic steps and techniques in rDNA technology.

Unit - II

Gene libraries, construction of genomic library and cDNA library. PCR technique and DNA amplification. Methods of transfer of desired gene with target cell. Blotting techniques – southern, northern and western blotting.

Unit - III

DNA finger printing (DNA Profiling), and its application. Molecular markers – RFLP. Stem cells – types and potential use, gene therapy, organismal cloning.

Unit – IV

Applications of Plant Biotechnology - Single Cell Proteins (SCP) Biofertilizers – Biopesticides – Bt cotton - Applications of Animal Biotechnology in Medicine, Animal Breeding and Environmental Management - Transgenic animals (Cow & Mice) – Hybridoma technique and production of monoclonal antibodies - Gene therapy.

Unit – V

Principle, techniques and applications of animal cell culture -Environmental Biotechnology - Biofuels – Bioremediation - Genetically Modified Microorganisms (definition); Biosafety, Intellectual Property Rights (IPR) and protection (IPP) – Human Genome project.

Text Books

1. Dubey, R.C. 2004, A text book of Biotechnology, S. Chand and Co., New Delhi.
2. Purohit, S.S. and S.K. Mathur, 1999, Biotechnology – Fundamentals and applications, Agro - Botanica, New Delhi.

References Books

1. Brown, T.A. 1995, Gene Cloning, Stanley Thomas Publishers.
2. Masters, J.R.W. 2000, Animal Cell Culture - A Practical Approach, Oxford University Press.
3. Trevan, M.D., S. Boffey, K.H. Goulding and P. Stanbury. 1990, Gene Biotechnology , Himalaya Publishing House, New Delhi.
4. Glick, B.R. and J .J. Pasternak (1994). Molecular Biotechnology, ASM Press.
5. Mitra, S. 1996, Genetic Engineering Principles and Practice, Macmillan India Ltd.
6. Trehen, K. 2002, Biotechnology, New Age International (P) Ltd, New Delhi.

Course Code	Course Title	C	H	I	E	T
17U6ZSM4	Forensic Science	2	2	25	75	100

Objectives

- ❖ To learn the basics and applications of Forensic science
- ❖ To study about the investigation techniques.

Learning Outcome

1. Acquire knowledge on investigation techniques of forensic science.
2. Explore the information about the role of microbes and insects in crime investigation.

Unit - I

Definition, principles and laws of Forensic Science. Need and background of forensic science in India. Forensic science laboratories: types and divisions.

Unit – II

Crime: Definition, types, causes and prevention. Introduction of Cyber crime and criminal behavior. Crime Scene-introduction, significance and role.

Unit – III

Investigation techniques: Documents-importance, nature and preliminary examination. Ballistics-definition, types. Fingerprints examination-principle, types and characteristics.

Unit – IV

DNA profiling-principle and application. Brain Fingerprinting-Introduction and application. Narco Analysis- principle.

Unit – V

Bacteria and other animals: types and tools for investigation of forensic science. Insects in forensic science-Introduction, types and application.

Text Books

1. Singh, N. 2015, Forensic Science: Principles & Concepts, Ancient Publishing House.
2. Siegel, J. 2016, Forensic Science: A Beginner's Guide, Oneworld Publications.

References Books

1. Nabar, B. S. 2015, Forensic Science in Crime Investigation, Asia Law House, Hyderabad.
2. Narayan Reddy, K.S. 2015, The Essentials of Forensic Medicine And Toxicology, Jaypee Brothers Medical Publishers.

Course Code	Course Title	C	H	I	E	T
17U6ZAC4	Molecular Biology, Biotechnology and Immunology	2	4	25	75	100

Objectives

- ❖ To learn the basic concepts of molecular biology, biotechnology and immunology.
- ❖ To create the awareness regarding benefits of biotechnology.
- ❖ To study the role of immune system in animal.

Learning Outcome

1. Create awareness in molecular biology, biotechnology and immunology.
2. Motivates the students to be placed in research laboratories.

Unit-I

Molecular Biology: Nucleic acids: Molecular structure of DNA and RNA, Types of RNA, DNA replication, protein synthesis. Fine structure of Gene: Cistron, recon, muton, Lac-operon, genetic code, mutation–molecular basis of mutation, gene mutation, chromosomal aberrations, mutagens.

Unit-II

Biotechnology: Transgenic animals (Dolly and Transgenic fish), Hybridoma technology (MAB production). Gene cloning – vectors (PBR322 and phage).

Unit –III

Biofertilizers (Rhizobium and Azospirillum), Biopesticides (Bt toxin). Biosensors – structure and application. Application genetically engineered bacteria – Super Bug, role of *Thiooillus thiooxidants* in ore leaching.

Unit-IV

Immunology: Types of immunity – natural and acquired, active and passive, antigen-antibody reaction (Precipitation and Agglutination).

Unit-V

Lymphoid organs – primary and secondary lymphocytes. Stem, T and B cells, Macrophages. Immunoglobulin – Structure and functions.

Text books

1. Gupta, P. K. 2011. Molecular Biology and Genetic Engineering, Rastogi Publications, Meerut, India.
2. Satyanarayanan. U. 2007. Biotechnology, Arunabha Sen Books and Allied (P) Ltd, Kolkata.
3. Benjamin et al . 2004. Immunology, 4th Edition, A John Wiley & Sons Inc., Publication.

References Books

1. Burton E. T. 2012. Principles of Molecular Biology, Jones & Bartlett Learning.
2. Kuby, J. 1997. Immunology. W.H. Freeman & Company, New York.
3. Dubey. R.C. 2005. A textbook of Biotechnology, S. Chand & Company Ltd.

Course Code	Course Title	C	H	I	E	T
17U6ZMP3	Major Practical 3	6	3	25	75	100

Major Practical 3 (Genetics, Biodiversity & Conservation Biology, Animal Physiology & Animal Behavior, Forensic Science)

Genetics

1. Mounting of polytene chromosomes
2. Observation of chromosomal variation from permanent slides or pictures provided

Spotters: Twins, Replication model, Mendelian traits in Man, Sickle cell anaemia, Klinefelter's, Turner and Down's Syndromes

Biodiversity & Conservation Biology

1. Estimation of salinity in water sample
2. Estimation of O₂ and CO₂ in water sample Identification of Planktons
3. Visit of pond / Forest ecosystem — report of fauna.
4. Usage of Sacchis' Disc, Hygrometer, pH meter, rain gauge etc.

Spotters: Ecological pyramids, Light trap, Pitfall trap, Alpha, Beta and Gamma diversity, Red Data Book, National Parks.

Animal Physiology & Animal behaviour

1. Estimation of oxygen consumption of fish with reference to body weight.
2. Qualitative analysis of nitrogenous waste products in fish tank water, bird excreta and mammalian urine.

Spotters: Sphygmomanometer, Kymograph, ECG

Forensic Science

1. Observation of Finger prints in human population
2. Visit to forensic laboratory

Spotters: DNA profiling, Insects in Forensic science, Cyber crime

Course Code	Course Title	C	H	I	E	T
17U6ZMP4	Major Practical 4	6	3	25	75	100

Major Practical 4 (Developmental Biology & Evolution, Microbiology and Immunology, Biophysics, Biostatistics and Bioinformatics And Biotechnology)

Developmental Biology and Evolution

1. Observation of embryonic stages of Chick
2. Observation of vestigial organs of man from pictures
3. Study on types of fossils.

Spotters: Human sperm, Ovum, Darwin finches

Biotechnology

1. Isolation of DNA/RNA - Demonstration
2. Electrophoretic separation of DNA - Demonstration
3. Visit to Biotechnology industries.

Spotters: Human sperm, Ovum, Darwin finches

Microbiology and Immunology

1. Simple staining of bacteria.
2. Gram staining of bacteria.
3. Hanging drop method.
4. Blood grouping - Man.
5. Lymphoid organs in chick - Demonstration

Spotters: Whittaker's Five Kingdom, Bacterial growth curve, Tuberculosis, HIV, Antibody structure, Immunodiffusion.

Biophysics, Biostatistics & Bioinformatics

1. Tabulation for a given biological data
2. Calculation of Arithmetic Mean, Median, Mode, Range and Standard Deviation for any biological data.
3. Correlation analysis for a biological data.
4. Components of Computer.
5. Download and study at least two samples of Genome sequences from NCBI.

Spotters: Osmosis, Ramachandran plot, Input devices, output devices, BLAST, FASTA.

Course Code	Course Title	C	H	I	E	T
17U6ZAP2	Ancillary Botany practical 2	2	2	25	75	100

Ancillary Botany practical 2 (Fundamentals of Physiology and Microbiology Molecular Biology, Biotechnology and Immunology)

1. Estimation of oxygen consumption of fish with reference to body weight.
2. Estimation of oxygen consumption of fish with reference to temperature
3. Estimation of O₂ in water sample
4. Estimation of CO₂ in water sample
5. Isolation of DNA (Demo)
6. Isolation of RNA (Demo)
7. Lymphoid organs in Chick (Demo)
8. Blood grouping - Man.
9. Simple staining and Gram staining
10. Hanging drop method.

Spotters: Sphygmomanometer, Kymograph, Warburg Respirometer, DNA, RNA and its types, Double immunodiffusion, Antibody structure, Gene cloning, DPT vaccines, Ecological pyramids, Alpha, Beta and Gamma diversity, Red Data Book, National Parks, Green house effect.

DEPARTMENT OF COMPUTER SCIENCE

B.Sc. Computer Science Syllabus (CBCS Pattern) with effect from JUNE 2017 onwards.

Semester	Sub Code	Course Title	Hours	Credits
I	17U1DMC1	Programming in C	6	4
	17U1DMC2	Digital Electronics	5	4
	17U1DAC1	Discrete Mathematics	5	3
	17U1DMP1	LAB-1: C Programming Lab	3	2
	17U1DSM1	LAB-2 :SBE Office Automation Lab	3	2
	17U1DES1	Environmental Studies	2	2
II	17U2DMC3	OOPS with C++	6	5
	17U2DMC4	Computer Organization and Architecture	5	4
	17U2DAC2	Microprocessors 8086/88 And Its Applications	5	4
	17U2DMP2	LAB- 3: C++ Programming Lab	3	1.5
	17U2DSM2	LAB- 4: SBE Microprocessors Lab	3	1.5
	17U2DVE1	Value Education	2	2
III	17U3DMC5	Data Structures and Computer Algorithms	5	5
	17U3DMC6	Visual Programming	4	4
	17U3DMC7	Operating systems	4	4
	17U3DAC3	Financial Accounting	3	3
	17U3DAC4	Statistics and Numerical Methods	4	3
	17U3DMP3	LAB -5 : Visual Programming Lab	4	2
	17U3DSM3	LAB – 6 : SBE Data Structures Lab	4	2
	17U3DNM1	NME - Computer fundamentals	2	2
IV	17U4DMC8	Computer Networks	4	4
	17U4DMC9	Linux programming	5	4
	17U4DMC10	Programming in JAVA	4	4
	17U4DMC11	Computer Security	5	4
	17U4DAC5	Resource Management Technique	4	2
	17U4DMP4	LAB-7: JAVA Programming Lab	3	2
	17U4DSM4	LAB-8: SBE LINUX Programming Lab	3	2
	17U4DNM2	Introduction to Internet	2	2
V	17U5DMC12	RDBMS	5	4
	17U5DMC13	Software Engineering	5	4
	17U5DMC14	Web Designing	5	4

	17U5DMC15	Dot net Technologies	5	4
	17U5DME1	Elective –I : A. Client/ Server computing B. Android Programming C. Multimedia Technology D. Programming in ASP	4	4
	17U5DMP5	LAB-9: Web Programming Lab	3	3
	17U5DSM5	LAB-10: SBE RDBMS Lab	3	3
		Extension activity		1
VI	17U6DMC16	Data Mining	5	5
	17U6DMC17	Management Information systems	4	4
	17U6DME2	Elective- II : E. PHP Programming F. Cryptography & Network Security G. Information Security H. Computer Graphics	5	4
	17U6DMP6	LAB – 11: Dot net Programming Lab	7	2
	17U6DMP7	Project and Viva-Voce	7	5
	17U6DSM6	Part- IV SBE Desktop Publishing (DTP)	2	2
		Extension Activity		1

Course Code	Course Title	H	C	I	E	T
17U5DMC12	RDBMS	5	4	25	75	100

Objectives

- To impart the knowledge of Database concepts.
- Learning the programming logic and operations of SQL & PL/SQL

Total Hours : 75**(12 Hours)****Unit – I:****Introduction**

Database system applications – Purpose of database system – View of data – Database Languages – Relational databases – Transaction management – Database architecture.

Unit – II:**Relational Databases****(16 Hours)**

Structure of relational databases – Database schema – Keys – Schema diagrams. **Formal Relational Query Languages:** Fundamental operations – Formal definition of the Relational algebra – Additional Relational algebra operations.

Unit – III:**Introduction to SQL****(16 Hours)**

Overview of the SQL query language – SQL Data definition – Basic structure of SQL queries – Additional basic operations - Set operations – Null values – Aggregate functions – Nested sub queries – Modification of the database. **Intermediate SQL:** Join expressions – Views - Transactions.

Unit – IV:**Advanced SQL & E-R Model****(15 Hours)**

Functions and procedures – Triggers. **Database design and ER model:** – Overview of the design process – The ER model – constraints – ER diagrams - Extended ER features.

Unit – V:**Relational Database Design****(16 Hours)**

Features of good relational designs – Atomic domains and First normal form – Decomposition using functional dependencies – Functional dependency theory. **Storage and File Structure:** RAID – File organization – Organization of records in files – Data dictionary storage.

Text Book:

“Database System Concepts” - Abraham Silberschatz, Henry F. Korth, S. Sudharshan - VI Ed., - Mc Graw Hill International Edition 2011.

Chapters:

Unit – I : 1.1, 1.2, 1.3, 1.4, 1.5, 1.8, 1.9.

Unit – II : 2.1, 2.2, 2.3, 2.4, 6.1.1, 6.1.2, 6.1.3.

Unit – III : 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 4.1, 4.2, 4.3.

Unit – IV : 5.2, 5.3, 7.1, 7.2, 7.3, 7.5, 7.8.

Unit – V : 8.1, 8.2, 8.3, 8.4, 10.3, 10.5, 10.6, 10.7.

Reference Books:

1. “Database Systems” - Thomas Connolly - Addison Wesley - New Print 2000.
2. “Database Management Systems” - Ragu Rama Krishnan, Johannes Gehrke - III Ed. – Mc Graw Hill Edition, New Delhi.

Course Code	Course Title	H	C	I	E	T
17U5DMC13	Software Engineering	5	4	25	75	100

Objectives:

- To impart the knowledge of Software Product development with an engineering approach.
- To teach software development methodologies, tools and techniques.

Unit – I**Total Hours: 75****Introduction****(15 Hours)**

Definitions - Some Size factors - Quality and Productivity factors - Managerial issues.

Unit – II**Planning a Software Project****(15 Hours)**

Defining the problem - Developing a solution strategy - Planning the development process - Planning an organizational structure – Other Planning Activities.

Unit – III**Software Cost Estimation****(15 Hours)**

Software cost factors - Software cost estimation techniques - Staffing level estimation - Software requirements definition – The software requirements specification – Formal Specification techniques.

Unit – IV**Software Design****(15 Hours)**

Fundamental design concepts - Modules and modularization criteria - Design notations - Design techniques - Real-time and distributed system design – Test plans - Milestones, walkthroughs & inspections.

UNIT – V**Software Maintenance****(15 Hours)**

Enhancing Maintainability during development - Managerial aspects of software maintenance - Configuration management - Source - code metrics - Other Maintenance tools and Techniques.

Text Book:

“Software Engineering concepts” – Richard Fairley – MGH.

Chapters:

Unit – I : 1.1,1.2,1.3, 1.4

Unit – II : 2.1 ,2.2,2.3,2.4,2.5

Unit – III : 3.1 ,3.2,3.3, 4.1, 4.2

Unit – IV : 5.1,5.2,5.3,5.4, 5.6,5.7,5.8

Unit – V : 9.1,9.2,9.3,9.4,9.5

Reference Books:

1. “Software engineering design” - H.C Shooman – MGH - 1983.
2. “Software Engineering” – Roger Pressman – MGH - IV Ed.,1998.

Course Code	Course Title	H	C	I	E	T
17U5DMC14	Web Designing	5	4	25	75	100

Objectives:

- To impart knowledge about the web development and their applications.
- To understand the basic software tools, methods of web designing.

Unit – I**Total Hours : 75****Introduction****(15 Hours)**

What is Internet-History of Internet- Internet Services and Accessibility-Uses of the Internet-Protocols-Web concepts-The client/server model of the web-Retrieving data from the web. **Internet Protocols:** Introduction – Internet protocols-transmission control protocols-User Datagram protocols - Host Names.

Unit –II**HTML****(15 Hours)**

Introduction-SGML-DTD-DTD Elements- attributes-outline of an HTML document-Head section-Body section - Headers – Paragraphs – Text formatting – Linking – Internal linking – Embedding images – Lists – Tables – Frames – Other Special tags - HTML forms.

Unit- III**JavaScript****(15 Hours)**

Introduction- need of a scripting language - language elements - Identifiers – Expressions – JavaScript keywords – Operators – Statements – functions.

Unit - IV**Objects of JavaScript****(15 Hours)**

The Window object – The Document object – Forms object – Text boxes and text areas – Buttons , Radio buttons and Check boxes – Select object - other objects - The Date object – The Math Object – The String Object –Regular Expressions– Arrays – worked examples.

Unit - V**Dynamic HTML****(15 Hours)**

Introduction- cascading style sheets - Coding CSS – Properties of tags – Property values – Other style properties – Inline Style Sheets –Embedded Style Sheets – External Style sheets – Grouping – Inheritance – Class as Selector – ID as Selector – Contextual Selectors – Pseudo Classes and Pseudo-elements – Positioning – Backgrounds – Element Dimensions.

Text Book

“Web Technology A Developer’s Perspective “ - N.P.Gopalan, J. Akilandeswari - Second Edition - PHI publishers.

Chapters

Unit – I : 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 2.1, 2.2, 2.3

Unit – II : 4

Unit – III : 5.1, 5.2

Unit – IV : 5.3, 5.4, 5.5

Unit – V : 7.1, 7.2

Reference Books:

1. “Web Technology and Design” - C. Xavier - New Age International Publishers.
2. “Web Technologies TCP/IP Architecture and Java Programming” - Achyut S. Godbole &
3. Atul Kahate- Second Edition -Tata McGraw Hill
4. “Web Technology “ - S. Padma Priya - SCITECH Publications (India)Pvt. Ltd

Course Code	Course Title	H	C	I	E	T
17U5DMC15	Dot Net Technologies	5	4	25	75	100

Objectives:

- To understand the concept of GUI Design tools, also to make them aware of controls in VB.NET
- Code programs and develop interface using VB.NET.

Unit – I**Total Hours : 75****Introduction to VB.NET****(15 Hours)**

Getting started in Visual Basic to .Net –Starting Visual Basic Dot Net-Creating and Running very first application-**IDE:** What is IDE-Using the Auto hide facility–Using the Properties windows–Setting the properties of forms and controls–Using the solution explorer-Writing an event procedure-The Standard Toolbar. Setting properties using the Properties Window: Classification of Properties.

Unit - II**Control structure & Looping****(15 Hours)**

Variables and Data types-Text box control–Radio button control-Programming Statements :IF...Then ,IF...THEN...END IF, IF...THEN...ELSE...END IF–The MsgBox() function-The InputBox() function-List box control-Programming Statement: Select Case–Check box control-Iteration Statements-Do While Loop- Do Until Loop- Do Loop Until-For Next-Arrays

Unit - III**Menus and Dialog Boxes****(15 Hours)**

Basic elements of menus-Generic procedure of creating menus-Creating a simple menu application. Structured Programming:What is Structured Programming-Events, Subroutines & Functions-Scope of variables-Scope of procedures-Elementary and composite data types.

Unit - IV**Object-Oriented programming****(15 Hours)**

What is OOPS-Implementing OOPS-Inheritance overriding-Collections. Working with files: Introduction to files-Classification of files-Handling files and folders using functions-File processing using streams-Advanced Techniques in Visual Basic Dot Net:Single document interface and multiple document interface.

Unit – V

Data Access with ADO.Net

(15 Hours)

What are databases-Connections, Data Adapters and Datasets-Accessing Data with Server Explorer-Accessing Data with Data Adapters and Datasets-Working with ADO.Net-Overview of ADO.Net Objects.

Text Book:

1. “**Visual Basic Dot Net** ” -Shirish Chavan - Pearson Edition- Fourth Edition.
2. “**Visual Basic Dot Net Black Book**” - Steven Holzner –Wiley Press.

Chapters:

Unit – I: 1.5, 1.6, 2.2, 2.5, 2.14-2.16, 2.18, 2.22, and 3.1.

Unit – II : 5.1,5.11,5.12,5.13,5.14,6.3,6.7,6.9,6.10,7.2,7.3,7.5,7.6,7.8,7.9,7.11. } Textbook 1

Unit – III: 9.1, 9.2, 9.3, 10.1, 10.2, 10.3, 10.4, 10.7.

Unit – IV: 11.1, 11.2, 13.1, 13.2, 13.4, 13.10, 14.1.

Unit – V: 21 →Textbook 2

Reference Books:

1. “Visual Basic Dot Net-A Beginner’s guide” - Jeffery Kent -Tata McGraw Hill- First Edition 2002.
2. “Visual Basic Dot Net Step by Step” - Michael Halvorson –Prentice Hall of India Pvt-, First Edition,2002.
3. “The Complete reference Visual Basic Dot Net” - Jeffrey R.Sharpiro-Tata McGraw Hill-Sixteenth Reprint,2010
4. “Visual Basic Dot Net” - John Smiley-Tata McGraw Hill, First Edition 2002.

B.Sc. Computer Science

SEMESTER – V

Course Code	Course Title	H	C	I	E	T
17U5DME1	Elective – I A. Client/server computing	4	4	25	75	100

Objectives:

- To impart the knowledge of Client server technologies.
- Learning the concept and operations of various application development tools.

Unit – I

Total Hours : 60

Introduction

(12 Hours)

Overview of Client/Server Computing - Evolution of Client/Server Computing - Overview of Client/Server application - Understanding Client/Server computing.

Unit – II

Client Environment

(12 Hours)

Client Hardware and Software - Client Software Products - Client Requirements.

Unit - III

Server Environment

(12 Hours)

Server Hardware - Server Environment - Server Operating systems - Server Requirements - Server data management and access tools.

Unit - IV

Networking

(12 Hours)

Overview of Networking - LAN Hardware & software - Development methodology.

Unit – V

Application Development Tools

(12 Hours)

Application Development tools - Managing the production environment - Production requirements - Future trends.

Text Book:

“Client/Server Computing” - Dawna Travis Dewire – McGraw-Hill International Editions.

Chapters:

Unit – I : 1,2,3,4

Unit – II : 5,6,7

Unit – III : 8,9,10,11,12

Unit – IV : 13,14,15

Unit – V : 16,17,18,19

Reference Books:

1. “Client/Server Computing” - Patrick Smith & Steve Guengerich – PHI – II Edition.
2. “The Essential Client/ Server survival Guide “ – Robert Orfali, Dan Harkey, Jeri Edwards- II Edition – Galgotia publication.

Course Code	Course Title	H	C	I	E	T
17U5DME1	Elective – I B. Android programming	4	4	25	75	100

Objectives:

- To impart the knowledge of Android Programming.
- Learning the concept and operations of Android Applications.

Unit I**Total: 60 Hours****Fundamentals of Android Development****(10 Hours)**

Introduction to Android: The android 4.1 Jelly Bean SDK – Understanding the Android Software Stack – Installing the Android SDK – Creating Android Virtual Devices – Using the Text View Control – Using The Android Emulator – The Android Debug Bridge (ADB) – Launching Android Applications on a Hand Set. **Basic Widgets:** Understanding the role of Android Project Files- understanding Activities – Role of the Android Manifest Editor – Creating the user interface – Commonly used layouts and controls – Event Handling – Displaying Messages Through Toast – Creating and Starting an Activity – Using the Edit Text control – Choosing options with Checkbox – Choosing mutually exclusive items using Radio Buttons.

Unit II**Building Blocks for Android Application Design****(10 Hours)**

Laying Out Controls in Containers: Introduction to layouts – Linear layout – Relative Layout – Absolute Layout – using Image View – Frame Layout – Table Layout – Grid Layout – Adapting to Screen Orientation. **Utilizing resources and Media:** Creating an Image switcher Application – Scrolling through Scroll View – Playing Audio – Playing Video – Displaying progress with progress Bar – Using Assets.

Unit – III**Using selection Widgets and Debugging****(15 Hours)**

Using list View – Using the spinner control – using the Grid view control – Creating an Image Gallery using the View pager control – Using debugging tool(DDMS)- Debugging Applications – Using the debug perspective. **Creating Interactive menus and ActionBars:** Menus and their types – Creating Menus through XML – Creating Menus through coding – Applying a Context Menu to a ListView – Using the Action Bar -Replacing Menus with the Action Bar- Creating a Tabbed Action Bar – Creating a Drop-Down List Action Bar.

Unit – IV

Using DataBases

(10 Hours)

Using the SQLiteOpenHelper Class – Accessing Databases with ADB – Creating a Data Entry Form.

Unit – V

Advanced Android Programming Internet, Entertainment, and Services

(15 Hours)

Displaying Web Pages and Maps: Displaying Web Pages – Using the WebViewClient Class – Using Google Maps.

Chapters:

Unit I – Chapter 1, 2

Unit II – Chapter 3, 4

Unit III – Chapter 5, 7

Unit IV - Chapter 8

Unit V - Chapter 10

Text Book:

Android Programming - Unleashed – B.M. Harwani – Pearson Education 2013.

Reference Books:

1. Android Programming for Beginners – John Horton, First Edition, Packt Publishing.
2. Prasannakumar Dixit – Android 2014, Vikas Publishing Pvt Ltd.,
3. Wei-Menglee – Beginning Android 4 Application Development, 2014 Wiley India Pvt Ltd.,
4. Android Programming: The Big Nerd Ranch Guide – Bill Phillips and Chris Stewart – O'Reilly Media Publishers, Third Edition.

B.Sc. Computer Science

SEMESTER – V

Course Code	Course Title	H	C	I	E	T
17U5DME1	Elective - I C. Multimedia Technology	4	4	25	75	100

Objectives:

- To impart the knowledge of Multimedia technology and its applications.
- Learning the concepts of various Multimedia components and tools.

Unit – I

Total Hours: 60

Introduction to Multimedia

(12 Hours)

Definitions – Multimedia applications – Delivering Multimedia - CD-ROM, DVD and Flash drives – The broadband Internet – Making Multimedia: The stages of a Multimedia project – The Intangibles - Multimedia skills.

Unit – II

Making Multimedia

(12 Hours)

Hardware – Software - Authoring systems - Making Instant Multimedia – Types of authoring tools – Objects – Choosing an authoring tool.

Unit - III

Text & Sound

(12 Hours)

Text:- The power of meaning – About Fonts and Faces – Using Text in Multimedia – Computers and Text – Hypermedia and Hypertext – Sound: - The power of sound – Digital Audio - MIDI audio – MIDI Vs Digital Audio – Multimedia System sounds - Audio file formats.

Unit - IV

Images & Animation

(12 Hours)

Images: – Making Still Images – Color – Image file formats – Animation: - The power of Motion – Principles of Animation – Animation by computer – Making Animations that work.

Unit - V

Video & Planning and Producing

(12 Hours)

Video: - Using Video – How video works and is displayed – Planning and Costing - The process of making Multimedia – Scheduling – Estimating - Designing and Producing: Designing - Producing.

Text Book:

“Multimedia Making it Work” - Tay Vaughan – Ninth Edition - MGH.

Chapters:

Unit – I : 1, 7(First 3 Sections)

Unit – II : 7

Unit – III : 2, 4

Unit – IV : 3, 5

Unit – V : 6, 9

Reference Books:

1. “Multimedia in Practice - Technology & Applications” – Judith jeffcoate- PHI.
2. “Multimedia production-Planning and Delivery” –John Villamil, Casanova Lous Molina– PHI.

Course Code	Course Title	H	C	I	E	T
17U5DME1	Elective – I D. Programming in Asp	4	4	25	75	100

Objectives:

- To impart the knowledge of Active server pages.
- Learning the concept and operations of ASP & ADO objects

Unit – I**Total Hours : 60****The Basics of ASP Programming****(12 Hours)**

Need for active server pages - Automated Development - ASP Objects - ADO Objects - Asp Components - Relational Databases and other Data sources - Developing Online Applications - Client/Server or tiered Applications - Virtual Directories - The Website as Communications Channel - Development Issues - ASP and Web programming Basics: Website Coding languages.

Unit – II**The Request and Response objects****(12 Hours)**

Web-Based Communications- The Request Object- Collections-Accessing values from Forms or URL's- The Server Variables Collection- The Cookies Collection- The Client Certificate Collection- The Response Object-Response Object Collections-Response Object Properties-Response Object Methods - Writing Data to Browser - Redirecting Browser.The server object : Server object - The ASP error object-The application and session objects.

Unit – III**Active Server Components and ADO****(12 Hours)**

The scripting Object Model: Creating Objects-The Dictionary Object- The scripting file system Object-The Drive Object-The folder Object-The file Object-The Scripting Text stream Object. Major Active Server Components: Creating Server Components with ASP-The Ad Rotator Component-The Browser Capabilities Component-The Content Linking Component-The Content Rotator Component- More Active Server components.

Unit – IV**The ADO connection****(12 Hours)**

Interactivity and Latency: Optimizing Database interactions- The Connection Object - Advanced Error-Handling Techniques-The command Object- Recordset cursors- Recordset locking-Stored Procedures-The parameters Collection.

Unit – V

The ADO Recordset

(12 Hours)

The Recordset Object-Recordset Methods and Properties-Recordset Navigation and Manipulation Operations-The Stream and Record Objects: Record Object Properties and Methods-Stream Object Properties and Methods.

Text Book:

“Asp 3.0 a beginner’s Guide” – Dave Mercer –TMH.

Chapters:

Unit – I	: 1, 2
Unit – II	: 3, 4, 5
Unit – III	: 6, 7, 8
Unit – IV	: 10
Unit – V	: 11

Reference Books

1. “Beginning ASP 3.0” – Chris Ullman, Wrox Publications.
2. “Designing Active Server Pages” – Scott Mitchell - O'REILLY Publications.
3. “Master Active server Pages 3” –Russell Jones - Sybex Publications

Course Code	Course Title	H	C	I	E	T
17U6DMC16	Data Mining	5	5	25	75	100

Objectives:

- To impart the knowledge of Data warehousing and Data Mining.
- Learning the concepts of various data mining methods and techniques.

Unit - I**Total Hours: 75****Introduction & Data Preprocessing****(15 Hours)**

Introduction to Data Mining – Data preprocessing: An overview - Data Cleaning - Data Integration - Data reduction – Data transformation and Data discretization.

Unit - II**Data warehousing and online analytical processing****(15 Hours)**

Data warehouse: Basic concepts – Data Warehouse modeling: Data Cube and OLAP – Data Warehouse Implementation – Data generalization by attribute-oriented induction.

Unit - III**Mining Frequent, Associations and correlations****(15 Hours)**

Basic concepts - Frequent Itemset Mining methods – Advanced Pattern mining: A road map - Pattern mining in multilevel, multidimensional space – Constraint-based frequent pattern mining.

Unit - IV**Classification****(15 Hours)**

Basic concepts - Decision tree Induction- Bayes classification methods- Rule based classification – Classification: Advanced methods - Classification by Back propagation.

Unit - V**Cluster analysis****(15 Hours)**

Basic Concepts and methods: Cluster analysis- Partitioning methods - Hierarchical methods – Density based methods – Data Mining Trends and Research Frontiers: Data Mining Applications.

Text Book:

“Data Mining concepts and Techniques” – Jiawei Han, Micheline Kamber, Jian Pei -Third Edition - Morgan Kaufmann Publishers, New Delhi.

Chapters:

Unit – I: 1.1, 1.2, 3.1, 3.2, 3.3, 3.4, 3.5.

Unit – II: 4.1, 4.2, 4.4, 4.5

Unit – III: 6.1, 6.2, 7.1, 7.2, 7.3

Unit – IV: 8.1, 8.2, 8.3, 8.4, 9.2

Unit – V: 10.1, 10.2, 10.3, 10.4, 13.3.

Reference Books:

1. “Data Mining Introductory and Advanced topics” - Margaret Dunham –Prentice Hall 2003.
2. “Principles of Data Mining” - Heikki Mannila and Padhraic Smyth – MIT Press Fall 2000.

Course Code	Course Title	H	C	I	E	T
17U6DMC17	Management Information Systems	4	4	25	75	100

Objectives:

- To impart the knowledge of Management Information Systems.
- Learning the concept of decision making system.

Unit – I**Total Hours : 60
(12 Hours)**

Meaning - Definition- Integrated system- MIS vs. data processing - MIS and other academic discipline such as managerial Accounting, operational research, Management, organization theory and computer science.

Unit – II**(12 Hours)**

MIS support for decision making-Structured, Programmable decisions-unstructured, non programmable Decisions- hierarchy of management activity-Information systems for operational & management control- Planned performance - Variance from planned performance, reasons for variances, Analysis of possible decisions or courses of action - MIS structure based on organizational function - Formal Vs Informal systems.

Unit – III**(12 Hours)**

Decision- making process-Phases of decision- making process, problem finding, Formulation and solution or alternatives-criteria for decision making - Decision trees.

Unit – IV**(12 Hours)**

Concepts of information - Definition of information. Model of communication system - mathematical definition of Information-information presentation-quality of Information - Gentle model of the human as an Information processor.

Unit – V**(12 Hours)**

Concepts of planning and control and Organization Structure - Meaning-object of organizational planning-Setting of goals and objectives-hierarchy of planning -the planning process-the sources of Planning data-development of planning models - The basic model of organization structure-organization by product or service- Matrix organization.

Text Book:

“Management Information System Conceptual Foundations, Structure & Development” - Margrethe.H.Olson&Gordon.B.Davis–II Ed., -MGH.

Reference Books:

1. “Management Information System” - Davidkroneke, RichardAllanHatch.
2. “Management Information System” – C. Laudan, JanePriceLaudon – PHI.

Course Code	Course Title	H	C	I	E	T
17U6DME2	Elective - II E. PHP Programming	5	4	25	75	100

Objectives:

- To impart the knowledge of PHP Programming.
- Code programs and develop interface using PHP Programming.

Unit –I**Total Hours:75****Introduction to PHP****(15 Hours)**

Overview of PHP: PHP Origin-PHP History-Benefits in running PHP As A Server Side Script-Drawbacks in running PHP As A Server Side Script. Getting started: Writing PHP-Naming files-comments- The semicolon- Delivering text as output- White spaces- Running the PHP script- Data types-variables-constants.

Unit-II**The Basics of PHP****(15 Hours)**

Operators: Unary operators-Negation operators-Increment/Decrement operators-Cast operators-Binary operators-Numeric operators-Assignment operators-Concatenation operators-Comparison operators-Logical operators-Bitwise operators-Ternary operators-Operator precedence. Arrays: Array Creation-Array Data Retrieval-Associative array-Conditional Statements: The if statement-Executing multiple statements-The else if clause-The switch statement. Iterations: looping-The For loop-The While loop-Controlling an array using a while loop -Do while statement-The for each loop-Infinite loops-Special Loop keywords - Loops within Loops.

Unit-III**Functions****(15 Hours)**

User defined functions: Functions with arguments-Functions with multiple Arguments-Functions Accepting and returning values by reference- Functions Accepting and returning values by value-Accessing global variables within a function-Globalizing functions-Functions in Files-Recursion-Anonymous Functions-Built-in Functions-PHP Server variables-Working with DATE and TIME Functions-Performing mathematical operations-Working with String Functions.

Unit-IV**Exception Handling and Working with files****(15 Hours)**

Configuration directives-Error logging-Exception handling-About files and directories: Parsing directory paths-calculating file, directory and disk sizes-determining access and modification times-Working with files: the concept of resource-recognizing newline characters, end of file character-opening and closing a file-reading from a file-writing a string to a file-moving the file pointer-reading directory contents.

Unit-V

Working with Forms

(15 Hours)

Introducing HTML Form Tags and Elements-The main <form> Tag - Form elements:Text Box-Text Area-Password-Radio Button-Check Box-The Combo Box or Drop Down List Box-Hidden Field-Image-Submit and Reset buttons. Adding Elements To A Form: Adding A Textbox- Adding Radio buttons- Adding Check boxes- Adding A select box- Adding A password field- Adding A Textarea- Adding A Submit and Reset button-Adding a Hidden Field-Uploading Files to the web server using PHP-THE move_uploaded_file() function.

Text Books:

1. “PHP 5.1 for beginners” - Ivan Bayross,Sharnam Shah -First edition - SPD publishers.
2. 2.,”Beginning Php and Mysql” - W.Jason Gilmore - Fourth edition, - Springer publishers.

Chapters:

Unit –1: 1,5

Unit –2: 6

Unit –3: 7

Unit –4: 8, 10(pages 229-248) → Text Book 2

Unit –5: 8 → Text Book 1

Reference Books:

1. “Build your own database driven wed site using PHP & MySQL” - Kevin Yank - IV Edition.
2. “Straight to the point PHP” - Dinesh Maidasani,- First edition- FireWall media.

Course Code	Course Title	H	C	I	E	T
17U6DME2	Elective – II F. Cryptography and Network Security	5	4	25	75	100

Objectives:

- To impart the knowledge of Cryptography.
- Learning the concepts and techniques in network security

Unit I**Total Hours: 75****Introduction****(15 Hours)**

Security trends – The OSI security architecture – Security attacks – Security services – security mechanisms – A model for network security. Classical Encryption Techniques : Symmetric cipher model- Substitution techniques.

Unit II**Block Chiphers and DES****(15 Hours)**

Block cipher principles – the DES – the strength of DES – Block cipher design principles. Advanced Encryption Standard : Evaluation criteria for AES – The AES Cipher.

Unit III**Symmetric Cipher****(15 Hours)**

Multiple Encryption and triple DES – Block cipher modes of operation. Confidentiality using Symmetric Encryption : Placement of encryption functions – key distribution – Random number generation.

Unit IV**Public- Key Cryptography and RSA****(15 Hours)**

Principles of public –key cryptosystems – The RSA algorithm . Key Management; other public-key cryptosystem: Key management – Diffie-Hellman key exchange. Message Authentication and Hash functions: Authentication requirements – functions- Hash functions- Security of hash functions and MACs.

Unit – V**Digital Signature and Authentication Protocols****(15 Hours)**

Digital signatures – Authentication protocols – Digital signature standard. IP Security: IP security overview - IP security architecture – Authentication header – Encapsulating security payload –

combining security association. Web Security: Web security considerations – Secure socket layer and transport layer – Secure electronic transaction.

Textbook:

“Cryptography and Network Security Principles and Practices” – Willam Stallings – IV Ed. – Prentice Hall – 2005.

Chapters:

Unit – I	:	1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 2.1, 2.2.
Unit – II	:	3.1, 3.2, 3.3, 3.5, 5.1, 5.2.
Unit – III	:	6.1, 6.2, 7.1, 7.3, 7.4.
Unit – IV	:	9.1, 9.2, 10.1, 10.2, 11.1, 11.2, 11.4, 11.5.
Unit – V	:	13.1, 13.2, 13.3, 16.1, 16.2, 16.3, 16.4, 16.5, 17.1, 17.2, 17.3.

Reference Books:

1. “Cryptography and Network Security” – Atul Kahate – Mc Graw Hill
2. “Cryptography and Network Security” – C K Shyamala, N Harini, Dr T R Padmanaban – Wiley India – I Edition.

Course Code	Course Title	H	C	I	E	T
17U6DME2	Elective II – G. Information Security	5	4	25	75	100

Objectives:

- To impart the knowledge of Information Security.
- Learning the concepts of Information Security and its application.

Unit I**Total: 75 Hours****Introduction****(15 hours)**

Security Trends – OSI Security architecture – Security attacks, Security services, Security Mechanism, Security System development life cycle – Legal ethical and professional issues.

Unit II**Symmetric and Public Key Crypto****(15 hours)**

Stream ciphers – Block ciphers (DES, Triple DES, and AES) – Integrity – RSA – Diffie-Hellman – Elliptic curve cryptography-Uses for public key cryptography.

Unit III**Hash functions and Authentication****(15 hours)**

HMAC – Uses for Hash function – Miscellaneous crypto related topics – Authentication methods- passwords – Biometrics – Two factor authentication.

Unit IV**Authorization and Authentication protocols****(15 hours)**

Introduction – History of Authorization – Firewalls – Intrusion detection systems (Signature and Anomaly based IDS) – Authentication protocols – Authentication and TCP.

Unit V**Real world security protocols****(15 hours)**

Introduction – SSH – SSL – IPsec (Digital Signature, Symmetric Key, Public Key Encryption, Cookies) – Kerberos (Login, Ticket, Security) –GSM.

Text Books:

1. “Information Security principles and practice” - Mark Stamp - Second edition - Wiley publishing.
2. “Cryptography and Network Security principles and practice” - William Stallings - Third Edition - Pearson education 2003.

Chapters:

Unit I: 1.1 , 1.2, 1.3 -> Text Book2

Unit II: 3.2 , 3.3, 3.4, 4.3, 4.4, 4.5, 4.6, 4.7

Unit III: 5.7, 5.8, 5.9, 7.2, 7.3, 7.4, 7.6

Unit IV: 8.1, 8.2, 8.9, 8.10, 9.3, 9.4

Unit V: 10.1, 10.2, 10.3, 10.4, 10.5, 10.6

Reference Books:

1. “Principles of Information Security”- Michael E.Whitman and Herbert J.Mattor - Fifth Edition - Vikas publishing house.
2. “Elementary Information Security” - Richard E.Smith - Second Edition - John & Barlett publishers.

Course Code	Course Title	H	C	I	E	T
17U6DME2	Elective II – H. Computer Graphics	5	4	25	75	100

Objectives:

- To impart the knowledge of computer graphics.
- Learning the concepts of various aspects of graphical primitives and algorithms.

Unit – I**Total Hours: 75****Geometry & Line Generation****(15 Hours)**

Introduction – Pixels & frame buffers - Vector generation - Bresenham's algorithm - Antialiasing of lines - Thick line segments Character generation - Displaying the frame buffer.

Unit – II**Polygons****(15 Hours)**

Introduction – Polygons - Polygon representation - Entering polygons - An inside test - Polygon interfacing algorithms - Filling polygons - Filling with a pattern.

Unit – III**Transformations****(15 Hours)**

Introduction - Matrices - Scaling transformations - Sin and Cos –Rotation - Homogeneous coordinates & translation - Coordinate Transformations - Rotation about an arbitrary point - Other Transformations – Inverse transformations - Transformation Routines - Display procedures.

Unit – IV**Segments****(15 Hours)**

Introduction - The segment table - Segment creation - Closing a segment - Deleting a segment - Renaming a segment - Visibility – Image transformation - Saving and Showing Segments - Other displays – File Structures.

Unit – V**Windowing & Clipping****(15 Hours)**

Introduction - The viewing transformation - Clipping - The Cohen - Sutherland out code algorithm - The Sutherland hodgman algorithm - Adding clipping to the system - Multiple windowing.

Text Book:

“Computer Graphics, A Programming Approach” – Steven Harrington – Second Edition McGraw Hill International Edition.

Chapters:

Unit – I: Chapter 1

Unit – II: Chapter 3

Unit – III: Chapter 4

Unit – IV: Chapter 5

Unit – V: Chapter 6

Reference Books:

1. “Principles of Interactive Computer Graphics”- Newman & Sproull – Second Edition McGraw Hill Edition.
2. “Computer Graphics”- Donald Hearn|M.Pauline Baker- Second Edition-PHI.

Course Code	Course Title	H	C	I	E	T
17U6DSM6	Desktop Publishing	2	2	25	75	100

Objectives:

- To impart the knowledge of Desktop Publishing.
- Learning the tools of Photoshop and Flash software.

Unit – I**Total Hours: 30****Photoshop****(6 Hours)**

Introduction – Working environment – Opening and Saving files – Getting started with Images – Defining colors.

Unit – II**Photoshop tools****(6 Hours)**

Painting tools – Editing tools – Making selection – Layers – Filters – Color correction and Techniques.

Unit – III**Photoshop tools****(6 Hours)**

Getting started – Tools & Toolbar – Properties inspector – Panels – Viewing Options - Creating Objects – Stage and overlay objects – Tools – Panel tool – Line tool – Pen tool – Sub select tool – Oval tool – Rectangle tool – Pencil tool – Brush tool – Ink bottle tool – Paint bucket tool – Dropper tool – Eraser tool.

Unit – IV**Flash****(6 Hours)**

Editing object – Selecting with Lasso tool – Arrow tool – Grouping objects – Free Transform tool – Reshaping objects – Align objects – Pixels – Snapping – Stacking order – Color and text – Standard color Palette – Adding solid colors – Adding Gradients – Fill Transform tool – Selecting Colors – Adding, formatting, Manipulating text – Bitmap sound and videos – Using bitmaps – Importing bitmaps – Properties – Bitmap as file – Using sound – Importing sounds – Editing sounds – Adding video – Manipulating videos.

Unit – V**Flash tools****(6 Hours)**

Frames and layers – Working with frames – Adding frames – Deleting and copying frames – Frame properties – Working with layers – Inserting layers – Deleting and Copying layers – Layer mode – Properties – Folders – Mask layers – Animations – Animation basics – Elements of Animation – Animation scenes – Frame by Frame animation – Motion twinning – Motion Guides – Shape twinning – Animation text – Distribute text to layers – Movie clips.

Text Book:

1. Nick Vandome – “Flash MX in Easy steps” – Dream tech Press.
2. Robert Shuttleworth - “Photoshop 7 in Easy steps” – Dream tech Press.

Reference Books:

1. Vikas Gupta – “Comdex Desktop publishing course kit”.
2. Lisa Bucki – “Macro Media flash MX 2004 fast and easy web development” – Premier Press.

Course Code	Course Title	H	C	I	E	T
17U1DAC1	Discrete Mathematics	5	3	25	75	100

Objectives:

- To impart the knowledge of Discrete Mathematics.
- Learning the concepts of various aspects of discrete theory and its applications.

Unit – I**Total Hours: 75****The Foundations: Logic and Proofs****(15 Hours)**

Propositional logic – Applications of Propositional logic – Propositional equivalences – (Exclude Propositional satisfiability, Applications of satisfiability, Solving satisfiability problems, and its related problems).

Unit - II**Set Theory****(15 Hours)**

Introduction – Sets - Notation and Description of Sets – Subsets - Venn-Euler Diagrams - operations on sets - Properties of set operations - verification of the Basic Laws of Algebra by Venn diagram.

Unit - III**Relations****(15 Hours)**

Relations and their properties – Representing relations – Closures of relations – Equivalence relations – Partial orderings (Theorems statement only; Exclude lexicographic ordering - Exclude Lattices).

Unit - IV**Graphs****(15 Hours)**

Graphs and Graphs models, (Excluding Biological networks; Tournaments; all its related examples and problems) – Graph terminology and special types of graphs – Representing graphs and Graph isomorphism – Connectivity (paths – connectedness in undirected graphs – paths and isomorphism – counting paths between vertices) – shortest path problems.

Unit - V**Matrices****(15 Hours)**

Introduction – operations – Inverse – Rank of a matrix - Solution of simultaneous linear equations – Eigen values and Eigen Vectors.

Text Books:

1. Discrete Mathematics and its applications, Seventh Edition, Kenneth.H.Rosen, McGrawHill Publishing company.
2. Discrete Mathematics, M.Venkataraman, N.Sridharan and N.Chandrasekaran, The National Publishing company, 2009.

Chapters:

Unit – I : 1.1, 1.2, 1.3

Unit - II : 1.1 – 1.8 \rightarrow *Textbook 2*

Unit - III : 9.1, 9.3, 9.4, 9.5, 9.6

Unit – IV : 10.1, 10.2, 10.3, 10.4, 10.6)

Unit – V : 6.1 to 6.5, and 6.7) \rightarrow *Textbook 2*

Reference Books

1. Alan Doerr,Levassure – “Applied Discrete Mathematical Structures for Computer Science” – Galgotia Publications.
2. Trembly and Manohar – “Discrete Mathematical Structures with Application to Computer

B.Sc. IT Syllabus (CBCS Pattern) with effect from JUNE 2017 onwards.

Semester	Sub Code	Course Title	Hours	Credits
I	17U1FMC1	Fundamentals of Information Technology	6	6
	17U1FMC2	Programming in C	5	3
	17U1FAC1	Digital Electronics	5	3
	17U1FMP1	LAB-1: C programming Lab	3	1.5
	17U1FSM1	LAB-2: Office Automation Lab	3	1.5
	17U1FES1	Environmental Studies	2	2
II	17U2FMC3	Object Oriented Programming with C++	6	6
	17U2FMC4	Multimedia Technology	5	3
	17U2FAC2	Discrete Mathematics	5	3
	17U2FMP2	LAB- 3: C++ Programming Lab	3	1.5
	17U2FSM2	LAB-4: Multimedia Lab	3	1.5
	17U2FVE1	Value Education	2	2
III	17U3FMC5	Operating systems	4	4
	17U3FMC6	Visual Programming	5	4
	17U3FMC7	LINUX Programming	4	4
	17U3FAC3	Data Structures and Computer Algorithms	4	4
	17U3FAC4	Computerized Accounting	3	2
	17U3FMP3	LAB-5: LINUX Programming Lab	4	2
	17U3FSM3	LAB- 6: Visual Programming	4	2
	17U3FNM1	Non major Elective(NME) Introduction to Internet	2	2
IV	17U4FMC8	Programming in JAVA	5	4
	17U4FMC9	Data Communication & Computer Networks	4	4
	17U4FMC10	Web Programming Using PHP and MySQL	4	4
	17U4FMC11	Computer Organization	4	4
	17U4FAC5	Numerical Methods	3	2
	17U4FMP4	LAB-7: Web Programming Lab	4	2
	17U4FSM4	LAB-8: JAVA Programming Lab	4	2
	17U4FNM2	PC Software	2	2
V	17U5FMC12	Relational Database Management Systems	5	4
	17U5FMC13	Management Information Systems	5	4
	17U5FMC14	Software Engineering	5	4
	17U5FMC15	Dot Net Technologies	5	4
	17U5FME1	Elective – I	4	4

		A. Programming in ASP B. Cloud computing C. Information Security D. Client /Server computing		
	17U5FMP5	LAB-9: RDBMS Lab	3	3
	17U5FSM5	LAB-10: Dot net Programming Lab	3	3
		Extension activity		1
VI	17U6FMC16	Android Programming	5	5
	17U6FMC17	Data Mining and Data Warehousing	5	4
	17U6FME2	Elective – II E. PHP Programming F. Mobile Computing G. WAP and XML H. LAN and Windows Server 2000	4	4
	17U6FMP6	LAB-11: Open source Lab	7	2
	17U6FMP7	Project and Viva-voce	7	5
	17U6FSM6	Part- IV SBE Animation Techniques Using FLASH	2	2
		Extension Activity		1

SEMESTER-V

Course Code	Course Title	H	C	I	E	T
17U5FMC12	Relational Database Management Systems	5	4	25	75	100

Objectives:

- To understand the fundamentals of data models and concepts of database system
- To develop a programming skill of SQL

Unit – I**Total: 75 Hours****Introduction****(15 Hours)**

Database System Applications – Purpose of Database Systems – View of Data – Database Languages – Relational Databases – Database Design – Object based and Semi structured databases -Data Storage and Querying – Transaction Management – Data Mining and Analysis – Database Architecture – Specialty Databases-Database users and Administrators – History of Database Systems.

Unit – II**Relational Databases****(15 Hours)**

Relational Model: Structure of Relational Databases – Fundamental Relational Algebra Operations – Additional Relational Algebra Operations – Extended Relational Algebra Operations – Null Values – Modification of the Database. **SQL:** Background -Data Definition – Basic Structure of SQL Queries – Set Operations – Aggregate Functions – Null Values – Nested Sub queries – Complex Queries – Views – Modification of the Database – Joined Relations.

Unit – III**Database Design****(15 Hours)**

Other Relational Languages: The Tuple Relational Calculus -The Domain Relational Calculus – Query-By-Example-Data log. **Database Design and E-R Model:** Overview of the Design Process – The Entity Relationship Model – Constraints – Entity Relationship Diagrams – Entity Relationship Design Issues – Weak Entity Sets – Extended E-R Features.

Unit – IV**Normalization****(15 Hours)**

Features of Good Relational Database Designs – Atomic Domains and First Normal Form – Decomposition using Functional Dependencies – Functional Dependency Theory – Keys and Functional dependencies: Boyce Codd Normal form-BCNF and Dependency Preservation-Third Normal Form.

Unit – V

Storage and File Structure

(15 Hours)

Overview of Physical Storage Media – Magnetic Disks – RAID – Tertiary Storage – Storage Access – File Organization – Organization of records in Files – Data-Dictionary Storage.

Text Book:

Abraham Silberschatz, Henry F. Korth, S. Sudharshan -“Database System Concepts”,VI Ed., TMH.

Chapters:

Unit I : 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 1.10, 1.11, 1.12, 1.13.

Unit II : 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10, 3.11.

Unit III: 5.1,5.2, 5.3, 5.4, 6.1,6.2, 6.3, 6.4, 6.5, 6.6, 6.7

Unit IV: 7.1, 7.2, 7.3, 7.4

Unit V : 11.1, 11.2, 11.3, 11.4, 11.5, 11.6, 11.7, 11.8

Reference Books:

1. Raghu RamaKrishnan,Johannes Gehrke-, “**Database Management System**”- Mcgraw Hill,Third Edition.
2. Leon & Leon -“**DBMS**” ,New Edition ,Leon vikas Pub.
3. Thomas Connolly -“**Database Systems**”-,Addison Wesley–NewPrint.
4. J.Keerthika -“**Database Management Systems**”, Excellent publishers.

Course Code	Course Title	H	C	I	E	T
17U5FMC13	Management Information Systems	5	4	25	75	100

Objectives

- To impart the knowledge of Management Information systems.
- Learning the concept and operations of information systems.

Total: 75 Hours**Unit - I****(15 hours)**

Meaning-Definition-Integrated systems-MIS and data processing-MIS and other academic discipline such as managerial accounting, operational research, management, organization theory and computer science.

Unit - II**(15 hours)**

MIS support for decision making-structured, programmable decisions-Unstructured, non programmable decisions-hierarchy of management activity-Information systems for operational and management control –Planned performance-Variance from planned performance, reasons for variances, Analysis of possible decisions or courses of action-MIS structure based on organizational function-Formal and informal systems.

Unit - III**(15 hours)**

Decision-making process-phases of decision making process, problem finding, formulation and solution or alternatives-criteria for decision making-Decision trees.

Unit - IV**(15 hours)**

Concepts of information-Definition of information-Model of communication system-Mathematical definition of information-Information presentation-Quality of information-General model of the human as an information processor.

Unit - V**(15 hours)**

Concepts of planning and control and organization structure-Meaning-Object of organizational planning-Setting of goals and objectives-Hierarchy of planning-The planning process-The sources of planning data-Development of planning models-The basic model of an organization structure-Organization by product or service-Matrix organization .

Text Book:

Magrethe.H.Olson&Gordon.B.Davis-“ManagementInformationsystems”conceptual Foundations, structure and development-II edition, MGH.

Chapters:

Unit – I: 1.1, 1.2, 1.3.

Unit – II: 2.1, 2.2, 2.3, 2.6.

Unit – III: 6.1, 6.2, 6.3, 6.7

Unit – IV: 7.1, 7.2, 7.3, 7.4, 8.1.

Unit – V: 10.1, 10.2, 11.1.11.2.

Reference Books:

1. James A O’Brien George M Marakas Ramesh Behl “Management Information Systems” Tenth edition McGrawHill publications.
2. Rainer Prince Watson “Management Information Systems”-Third edition Wiley publications.
3. C.Laudon,JanePrice Laudon-“Management Information System”- seventh edition -PHI.

Course Code	Course Title	H	C	I	E	T
17U5FMC14	Software Engineering	5	4	25	75	100

Objectives:

- Understanding user conceptual models and development of better specifications.
- Improvement in design languages and reusable code

Total:75 Hours**Unit1****Introduction****(15 Hours)**

Definitions- Some Size Factors: Total Effort Devoted to Software, Distribution of Effort, project size Categories, How Programmers Spend their time -Quality and Productivity factors-Managerial issues.

Unit II**Planning A Software Project****(15 Hours)**

Defining the problem: Goals and Requirements –Developing a solution strategy-Planning the development process: The phased Life-cycle Model, Milestones,,Documents,and Reviews, The Cost Model, The Prototype Life-Cycle Model, Successive versions- planning an organizational structure-other planning Activities.

Unit III**Software Cost Estimation****(15 Hours)**

Software cost factors-Software cost estimation techniques-Staffing level estimation –Software requirements definition-The Software requirements specification-Formal Specification techniques.

Unit IV**Software Design****(15 Hours)**

Fundamental design concepts-Modules and modularization criteria-Design notations-Design techniques-Real-time and distributed system design-Test plans-Milestones, walkthroughs & inspections.

Unit V**Software Maintenance****(15 Hours)**

Enhancing Maintainability during development - Managerial aspects of software maintenance-Configuration management - Source-code metrics - other Maintenance tools and Techniques.

Text Book:

Richard Fairley-“Software Engineering concepts”-MGH

Chapters:

Unit-I: 1.2, 1.3, 1.4

Unit-II: 2.1, 2.2, 2.3, 2.4, 2.5

Unit-III: 3.1, 3.2, 3.3, 4.1, 4.2

Unit-IV: 5.1, 5.2, 5.3, 5.4, 5.6, 5.7, 5.8

Unit-V: 9.1, 9.2, 9.3, 9.4, 9.5

Reference Books:

1. H.C.shooman-“Software engineering design”-MGH.
2. Roger.S.Pressman-“Software Engineering”-MGH-IVED.

Course Code	Course Title	H	C	I	E	T
17U5FMC15	Dot Net Technologies	5	4	25	75	100

Objectives:

- To understand the concept of GUI Design tools, also to make them aware of controls in VB.NET
- Code programs and develop interface using VB.NET.

Total: 75 Hours**Unit - I****Introduction to VB.NET****(15 Hours)**

Getting started in Visual Basic to .Net –Starting Visual Basic Dot Net-Creating and Running very first application-**IDE**: What is IDE-Using the Auto hide facility–Using the Properties windows–Setting the properties of forms and controls–Using the solution explorer-Writing an event procedure-The Standard Toolbar. Setting properties using the Properties Window: Classification of Properties.

Unit - II**Control structure & Looping****(16 Hours)**

Variables and Data types-Text box control–Radio button control-Programming Statements :IF...Then ,IF...THEN...END IF, IF...THEN...ELSE...END IF–The MsgBox() function-The InputBox() function-List box control-Programming Statement: Select Case–Check box control-Iteration Statements-Do While Loop- Do Until Loop- Do Loop Until-For Next-Arrays.

Unit - III**Menus and Dialog Boxes****(16 Hours)**

Basic elements of menus-Generic procedure of creating menus-Creating a simple menu application. Structured Programming:What is Structured Programming-Events, Subroutines & Functions-Scope of variables-Scope of procedures-Elementary and composite data types.

Unit - IV**Object-Oriented programming****(16 Hours)**

What is OOPS-Implementing OOPS-Inheritance overriding-Collections. Working with files: Introduction to files-Classification of files-Handling files and folders using functions-File processing using streams-Advanced Techniques in Visual Basic Dot Net:Single document interface and multiple document interface.

Unit – V

Data Access with ADO.Net

(12 Hours)

What are databases-Connections, Data Adapters and Datasets-Accessing Data with Server Explorer-Accessing Data with Data Adapters and Datasets-Working with ADO.Net-Overview of ADO.Net Objects.

Text Books:

1. “Visual Basic Dot Net”- Shirish Chavan, Pearson Edition, Fourth Edition.
2. “Visual Basic Dot Net Black Book” - Steven Holzner, Wiley Press.

Chapters:

Unit – I: 1.5, 1.6, 2.2, 2.5, 2.14, 2.15, 2.16, 2.18, 2.22, 3.1.

Unit – II : 5.1,5.11,5.12,5.13,5.14,6.3,6.7,6.9,6.10,7.2,7.3,7.5,7.6,7.8,7.9,7.11. } Textbook 1

Unit – III: 9.1, 9.2, 9.3, 10.1, 10.2, 10.3, 10.4, 10.7.

Unit – IV: 11.1, 11.2, 13.1, 13.2, 13.4, 13.10, 14.1.

Unit – V: 21→Textbook 2

Reference Books:

1. “Visual Basic Dot Net-A Beginner’s guide”- Jeffery Kent -Tata McGraw Hill, First Edition.
2. “Visual Basic Dot Net Step by Step”- Michael Halvorson ,Prentice Hall of India Pvt, First Edition,2002.
3. “The Complete reference Visual Basic Dot Net “Jeffrey R.Shapiro- Tata McGraw Hill, Sixteenth Reprint,2010
4. “Visual Basic Dot Net”- John Smiley Tata McGraw Hill, First Edition 2002.

Course Code	Course Title	H	C	I	E	T
17U5FME1	Elective-I. (A) Programming in Asp	4	4	25	75	100

Objectives:

- To impart the knowledge of ASP Programming.
- Learning the concepts of Active Server Pages and ADO controls.

Total: 60 Hours**Unit – I****The Basic of ASP Programming****(12 Hours)**

Active Server Pages: Need for Active server pages – **The Development Environment:** Automated Development - **Active Server Pages:** ASP Objects – ADO Objects – ASP Components -Relational Database and other Data Sources – Developing on-line Application – Client/Server or Tiered Applications – Virtual Directories – **The Web Site as Communications Channel:** Development Issues – **ASP and the Web programming basics:** Web sites coding languages – Static Web Pages – Dynamic Applications – Laying Out the Web Site.

Unit – II**The Request and Response Objects****(12 Hours)**

Web based communication: The Request object – Accessing values from forms or URLs- The Server Variables Collections – The Cookies Collections – The Client Certificate Collections-**The Response object:** Response Object Collections – Response Object Properties – Response Object Methods – Writing Data to the Browser – **The Server Object:** The Server object – The ASP Error Object – **The Application and Session Object: Visitor Status and State:** Maintaining State with Cookies – Scope – Default and Virtual ASP Applications – The Application Object – The global.asa File – Using The Application Object – ASP Sessions – The Session Object – Using the Session Object in an Application.

Unit – III**Active Server Components and ADO****(12 Hours)**

The Scripting Object Model and SOM Objects: **The Scripting Object Model:** Creating Objects- The Dictionary Objects – The Scripting: FileSystemObject Object – The Drive Objects – The Folder Object – The File Object – The Scripting: TextStream Object. **Major Active Server Components:** **Active Server Components:** Active Server Components - Creating Server Components with ASP – The Adrotator Component- The Browser Capabilities Component – The Content Linking Components – The Content Rotator Components- **More Active Server**

components: More Microsoft IIS Server Components – The Counters Components – Using the Counters Components – The Page Counter Components – The Tools Components – The Logging Utility Components – Third-Party Components ASP – Using These ASP Components.

Unit – IV

The ADO Connection – Related Objects

(12 Hours)

Interactivity and latency: Optimizing Database Interactions – The Connection Object – Advanced Error – Handling Techniques – The Command Object – Record Set Cursors – Record Set Locking – Stored Procedures – The Parameters Collections.

Unit V

The ADO Record Set–Related Objects

(12 Hours)

The Record set Object: Record set Methods and Properties- the Record set Navigation and Manipulation Operations – **The Stream and Record Object:** Record Object Properties and Methods- Stream Object Properties and Methods.

Text Book:

Dave Mercer – ASP3.0 a Beginner’s Guide – TMH 2012.

Chapters:

Unit I: 1, 2

Unit II: 3, 4, 5

Unit III: 6, 7, 8

Unit IV: 10

Unit V: 11

Reference Books:

1. Beginning ASP 3.0 – Chris Ullman, Wrox Publications, and Edition 2000.
2. Designing Active Server Pages – Scott Mitchell, O’REILLY Publications, and Edition 2000.
3. Sams Teach Yourself Active Server Pages 3.0 in 21 Days – Scott Mitchell and James Atkinson, 1st Edition, Sams Publications.
4. Master Active server Pages 3 –Russell Jones, Edition 2000, Sybex Publications

Course Code	Course Title	H	C	I	E	T
17U5FME1	Elective-I. (B) Cloud Computing	4	4	25	75	100

Objectives:

- To impart the knowledge of cloud computing.
- Understand the network from remote server.

Total: 60 Hours**Unit I****Introduction****(12 Hours)**

Web 2.0 and the cloud – distinguish cloud types – exploring uses of the cloud – introducing scalability – introducing virtualization – collecting processing power through grid computing – getting started with SaaS – understanding open SaaS solution – understanding service – oriented architecture.

Unit II**Platform and Infrastructure Service****(12 Hours)**

IT evolution leading to the cloud – benefits of PaaS solution – understanding IaaS – improving performance through load balancing – system and storage redundancy – utilizing cloud-based NAS devices – advantages of IaaS solution – server types within an IaaS solution – understanding single sign-on (SSO) – understanding open ID – mobile ID management.

Unit III**Data storage in cloud****(12 Hours)**

Examining the evolution of network storage – understanding cloud-based data storage – advantages and disadvantages of cloud-based data storage – getting past the fear of cloud-based data – cloud-based backup systems – industry specific cloud-based data storage – cloud-based database solution – cloud-based block storage.

Unit IV**Securing Cloud****(12 Hours)**

General security advantages of cloud-based solutions – introducing business continuity and disaster recovery – understanding distributed denial of service (DDOS) attacks – packet sniffing – man –in-the-middle attack – monitoring device screens – malicious employees – hypervisor attack – guest – hopping attack – SQL injection attack – physical security – threads.

Unit V

Mobile Cloud Computing

(12 Hours)

The evolution of mobile computing – the mobile cloud eco system – introducing mobile players – revisiting the role of HTMLs – mobile development considerations – understanding corporate governance – extending governance to information technology.

Text Book:

Kris Jamsa “Cloud Computing” First Edition – 2012, Library of Congress Cataloging in – Publication.

Chapters:

Unit - I: 1,2

Unit - II: 3, 4,5

Unit - III: 6

Unit - IV: 9

Unit - V: 14

Reference Books:

1. Rajkumar Buyya, James Broberg, Andrzej M. Goscinski “Cloud Computing: Principles and Paradigms” Wiley.
2. Ray J Rafaels “Cloud Computing: From Beginning to End”, CreateSpace Independent Publishing Platform (2015).
3. Michael J. Kavis “Architecting the Cloud: Design Computing Models (Saas, Paas, and IaaS)”, Wiley.
4. Anthony Velte, Robert C. Elsenpeter, and Toby J. Velte “Cloud Computing, A Practical Approach”, Tata McGraw-Hill Edition 2010.

Course Code	Course Title	H	C	I	E	T
17U5FME1	Elective-I. (C) Information Security	4	4	25	75	100

Objectives:

- To understand the basics of Information Security
- To know the technological accepts of Security Method

Total: 60 Hours**Unit I****Information security****(12 Hours)**

The Importance of Information Protection-The Evolution of information Security-Justifying Security Investment: Business Agility, Cost Reduction, Portability-Security Methodology- Security Program:Authority-Framework-Assessment-planning-Action-Maintenance-The Impossible job-The weakest Link-Strategy and Tactics-Business Process vs Technical controls.

Unit II**Risk Analysis****(12 Hours)**

Threat Definition: Threat Vectors, Threat Sources and Targets-Types of Attacks: Malicious Mobile code- Advanced persistent Threats (APTS)- Manual Attacks- Risk Analysis

Unit III**Security Policies****(12 Hours)**

Security Policies: Security Policy Development- Security policy Contributors- Security policy Audience- Policy Categories- Frameworks- Security Awareness- Importance of Security Awareness,-objectives of an Awareness Program- Increasing Effectiveness- Implementing the Awareness Program- Enforcement- Policy Enforcement for Vendors-policy Enforcement for Employees- Software-Based Enforcement- Data Privacy Polices- Data Integrity polices

Unit IV**Security Design & Organization****(12 Hours)**

The CIA Triad and other Models: Confidentiality-Integrity-Availability-Additional concepts- Defense models: The Lollipop model-The Onion model-Security Organization: Roles and responsibility: Security positions-Security incidence response Team-Managed security services.

Unit V:**Authentication and Authorization****(12 Hours)**

Authentication: Usernames and Passwords-Certificate based Authentication-Extensible authentication Protocol(EAP)-Biometrics-Additional users for Authentication Authorization: User Rights-Role-Based Authorization (RBAC)-Access Control Lists(ACLs)-Rule-Based Authorization

Text Book:

“Information Security” The Complete Reference 2nd Edition-Mark Rhodes –Ousley.

Chapters:

Unit I : 1

Unit II : 2

Unit III: 5

Unit IV: 4, 6

Unit V: 7

Reference Books:

1. Mark Stamp -“Information Security”, Willey 2005
2. E.Whitman and Herbert J.Mattord -“Principles of Information Security” ,Michael 4th edition

SEMESTER-V

Course Code	Course Title	H	C	I	E	T
17U5FME1	Elective-I.(D) Client/Server Computing	4	4	25	75	100

Objectives:

- To impart the knowledge of client/server computing.
- To learn the client components and categories of server.
- To understand the benefits of intelligent database.

Total:60 Hours**Unit - I****Introduction to Client/Server computing (12 Hours)**

Client/Server computing introduction – Benefits of client/server computing. Evolution of client/server computing: Hardware trends – Software trends – Evolution of operating systems – Networking trends – Business considerations. Overview of client/server applications: Components of client/server applications – Classes of client/server applications – Categories of client/server applications – Factors for success.

Unit - II**The Client (12 Hours)**

Client Hardware and Software: Client components – Client operating systems – GUI – Database access – Application logic. Client software products: GUI environments – Database access tools. Client Requirements: GUI design standards – Open GUI standards – Interface Independence – Testing Interfaces – Development aids.

Unit - III**The Server (12 Hours)**

Server Hardware: Categories of servers – Features of server machines – Classes of server machines. Server Environment: Layers of software – Network management environment – Network computing environment – Extensions – Network operating system – Loadable modules. Server operating systems: OS/2 2.0 – Windows new technology – Unix-Based operating systems.

Unit - IV**Server Requirements and Data Management (12 Hours)**

Server requirements: Platform independence – Transaction processing – Connectivity – Intelligent database – Stored procedures – Triggers – Load leveling – Optimizer – Testing and diagnostic tools – Reliability – Backup and Recovery mechanisms. Server Data Management and access tools: Data manager features – Data management software – Database gateway.

Unit - V

The Network and Development

(12 Hours)

Overview of networking: Layers, Interfaces, and Protocols – Standard architecture – Network characteristics – Network management standards – LAN characteristics. LAN Hardware and Software: LAN hardware – Network operating systems. Application development tools.

Text Book:

Dawna Travis Dewire - “Client/Server Computing” - Tata McGraw- Hill International Editions.

Chapters:

Unit – I : 1,2,3,4

Unit – II : 5,6,7

Unit – III: 8,9,10

Unit – IV: 11, 12

Unit – V : 13,14,16

Reference Books:

1. Patrick Smith & Steve Guengerich - “Client/Server Computing”- PHI-II Edition 1994.
2. Subhash Chandra Yadav & Sanjay Kumar Singh, “An Introduction to Client/Server Computing”-New Age International publishers,2009.
3. Eric.J.Johnson,The Complete guide to “Client/Server Computing”, Prentice Hall,2001.

Course Code	Course Title	H	C	I	E	T
17U5FMP5	RDBMS Lab	3	3	50	50	100

Cycle 1

1. Display the user name.
2. Display the current date and time.
3. Find the floor and ceil value for a given number.
4. Find the rounded value for a given number.
5. Find the truncated value for a given number.
6. Find the cube value for a given number.
7. Find the ascii value for a given number.
8. Extract "d morning" from the string "good morning".
9. Find the number of months between given two dates.
10. Display all the records in the table customer.
11. Display all the records that are in the loan table whose amount is > 200000.
12. Display ano, cname for 'john' and 'leon'.
13. Display all the records that are in bname='chrompet'.
14. How many customers are getting their loan amount more than 300000.
15. Display all the customer whose name starts with 's'.
16. Find all the bank customers having a loan, an account or both at the bank.
17. Find all lno for loans made at the 'simmakal' branch with loan amount > 500000
18. Find the average balance for all accounts
19. Fine the average account balance at each branch. Group all the records by the department.

Cycle 2

1. To list the entire loan relation in descending order of amount. if several loans have the same amount order them in ascending order by lno.
2. Find the customer name,loan no,loan amount for the customer who have an account and loan at the bank.
3. To generate single relation with all the information about full time employees using outer join.
4. To generate single relation with all the information about full time employees using left outer join.
5. To generate single relation with all the information about full time employees using right outer join.
6. To find all customers who do not have loan at the bank,but do not have an account at the bank.

7. Find the names of all branches that have an asset value greater than each branch in 'madurai'.
8. Delete all loans with loan amount between \$100000 and \$200000.
9. To create a view for each branch with the sum of the amounts of all loans at the branch.

PL/SQL Blocks

Cursor

10. Write a block to update the basic pay by adding rs.500 to that of existing amount whose job is 'trainee'.

Procedure

11. Create a procedure to display the details of given employee. If no value is given, just display the details of all the employees.

Trigger

12. Write the db trigger that prevents user to insert or delete or update the employee on saturday or sunday.

SEMESTER - V

Course Code	Course Title	H	C	I	E	T
17U5FSM5	Dot Net Programming Lab	3	3	50	50	100

1. Write a program to convert the given decimal number into binary,octal,and hexadecimal numbers.
2. Write a program to develop a calculator with basic operations.
3. Write a program to create menus in a form using menu editor.
4. Write a program to add the items to list box and move the selected item from the list box to the combo box.
5. Design a form using common dialog control to display the save and open dialog box.
6. Write a program for obtaining root directory and current directory.
7. Write a program to use a tool bar to set editor properties.
8. Write a program to create and reading text file.
9. Write a program to implement a binary search using collection class.
10. Write a program to create an employee details with database connectivity.

Course Code	Course Title	H	C	I	E	T
17U6FMC16	Android Programming	5	5	25	75	100

Objectives:

- To impart the knowledge of Android Programming.
- Learning the concept and operations of Android Applications.

Total: 75 Hours**Unit I****Fundamentals of Android Development****(15 Hours)**

Introduction to Android: The android 4.1 Jelly Bean SDK – Understanding the Android Software Stack – Installing the Android SDK – Creating Android Virtual Devices – Using the Text View Control – Using The Android Emulator – The Android Debug Bridge (ADB) – Launching Android Applications on a Hand Set. **Basic Widgets:** Understanding the role of Android Project Files- understanding Activities – Role of the Android Manifest Editor – Creating the user interface – Commonly used layouts and controls – Event Handling – Displaying Messages Through Toast – Creating and Starting an Activity – Using the Edit Text control – Choosing options with Checkbox – Choosing mutually exclusive items using Radio Buttons.

Unit II**Building Blocks for Android Application Design****(15 Hours)**

Laying Out Controls in Containers: Introduction to layouts – Linear layout – Relative Layout – Absolute Layout – using Image View – Frame Layout – Table Layout – Grid Layout – Adapting to Screen Orientation. **Utilizing resources and Media:** Creating an Image switcher Application – Scrolling through Scroll View – Playing Audio – Playing Video – Displaying progress with progress Bar – Using Assets.

Unit – III**Using selection Widgets and Debugging****(15 Hours)**

Using list View – Using the spinner control – using the Grid view control – Creating an Image Gallery using the View pager control – Using debugging tool(DDMS)- Debugging Applications – Using the debug perspective. **Creating Interactive menus and ActionBars:** Menus and their types – Creating Menus through XML – Creating Menus through coding – Applying a Context Menu to a ListView – Using the Action Bar -Replacing Menus with the Action Bar- Creating a Tabbed Action Bar – Creating a Drop-Down List Action Bar.

Unit – IV

Using DataBases

(15 Hours)

Using the SQLiteOpenHelper Class – Accessing Databases with ADB – Creating a Data Entry Form.

Unit – V

Advanced Android Programming Internet, Entertainment, and Services

(15 Hours)

Displaying Web Pages and Maps: Displaying Web Pages – Using the WebViewClient Class – Using Google Maps.

Text Book:

Android Programming - Unleashed – B.M. Harwani – Pearson Education 2013.

Chapters:

Unit I: 1, 2

Unit II: 3, 4

Unit III: 5, 7

Unit IV: 8

Unit V: 10

Reference Books:

1. Android Programming for Beginners – John Horton, First Edition, Packt Publishing.
2. Prasannakumar Dixit – Android 2014, Vikas Publishing Pvt Ltd.,
3. Wei-Menglee – Beginning Android 4 Application Development, 2014 Wiley India Pvt Ltd.,
4. Android Programming: The Big Nerd Ranch Guide – Bill Phillips and Chris Stewart – O'Reilly Media Publishers, Third Edition.

SEMESTER - VI

Course Code	Course Title	H	C	I	E	T
17U6FMC17	Data Mining and Data Warehousing	5	4	25	75	100

Objectives:

- Understanding the concepts of Data Warehousing and Data Mining
- Understanding various Data Mining Algorithms.

Total: 75 Hours**Unit - I****Introduction to Data Mining and Data****(15 Hours)**

Introduction – Why Data Mining – Moving toward the Information Age – Data Mining as the Evolution of Information Technology – What Is Data Mining – What Kinds of Data Can Be Mined – Database Data – Data Warehouses – Transactional Data – Other Kinds of Data – What Kinds of Patterns Can Be Mined – Class/Concept Description: Characterization and Discrimination – Mining Frequent Patterns, Associations, and Correlations – Classification and Regression for Predictive Analysis – Cluster Analysis – Outlier Analysis – Are All Patterns Interesting – Getting to Know Your Data – Data Objects and Attribute Types – What Is an Attribute – Nominal Attributes – Binary Attributes – Ordinal Attributes – Numeric Attributes – Discrete versus Continuous Attributes – Basic Statistical Descriptions of Data – Measuring the Central Tendency: Mean, Median, and Mode – Measuring the Dispersion of Data: Range, Quartiles, Variance, Standard Deviation and Interquartile Range – Graphic Displays of Basic Statistical Descriptions of Data – Measuring Data Similarity and Dissimilarity – Data Matrix versus Dissimilarity Matrix – Proximity Measures for Nominal Attributes – Proximity Measures for Binary Attributes – Dissimilarity of Numeric Data: Minkowski Distance – Proximity Measures for Ordinal Attributes – Dissimilarity of Attributes of Mixed Types – Cosine Similarity.

Unit - II**Data Preprocessing****(14 Hours)**

Data Preprocessing: An Overview – Data Quality: Why Preprocess the Data – Major Tasks in Data Preprocessing – Data Cleaning – Missing Values – Noisy Data – Data Cleaning as a Process – Data Integration – Entity Identification Problem – Redundancy and Correlation Analysis – Tuple Duplication – Data Value Conflict Detection and Resolution – Data Reduction – Overview of Data Reduction Strategies – Wavelet Transforms – Principal Components Analysis – Attribute Subset Selection – Regression and Log-Linear Models: Parametric Data Reduction – Histograms – Clustering – Sampling – Data Cube – Aggregation – Data Transformation and Data Discretization – Data Transformation Strategies – Overview – Data Transformation by Normalization – Discretization by Binning – Discretization by Histogram Analysis – Discretization by Cluster, Decision Tree, and Correlation Analyses – Concept Hierarchy Generation for Nominal Data.

Unit - III

Data Warehousing and OLAP

(15 Hours)

Basic Concepts – What Is a Data Warehouse – Differences between Operational Database Systems and Data Warehouses – But, Why Have a Separate Data Warehouse – Data Warehousing: A Multitiered Architecture – Data Warehouse Models: Enterprise Warehouse, Data Mart, and Virtual Warehouse – Extraction, Transformation, and Loading – Metadata Repository – Data Warehouse Modeling: Data Cube and OLAP – Data Cube: A Multidimensional Data Model – Stars, Snowflakes, and Fact Constellations: Schemas for Multidimensional Data Models – Dimensions: The Role of Concept Hierarchies – Measures: Their Categorization and Computation – Typical OLAP Operations – A Starlet Query Model for Querying Multidimensional Databases – Data Warehouse Design and Usage – A Business Analysis Framework for Data Warehouse Design – Data Warehouse Design Process – Data Warehouse Usage for Information Processing – From Online Analytical Processing to Multidimensional Data Mining – Data Warehouse Implementation – Efficient Data Cube Computation: An Overview – Indexing OLAP Data: Bitmap Index and Join Index – Efficient Processing of OLAP Queries – OLAP Server Architectures: ROLAP versus MOLAP versus HOLAP.

Unit - IV

Frequent Patterns, Associations & Correlations and Classification

(16 Hours)

Basic Concepts – Market Basket Analysis: A Motivating Example – Frequent Itemsets, Closed Itemsets, and Association Rules – Frequent Itemset Mining Methods – Apriori Algorithm: Finding Frequent Itemsets by Confined – Candidate Generation – Generating Association Rules from Frequent Itemsets – Improving the Efficiency of Apriori – A Pattern-Growth Approach for Mining Frequent Itemsets – Mining Frequent Itemsets Using Vertical Data Format – Mining Closed and Max Patterns – Which Patterns Are Interesting—Pattern Evaluation Methods – Strong Rules Are Not Necessarily Interesting – From Association Analysis to Correlation Analysis – A Comparison of Pattern Evaluation Measures – Classification: Basic Concepts – Basic Concepts – What Is Classification – General Approach to Classification – Decision Tree Induction – Decision Tree Induction – Attribute Selection Measures – Tree Pruning – Scalability and Decision Tree Induction – Visual Mining for Decision Tree Induction – Rule-Based Classification – Using IF-THEN Rules for Classification – Rule Extraction from a Decision Tree – Rule Induction Using a Sequential Covering Algorithm.

Unit - V

Cluster Analysis

(15 Hours)

Cluster Analysis – What Is Cluster Analysis – Requirements for Cluster Analysis – Overview of Basic Clustering Methods – Partitioning Methods – k-Means: A Centroid-Based Technique – k-Medoids: A Representative Object-Based Technique – Hierarchical Methods – Agglomerative versus Divisive Hierarchical Clustering – Distance Measures in Algorithmic Methods – BIRCH: Multiphase Hierarchical Clustering Using Clustering Feature Trees – Chameleon: Multiphase Hierarchical Clustering Using Dynamic Modeling – Probabilistic Hierarchical Clustering – Grid-

Based Methods – STING: STatistical INformation Grid – CLIQUE: An Apriori-like Subspace Clustering Method.

Text Book:

Jiawei Han, Micheline Kamber, and Jian Pei – “DATA MINING Concepts and Techniques” – Third Edition – Morgan Kaufman Publishers, New Delhi.

Chapters:

Unit-I: 1.1, 1.2, 1.3, 1.4, 2.1, 2.2, & 2.4.

Unit – II: 3.

Unit-III: 4.1, 4.2, 4.3, 4.4.

Unit-IV: 6, 8.1, 8.2, 8.4.

Unit V: 10.1, 10.2, 10.3, 10.5

Reference Books:

1. Alex Berson and Stephen J. Smith “Data Warehousing, Data Mining, and OLAP” – Tata McGraw Hill Edition.
2. Margaret Dunham – “Data Mining Introductory and Advanced topics” - Prentice Hall 2003.
3. Heikki Mannila and Padhraic Smyth – “Principles of Data Mining” - MIT Press Fall 2000.

Course Code	Course Title	H	C	I	E	T
17U6FME2	Elective-II.(E) PHP Programming	4	4	25	75	100

Objectives:

- To impart the knowledge of PHP programming
- Code programs and develop interface using PHP programming

Total : 60 Hours**Unit –I****Introduction to PHP****(12 Hours)**

Overview of PHP: PHP Origin-PHP History-Benefits in running PHP As A Server Side Script-Drawbacks in running PHP As A Server Side Script. Getting started: Writing PHP-Naming files-comments- The semicolon- Delivering text as output- White spaces- Running the PHP script- Data types-variables-constants.

Unit-II**The Basics of PHP****(12 Hours)**

Operators: Unary operators-Negation operators-Increment/Decrement operators-Cast operators-Binary operators-Numeric operators-Assignment operators-Concatenation operators-Comparison operators-Logical operators-Bitwise operators-Ternary operators-Operator precedence. Arrays: Array Creation-Array Data Retrieval-Associative array-Conditional Statements: The if statement-Executing multiple statements-The else if clause-The switch statement. Iterations: looping-The For loop-The While loop-Controlling an array using a while loop -Do while statement-The for each loop-Infinite loops-Special Loop keywords - Loops within Loops.

Unit-III**Functions****(12 Hours)**

User defined functions: Functions with arguments-Functions with multiple Arguments-Functions Accepting and returning values by reference- Functions Accepting and returning values by value-Accessing global variables within a function-Globalizing functions-Functions in Files-Recursion-Anonymous Functions-Built-in Functions-PHP Server variables-Working with DATE and TIME Functions-Performing mathematical operations-Working with String Functions.

Unit-IV**Exception Handling and Working with files****(12 Hours)**

Configuration directives-Error logging-Exception handling-About files and directories: Parsing directory paths-calculating file, directory and disk sizes-determining access and modification times-

Working with files: the concept of resource-recognizing newline characters, end of file character-opening and closing a file-reading from a file-writing a string to a file-moving the file pointer-reading directory contents.

Unit-V

Working with Forms

(12 Hours)

Introducing HTML Form Tags and Elements-The main <form> Tag - Form elements:Text Box-Text Area-Password-Radio Button-Check Box-The Combo Box or Drop Down List Box-Hidden Field-Image-Submit and Reset buttons. Adding Elements To A Form: Adding A Textbox- Adding Radio buttons- Adding Check boxes- Adding A select box- Adding A password field- Adding A Textarea- Adding A Submit and Reset button-Adding a Hidden Field-Uploading Files to the web server using PHP-The move_uploaded_file() function.

Text Books:

- 1.Ivan Bayross,Sharnam Shah, “PHP 5.1 for beginners”,First edition,SPD publishers.
2. W.Jason Gilmore,”Beginning Php and Mysql,Fourth edition,Springer publishers.

Chapters:

Unit –I: 1,5

Unit –II: 6

Unit –III: 7

Unit –V: 8

Unit –IV: 8, 10(pages 229-248) → Text Book -2

Reference Books:

1. Kevin Yank,”Build your own database driven web site using PHP & MySQL”,2011,4th edition,sitepoint.
2. Dinesh Maidasani, “Straight to the point PHP”,First edition,FireWall media.
3. Matt Zandstra,” SAMS Teach yourself PHP4 in 24 hours”

Course Code	Course Title	H	C	I	E	T
17U6FME2	Elective-II.(F) Mobile Computing	4	4	25	75	100

Objectives:

- Learn the basics of mobile telecommunication system
- Be exposed to Ad-Hoc networks.
- Gain Knowledge about different mobile platforms and application development.

Total: 60 Hours**Unit I****Introduction****(12 Hours)**

Introduction-Mobile Computing Vs Wireless Networking-Mobile Computing Applications-Characteristics of Mobile Computing-Structure of Mobile Computing Application. MAC Protocols – Wireless MAC Protocol Issues - Fixed Assignment Schemes. – Random Assignment Schemes – Reservation Based Schemes.

Unit II**Mobile Internet Protocol And Transport Layer****(12 Hours)**

Overview of Mobile IP – Features of Mobile IP – Key Mechanism in Mobile IP – Route Optimization. Overview of TCP/IP – Architecture of TCP/IP – Adaptation of TCP Window – Improvement in TCP Performance.

Unit III**Mobile Telecommunication System****(12 Hours)**

Cellular Mobile Communication – Global System for Mobile Communication (GSM) – General Packet Radio Service(GPRS) – Universal Mobile Telecommunication System(UMTS).

Unit IV**Mobile Ad-Hoc Networks****(12 Hours)**

Ad-Hoc Basic Concept – Characteristics – Applications – Design Issues – Routing – Essential of Traditional Routing Protocols – Popular Routing Protocols – Vehicular Ad Hoc networks (VANET) – MANET Vs VANET – Security issues in a MANET.

Unit V

Mobile Platforms And Applications

(12 Hours)

Operating System responsibilities in Mobile Device– Special Constrains & Requirements of Mobile O/S– Commercial Mobile Operating Systems – Software Development Kit : iOS, Android, Blackberry, Windows Mobile – M-Commerce – Structure – Pros & Cons – Mobile Payment System – Security Issues.

Text Book:

1. Prasant Kumar Pattnaik, Rajib Mall, “Fundamentals of Mobile Computing”, 2012 by PHI Learning Pvt.Ltd, New Delhi.

Chapters:

Unit I: 2.1, 2.2, 2.3, 2.4, 2.5, 3.1, 3.2, 3.4, 3.5, 3.6

Unit II: 4.1, 4.4, 4.5, 4.6, 5.1, 5.2, 5.7, 5.8

Unit III: 2.6, 2.7, 2.8, 2.9,

Unit IV: 7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 7.7, 7.9, 7.10, 7.11

Unit V: 9.1, 9.3, 9.4, 11.1, 11.3, 11.4, 11.5, 11.6

Reference Books:

1. Jochen H.Schiller, “Mobile Communications”, 3rd Edition, Pearson Education, New Delhi.
2. Dharma PrakashAgarval, Qing and an Zeng, “Introduction to Wireless and Mobile Systems”, 4th Edition, Thomson Asia Pvt. Ltd.
3. Norman Sadeh, “M-Commerce Technologies, Services and Business Models”, 2002 by Wiley Publications.

Course Code	Course Title	H	C	I	E	T
17U6FME2	Elective-II. (G) WAP and XML	4	4	25	75	100

Objectives

- To impart the knowledge of communication protocols especially for wireless devices.
- Introduction of skills related to XML which includes Document Type Definition (DTDs), well formed and Valid XML documents and XML schemas.

Total : 60 Hours**Unit I (12 Hours)**

Overview of WAP: WAP and the wireless world –WAP Application architecture – WAP internal structure – WAP versus the Web – WAP 1.2 – WTA and Push features.

Unit II (12 Hours)

WAP Gateways: Definition – Functionality of a WAP gateway – The web modal versus the WAP model – Positioning of a WAP gateway in the network – selecting a WAP gateway.

Basic WML: Extensible Mark-up Language – WML structure – A basic WML card – Text Formatting –navigation – Advanced display features.

Unit III (12 Hours)

XML: Introduction XML: XML history and origin- XML syntax - Components of XML - CDATA & PCDATA - State of XML - Modelling Data - XML declaration - XML First program – XML namespace.

Unit IV (12 Hours)

Document Type Definition (DTD): Fundamentals - Internal & External DTDs – Valid and well formed documents – Elements of DTDs – Types of elements: empty, element-only, mixed elements- Attributes of DTDs-Types of attributes: String, enumerated, Tokenized-creating a valid document from a DTD.

Unit V (12 Hours)

XML Schema: XML Schema and W3C Schema- Benefits of Schema- XML Schema vocabulary-schema elements – Data type Elements –Element type Elements – Group Element – Attributes type Elements – Description Element – XML Data type –conversion of DTDs to Schema.

Text Books:

1. For Unit I , II Charles Arehart and Others, “Professional WAP with WML , WML scripts , ASP, JSP,XML ,XSLT, WTA Push and Voice XML” Shroff Publishers and Distributers Pvt. Ltd. 2000.
2. For Unit III, IV and V “XML Unleashed “by Michael Morrision , Techmedia publication, 2000.

Reference Books:

- 1) “XML TM Bible “,Eliotte Rusty Harlod ,Books India (P) Ltd, 2000.
- 2) “Beginning XML”, By Joe Fawcett, Liam R.E. Quin, DannyAyers , John wiley & Sons, Inc., Fifth Edition.
- 3) “WAP – The Wireless Application Protocol” by Sandeep Singhal, Lalitha suryanarayana, Pearson Education India 2002.

B.Sc. (IT)

SEMESTER – VI

Course Code	Course Title	H	C	I	E	T
17U6FME2	Elective-II. (H) LAN and windows server 2000	4	4	25	75	100

Objectives

- To impart the knowledge of LAN and Server functionalities.
- Introduction of Windows Server components.

Total: 60 Hours

Unit – I

(12 Hours)

LAN communication concepts - Types of communication – Analog and Digital – LAN topologies – Transmission media – Bus/Tree –Rings – Stars – Structured cabling system – Channel allocation.

Unit – II

(12 Hours)

Client/Server Information systems – LAN internetworking – Modems – Bridges – Switches – Hubs – Source routing – Wireless networks – LAN remote access – LAN OS – Communication protocols.

Unit – III

(12 Hours)

Token ring based LANs – Traditional LANs – Ethernet – IEEE 802.3 – Internet Client/Server structure – 100 Mbps Ethernet LANs – 100BASE-T – Switched Ethernet – 100VG-AnyLAN – 1000 Mbps Gigabit Ethernet.

Unit – IV

(12 Hours)

Feature of Windows 2000 – Install or Upgrade to Windows 2000 – Configure Windows 2000 – Connect Clients running windows 2000 to Networks – Create and manage user accounts – Manage access to resources by using groups.

Unit – V

(12 Hours)

Manage access to resources by user groups – Manage data by using the NTFS file system – Provide network access to file resources – Monitor and optimize performance in Windows 2000 – Implement security in Windows 2000 – Configure printing.

Text Book:

1. William Stalings – “Local and Metropolitan area networks – VI Ed., - Pearson Pub.,
2. Sanjay Saxena – “A First course in Computers” – Vikas Pub.,

Reference Book:

“Implementing a Microsoft Windows 2000 Network Infrastructure” – Tech media.

Course Code	Course Title	H	C	I	E	T
17U6FSM6	SBE - Animation Techniques using FLASH	2	2	25	75	100

Objectives:

- To impart the knowledge of Basic Animations.
- Learning the concept of 2D Animations and its operations.

Total : 30 Hours**Unit I****Introducing Flash CS5****(5 Hours)**

Introduction to Flash CS5: Exploring the New and Enhanced features of Flash CS5 – Launching the Flash Application – Exploring the User Interface of Flash CS5 – Working with workspaces – Saving – Opening – Closing Flash Document.

Unit II**Getting Started with Tools****(5 Hours)**

Working with Drawing Tools in Flash – Working with the Selection and Modification Tools in Flash – Working with Colors in Flash – Adding Filters in Flash.

Unit III**Working with Objects and Text****(6 Hours)**

Editing Objects in Flash – Transforming Objects – Copying – Deleting – Working with Classic and Text Layout Framework text Engines – Editing a Text Field.

Unit IV**Working with the TIMELINE Panel****(7 Hours)**

Working with Frames and Keyframes in Flash – Working with Layers and Layer Folders in Flash – Creating Symbols in Flash – Modifying Symbols.

Unit V**Creating Animations****(7 Hours)**

Working with Sound files in Flash – Understanding Tweened Animations – Using Shape Tweening in Flash – Working with Motion Tweening in Flash – Editing the Motion Path of a Tweened Object – Working with Motion Presets in Flash.

Text Book:

1. Flash CS5 in Simple Steps – Kogent Learning Solutions Inc. 2011 Dream Tech Press.

Chapters:**Unit I:** 1**Unit I:** 2**Unit III:** 3**Unit IV:** 4, 5**Unit V:** 6, 7**Reference Books:**

1. Learning Flash CS5 by Ramesh Bangia, Khanna Publishing.
2. Adobe Flash Professional CS5 Bible by Todd Perkins, Wiley Publications.

DEPARTMENT OF COMMERCE



The Madura College (Autonomous), Madurai – 625 011

Department of Commerce

B.Com

V Semester & VI Semester Course Structure under CBCS Pattern
with effect from the Academic Year 2017-18

V Semester					VI Semester				
Category	Course Code	Paper	Hrs	Credit	Category	Course Code	Paper	Hrs	Credit
Part III					Part III				
Core -12	17U5KMC12	Elements of Operations Research	6	5	Core -14	17U6KMC14	Management Accounting	6	5
Core-13	17U5KMC13	Corporate Accounting	6	5	Core-15	17U6KMC15	Investment Management	6	5
Core Elective-1	17U5KME1	Income Tax-I	6	4	Core Elective-4	17U6KME4	Income Tax -II	6	4
Core Elective-2	17U5KME2	Business Legislation - II	5	4	Core Elective-5	17U6KME5	Business Management	5	4
Core Elective-3	17U5KME3	Auditing and Assurance	5	4	Core Elective-6	17U6KME6	Indirect- Tax	5	4
Part IV					Part IV				
Skill Based Elective	17U5KSM5	Business Valuation	2	2	Skill Based Elective	17U6KSM6	Soft Skills	2	2
Total			30	24	Total			30	24

V SEMESTER

Course Code	Course Title	C	H	I	E	T
17U5KMC12	Elements of Operations Research	5	90	25	75	100
Learning Objectives <ul style="list-style-type: none">To understand the basic concept of Operations Research and tools used in business decisions.To gain working knowledge on Linear Programming, Transportation and Assignment problemsTo apply game, queuing and network analysis in business situations						
Learning Outcomes: Knowledge on operations research tools and its applicability in business decisions and ability to solve various business problems through OR tools.						

Unit I

Introduction to Operations Research and Linear Programming

Definition – Characteristics – Uses of Operations Research – Techniques of Operations Research – Limitations. Linear Programming Problem - Meaning – Advantages – Areas of Application – Formulation of LPP – Graphical Method – Simplex Method (Simple problems only)

Unit II

Assignment Problem

Meaning – Hungarian Method – Types of Problems – Balanced Problem – Unbalanced Problem – Minimization Problem – Maximization Problem – Restricted Assignment Problem – Travelling Salesmen Problem.

Unit III

Transportation Problem

Meaning – Types of Problems – Balanced Problem – Unbalanced Problem – Minimization Problem – Maximization Problem – Initial Basic Feasible Solution - Methods – North-West Corner Method – Least Cost Method – Vogel's Approximation Method – Optimal Solution - Optimality Test under Modified Distribution Method (MODI Method).

Unit IV

Game Theory and Queuing Theory

Game Theory – Meaning – Saddle Point Method – Maximin Minimax Principle – Dominance Principle Method – Algebraic Method – Graphical Method.

Queuing Theory– Application Areas – Advantages – Single Channel Model Only (simple problems only).

Unit – V

Network Analysis

Meaning – Applications – Terminologies – Rules to frame a Network – Network Diagram – Critical Path Method (CPM) – Programme Evaluation and Review Techniques (PERT) (Simple Problems Only).

Note:

The Questions should be asked in the ratio of 80% Problems and 20 % Theory.

Book for Study:

Kapoor V.K. & Sumant Kapoor, *Operation Research Techniques for Management*, Sultan Chand & Sons, New Delhi.

Books for References:

1. K.K. Chawla,
2. Vijay Gupt & Bhushan K. Sharma, *Operations Research Quantitative Analysis for Management*, Kalyani Publishers, New Delhi.
3. Chawla. K.K, Vijay Gupta & Bhushan K. Sharma, *Operation Research Quantitative Analysis for Management*, Kalyani Publishers, New Delhi.
4. K. Shridhara Bhat, *Operation Research*, Himalaya Publishing House, Mumbai.
5. J.K.Sharma, *Quantitative Techniques in Management*, Trinity Press, New Delhi.
6. S. Gurusamy, *Operations Research*, Vijay Nicole Imprints Private Limited, Chennai.
7. www.icmai.in

Course Code	Course Title	C	H	I	E	T
17U5KMC13	Corporate Accounting	5	90	25	75	100
Learning Objectives <ul style="list-style-type: none"> To lay the foundations in company accounts viz., Issue of shares and debentures To gain working knowledge on preparation of final accounts and business combinations To solve the problems pertaining to liquidation of companies 						
Learning Outcomes: Knowledge on Issue of shares, ability to prepare final accounts and working knowledge and skill on preparation of accounting for business combination, reconstruction and liquidation of companies.						

Unit I

Issue of Equity Shares, Preferences Shares and Debentures

Issue of Equity Shares, Preferences Shares and Debentures – Issue at Par, Premium and Discount – Forfeiture and Re-issue of Shares – Redemption of Preference shares – Redemption of Debentures - Legal provisions.

Unit II

Profit Prior to Incorporation and Underwriting

Profit Prior to Incorporation – Treatment of Profit or Loss prior to incorporation- Methods of ascertaining Profit or Loss Prior to Incorporation- Steps involved in ascertaining Pre and Post Incorporation Profits

Underwriting – Underwriting Commission – Types – Complete Underwriting – Partial Underwriting and Firm underwriting.

Unit III

Final Accounts of Companies

Introduction - Legal Aspects as per Schedule III (Section 129) of Companies Act, 2013 - Part I Form of Balance Sheet – Part II Form of Statement of Profit and Loss - Managerial Remuneration - Preparation of Statement of Profit and Loss and Balance Sheet (Simple problems only).

Unit IV

Accounting for Mergers and Amalgamation

Corporate Restructuring – Types of Restructuring - Amalgamation - Amalgamation in the Nature of Merger – Amalgamation in the Nature Purchase – Accounting Entries in the books of Amalgamated Companies.

Unit V

Liquidation of Companies

Meaning of Liquidation – Order of Payment – Statement of Affairs - Liquidator's Final Statement of Accounts – Liquidators Remuneration.

Note: The Questions should be asked in the ratio of 80% Problems and 20% Theory.

Book for Study:

S.P. Jain & K.L. Narang, *Advanced Accountancy*, Vol.II, Corporate Accounting, Kalyani Publishers, Ludhiana.

Books for References:

1. T.S. Reddy & Dr. A. Murthy, *Corporate Accounting*, 6th Edition, 2015, Margham Publications, Chennai.
2. Dr. M.A. Arulanandam & Dr. K. S. Raman, *Advanced Accountancy, Corporate Accounting*, Vol.II Revised Edition 2012, Himalaya Publishing House, Mumbai.
3. R. L. Gupta & M. Radhaswamy, *Advanced Accountancy*, Vol.II, Sultan Chand & Sons, New Delhi.
4. www.icaai.org.in
5. www.icmai.in
6. www.icsi.edu.in

Course Code	Course Title	C	H	I	E	T
17U5KME1	Income Tax - I	4	90	25	75	100
Learning Objectives <ul style="list-style-type: none"> To gain knowledge of the provisions of income tax law relating to the topics mentioned in the contents To gain ability to solve problems on computation of tax of various sources of Income 						
Learning Outcomes: Ability to compute income tax liability independently. Understanding and application of Advance tax and TDS.						

Unit I

Introduction to Income Tax

Introduction – Machinery for Taxation – Various Authorities – Central Board of Direct Taxes - Appellate Tribunal - Basis of charge – Definitions – Assessment year – Previous year – Assessee – Person – Income – Capital and Revenue – Residential Status – Rules for determining residential status – Incidence of tax – Income exempted from Tax.

Unit II

Income from Salary

Introduction – Definition – Characteristics – Allowances – Perquisites – Profit in lieu of salary – Gratuity – Provident fund – Kinds – Deduction from salary income – Deduction in respect of entertainment allowance – Tax on employment.

Unit III

Income from House Property

Introduction – Definitions – Charge on Annual Value – Income from House Property Wholly Exempt from Tax – Computation of Income from House Property – Let out House – Self Occupied House – Gross Annual value – Adjusted Annual Value – Deductions U/S 24.

Unit IV

Profits and Gains of Business and Profession

Introduction – Definitions – Computation of Income under Business and Profession – Allowable expenses – Expenses expressly disallowed. Depreciation – Meaning – Conditions for depreciation – Normal and additional depreciation - Actual Cost of Assets – Computation of Depreciation – Unabsorbed depreciation.

Unit V

Capital Gains

Introduction – Definitions – Types – Computations – Exemptions U/S 54 – Short Term Capital Gain – Long Term Capital Gain – Rate of Taxes.

Note: The Questions should be asked in the ratio of 80% Problems and 20% Theory.

Book for Study:

Dr.Vinod K. Singhania & Dr. Monica Singhania, Students' Guide to Income Tax, Taxmann Publications Pvt. Ltd.

Books for References:

1. V.P. Gaur, D.B. Narang, Puja Gaur and Raheev Puri, *Practical Income Tax*, Kalyani Publishers, Ludhiyana.
2. T.S. Reddy & Y. Hari Prasad Reddy, *Income Tax Theory, Law & Practice*, Margham Publications, Chennai.
3. B.B. Lal & Nitin Vashisht, *Income Tax and Central Sales Tax Law and Practice*, Pearson Education, Delhi.
4. www.icaai.org.in,
5. www.icmai.in,
6. www.icsi.edu.in

Course Code	Course Title	C	H	I	E	T
17U5KME2	Business Legislation - II	4	75	25	75	100
Learning Objectives						
<ul style="list-style-type: none"> To gain the comprehensive knowledge on the business laws viz., Factories Act, Industrial Dispute Act To know the legal framework for laws pertaining to employees viz., Employees Compensation Act, ESI, PF and Payment of Bonus Act To recognize the change in the various labour laws 						
Learning Outcomes: Basic knowledge on Factories Act, Industrial Dispute Act Employees Compensation Act, ESI, PF and Payment of Bonus Act.						

Unit I

Factories Act, 1948

Factories Act, 1948 – Object – Definitions – Licensing and Registration – Health, Safety and welfare – Provisions relating to annual leave with wages – Special provision relating to employment of women – Working hours.

Unit II

Industrial Disputes Act, 1947

Industrial Disputes Act, 1947 – Object – Definitions – Authorities – Legality of strike and lockout procedure for closure – Retrenchment.

Unit III

Employees' Compensation Act, 1923

Employees' Compensation Act, 1923 – Object – Definitions – Rules regarding payment – Amount and distribution of Compensation.

Unit IV

Employees' State Insurance Act, 1948 and Employees' Provident Fund & Miscellaneous Provisions Act, 1952

Employees' State Insurance (ESI) Act, 1948 – Object – Definitions – Benefits – ESI Corporation. Employees' Provident Fund (EPF) & Miscellaneous Provisions (MP) Act, 1952 – Object – Definitions - Schemes

Unit V

Payment of Bonus Act, 1965 and Trade Unions Act, 1926

Payment of Bonus Act, 1965 – Object – Definitions – Determination of Bonus. Trade Unions Act, 1926 – Trade Dispute – Trade Union – Registration of trade union – Rights – Duties – Liabilities and Privileges of trade union – Cancellation.

Book for Study:

S.N Maheshwari & S.K. Maheshwari, *A Manual of Business Law*, Edition 2016, Himalaya Publishing House, Delhi.

Books for References:

1. N.D. Kapoor, *Hand Book of Industrial Law*, Sultan Chand & Sons, New Delhi
2. Misra N.S. *Labour and Industrial Laws*, 28th Edition, 2016, Central Publication, Allahabad.
3. Vincent, A. Arputham, *Labour and Industrial Laws*, 2002, Southern Publishers, Karungal.
4. *Labour Laws*, 2017, Taxman Allied Services Pvt., Ltd., New Delhi.
5. www.icaai.org.in
6. www.icmai.in
7. www.icsi.edu.in

Course Code	Course Title	C	H	I	E	T
17U5KME3	Auditing and Assurance	4	75	25	75	100
Learning Objectives <ul style="list-style-type: none"> To gain basic knowledge on auditing and its importance To get comprehensive knowledge on Internal audit and internal control To acquire skill on vouching and verification of assets and liabilities To facilitate to read audit report and know about liabilities of an auditor 						
Learning Outcomes: Thorough knowledge on auditing, preparation of audit programmes, conduct of internal audit , audit report and acquaint knowledge on liabilities of auditor						

Unit I

Introduction to Auditing

Meaning – Definition – Nature of Audit – Objectives of Audit - Scope of Audit – Advantages of Auditing – Inherent Limitations of an Audit - Types of Audit - Basic Principles governing an Audit –Relationship of Auditing with other disciplines – Ethical Principles and Concepts of Auditor’s Independence - Qualities of Auditor - Audit Note book – Audit File.

Unit II

Audit Planning and Programme

Audit Planning – Development of an overall plan. Audit programme – Advantage and Disadvantages of an Audit Programme – Audit Procedures and Audit Techniques – Delegation and Supervision of Audit Work.

Unit III

Internal Control and Internal Audit

Internal Control - Concept of Internal Control – Features of a Good Internal Control System – Limitations of Internal Control - Components of an Internal Control System - – Review of Internal control by the Auditor – Test of Control – Internal control in Computerised information System Environment (CIS) - Internal Check – Features. Internal Audit – Definition – Scope – Internal Audit Report.

Unit – IV

Vouching and Verification of Assets & Liabilities

Vouching - Meaning –General considerations – Classification of Vouching – Analytical Review procedures.

Verification of Assets and Liabilities - Definition – General Principles – Fixed assets – Investment – Inventories – Freehold and Lease hold property – Loans, bills receivable – Sundry debtors – Plant and Machinery – Patents – Verification and valuation of liabilities – Duties of an Auditor.

Unit V

Audit Report and Liabilities of an Auditor

Introduction – Contents of Audit Report – Signing of Auditors Report – Reporting Requirements – National Financial Reporting Authority – Liabilities of an Auditor under Companies Act, 2013 – Liabilities for negligence – Liabilities for misfeasance – Criminal Liability – Liability to third party – Liability for Unaudited Accounts – Legal Decisions regards Auditor’s Liabilities.

Books for Study:

1. Dr. B.N. Tandon, Dr. S. Sudharsanam & S. Sundharabahu, *Practical Auditing*, S.Chand & Company Pvt.Ltd. New Delhi.
2. CA Pavan Kumar K.CH, *Auditing and Assurance*, First Edition 2013, S.Chand & Company Pvt. Ltd., New Delhi.

Books for References:

1. Aruna Jha, *Auditing & Assurance*, 4th Edition, Taxmann’s Publications, New Delhi.
2. S.K. Basu, *Auditing & Assurance*, Pearson Publications, Delhi.
3. www.icaai.org.in,
4. www.icmai.in
5. www.icsi.edu.in

Course Code	Course Title	C	H	I	E	T
17U5KSM5	Business Valuation	2	30	25	75	100
Learning Objectives <ul style="list-style-type: none"> To gain knowledge on business valuation , elements and importance of valuation To acquire skill on various valuation models To get hold on valuation of inventories, investments and intangibles 						
Learning Outcomes: Ability to value inventories, investments and intangibles						

Unit I

Introduction to Business Valuation

Introduction – Difference between Value & Valuation – Purpose of Valuation - Advantages – Elements of Business Valuation – Economic Conditions – Normalization of Financial Statement – Valuation approach – Basis for Valuation.

Unit II

Valuation Models

Introduction – Methods of Valuation – Income Based Method – Capitalization of Earning Method – Discounted Free Cash Flow Method –Asset Based Method – Book Value Method – Realization Method - Market Based Method – Comparable Companies Market Multiples Method (CCM) – Comparable Transactions Multiple Method (CTM) – Market Value Method.

Unit III

Valuation of Inventories

Definition of Inventory –Inventory Valuation Methods – FIFO Method – LIFO Method –HIFO - Average Cost Method - Specific Price Method - Market Price Method - Standard Price Method – Retail Cost Method –Inflated Method

Unit IV

Valuation of Intangibles

Definition – Nature of Goodwill – Sources of Goodwill – Factors affecting Value of Goodwill – Profitability – Normal Rate of Return – Capital Employed – Average Capital Employed – Method of Valuation of Goodwill – Average profit method – Super profit method – Capitalization Method.

Unit V

Valuation of Investments

Valuation of Equity Shares – Meaning – Need for Valuation of Equity Shares — Methods – Net Asset Method – Yield Method – Fair Method- Valuation of Preference Shares –Meaning – Yield on Preference Share – Bond Valuation – Traditional Technique – Current Yield – Yield to Maturity – Modern Technique – Holding Period yield.

Note: The Questions should be asked in the ratio of 60% Problems and 40 % Theory.

Books for Study:

1. Preeti Singh, *Investment Management Security Analysis and Portfolio Management*, 19th Revised Edition, 2015, Himalaya Publishing House, New Delhi.
2. Ravindhar Vadapalli, *Mergers, Acquisitions and Business Valuation*, Excel Books, New Delhi.

Books for References:

1. S.P. Jain & K.L Narang, "*Advanced Accountancy*" Vol-I, Nineteenth Edition, 2015, Kalyani Publishers, Mumbai.
2. M.Y. Khan & P.K. Jain, *Financial Management Text, Problems and Cases*, McGraw Hill Education Pvt. Ltd. New Delhi.
3. S.P. Jain & K.L Narang, *Cost Accounting*, Kalyani Publishers, Ludhiana.
4. www.icaai.org.in
5. www.icmai.in
6. www.icsi.edu.in

VI SEMESTER

Course Code	Course Title	C	H	I	E	T
17U6KMC14	Management Accounting	5	90	25	75	100
Learning Objectives <ul style="list-style-type: none">To gain knowledge on Management Accounting Principles and ability to prepare Cash flow and fund flow statements and interpret the financial statements in detailTo get basic understanding of marginal costing techniques and its applicability in business decision.Ability to prepare variance analysis report and budgets						
Learning Outcomes: Ability to interpret financial statements and taking business decision based on marginal costing techniques. Preparation of budgets and variance reporting independently.						

Unit I

Introduction to Management Accounting and Analysis of Financial Statements

Introduction to Management Accounting – Meaning – Nature – Scope – Features – Objectives – Distinction between Financial Accounting and Cost Accounting and Management Accounting. Analysis & Interpretation of Financial Statements: Procedure –Comparative statements – Ratio analysis – Use and significance of ratio analysis- Classification of Ratios – Liquidity ratio – Profitability Ratio - Solvency Ratio - Activity ratios.

Unit II

Fund Flow Statement and Cash Flow Statement

Fund Flow Statement: Meaning – Concept – Flow of Funds – Uses – Significance - Limitations – Procedure - Schedule of Change in Working Capital - Statements of Sources and Application of Funds.

Cash Flow Statement (AS 7): Meaning – Difference between Fund Flow Statement and Cash Flow Statement – Uses – Significance – Limitations - Procedure.

Unit III

Marginal Costing

Meaning - Ascertainment – Break Even Analysis – Margin of Safety – Application of Marginal Costing - Key (or limiting) Factors – Make or buy decision – Selection of a suitable product- mix – Effect of changes in sales price – Maintaining a desired level of profits – Alternatives methods of production – Diversification of products – Alternative course of action – Level of Activity planning.

Unit IV

Standard Costing

Meaning - Analysis of Variances – Material Variance – Labour Variance – Overheads Variance - Sales variances.

Unit – V

Budgeting and Budgetary Control

Meaning – Need for budget – Budgetary control – Budget manual – Budget period – Key factor – Sales budget – Production Budget - Material budget - Cash budget – Flexible Budget - Master Budget – Zero base Budgeting.

Note: The Questions should be asked in the ratio of 80% Problems and 20% Theory.

Book for Study:

Murthy A. & S. Gurusamy, Management Accounting, Vijay Nicole Imprints Private Limited, Chennai.

Books for References:

1. R.S.N. Pillai, *Management Accounting*, Revised Edition 2015, S.Chand, New Delhi.
2. S.N. Maheshwari, *Management Accounting*, Seventeenth Revised Edition 2012, Sultan Chand & Sons, New Delhi.
3. T.S. Reddy & Y. Hari Prasad Reddy, *Cost and Management Accounting*, Forth Edition Margham Publications, Chennai.
4. www.icaai.org.in
5. www.icmai.in
6. www.icsi.edu.in

Course Code	Course Title	C	H	I	E	T
17U6KMC15	Investment Management	5	90	25	75	100
Learning objectives <ul style="list-style-type: none"> To gain knowledge of investments and investment alternatives To develop ability to value the securities by fundamental and technical analysis To understand the concept of portfolio management, theories of Portfolio management and evaluate the portfolio 						
Learning Outcomes: Advanced knowledge on investment management. Skill towards fundamental and technical analysis. Understanding of derivatives market and portfolio management and evaluation						

Unit I

Introduction to Investment Management

Investment: Meaning of Investment – Need of Investment – Scope of Investment – Differences between Investment, Speculation and Gambling – Factors favourable for Investment – Features for an Investment programme - Investment Media - Investment process.

Unit II

Investment Avenues

Introduction – Investor Classification – Corporate Bonds – Features of Bonds – Preference Shares – Features – Types – Equity Shares – Features – Government Securities – Types – Innovative Financial Instruments.

Unit III

Risk and Return

Risk – Meaning – Systematic Risk – Unsystematic Risk. Returns – Meaning – Relationship of Risk and Return – Measurement of Returns – Investors Attitude towards Risk and Return.

Unit IV

Fundamental and Technical Analysis

Fundamental Analysis – Meaning - Features – EIC Approach - Economic Analysis – Industry Analysis – Company Analysis.

Technical Analysis – Meaning – Assumptions – Difference between Fundamental and Technical Analysis – Theories of Technical Analysis – Dow Theory – Elliott Wave Theory – Theory of Contrary opinion – Odd lot Theory – Charting as a Technical Tools – Bar Chart – Line Chart – Point and Figure Chart – Candle Stick Chart – Efficient Market Hypothesis – Meaning – Assumptions.

Unit V

Portfolio Management

Meaning – Objectives – Portfolio Management Process – Need – Importance – Types of Portfolio – Aggressive Investment Portfolio – Balance or Moderate Portfolio – Conservative Portfolio – Mutual Funds – Features of Mutual Fund – Types – SEBI Regulations for Mutual Fund Investments – Management Performance Evaluation

Book for Study:

Preeti Singh, *Investment Management Security Analysis and Portfolio Management*, 19th Revised Edition, 2015, Himalaya Publishing House, New Delhi.

Books for References:

1. V.K.Bhalla, *Investment Management Security Analysis and Portfolio Management*, S.Chand & Company Ltd, New Delhi.
2. Dr.R.P. Rustagi, *Investment Analysis and Portfolio Management*, Sultan Chand & Sons, New Delhi.
3. M./Ranganatham & R. Madhumathi, *Investment Analysis and Portfolio Management*, Pearson Education, Delhi.
4. www.investopedia.com

Course Code	Course Title	C	H	I	E	T
17U6KME4	Income Tax - II	4	90	25	75	100
Learning Objectives <ul style="list-style-type: none"> To gain knowledge of the provisions of income tax law relating to Income from other sources, Set off, carry forward of losses and clubbing of income To gain ability to solve problems concerning assessee with the status of Individual, HUF, Partnership and companies. 						
Learning Outcomes: Ability to compute income tax liability independently. Understanding and application of Advance tax and TDS						

Unit I

Income from other Sources

Introduction – Definitions – Income falling under this head – General incomes – Specific incomes – Casual Income – Deduction of Tax at Source

Unit II

Set-Off, Carry Forward of Losses and Clubbing of Income

Meaning - Set off in the same year within the head and against other head - Carry forward to subsequent year – Clubbing of income.

Unit III

Gross Total Income, Deductions and Rebates

Computation of Gross Total Income - Deductions U/S 80C to 80U – Rebate U/S 87A – Deferred Taxation.

Unit IV

Computation of Total Tax Liability

Introduction - Computation of Total Tax Liability - Individual – Hindu Undivided Family (HUF) – Firm – Companies (including Minimum Alternate Tax (MAT))

Unit V

Procedure for Assessment

Introduction – Types of Assessment - Deduction of Tax at Source – Advance payment of Tax – Return of Income – E-Filing Procedure.

Note: The Questions should be asked in the ratio of 80% Problems and 20% Theory.

Book for Study:

Dr. Vinod K. Singhania & Dr. Monica Singhania, Students' Guide to Income Tax, Taxmann Publications Pvt. Ltd.

Books for References:

1. V.P. Gaur, D.B. Narang, Puja Gaur and Raheev Puri, *Practical Income Tax*, Kalyani Publishers, Ludhiyana.
2. T.S. Reddy & Y. Hari Prasad Reddy, *Income Tax Theory, Law & Practice*, Margham Publications, Chennai.
3. B.B. Lal & Nitin Vashisht, *Income Tax and Central Sales Tax Law and Practice*, Pearson Education, Delhi.
4. www.icaai.org.in
5. www.icmai.in
6. www.icsi.edu.in

Course Code	Course Title	C	H	I	E	T
17U6KME5	Business Management	4	75	25	75	100
Learning Objectives						
To gain knowledge on concept of business management and its principles						
To understand and know the functions of management in detail						
To get better exposure on theories of motivation and leadership						
Learning Outcomes: Comprehensive knowledge on management principles and its applicability in business issues and better understanding of motivation, leadership and controlling.						

Unit I

Introduction to Business Management

Introduction – Meaning – Nature - Management as Science or an Art – Importance of Management - Manager’s role – Schools of Management Thought – Henry Fayol’s Theory of Management – General Principles of Management.

Unit II

Planning and Decision Making

Planning and goal setting – Meaning - Nature - Purpose – Types – Steps in Planning – Planning Process – Management by objectives – Strategies and policies – Limitation.

Decision making – Significance – Steps in decision making – Techniques of decision making.

Unit III

Organising

Meaning – Nature – Characteristics – Importance – Types of Organisation – Formal and Informal Organisation – Line Organisation – Functional Organisation – Line & Staff Organisation – Project Organisation - Matrix Organisation – Committee Organisation - Free Form Organisation - Process of Organisation – Key elements of Organisation process - Departmentation – Delegation – Centralization and Decentralization – Span of Management.

Unit IV

Staffing

Meaning – Recruitment – Sources of Recruitment – Internal and External Sources. Selection – Selection Procedure. Training – Need for Training – Types of Training – Management Games – Transactional Analysis – Job Analysis – Job Design, Analysis and Evaluation - Performance Appraisal.

Unit V

Directing and Control

Directing – Meaning – Features – Principles of Direction. Motivation – Meaning – Importance – Theories of Motivation. Leadership – Significance – Nature – Styles – Qualities of a Leader – Trait theory. Control – Meaning – Importance – Steps – Techniques.

Book for Study:

L.M. Prasad, *Principles and Practice of Management*, Sixth Edition, Sultan Chand & Sons, New Delhi

Books for References:

1. R.N. Gupta, *Principles of Management*, S.Chand & Company Pvt. Ltd. New Delhi.
2. Dinkar Pagare, *Business Management*, Sultan Chand & Sons, New Delhi.
3. Peter F. Drucker, *The Practice of Management*, Harper Business Publication, New York.
4. www.icsi.edu.in

Course Code	Course Title	C	H	I	E	T
17U6KME6	Indirect Tax	4	75	25	75	100
Learning Objectives <ul style="list-style-type: none"> To gain knowledge on concept of Indirect taxation viz., Customs act, GST Act To gain concept and simple problems on customs act as working knowledge To understand the concept of GST related terms and its relevance in the GST Act To be able to solve simple problems on GST 						
Learning Outcomes: Comprehensive knowledge on concept of Indirect taxation including GST. Ability to solve simple problems on GST.						

Unit I

Introduction to Indirect Taxation

Meaning of Indirect Taxes - Distinction between Direct Taxes and Indirect Taxes – Constitutional authority to levy and collect indirect taxes – Canons of Taxation – Types of Indirect Taxes prevailing in India at national level such as Goods and Services Tax and Customs Act.

Unit II

Customs Act, 1962

Meaning of Customs Duty – Procedure prescribed under the Customs Act to Import Goods and Services and Export of Goods and Services – Types of customs duty – simple problems in determination of assessable value and determination of Customs Duty liability – Various Documents involved in imports and exports.

Unit III

Introduction of Goods and Services Tax, 2017 (GST)

Introduction to GST – Scope – Features – GST Council – Levy under GST – CGST – IGST – SGST – Definitions – Person – Business – Goods – Services – Registration Procedures - Taxable Person – HSN/SAC classification - Meaning of Supply – Time of Supply – Nature of Supply - Place of Supply - Value of Supply – Charge and Levy.

Unit IV

Input Tax Credit (ITC)

Meaning – Eligible and Ineligible Input Tax Credit – Tax Credit in respect of Capital Goods – Transfer — Reverse charge Mechanisms – Rates of Taxes – Zero Rated - Exemptions – Job work – Works Contract – Composition Scheme.

Unit V

Compounded Levy Scheme for CGST and IGST

Preparation of Tax invoice – Credit and Debit Notes - Filing of Returns – E-Payment of Tax – E-Way Bill - Computation of GST liability – Anti Profiteering – Offences and Penalty – Advance Ruling – Appeals and Revision.

Note: The Questions should be asked in the ratio of 80% Theory and 20 % Problems.

Book for Study:

V.S. Datey, *Indirect Taxation*, Taxmann Publication, New Delhi.

Books for References:

1. *Indirect Taxes*, Institute of Chartered Accountants of India Publications, New Delhi.
2. *Indirect Taxes*, Institute of Cost Accountants of India, Kolkata.
3. Dr. H.C. Mehrotra and Dr. S.P. Goyal, *Indirect Taxes*, Bhawan Publications, Agra.
4. www.gst.gov.in
5. www.customes.gov.in

Course Code	Course Title	C	H	I	E	T
17U6KSM6	Soft Skills	2	30	25	75	100
Learning Objectives To gain knowledge on concept of soft skills and its attributes To understand the concept of body language Team building and group discussion To get better exposure to prepare CV and to face interviews confidently To sensitise the concept of stress management and time management.						
Learning Outcomes: Comprehensive knowledge on soft skills, confidence to face interview and preparation of CV independently and ability cope up with time and stress management.						

Unit I

Introduction to Soft Skills

Meaning – Importance of soft skills – Attributes regarded as soft skills – Knowing yourself – Process of knowing yourself – SWOT analysis – Benefits of SWOT analysis.

Unit II

Team Building and Group Discussion

Team Building - Introduction – Meaning – Aspects of team building – Skills needed for teamwork – A model of team building – Team Vs Group – Characteristics of effective team – Role of a team leader – Role of team member.

Group discussion – Meaning – Need – Types of Group discussion – Skills required in a Group discussion – Traits tested in a Group discussion – Group discussion etiquette – Areas to be concentrated while preparing for a group discussion – Techniques to initiate a Group discussion.

Unit III

Body Language and Etiquette

Body Language - Introduction – Voluntary and involuntary body language – Body language in building interpersonal relations – Body language in building industrial relations – Types of body language – Gender differences – Female interest and body language.

Etiquette – Introduction – Modern etiquette – Benefits of etiquette – Classification of etiquette manners.

Unit IV

Preparing CV/ Resume and Interview Skills

Preparing CV/ Resume – Meaning – Difference among Bio Data, CV and Resume – The purpose of CV writing – Types of Resume.

Interview Skills - Introduction – Need – Types of interview – Interview panel – Post-interview etiquette – Dress code at interview.

Unit V

Time Management and Stress Management

Time Management – Introduction – The 80:20 rule – Time management matrix – Analysis of time matrix.

Stress Management – Introduction – Effects of stress – Kinds of stress – Sources of stress – Behaviour identified with stress – Stress Management Tips.

Book for Study

Dr. K. Alex, *Soft Skills*, S.Chand, New Delhi.

Books for Reference

1. Dr. H.R. Appannaiah, *Soft Skills for Business*, Himalaya Publications, Mumbai.
2. <http://swayam.gov.in/course/3772-soft-skills>.



THE MADURA COLLEGE (AUTONOMOUS), MADURAI – 625 011
DEPARTMENT OF COMMERCE

B.Com (Professional Accounting)

V Semester & VI Semester Course Structure under CBCS Pattern with effect from the Academic Year 2017-18

V Semester					VI Semester				
Category	Course Code	Paper	Hrs	Credit	Category	Course Code	Paper	Hrs	Credit
Part III					Part III				
Core -11	17U5AMC11	Presentation of Corporate Accounts	6	5	Core -13	17U6AMC13	Indian Accounting Standards	6	5
Core-12	17U5AMC12	Financial Management	6	5	Core-14	17U6KMC14	Management Accounting	6	5
Core Elective-1	17U5KME1	Income Tax – I	6	4	Core Elective-4	17U6KME4	Income Tax - II	6	4
Core Elective-2	17U5AME2	Project Management	5	4	Core Elective-5	17U6AME5	Advanced Excel Modelling	5	4
Core Elective-3	17U5KME3	Auditing and Assurance	5	4	Core Elective-6	17U6KME6	Indirect- Tax	5	4
Part IV					Part IV				
Skill Based Elective	17U5ASM5	E-Filing	2	2	Skill Based Elective	17U6KSM6	Soft Skills	2	2
Total			30	24	Total			30	24

V SEMESTER

Course Code	Course Title	C	H	I	E	T
17U5AMC11	Presentation of Corporate Accounts	5	90	25	75	100
Learning Objectives <ul style="list-style-type: none">To lay the foundations in preparation of company final accounts as per schedule III of Companies Act, 2013To gain working knowledge on preparation of final accounts of Banking and Insurance companies						
Learning Outcomes: Knowledge and ability to prepare final accounts of companies, banking and Insurance companies.						

Unit I

Introduction to Accounts of Companies

Meaning – Legal Position regarding final accounts of Companies as per Companies Act, 2013 – Objectives – Scope – Applicability – Books of Accounts to be maintained by Companies (Chapter IX) – Financial Statements – Consolidation of Accounts under Companies (Accounts) Rules, 2014 – Directors' Responsibility Statement – Publication of Financial Statement – Filing of Financial Statements - Constitution of National Financial Reporting Authority – Compliance with Accounting Standards.

Unit II

Financial Statement (Scheduled III of Companies Act, 2013)

Form and Contents of Balance Sheet (Part I of Scheduled III of Companies Act, 2013) General instructions for Preparation of Balance Sheet – Difference between Provisions and Reserves – Form of Statement of Profit and Loss (Part II of Scheduled III of Companies Act, 2013) – General instructions of for preparation of Statement of Profit and Loss.

Unit III

Final Accounts of Companies

Managerial Remuneration – Methods for Calculating Net Profit for Managerial Remuneration – Accounting Entries related to Dividend – Provision for Taxation – Advance payment of Tax and Provision for Taxation - Preparation of Statement of Profit and Loss and Balance Sheet.

Unit IV

Accounts for Banking Companies

Introduction to Banking Companies - Capital adequacy Ratio – Accounting system – Final Accounts – Profit and Loss Accounts (Form B in the Third Schedule, Banking Regulation Act, 1949) – Balance Sheet (Form A in the Third Schedule, Banking Regulation Act, 1949) – Guidelines of Reserve Bank of India in preparation of Final Accounts.

Unit V

Accounts for Insurance Companies

Introduction to Insurance Companies – Insurance Regulatory and Development Authority (IRDA),2002 - Accounting principles for preparation of Financial Statements – Revenue Account (Form A – RA) – Profit and Loss Account (Form A-PL) – Balance Sheet (Form A-BS).

Note: The Questions should be asked in the ratio of 60% Problems and 40% for Theory

Books for Study:

1. V. Balachandran & M. Govindarajan, *A Student Handbook on Company Law an Practice*, Vijay Nicole Imprints Private Ltd, Chennai.
2. S.P. Jain & K.L Narang, “*Advanced Accountancy*” Vol-I, Nineteenth Edition, 2015, Kalyani Publishers, Mumbai.

Books for References:

1. T.S. Reddy & Dr. A. Murthy, *Corporate Accounting*, 6th Edition, 2015, Margham Publications, Chennai.
2. Dr. M.A. Arulanandam & Dr. K. S. Raman, *Advanced Accountancy, Vol.II Corporate Accounting*, Revised Edition 2012, Himalaya Publishing House, Mumbai.
3. R. L. Gupta & M. Radhaswamy, *Advanced Accountancy*, Vol.II, Sultan Chand & Sons, New Delhi.
4. www.icaai.org.in
5. www.icmai.in,
6. www.icsi.edu.in

Course Code	Course Title	C	H	I	E	T
17U5AMC12	Financial Management	5	90	25	75	100
Learning Objectives <ul style="list-style-type: none"> To understand the concept of finance & finance functions, and familiarize with the various sources of funds To calculate Cost of Capital, Leverages and optimizing EPS through capital structure models. To make a decision long term investment proposals by using Payback, NPV, IRR & ARR and prepare statement of working capital requirements independently. To familiarize the concept of dividend policy and its relevance in corporate 						
Learning outcomes: In-depth knowledge on corporate finance, ability to determine and calculate optimum capital structure. Independent appraisal of capital investment, working capital and dividend decisions.						

Unit I

Introduction to Financial Management

Definition - Scope – Objectives – Functions - Responsibility of Financial manager – Financial Decisions – Sources of funds – Long term – Short term sources.

Unit II

Cost of Capital, Capital Structure and Leverages

Cost of Capital-Meaning – Importance – Measurement - Cost of Debenture, Preference share, Equity share, Retained Earnings – Weighted Average Cost. Capital structure - Theories of Capital Structure – Designing Optimum Capital structure – Indifference point – Financial Break Even point. Leverages – Meaning – Financial Leverage – Operating Leverage - Combined Leverage.

Unit III

Capital Budgeting

Meaning – Significances - Methods of appraisal-Pay back method- Discounted cash flow method – Discounted pay back – Net present value – Profitability index – Internal rate of return – Average Rate Return (ARR) – Capital rationing – Risk Analysing in Capital Budgeting.

Unit IV

Working Capital Management

Meaning – Types of working capital – Factors influencing working capital-Sources of working capital – Operating cycle – Estimation of working capital – Management of Cash – Receivables Management – Working Capital Financing.

Unit V

Dividend Policy

Meaning – Types of Dividend – Factors influencing Dividend Policies – Theories of Dividend Decisions – Relevance of Dividends – MM Theory – Irrelevance Dividend - Walter's Model – Gordon's Model – Dividend Capitalization Model – Determinants of Dividend Policy – Dividend Policy in India.

Note: The Questions should be asked in the ratio of 60% Problems and 40% for Theory

Book for Study:

Shasi K. Gupta, *Financial Management*, Kalyani Publishers, Ludiana.

Books for References:

1. Ravi M. Kishore, *Financial Management*, Taxmann Publications, New Delhi.
2. M.Y. Khan & P.K. Jain, *Financial Management Text, Problems and Cases*, McGraw Hill Education Pvt. Ltd. New Delhi.
3. IM. Pandey, *Financial Management*, Vikas Publishing House Pvt. Ltd. Noida.
4. Dr. A. Murthy, *Financial Management*, Margham Publications, Chennai.
5. www.icaai.org.in
6. www.icmai.in,
7. www.investopedia.com,
8. www.managementstudyguide.com

Course Code	Course Title	C	H	I	E	T
17U5KME1	Income Tax - I	4	90	25	75	100
Learning Objectives <ul style="list-style-type: none"> To gain knowledge of the provisions of income tax law relating to the topics mentioned in the contents To gain ability to solve problems on computation of tax of various sources of Income 						
Learning Outcomes: Ability to compute income tax liability independently. Understanding and application of Advance tax and TDS						

Unit I

Introduction to Income Tax

Introduction – Machinery for Taxation – Various Authorities – Central Board of Direct Taxes - Appellate Tribunal - Basis of charge – Definitions – Assessment year – Previous year – Assessee – Person – Income – Capital and Revenue – Residential Status – Rules for determining residential status – Incidence of tax – Income exempted from Tax.

Unit II

Income from Salary

Introduction – Definition – Characteristics – Allowances – Perquisites – Profit in lieu of salary – Gratuity – Provident fund – Kinds – Deduction from salary income – Deduction in respect of entertainment allowance – Tax on employment.

Unit III

Income from House Property

Introduction – Definitions – Charge on Annual Value – Income from House Property Wholly Exempt from Tax – Computation of Income from House Property – Let out House – Self Occupied House – Gross Annual value – Adjusted Annual Value – Deductions U/S 24.

Unit IV

Profits and Gains of Business and Profession

Introduction – Definitions – Computation of Income under Business and Profession – Allowable expenses – Expenses expressly disallowed. Depreciation – Meaning – Conditions for depreciation – Normal and additional depreciation - Actual Cost of Assets – Computation of Depreciation – Unabsorbed depreciation.

Unit V

Capital Gains

Introduction – Definitions – Types – Computations – Exemptions U/S 54 – Short Term Capital Gain – Long Term Capital Gain – Rate of Taxes.

Note: The Questions should be asked in the ratio of 80% Problems and 20% Theory.

Book for Study:

Dr. Vinod K. Singhanian & Dr. Monica Singhanian, Students' Guide to Income Tax, Taxmann Publications Pvt. Ltd.

Books for Reference:

1. V.P. Gaur, D.B. Narang, Puja Gaur and Raheev Puri, *Practical Income Tax*, Kalyani Publishers, Ludhiana.
2. T.S. Reddy & Y. Hari Prasad Reddy, *Income Tax Theory, Law & Practice*, Margham Publications, Chennai.
3. B.B. Lal & Nitin Vashisht, *Income Tax and Central Sales Tax Law and Practice*, Pearson Education, Delhi.
4. www.icaai.org.in
5. www.icmai.in
6. www.icsi.edu.in

Course Code	Course Title	C	H	I	E	T
17U5AME2	Project Management	4	75	25	75	100
Learning Objectives <ul style="list-style-type: none"> To understand the concept of project and project management and ability to prepare project report To gain working knowledge on project preparation independently To evaluate the projects by various feasibility studies. 						
Learning Outcomes: Understanding and comprehensive knowledge on project management and its relevance in business houses. Ability to appraise the projects by various feasibility studies						

Unit I

Introduction to Project Management

Meaning – Characteristics - Types- Project Life Cycle – Project formulation - Parameters in Project Selection – Stages in Project Formulation – Pre-feasibility study – Support Studies – Feasibility study – Detailed Project Report.

Unit II

Project Appraisal

Meaning – Types of Project Appraisal – Market and Demand Analysis – Conduct of Market Survey – Demand Forecasting: Uncertainties – Marketing Plan – Technical Analysis: Manufacturing Process – Technical Arrangements – Plant Capacities – Project chart and Layout - Financial Analysis – Economical and Environmental Analysis.

Unit III

Financial Estimates and Risk Analysis

Cost of Project – Means of Finance – Project finance – Sources and Pattern of Finance - Cost of capital- Estimates of Sales and Production – Working Capital Requirements – Profitability Projections – Profitability Statements – Projected Cash Flow Statement. Capital Budgeting – Techniques.

Risk Analysis – Sensitivity Analysis – Break Even Analysis - Decision Tree Analysis – Capital Asset Pricing Model –Social Cost Benefit Analysis.

Unit IV

Project scheduling, Managing & Implementing

Introduction – Project Scheduling – Network Based Scheduling – Critical Path Method (CPM) – Project Evaluation Review Techniques (PERT) – Resource Allocation – Network cost crash. Project Management – Forms Project Organization - Project Planning and Control- - Pre-Implementation Project – Implementation – Monitoring.

Unit V

Project Evaluation and Post Project Evaluation

Project Evaluation – Meaning – Objectives – Methods. Post Project Evaluation – Meaning – Post Audit – Objectives – Types – Preparation of Project Report – Computer Aided Project.

Book for Study:

Prasanna Chandra, *Projects Planning, Analysis, Selection, Financing, Implementation and Review*, Tata McGraw Hill Education Pvt. Ltd. New Delhi.

Books for References:

1. Vasant Desai, *Project Management*, Himalaya Publishing House, Mumbai.
2. K. Nagarajan, *Project Management*, New Age International Publishers, New Delhi.
3. www.investopedia.com
4. www.businessdictionary.com

Course Code	Course Title	C	H	I	E	T
17U5KME3	Auditing and Assurance	4	75	25	75	100
Learning Objectives <ul style="list-style-type: none"> To gain basic knowledge on auditing and its importance To get comprehensive knowledge on Internal audit and internal control To acquire skill on vouching and verification of assets and liabilities To facilitate to read audit report and know about liabilities of an auditor 						
Learning Outcomes: Thorough knowledge on auditing, preparation of audit programmes, conduct of internal audit , audit report and acquaint knowledge on liabilities of auditor						

Unit I

Introduction to Auditing

Meaning – Definition – Nature of Audit – Objectives of Audit - Scope of Audit – Advantages of Auditing – Inherent Limitations of an Audit - Types of Audit - Basic Principles governing an Audit –Relationship of Auditing with other disciplines – Ethical Principles and Concepts of Auditor’s Independence - Qualities of Auditor - Audit Note book – Audit File

Unit II

Audit Planning and Programme

Audit Planning – Development of an overall plan. Audit programme – Advantage and Disadvantages of an Audit Programme – Audit Procedures and Audit Techniques – Delegation and Supervision of Audit Work.

Unit III

Internal Control and Internal Audit

Internal Control - Concept of Internal Control – Features of a Good Internal Control System – Limitations of Internal Control - Components of an Internal Control System – Review of Internal control by the Auditor – Test of Control – Internal control in Computerised information System Environment (CIS) - Internal Check – Features. Internal Audit – Definition – Scope – Internal Audit Report.

Unit IV

Vouching and Verification of Assets & Liabilities

Vouching – Meaning – General considerations – Classification of Vouching – Analytical Review procedures.

Verification of Assets and Liabilities - Definition – General Principles – Fixed assets – Investment – Inventories – Freehold and Lease hold property – Loans, bills receivable – Sundry debtors – Plant and Machinery – Patents – Verification and valuation of liabilities – Duties of an Auditor.

Unit V

Audit Report and Liabilities of an Auditor

Introduction – Contents of Audit Report – Signing of Auditors Report – Reporting Requirements – Liabilities of an Auditor under Companies Act, 2013 – Liabilities for negligence – Liabilities for misfeasance – Criminal Liability – Liability to third party – Liability for Unaudited Accounts – Legal Decisions regards Auditor's Liabilities.

Books for Study:

1. Dr. B.N. Tandon, Dr. S. Sudharsanam & S. Sundharabahu, Practical Auditing, S.Chand & Company Pvt.Ltd. New Delhi.
2. CA Pavan Kumar K.CH, *Auditing and Assurance*, First Edition 2013, S.Chand & Company Pvt. Ltd., New Delhi.

Books for References:

1. Aruna Jha, Auditing & Assurance, 4th Edition, Taxmann's Publications, New Delhi.
2. S.K. Basu, Auditing & Assurance, Pearson Publications, Delhi.
3. www.icaai.org.in
4. www.icmai.in
5. www.icsi.edu.in

Course Code	Course Title	C	H	I	E	T
17U5ASM5	E – Filing	2	30	25	75	100
Learning Objectives						
<ul style="list-style-type: none"> To gain basic knowledge on E Filing and IT Act, 2000 To get comprehensive knowledge and skill on E filing procedure under Income Tax and GST act To acquire knowledge on various forms through E filing , suggested by MCA 						
Learning Outcomes: Thorough knowledge on E Filing procedure under Income Tax Act and GST Act.						

Unit I

Introduction to E-Filing

Introduction to E-filing - Difference between E-filing and regular filing of return - Advantages of E-Filing - Limitations of E-filing - Types of e-filing - E-Filing Process – E-Filing security.

Unit II

Information Technology Act, 2000

Definitions – Electronic Governance – Certifying Authorities – Digital Signature Certificates – Penalties – Appeals.

Unit III

E-Filing of Income Tax Returns

Introduction - Basic Terminologies – Types of Assessee – Basis of Computation of Total Income and Tax liabilities – Deductions Available – Due date of Filing Income Tax returns – Preparation of Electronic Returns - Relevant notifications.

Unit IV

E-Filing of GST

Introduction – GST – GST Rate – SAC – HSN code – GST Registration – Payment of Tax - E Filing of GST returns – Monthly returns – GSTR-3B, GSTR-1 - Annual Returns - GSTR-9 and GSTR-9C.

Unit V

Ministry of Corporate Affairs Portal

Introduction – MCA Portal – Registration of a Company – Corporate Identification Number (CIN) – Director Identification Number (DIN) - Conversion of Physical Documents in to Electronic/ Digital Documents – Digital Signature Certificate (DSC) – Electronic Payment.

Books for Study:

1. Study Material, Income Tax Part I, Institute of Chartered Accountants of India, New Delhi.
2. V. Balachandran & M. Govindarajan, *A Students Handbook on Company Law and Practice*, Vijay Nicole Imprints Private Limited, Chennai.

Books for References:

1. S.N Maheshwari & S.K. Maheshwari, *A Manual of Business Law*, Edition 2016, Himalaya Publishing House, Delhi.
2. Dr. K. Abirami Devi & Dr. M. Alagammai, *E-Commerce*, Margham Publication, Chennai.
3. Nidhi Dhawan, *E-Commerce Concepts and Applications*, International Book House Pvt. Ltd. New Delhi.
4. www.icaai.org.in
5. www.icmai.in
6. www.icsi.edu.in

Course Code	Course Title	C	H	I	E	T
17U5APR1	Internship Training / Project Report (Optional – Extra Credit)	2	--	50	50	100

Learning Objectives

- To enable the students to have practical exposure in the Industrial sector through Internship training.
- To enable the students to create confidence for preparation of Project report.
- To gain knowledge on the Research methodology
- To equip the students to prepare project report independently.

Learning Outcomes: Comprehensive knowledge on Industrial atmosphere / research methodology and research design. Ability to develop their skill with regard to practical aspects of Corporate sector / to analyze and interpret data. Confidence in preparation of project report independently.

- 1) This is optional extra credit paper of two credits.
- 2) The students during the fourth semester vacation shall go for 7 days Internship training in any corporate sector or with any Auditors, Company Secretaries and Cost Accountants / students shall undertake a Project and submit the Project report on the following areas during the fourth semester.

<p>Marketing</p> <ul style="list-style-type: none"> • Marketing of products and services. • Behavioral pattern of consumers. • Customer Relationship Management. • Supply chain and Logistic Management. • Advertisement and Sales promotion • Multi level marketing. <p>Human Resource Management</p> <ul style="list-style-type: none"> • Human Resource Planning and Development. • Compensation and Rewards Management. • Performance Appraisal Management • Motivational Morale • Women Empowerment • Work Life Management <p>Entrepreneurship</p> <ul style="list-style-type: none"> • Start Up • MSME • Women Entrepreneurship • Self Help Groups (SHG) 	<p>Finance, Accounting and Taxation</p> <ul style="list-style-type: none"> • Financial Performance • Working Capital Management • Equity financing and Venture Capital Management. • Valuation Management • Cost Management in various sectors • Total Quality Management • Balance Score Card • Accounting Standards • Taxation • Goods and Service Tax • Export Documentation <p>Corporate Management</p> <ul style="list-style-type: none"> • Corporate Governance and Corporate Social Responsibility • Directors and Women Directors <p>Banking</p> <ul style="list-style-type: none"> • Non Performing Assets • Basel Norms • Modern Banking services
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3) Evaluation Pattern

Internship Training:

Work diaries and Report – 50 Marks (Internal 25 marks and External 25 marks)

Viva Voce - 50 Marks (Internal 25 marks and External 25 marks)

Project Report

Dissertation - 50 Marks (Internal 25 marks and External 25 marks)

Vivo Voce - 50 Marks (Internal 25 marks and External 25 marks)

SEMESTER VI

Course Code	Course Title	C	H	I	E	T
17U6AMC13	Indian Accounting Standards	5	90	25	75	100
Learning Objectives <ul style="list-style-type: none">To gain basic knowledge on Ind AS and its applicabilityTo get comprehensive knowledge on Ind AS 1,2,7,10,16,18,23,24						
Learning Outcomes: Thorough knowledge on Indian Accounting Standards and their applicability in preparation of accounting records and auditing procedures						

Unit I

Introduction to Accounting Standards

Introduction – International Accounting Standards (AS) - An overview of International Financial Reporting System (IFRS) - Indian Accounting Standards (Ind AS) – Companies (Indian Accounting Standard) Rules, 2015 – Composition of the Accounting Standards Board - Compliance with Accounting Standards under various Statues - Categorisation of enterprises for the applicability of various accounting standards Recognition Principles under Ind AS.

Unit II

Ind AS1 and Ind AS2

Ind AS1- Disclosure of Accounting Policies- Meaning of Accounting policies - Need for accounting policies - Selection of an Accounting policy - Fundamental Accounting assumptions - Disclosure requirements- simple problems.

Ind AS2 – Valuation of Inventories – applicability- measurement of Inventories - Cost of purchase - conversion cost - other costs – Determination of Net Realisable value - Disclosure requirements - simple problems.

Unit III

Ind AS7 and Ind AS10

Ind AS 7 – Cash Flow Statements - Applicability - Meaning of Cash - Cash Equivalents - Cash flow - presentation of cash flow statements - operating – investing – financing activities - Disclosure requirements - simple problems.

Ind As 10 – Contingencies & Events occurring after the Reporting Period - Adjustments to be made - Non-adjusting events - Disclosure requirements - simple problems.

Unit IV

Ind AS 16 and Ind AS 18

Ind AS 16 - Property Plant and equipments - Depreciation Accounting - Accounting treatments - Change in method of depreciation - Change in useful life - Change in value due to revaluation - Addition/Extension to asset (becoming integral part of existing asset) Disclosure requirements - simple problems

Ind AS 18 - Revenue recognition – Meaning - Timing of recognition of revenue - Revenue from sale of goods - Revenue from rendering of services - Other revenues - Disclosure requirements - simple problems

Unit V

Ind AS 23 and Ind AS 24

Ind AS 23 Borrowing Costs - Meaning – Qualifying asset - Recognition of borrowing costs - Acquisition - Construction or production of qualifying assets.

Ind AS 24 Related Parties Disclosures – Meaning – Objective – Scope – Related Party – Related Party Transactions – Disclosure Requirements

Note: The questions should be asked in the ratio of 80% Theory and 20% problem

Book for Study:

Dr. Rajkumar S Adukia, *Guide on Indian Accounting Standards (Ind ASs)*, First Edition 2016, Rishabh Academy Private Limited, Mumbai.

Books for References:

1. *Indian Accounting Standards*, Taxmann's Publications, New Delhi.
2. www.icai.org.in

Course Code	Course Title	C	H	I	E	T
17U6KMC14	Management Accounting	5	90	25	75	100
Learning Objectives						
<ul style="list-style-type: none"> To gain knowledge on Management Accounting Principles and ability to prepare Cash flow, fund flow statements and interpret the financial statements in detail To get basic understanding of marginal costing techniques and its applicability in business decision. Ability to prepare variance analysis report and budgets 						
Learning Outcomes: Ability to interpret financial statements and taking business decision based on marginal costing techniques. Preparation of budgets and variance reporting independently.						

Unit I

Introduction to Management Accounting and Analysis of Financial Statements

Introduction to Management Accounting – Meaning – Nature – Scope – Features – Objectives – Distinction between Financial Accounting and Cost Accounting and Management Accounting. Analysis & Interpretation of Financial Statements: Procedure –Comparative statements – Ratio analysis – Use and significance of ratio analysis- Classification of Ratio – Liquidity ratio – Profitability Ratio - Solvency Ratio - Activity ratios.

Unit II

Fund Flow Statement and Cash Flow Statement

Fund Flow Statement: Meaning – Concept – Flow of Funds – Uses – Significance - Limitations – Procedure - Schedule of Change in Working Capital - Statements of Sources and Application of Funds.

Cash Flow Statement (AS 7): Meaning – Difference between Fund Flow Statement and Cash Flow Statement – Uses – Significance – Limitations - Procedure.

Unit III

Marginal Costing

Meaning - Ascertainment – Break Even Analysis – Margin of Safety – Application of Marginal Costing - Key (or limiting) Factors – Make or buy decision – Selection of a suitable product- mix – Effect of changes in sales price – Maintaining a desired level of profits – Alternatives methods of production – Diversification of products – Alternative course of action – Level of Activity planning.

Unit IV

Standard Costing

Meaning - Analysis of Variances – Material Variance – Labour Variance – Overheads Variance - Sales variances.

Unit – V

Budgeting and Budgetary Control

Meaning – Need for budget – Budgetary control – Budget manual – Budget period – Key factor – Sales budget – Production Budget - Material budget - Cash budget – Flexible Budget - Master Budget – Zero base Budgeting.

Note: The Questions should be asked in the ratio of 80% Problems and 20% Theory

Book for Study:

Murthy A. & S. Gurusamy, Management Accounting, Vijay Nicole Imprints Private Limited, Chennai.

Books for References:

1. R.S.N. Pillai, *Management Accounting*, Revised Edition 2015, S.Chand, New Delhi.
2. S.N. Maheshwari, *Management Accounting*, Seventeenth Revised Edition 2012, Sultan Chand & Sons, New Delhi.
3. T.S. Reddy & Y. Hari Prasad Reddy, Cost and Management Accounting, Forth Edition Margham Publications, Chennai.
4. www.icaai.org.in
5. www.icmai.in
6. www.icsi.edu.in

Course Code	Course Title	C	H	I	E	T
17U6KME4	Income Tax - II	4	90	25	75	100
Learning Objectives <ul style="list-style-type: none"> To gain knowledge of the provisions of income tax law relating to Income from other sources, Set off, carry forward of losses and clubbing of income To gain ability to solve problems concerning assessee with the status of Individual, HUF, Partnership and companies. 						
Learning Outcomes: Ability to compute income tax liability independently. Understanding and application of Advance tax and TDS						

Unit I

Income from other Sources

Introduction – Definitions – Income falling under this head – General incomes – Specific incomes – Casual Income – Deduction of Tax at Source

Unit II

Set-Off, Carry Forward of Losses and Clubbing of Income

Meaning - Set off in the same year within the head and against other head - Carry forward to subsequent year – Clubbing of income.

Unit III

Gross Total Income, Deductions and Rebates

Computation of Gross Total Income - Deductions U/S 80C to 80U – Rebate U/S 87A – Deferred Taxation.

Unit IV

Computation of Total Tax Liability

Introduction - Computation of Total Tax Liability - Individual – Hindu Undivided Family (HUF) – Firm – Companies (including Minimum Alternate Tax (MAT))

Unit V

Procedure for Assessment

Introduction – Types of Assessment - Deduction of Tax at Source – Advance payment of Tax – Return of Income – E-Filing Procedure.

Note: The Questions should be asked in the ratio of 80% Problems and 20% Theory.

Book for Study:

Dr. Vinod K. Singhania & Dr. Monica Singhania, Students' Guide to Income Tax, Taxmann Publications Pvt. Ltd.

Books for References:

- V.P. Gaur, D.B. Narang, Puja Gaur and Raheev Puri, *Practical Income Tax*, Kalyani Publishers, Ludhiyana.
- T.S. Reddy & Y. Hari Prasad Reddy, *Income Tax Theory, Law & Practice*, Margham Publications, Chennai.

3. B.B. Lal & Nitin Vashisht, Income Tax and Central Sales Tax Law and Practice, Pearson Education, Delhi.
4. www.icaai.org.in
5. www.icmai.in
6. www.icsi.edu.in

Course Code	Course Title	C	H	I	E	T
17U6AME5	Advanced Excel Modelling	4	75	25	75	100
Learning Objectives <ul style="list-style-type: none"> To gain advanced knowledge on MS Excel To comprehensive knowledge on business decisions through Excel To get exposure on data analysis through excel 						
Learning Outcomes: Comprehensive knowledge and skill on business decision and finance modeling through MS Excel						

Unit I

Introduction to MS-Excel (Latest version)

Introduction - MS Excel - Features of MS-Excel – Electronic Spread sheet –Standard Toolbar - Excel’s keyboard shortcuts -Work book – Selecting Cells and Ranges – Data Entry – Editing Data - Cell References - Formulae - Creating Charts - Lines, Bars, Stacked Bars, Pie - Restructuring Worksheets - Formatting Data - Working with Worksheets Data Form - Sorting Data- Filtering - Creating sub totals - Pivot Table - Printing excel.

Unit II

Excel Functions

Logical Functions – Text Functions – Date & Time Function – Look up & Reference Function - Mathematical Functions – Statistical Functions.

Unit III

Data Analysis

Financial Functions in Excel – Rate – Future Value (FV) – Present Value (PV) – NPER – IRR - Geometric Progression - Compound Interest – Cumulative Interest – Histogram analysis - Descriptive analysis - Covariance & Correlation Analysis - Regression analysis - What-If analysis.

Unit IV

Creating Macros

Recording a Macro – Running a Macro – Assigning a Macro to a button – Editing a Macro – Documenting a Macro – Inserting Hyperlinks.

Unit V

Visual Basics for Applications (VBA)

Meaning – Introduction to VBA Programming – Advantages - VBA Editor – Modules and Procedures – Interacting With Other Office Applications

Note: 100% Practical Lab

Book for Study:

Sanjay Saxena, *MS Office*, Vikas Publishing House, Chennai

Books for References:

1. Nellai Kannan, *MS Office*, BPB Publications.
2. R. K. Taxali, *PC Software for Windows*, Tata McGraw Hill Publishing Company Limited, New Delhi.

Course Code	Course Title	C	H	I	E	T
17U6KME6	Indirect Tax	4	75	25	75	100
Learning Objectives <ul style="list-style-type: none"> To gain knowledge on concept of Indirect taxation viz., Customs act, GST act To gain concept and simple problems on customs act as working knowledge To understand the concept of GST related terms and its relevance in the GST Act To be able to solve simple problems on GST 						
Learning Outcomes: Comprehensive knowledge on concept of Indirect taxation including GST. Ability to solve simple problems on GST						

Unit – I

Introduction to Indirect Taxation

Meaning of Indirect Taxes - Distinction between Direct Taxes and Indirect Taxes – Constitutional authority to levy and collect indirect taxes – Canons of Taxation – Types of Indirect Taxes prevailing in India at national level such as Goods and Services Tax and Customs Act.

Unit – II

Customs Act, 1962

Meaning of Customs Duty – Procedure prescribed under the Customs Act to Import Goods and Services and Export of Goods and Services – Types of customs duty – simple problems in determination of assessable value and determination of Customs Duty liability – Various Documents involved in imports and exports.

Unit – III

Introduction of Goods and Services Tax, 2017 (GST)

Introduction to GST – Scope – Features – GST Council – Levy under GST – CGST – IGST – SGST – Definitions – Person – Business – Goods – Services – Registration Procedures - Taxable Person – HSN/SAC classification - Meaning of Supply – Time of Supply – Nature of Supply - Place of Supply - Value of Supply – Charge and Levy.

Unit – IV

Input Tax Credit (ITC)

Meaning – Eligible and Ineligible Input Tax Credit – Tax Credit in respect of Capital Goods – Transfer — Reverse charge Mechanisms – Rates of Taxes – Zero Rated - Exemptions – Job work – Works Contract – Composition Scheme.

Unit –V Compounded Levy Scheme for CGST and IGST

Preparation of Tax invoice – Credit and Debit Notes - Filing of Returns – E-Payment of Tax – E-Way Bill - Computation of GST liability – Anti Profiteering – Offences and Penalty – Advance Ruling – Appeals and Revision.

Note: The Questions should be asked in the ratio of 80% theory and 20 % Problems.

Book for Study:

V.S. Datey, *Indirect Taxation*, Taxmann Publication, New Delhi.

Books for Reference:

1. *Indirect Taxes*, Institute of Chartered Accountants of India Publications, New Delhi.
2. *Indirect Taxes*, Institute of Cost Accountants of India, Kolkata.
3. Dr. H.C. Mehrotra and Dr. S.P. Goyal, *Indirect Taxes*, Bhawan Publications, Agra.
4. www.gst.gov.in
5. www.customes.gov.in

Course Code	Course Title	C	H	I	E	T
17U6KSM6	Soft Skills	2	30	25	75	100
Learning Objectives						
<ul style="list-style-type: none"> • To gain knowledge on concept of soft skills and its attributes • To understand the concept of body language Team building and group discussion • To get better exposure to prepare CV and to face interviews confidently • To sensitise the concept of stress management and time management 						
Learning Outcomes						
Comprehensive knowledge on soft skills, confidence to face interview and preparation of CV independently and ability cope up with time and stress management.						

Unit I

Introduction to Soft Skills

Meaning – Importance of soft skills – Attributes regarded as soft skills – Knowing yourself – Process of knowing yourself – SWOT analysis – Benefits of SWOT analysis.

Unit II

Team Building and Group Discussion

Team Building - Introduction – Meaning – Aspects of team building – Skills needed for teamwork – A model of team building – Team Vs Group – Characteristics of effective team – Role of a team leader – Role of team member.

Group discussion – Meaning – Need – Types of Group discussion – Skills required in a Group discussion – Traits tested in a Group discussion – Group discussion etiquette – Areas to be concentrated while preparing for a group discussion – Techniques to initiate a Group discussion.

Unit III

Body Language and Etiquette

Body Language - Introduction – Voluntary and involuntary body language – Body language in building interpersonal relations – Body language in building industrial relations – Types of body language – Gender differences – Female interest and body language.

Etiquette – Introduction – Modern etiquette – Benefits of etiquette – Classification of etiquette manners.

Unit IV

Preparing CV/ Resume and Interview Skills

Preparing CV/ Resume – Meaning – Difference among Bio Data, CV and Resume – The purpose of CV writing – Types of Resume.

Interview Skills - Introduction – Need – Types of interview – Interview panel – Post-interview etiquette – Dress code at interview.

Unit V

Time Management and Stress Management

Time Management – Introduction – The 80:20 rule – Time management matrix – Analysis of time matrix.

Stress Management – Introduction – Effects of stress – Kinds of stress – Sources of stress – Behaviour identified with stress – Stress Management Tips.

Book for Study:

Dr. K. Alex, *Soft Skills*, S.Chand, New Delhi.

Books for References:

1. Dr. H.R. Appannaiah, *Soft Skills for Business*, Himalaya Publications, Mumbai.
2. <http://swayam.gov.in/course/3772-soft-skills>.



THE MADURA COLLEGE (AUTONOMOUS), MADURAI – 625 011
DEPARTMENT OF COMMERCE

B.Com (Banking and Insurance)

V Semester & VI Semester Course Structure under CBCS Pattern with effect from the Academic Year 2017-18

V Semester					VI Semester				
Category	Course Code	Paper	Hrs	Credit	Category	Course Code	Paper	Hrs	Credit
Part III					Part III				
Core -12	17U5KMC12	Elements of Operations Research	6	5	Core -14	17U6KMC14	Management Accounting	6	5
Core-13	17U5KMC13	Corporate Accounting	6	5	Core-15	17U6KMC15	Investment Management	6	5
Core Elective-1	17U5KME1	Income Tax-I	6	4	Core Elective-4	17U6KME4	Income Tax – II	6	4
Core Elective-2	17U5IME2	Practice of General Insurance	5	4	Core Elective-5	17U6IME5	Auditing of Banking & Insurance Companies	5	4
Core Elective-3	17U5IME3	Banking & Allied Law -II	5	4	Core Elective-6	17U6KME6	Indirect Tax	5	4
Part IV					Part IV				
Skill Based Elective 5	17U5ISM5	Preparation of Project Report	2	2	Skill Based Elective 6	17U6KSM6	Soft Skills	2	2
Total			30	24	Total			30	24

V SEMESTER

Course Code	Course Title	C	H	I	E	T
17U5KMC12	Elements of Operations Research	5	90	25	75	100
Learning Objectives <ul style="list-style-type: none">• To understand the basic concept of operations research and tools used in business decisions.• To gain working knowledge on Linear Programming, Transportation and Assignment problems• To apply game, queuing and network analysis in business situations						
Learning Outcomes: Knowledge on operations research tools and its applicability in business decisions and ability to solve various business problems through OR tools						

Unit I

Introduction to Operations Research and Linear Programming

Definition – Characteristics – Uses of Operations Research – Techniques of Operations Research – Limitations. Linear Programming Problem - Meaning – Advantages – Areas of Application – Formulation of LPP – Graphical Method – Simplex Method (Simple problems only)

Unit II

Assignment Problem

Meaning – Hungarian Method – Types of Problems – Balanced Problem – Unbalanced Problem – Minimization Problem – Maximization Problem – Restricted Assignment Problem – Travelling Salesmen Problem.

Unit III

Transportation Problem

Meaning – Types of Problems – Balanced Problem – Unbalanced Problem – Minimization Problem – Maximization Problem – Initial Basic Feasible Solution - Methods – North-West Corner Method – Least Cost Method – Vogel's Approximation Method – Optimal Solution - Optimality Test under Modified Distribution Method (MODI Method).

Unit IV

Game Theory and Queuing Theory

Game Theory – Meaning – Saddle Point Method – Maximin Minimax Principle – Dominance Principle Method – Algebraic Method – Graphical Method.

Queuing Theory– Application Areas – Advantages – Single Channel Model Only (simple problems only).

Unit V

Network Analysis

Meaning – Applications – Terminologies – Rules to frame a Network – Network Diagram - Critical Path Method (CPM) – Programme Evaluation and Review Techniques (PERT) (Simple Problems Only).

Note: The Questions should be asked in the ratio of 80% Problems and 20 % for theory

Book for Study:

Kapoor V.K. & Sumant Kapoor, *Operation Research Techniques for Management*, Sultan Chand & Sons, New Delhi.

Books for References:

1. K.K. Chawla, Vijay Gupt & Bhushan K. Sharma, *Operations Research Quantitative Analysis for Management*, Kalyani Publishers, New Delhi.
2. Chawla. K.K, Vijay Gupta & Bhushan K. Sharma, *Operation Research Quantitative Analysis for Management*, Kalyani Publishers, New Delhi.
3. K. Shridhara Bhat, *Operation Research*, Himalaya Publishing House, Mumbai.
4. J.K.Sharma, *Quantitative Techniques in Management*, Trinity Press, New Delhi.
5. S. Gurusamy, *Operations Research*, Vijay Nicole Imprints Private Limited, Chennai.
6. www.icmai.in

Course Code	Course Title	C	H	I	E	T
17U5KMC13	Corporate Accounting	5	90	25	75	100
Learning Objectives To lay the foundations in company accounts viz., Issue of shares and debentures To gain working knowledge on preparation of final accounts and business combinations To solve the problems pertaining to liquidation of companies						
Learning Outcomes: Knowledge on Issue of shares, ability to prepare final accounts and working knowledge and skill on preparation of accounting for business combination, reconstruction and liquidation of companies						

Unit I

Issue of Equity Shares, Preferences Shares and Debentures

Issue of Equity Shares, Preferences Shares and Debentures – Issue at Par, Premium and Discount – Forfeiture and Re-issue of Shares – Redemption of Preference shares – Redemption of Debentures - Legal provisions.

Unit II

Profit Prior to Incorporation and Underwriting

Profit Prior to Incorporation – Treatment of Profit or Loss prior to incorporation- Methods of ascertaining Profit or Loss Prior to Incorporation- Steps involved in ascertaining Pre and Post Incorporation Profits

Underwriting – Underwriting Commission – Types – Complete Underwriting – Partial Underwriting and Firm underwriting.

Unit III

Final Accounts of Companies

Introduction - Legal Aspects as per Schedule III (Section 129) of Companies Act, 2013 - Part I Form of Balance Sheet – Part II Form of Statement of Profit and Loss - Managerial Remuneration - Preparation of Statement of Profit and Loss and Balance Sheet (Simple problems only).

Unit IV

Accounting for Mergers and Amalgamation

Corporate Restructuring – Types of Restructuring - Amalgamation - Amalgamation in the Nature of Merger – Amalgamation in the Nature Purchase – Accounting Entries in the books of Amalgamated Companies.

Unit V

Liquidation of Companies

Meaning of Liquidation – Order of Payment – Statement of Affairs - Liquidator's Final Statement of Accounts – Liquidators Remuneration.

Note: The Questions should be asked in the ratio of 80% Problems and 20% for theory.

Book for Study:

S.P. Jain & K.L. Narang, *Advanced Accountancy*, Vol.II, Corporate Accounting, Kalyani Publishers, Ludhiana.

Books for References:

1. T.S. Reddy & Dr. A. Murthy, *Corporate Accounting*, 6th Edition, 2015, Margham Publications, Chennai.
2. Dr. M.A. Arulanandam & Dr. K. S. Raman, *Advanced Accountancy*, Vol.II Corporate Accounting, Revised Edition 2012, Himalaya Publishing House, Mumbai.
3. R. L. Gupta & M. Radhaswamy, *Advanced Accountancy*, Vol.II, Sultan Chand & Sons, New Delhi.
4. www.icaai.org.in
5. www.icmai.in
6. www.icsi.edu.in

Course Code	Course Title	C	H	I	E	T
17U5KME1	Income Tax- I	4	90	25	75	100
Learning Objectives						
To gain knowledge of the provisions of income tax law relating to the topics mentioned in the contents						
To gain ability to solve problems on computation of tax of various sources of Income						
Learning Outcomes: Ability to compute income tax liability independently. Understanding and application of Advance tax and TDS						

Unit I

Introduction to Income Tax

Introduction – Machinery for Taxation – Various Authorities – Central Board of Direct Taxes - Appellate Tribunal - Basis of charge – Definitions – Assessment year – Previous year – Assessee – Person – Income – Capital and Revenue – Residential Status – Rules for determining residential status – Incidence of tax – Income exempted from Tax.

Unit II

Income from Salary

Introduction – Definition – Characteristics – Allowances – Perquisites – Profit in lieu of salary – Gratuity – Provident fund – Kinds – Deduction from salary income – Deduction in respect of entertainment allowance – Tax on employment.

Unit III

Income from House Property

Introduction – Definitions – Charge on Annual Value – Income from House Property Wholly Exempt from Tax – Computation of Income from House Property – Let out House – Self Occupied House – Gross Annual value – Adjusted Annual Value – Deductions U/S 24.

Unit IV

Profits and Gains of Business and Profession

Introduction – Definitions – Computation of Income under Business and Profession – Allowable expenses – Expenses expressly disallowed. Depreciation – Meaning – Conditions for depreciation – Normal and additional depreciation - Actual Cost of Assets – Computation of Depreciation – Unabsorbed depreciation.

Unit V

Capital Gains

Introduction – Definitions – Types – Computations – Exemptions U/S 54 – Short Term Capital Gain – Long Term Capital Gain – Rate of Taxes.

Note: The Questions should be asked in the ratio of 80% Problems and 20% for Theory.

Book for Study:

Dr.Vinod K. Singhanian & Dr. Monica Singhanian, Students' Guide to Income Tax, Taxmann Publications Pvt. Ltd.

Books for References:

1. V.P. Gaur, D.B. Narang, Puja Gaur and Raheev Puri, *Practical Income Tax*, Kalyani Publishers, Ludhiyana.
2. T.S. Reddy & Y. Hari Prasad Reddy, **Income Tax Theory, Law & Practice**, Margham Publications, Chennai.
3. B.B. Lal & Nitin Vashisht, **Income Tax and Central Sales Tax Law and Practice**, Pearson Education, Delhi.
4. www.icai.org.in
5. www.icmai.in
6. www.icsi.edu.in

Course Code	Course Title	C	H	I	E	T
17U5IME2	Practice of General Insurance	4	75	25	75	100
Learning Objectives To Sensitize the concept of general insurance and its market To gain comprehensive knowledge on Fire and Marine insurance To equip to prepare procedures for making claims against different kinds of insurance Life, Fire and Marine.						
Learning Outcomes: Basic knowledge general insurance and Depth knowledge on principles of insurance for Fire and Marine Insurance. Skill on premium calculation and Claim procedure						

Unit I

Introduction to General Insurance

Origin of Insurance – Classification of general insurance companies – Features of Indian General Insurance Market – International Insurance market – Global relationship – Claim process- Reinsurer – Retrocessionaire – Categories of insured – Intermediaries – Actuaries.

Policy Documents and Forms – Insurance Contract – Structure of an insurance policy – Legal Document – Insurance proposal forms and certificates.

Unit II

Fire and Marine Insurance

General Insurance Products – Cover provided under Fire Insurance Policy –Special Policies – Consequential Loss Policy – Marine Cargo Policy – Marine Hull Policy – Types of marine policies.

Unit III

Motor Insurance and Personal Liability Insurance

Motor Insurance policies – Compulsory insurance as per Motor Vehicles Act, 1988 – Types of policies – Basic underwriting and rating features – Motor claims and procedures – Cover provided under liability insurance. Personal accident, Health and specialty policies – Engineering insurance policies – Burglary insurance – Baggage insurance – Money insurance – Fidelity Guarantee Insurance – Television insurance – Pedal cycle insurance – Plate glass insurance – Neon sign insurance – Householders insurance – Shopkeeper’s insurance – Banker’s Blanket policies – Jeweller’s Block policies – Office Protection Shield – Crime insurance – Aviation insurance – Satellite insurance – Oil and energy risks insurance – Cyber liabilities – Micro insurance.

Unit IV

Underwriting, Rating and Premium

Underwriting process – Risk sharing methods – Reinsurance – Types – Methods – Risk management – Risk identification - Evaluation or assessment - Prevention - Control.

Premium pricing mechanism – Trends – Refinements – Burning cost – Soft market and hard market – Rating the policy.

Unit V

Claims, Insurance Reserves and Accounting

Basics of a claim – Claim conditions – Information Technology systems – Process of claims management – Quantification – Underinsurance – Arbitration – Modes of settlement – Leakage – Ex-gratia payments.

Different types of reserves – Stakeholders – Types of technical reserves – Reserving process – Premium investment strategies. Insurance Accounting – Accounting Module.

Book for Study:

Practice of General Insurance, Insurance Institute of India, Mumbai.

Books for References:

1. Alka Mittal & S.L. Gupta, *Principles of Insurance and Risk Management*, Sultan Chand & Sons, New Delhi. (Unit I & II)
2. M.N Mishra & S.B. Mishra. *Insurance Principles and Practice*, S. Chand & Company Ltd., New Delhi (Unit III , IV & V)
3. Dr. A. Murthy, *Principles of Insurance*, Margam Publications, Chennai.
4. Dr.P.Periasamy, *Principles & Practice of Insurance*, Himalaya Publishing House, Mumbai
5. <http://.insuranceinstituteofindia.com>
6. www.investopedia.com

Course Code	Course Title	C	H	I	E	T
17U5IME3	Banking & Allied Law - II	4	75	25	75	100
Learning Objectives To gain the comprehensive knowledge on consumer protection, competition and FEMA Act To know the legal framework for Bankers books evidence act, Right to Information and Information Technology act and SARAFASEI To acquire basic knowledge on Recovery of Debts Due to Banks and Financial Institutions (RDBFI) Act, 1993.						
Learning Outcomes: Basic knowledge on consumer protection, competition, FEMA, RTI, IT Act, Bankers Book Evidence Act and SARAFASEI Act						

Unit I

Consumer Protection Act 1986 , Competition Act 2002 and FEMA 1999.

Consumer Protection Act 1986 - Preamble, extent and Definitions – Consumer Protection Councils – Consumer Forums.

Competition Act 2002 – Object – Definitions – Competition Commission of India.

Foreign Exchange Management Act (FEMA) 1999 - Important terms – Powers of RBI – Directorate of Enforcement.

Unit II

Bankers Book Evidence Act, 1891

Introduction - Relevant Provisions of Law of Limitation – Prevention of Money Laundering. Definition of Sale, Mortgage, Lease with reference to relevant Laws.

Unit III

Right to Information (RTI) Act, 2005 & Information Technology (IT) Act, 2000

Introduction - RTI Act, 2005 – Applicability – Definitions – Important provisions. IT Act, 2000 – Definitions – Electronic Governance – Certifying Authorities – Digital Signature Certificates – Penalties – Appeal.

Unit IV

Securitization and Reconstruction of Financial Assets and Enforcement of Securities Interests (SARAFASEI) Act, 2002 and Insolvency and Bankruptcy Code (IBC), 2016

Introduction - Constitutional Validity - Definitions – Regulation & Reconstruction – Enforcement of Security interest – Central Registry – Enforcement and Penalties. An Overview of IBC 2016.

Unit V

Recovery of Debts Due to Banks and Financial Institutions (RDBFI) Act, 1993

Objectives – Constitution of Tribunals – Procedure – Enforcement Process – Banking Ombudsman – Lok Adalat

Books for Study

Legal and Regulatory Aspects of Banking, IIBF, MacMillan Publications, Mumbai.

Books for References:

1. S.N Maheshwari & S.K. Maheshwari, *A Manual of Business Law*, Edition 2016, Himalaya Publishing House, Delhi.
2. www.icaai.org.in
3. www.icmai.in
4. www.icsi.edu.in

Course Code	Course Title	C	H	I	E	T
17U5ISM5	Preparation of Project Report	2	30	25	75	100
Learning Objectives						
To understand the concept of project and project management and ability to prepare project report						
To gain working knowledge on project preparation independently						
To evaluate the projects by various feasibility studies.						
Learning Outcomes: Understanding and comprehensive knowledge on project management and its relevance in business houses. Ability to appraise the projects by various feasibility studies						

Unit I

Introduction to Project Management

Meaning – Characteristics - Types- Project Life Cycle – Project formulation - Parameters in Project Selection – Stages in Project Formulation – Pre-feasibility study – Support Studies – Feasibility study – Detailed Project Report.

Unit II

Project Appraisal

Meaning – Types of Project Appraisal – Market and Demand Analysis – Conduct of Market Survey – Demand Forecasting: Uncertainties – Marketing Plan.

Unit III

Technical Analysis

Manufacturing Process – Technical Arrangements – Plant Capacities – Project chart and Layout - Financial Analysis – Economical and Environmental Analysis.

Unit IV

Financial Estimates

Cost of Project – Means of Finance – Project finance – Sources and Pattern of Finance - Cost of capital - Estimates of Sales and Production – Working Capital Requirements – Profitability Projections – Profitability Statements – Projected Cash Flow Statement. Capital Budgeting – Techniques.

Unit V

Project Evaluation and Post Project Evaluation

Project Evaluation – Meaning – Objectives – Methods. Post Project Evaluation – Meaning - Post Audit – Objectives – Types – Preparation of Project Report – Computer Aided Project.

Book for Study

Prasanna Chandra, *Projects Planning, Analysis, Selection, Financing, Implementation and Review*, Tata McGraw Hill Education Pvt. Ltd. New Delhi.

Books for References:

1. Vasant Desai, *Project Management*, Himalaya Publishing House, Mumbai.
2. K. Nagarajan, *Project Management*, New Age International Publishers, New Delhi.
3. www.investopedia.com
4. [www.businessdictionary .com](http://www.businessdictionary.com)

Course Code	Course Title	C	H	I	E	T
17U5APR1	Internship Training / Project Report (Optional – Extra Credit)	2	--	50	50	100

Learning Objectives

To enable the students to have practical exposure in the Industrial sector through Internship training.

To enable the students to create confidence for preparation of Project report.

To gain knowledge on the Research methodology

To equip the students to prepare project report independently.

Learning Outcomes: Comprehensive knowledge on Industrial atmosphere / research methodology and research design. Ability to develop their skill with regard to practical aspects of Corporate sector / to analyze and interpret data. Confidence in preparation of project report independently.

1. This is optional extra credit paper of two credits.
2. The students during the fourth semester vacation shall go for 7 days Internship training in any corporate sector or with any Auditors, Company Secretaries and Cost Accountants / students shall undertake a Project and submit the Project report on the following areas during the fourth semester.

<p>Banking</p> <ul style="list-style-type: none"> Basel Norms Bancassurance Innovation in Banking Role Women Empowerment in Banking <p>Sector</p> <ul style="list-style-type: none"> Bank Branch Viability Asset Liability Management Non Performing Assets Interest Income vis-a-vis Non Interest Income Corporate Social Responsibility in Banking <p>Sector</p> <p>Insurance</p> <ul style="list-style-type: none"> Affordable Health Care Inclusive Insurance Keyman Insurance Micro and Credit Insurance Depository Insurance Corporate Social Responsibility in Insurance <p>Sector</p> <ul style="list-style-type: none"> International Insurance Innovations in Insurance Sector Relevant Issues in Insurance Sector Risk Management 	<p>Finance, Accounting and Taxation</p> <ul style="list-style-type: none"> Financial Performance Working Capital Management Equity financing and Venture Capital Management. Valuation Management Cost Management in various sectors Total Quality Management Balance Score Card Accounting Standards Taxation Goods and Service Tax Export Documentation <p>Corporate Management</p> <ul style="list-style-type: none"> Corporate Governance and Corporate Social Responsibility Directors and Women Directors
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Evaluation Pattern

Internship Training:

Work diaries and Report – 50 Marks (Internal 25 marks and External 25 marks)

Viva Voce - 50 Marks (Internal 25 marks and External 25 marks)

Project Report

Dissertation - 50 Marks (Internal 25 marks and External 25 marks)

Vivo Voce - 50 Marks (Internal 25 marks and External 25 marks)

VI SEMESTER

Course Code	Course Title	C	H	I	E	T
17U6KMC14	Management Accounting	5	90	25	75	100
Learning Objectives <ul style="list-style-type: none">To gain knowledge on Management Accounting Principles and ability to prepare Cash flow and fund flow statements and interpret the financial statements in detailTo get basic understanding of marginal costing techniques and its applicability in business decision.Ability to prepare variance analysis report and budgets						
Learning Outcomes: Ability to interpret financial statements and taking business decision based on marginal costing techniques. Preparation of budgets and variance reporting independently.						

Unit I

Introduction to Management Accounting and Analysis of Financial Statements

Introduction – Meaning – Nature – Scope – Features – Objectives – Distinction between Financial Accounting and Cost Accounting and Management Accounting. Analysis & Interpretation of Financial Statements: Procedure –Comparative statements – Ratio analysis – Use and significance of ratio analysis- Classification of Ratio – Liquidity ratio –Profitability Ratio - Solvency Ratio - Activity ratios.

Unit II

Fund Flow Statement and Cash Flow Statement

Fund Flow Statement: Meaning – Concept – Flow of Funds – Uses – Significance - Limitations – Procedure - Schedule of Change in Working Capital - Statements of Sources and Application of Funds.

Cash Flow Statement (AS 7): Meaning – Difference between Fund Flow Statement and Cash Flow Statement – Uses – Significance – Limitations - Procedure.

Unit III

Marginal Costing

Marginal Costing - Meaning - Ascertainment – Break even analysis – Margin of Safety – Application of marginal costing- Key (or limiting) Factors – Make or buy decision – Selection of a suitable product- mix – Effect of changes in sales price – Maintaining a desired level of profits – Alternatives methods of production – Diversification of products – Alternative course of action – Level of Activity planning.

Unit IV

Standard Costing

Meaning - Analysis of Variances – Material Variance – Labour Variance – Overheads Variance - Sales variances.

Unit – V

Budgeting and Budgetary Control

Meaning – Need for budget – Budgetary control – Budget manual – Budget period – Key factor – Sales budget – Production Budget - Material budget - Cash budget – Flexible Budget - Master Budget – Zero base Budgeting.

Note: The Questions should be asked in the ratio of 80% Problems and 20 % theory

Book for Study:

Murthy A. & S. Gurusamy, Management Accounting, Vijay Nicole Imprints Private Limited, Chennai.

Books for References:

1. R.S.N. Pillai, *Management Accounting*, Revised Edition 2015, S.Chand, New Delhi.
2. S.N. Maheshwari, *Management Accounting*, Seventeenth Revised Edition 2012, Sultan Chand & Sons, New Delhi.
3. T.S. Reddy & Y. Hari Prasad Reddy, Cost and Management Accounting, Forth Edition Margham Publications, Chennai.
4. www.icaai.org.in
5. www.icmai.in
6. www.icsi.edu.in

Course Code	Course Title	C	H	I	E	T
17U6KMC15	Investment Management	5	90	25	75	100
Learning objectives						
<ul style="list-style-type: none"> • To gain knowledge of investments and investment alternatives • To develop ability to value the securities by fundamental and technical analysis • To understand the concept of portfolio management , theories of Portfolio management and evaluate the portfolio 						
Learning Outcomes: Advanced knowledge on investment management. Skill towards fundamental and technical analysis. Understanding of derivatives market and portfolio management and evaluation						

Unit I

Introduction to Investment Management

Investment: Meaning of Investment – Need of Investment – Scope of Investment – Differences between Investment, Speculation and Gambling – Factors favourable for Investment – Features for an Investment programme - Investment Media - Investment process.

Unit II

Investment Avenues

Introduction – Investor Classification – Corporate Bonds – Features of Bonds – Preference Shares – Features – Types – Equity Shares – Features – Government Securities – Types –Innovative Financial Instruments.

Unit III

Risk and Return

Risk – Meaning – Systematic Risk – Unsystematic Risk. Returns – Meaning – Relationship of Risk and Return – Measurement of Returns – Investors Attitude towards Risk and Return.

Unit IV

Fundamental and Technical Analysis

Fundamental Analysis – Meaning - Features – EIC Approach - Economic Analysis – Industry Analysis – Company Analysis.

Technical Analysis – Meaning – Assumptions – Difference between Fundamental and Technical Analysis – Theories of Technical Analysis – Dow Theory – Elliott Wave Theory – Theory of Contrary opinion – Odd lot Theory – Charting as a Technical Tools – Bar Chart – Line Chart – Point and Figure Chart – Candle Stick Chart – Efficient Market Hypothesis – Meaning – Assumptions.

Unit V

Portfolio Management

Meaning – Objectives – Portfolio Management Process – Need – Importance – Types of Portfolio – Aggressive Investment Portfolio – Balance or Moderate Portfolio – Conservative Portfolio – Mutual Funds – Features of Mutual Fund – Types – SEBI Regulations for Mutual Fund Investments – Management Performance Evaluation

Book for Study:

Preeti Singh, *Investment Management Security Analysis and Portfolio Management*, 19th Revised Edition, 2015, Himalaya Publishing House, New Delhi.

Books for References:

1. V.K. Bhalla, *Investment Management Security Analysis and Portfolio Management*, S.Chand & Company Ltd, New Delhi.
2. Dr. R.P. Rustagi, *Investment Analysis and Portfolio Management*, Sultan Chand & Sons, New Delhi.
3. M/. Ranganatham & R. Madhumathi, *Investment Analysis and Portfolio Management*, Pearson Education, Delhi.
4. www.investopedia.com

Course Code	Course Title	C	H	I	E	T
17U6KME4	Income Tax - II	4	90	25	75	100
Learning Objectives						
<ul style="list-style-type: none"> To gain knowledge of the provisions of income tax law relating to Income from other sources, Set off, carry forward of losses and clubbing of income To gain ability to solve problems concerning assessee with the status of Individual, HUF, Partnership and companies. 						
Learning Outcomes: Ability to compute income tax liability independently. Understanding and application of Advance tax and TDS						

Unit I

Income from other Sources

Introduction – Definitions – Income falling under this head – General incomes – Specific incomes – Casual Income – Deduction of Tax at Source

Unit II

Set-Off, Carry forward of losses and Clubbing of Income

Meaning - Set off in the same year within the head and against other head - Carry forward to subsequent year – Clubbing of income.

Unit III

Gross Total Income, Deductions and Rebates

Computation of Gross Total Income - Deductions U/S 80C to 80U – Rebate U/S 87A – Deferred Taxation.

Unit IV

Computation of Total Tax Liability

Introduction - Computation of Total Tax Liability - Individual – Hindu Undivided Family (HUF) – Firm – Companies (including Minimum Alternate Tax (MAT))

Unit V

Procedure for Assessment

Introduction – Types of Assessment - Deduction of Tax at Source – Advance payment of Tax – Return of Income – E-Filing Procedure.

Note: The Questions should be asked in the ratio of 80% Problems and 20 % for theory

Book for Study:

Dr. Vinod K. Singhania & Dr. Monica Singhania, Students' Guide to Income Tax, Taxmann Publications Pvt. Ltd.

Books for References:

1. V.P. Gaur, D.B. Narang, Puja Gaur and Raheev Puri, *Practical Income Tax*, Kalyani Publishers, Ludhiyana.
2. T.S. Reddy & Y. Hari Prasad Reddy, *Income Tax Theory, Law & Practice*, Margham Publications, Chennai.
3. B.B. Lal & Nitin Vashisht, *Income Tax and Central Sales Tax Law and Practice*, Pearson Education, Delhi.
4. www.icai.org.in
5. www.icmai.in
6. www.icsi.edu.in

Course Code	Course Title	C	H	I	E	T
17U6IME5	Auditing of Banking and Insurance Companies	4	75	25	75	100
Learning Objectives						
To gain basic knowledge on auditing and its importance						
To get comprehensive knowledge on Internal audit and internal control						
To acquire skill on vouching and verification of assets and liabilities						
To gain better knowledge on audit of Banking and Insurance Companies						
Learning Outcomes: Thorough knowledge on auditing, preparation of audit programmes, conduct of internal audit , audit report of banking and insurance companies						

Unit I

Introduction to Auditing

Meaning – Definition – Nature of Audit – Objectives of Audit - Scope of Audit – Advantages of Auditing – Inherent Limitations of an Audit - Types of Audit - Relationship of Auditing with other disciplines – Qualities of Auditor - Audit Note book – Audit File – Audit Planning – Audit Programme.

Unit II

Internal Control and Internal Audit

Internal Control - Concept of Internal Control – Features of a Good Internal Control System – Limitations of Internal Control - Components of an Internal Control System - Test of Control – Internal control in Computerised information System Environment (CIS) - Internal Check – Features. Internal Audit – Definition – Scope – Internal Audit Report.

Unit III

Verification of Assets and Liabilities and Audit Report

Verification of Assets and Liabilities - Definition – General Principles – Fixed assets – Investment – Inventories – Freehold and Lease hold property – Loans, bills receivable – Sundry debtors – Plant and Machinery – Patents – Verification and valuation of liabilities. Audit Report - Contents of Audit Report – Signing of Auditors Report

Unit – IV

Audit of Banking Companies

Introduction - Salient Features – Accounting System of Bank – Internal Control System in a Bank – Bank Audit – Checking of Assets and Liabilities – Audit of Advances – Prudential Norms for Income and Recognition – Special Liabilities imposed on the Auditors of Banking Companies.

Unit V

Audit of Insurance Companies

Introduction - Accounts and Audit of General Insurance Business – IRDA (Preparation of Financial Statements and Auditors Report of Insurance Companies) Regulations, 2000 – Audit of Accounts – Audit of Revenue Accounts of Insurance Business – Audit of Balance Sheet.

Books for Study:

Dr. B.N. Tandon, Dr. S. Sudharsanam & S. Sundharabahu, **Practical Auditing**, S.Chand & Company Pvt.Ltd. New Delhi.

CA Pavan Kumar K.CH, **Auditing and Assurance**, First Edition 2013, S.Chand & Company Pvt. Ltd., New Delhi.

Books for References:

1. Aruna Jha, Auditing & Assurance, 4th Edition, Taxmann's Publications, New Delhi.
2. S.K. Basu, Auditing & Assurance, Pearson Publications, Delhi.
3. CA Pavan Kumar K.CH, **Auditing and Assurance**, First Edition 2013, S.Chand & Company Pvt. Ltd., New Delhi.
4. www.icaai.org.in,
5. www.icmai.in
6. www.icsi.edu.in

Course Code	Course Title	C	H	I	E	T
17U6KME6	Indirect Tax	4	75	25	75	100
Learning Objectives <ul style="list-style-type: none"> To gain knowledge on concept of Indirect taxation viz., Customs act, GST act To gain concept and simple problems on customs act as working knowledge To understand the concept of GST related terms and its relevance in the GST Act To be able to solve simple problems on GST 						
Learning Outcomes: Comprehensive knowledge on concept of Indirect taxation including GST. Ability to solve simple problems on GST						

Unit – I

Introduction to Indirect Taxation

Meaning of Indirect Taxes - Distinction between Direct Taxes and Indirect Taxes – Constitutional authority to levy and collect indirect taxes – Canons of Taxation – Types of Indirect Taxes prevailing in India at national level such as Goods and Services Tax and Customs Act.

Unit – II

Customs Act, 1962

Meaning of Customs Duty – Procedure prescribed under the Customs Act to Import Goods and Services and Export of Goods and Services – Types of customs duty – simple problems in determination of assessable value and determination of Customs Duty liability – Various Documents involved in imports and exports.

Unit – III

Introduction of Goods and Services Tax, 2017 (GST)

Introduction to GST – Scope – Features – GST Council – Levy under GST – CGST – IGST – SGST – Definitions – Person – Business – Goods – Services – Registration Procedures - Taxable Person – HSN/SAC classification - Meaning of Supply – Time of Supply – Nature of Supply - Place of Supply - Value of Supply – Charge and Levy.

Unit – IV

Input Tax Credit (ITC)

Meaning – Eligible and Ineligible Input Tax Credit – Tax Credit in respect of Capital Goods – Transfer — Reverse charge Mechanisms – Rates of Taxes – Zero Rated - Exemptions – Job work – Works Contract – Composition Scheme.

Unit –V

Compounded Levy Scheme for CGST and IGST

Preparation of Tax invoice – Credit and Debit Notes - Filing of Returns – E-Payment of Tax – E-Way Bill - Computation of GST liability – Anti Profiteering – Offences and Penalty – Advance Ruling – Appeals and Revision.

Note: The Questions should be asked in the ratio of 80% theory and 20 % Problems.

Book for Study:

V.S. Datey, *Indirect Taxation*, Taxmann Publication, New Delhi.

Books for References:

1. *Indirect Taxes*, Institute of Chartered Accountants of India Publications, New Delhi.
2. *Indirect Taxes*, Institute of Cost Accountants of India, Kolkata.
3. Dr. H.C. Mehrotra and Dr. S.P. Goyal, *Indirect Taxes*, Bhawan Publications, Agra.
4. www.gst.gov.in
5. www.customes.gov.in

Course Code	Course Title	C	H	I	E	T
17U6KSM6	Soft Skills	2	30	25	75	100
Learning Objectives						
To gain knowledge on concept of soft skills and its attributes						
To understand the concept of body language Team building and group discussion						
To get better exposure to prepare CV and to face interviews confidently						
To sensitise the concept of stress management and time management						
Learning Outcomes: Comprehensive knowledge on soft skills, confidence to face interview and preparation of CV independently and ability cope up with time and stress management.						

Unit I

Introduction to Soft Skills

Meaning – Importance of soft skills – Attributes regarded as soft skills – Knowing yourself – Process of knowing yourself – SWOT analysis – Benefits of SWOT analysis.

Unit II

Team Building and Group Discussion

Team Building - Introduction – Meaning – Aspects of team building – Skills needed for teamwork – A model of team building – Team Vs Group – Characteristics of effective team – Role of a team leader – Role of team member.

Group discussion – Meaning – Need – Types of Group discussion – Skills required in a Group discussion – Traits tested in a Group discussion – Group discussion etiquette – Areas to be concentrated while preparing for a group discussion – Techniques to initiate a Group discussion.

Unit III

Body Language and Etiquette

Body Language - Introduction – Voluntary and involuntary body language – Body language in building interpersonal relations – Body language in building industrial relations – Types of body language – Gender differences – Female interest and body language.

Etiquette – Introduction – Modern etiquette – Benefits of etiquette – Classification of etiquette manners.

Unit IV

Preparing CV/ Resume and Interview Skills

Preparing CV/ Resume – Meaning – Difference among Bio Data, CV and Resume – The purpose of CV writing – Types of Resume.

Interview Skills - Introduction – Need – Types of interview – Interview panel – Post-interview etiquette – Dress code at interview.

Unit V

Time Management and Stress Management

Time Management – Introduction – The 80:20 rule – Time management matrix – Analysis of time matrix.

Stress Management – Introduction – Effects of stress – Kinds of stress – Sources of stress – Behaviour identified with stress – Stress Management Tips.

Book for Study:

Dr. K. Alex, *Soft Skills*, S.Chand, New Delhi.

Books for References:

1. Dr. H.R. Appannaiah, *Soft Skills for Business*, Himalaya Publications, Mumbai.
2. <http://swayam.gov.in/course/3772-soft-skills>.



THE MADURA COLLEGE (AUTONOMOUS), MADURAI – 625 011
DEPARTMENT OF COMMERCE

B.Com (Capital Markets)

**III Semester & IV Semester Course Structure under CBCS Pattern with
effect from the Academic Year 2018-19**

III Semester					IV Semester				
Category	Course Code	Paper	Hrs	Credit	Category	Course Code	Paper	Hrs	Credit
Part III					Part III				
Core -6	18U3XMC6	Corporate Finance	4	4	Core -9	18U4XMC9	Back Office, Depository Operations, Clearing, Settlement & Risk Management	5	4
Core-7	17U3KMC7	Cost Accounting	6	4	Core-10	18U4XMC10	Foreign Exchange & Currency Markets	5	4
Core-8	17U3KMC8	Partnership Accounts	6	4	Core-11	17U4KMC11	Special Accounts	6	4
Allied-2	17U3KAC2	Company Law & Practice	5	4	Allied-4	18U4XAC4	Mutual Fund & Commodity Markets	5	4
Allied-3	18U3XAC3	Derivative Market	5	4	Allied-5	17U4KAC5	Business Legislation - I	5	4
Part IV					Part IV				
Skill Based Elective	18U3XSM3	NSE Learn to Trade (NLT) – III (Lab)	2	2	Skill Based Elective	18U4XSM4	Computer Applications in Financial Markets	2	2
Non Major Elective	17U3KNM1	Tamil - I	2	2	Non Major Elective	17U4KNM2	Tamil -II	2	2
Total			30	24	Total			30	24

III SEMESTER

Course Code	Course Title	C	H	I	E	T
18U3XMC6	Corporate Finance	4	60	25	75	100
Learning Objectives <ul style="list-style-type: none">• To understand the concept of finance & finance functions, and familiarize with the various sources of funds• To calculate cost of capital, Leverages and optimizing EPS through capital structure models.• To make a decision long term investment proposals by using Payback, NPV, IRR & ARR and prepare statement of working capital requirements independently.• To familiarize the concept of dividend policy and its relevance in corporate						
Learning Outcomes: Knowledge on Sources of finance, suggesting suitable capital mix for financing decisions, skill on capital budgeting, working capital and dividend decisions.						

Unit I

Introduction to Corporate Finance

Meaning – Definition - Goals and functions of finance - Applications of time value of money - Finding the risk and return of securities - Ex-post and Ex-ante - Risk and return on a portfolio - 2 Security case and 3-Security case - Capital Assets Pricing Model

Unit II

Working Capital Management

Nature of Working Capital - Planning of Working Capital - Computation of Working Capital and Managing the Constituents of Working Capital – Cash - Inventory – Receivables.

Unit III

Cost of Capital and Valuation of Securities

Meaning - Finding the cost of capital for various sources of finance - Weighted Cost of Capital: Book value and market value Proportions - Equity and Bond Valuation.

Unit IV

Capital Budgeting: Techniques and Applications

Meaning - Determination of Relevant Cash Flow - Capital Budgeting Techniques - Applications - Capital Budgeting under conflicting situations - Capital Rationing - Investment Decision under risk and uncertainty.

Unit V

Capital Structure and Dividend Policy

Capital structure – Theories of Capital Structure - MM Hypothesis with and without taxes - Capital Structure Decision Making, – Designing Optimum Capital Structure – Indifference Point – Financial Break Even Point. Leverages – Meaning – Financial Leverage – Operating Leverage – Combined Leverage - EBIT- EPS Analysis. Dividend Policy - Theories mechanics and Practices of Dividend Payment - Dividend Policy in India: Some Recent Evidence.

Note: The Questions should be asked in the ratio of 60% Problems and 40 % for theory.

Books for Study:

1. Stephen A. Ross, Randolph W. Westerfield & Bradford D. Jordan, *Fundamentals of Corporate Finance*, Ninth Edition, McGraw Hill Education Private Limited, Delhi.
2. Shasi K. Gupta, *Financial Management*, Kalyani Publishers, Ludiana.

Books for References:

1. M.Y. Khan & P.K. Jain, *Financial Management Text, Problems and Cases*, McGraw Hill Education Pvt. Ltd. New Delhi.
2. IM. Pandey, *Financial Management*, Vikas Publishing House Pvt. Ltd. Noida.
3. Dr. A. Murthy, *Financial Management*, Margham Publications, Chennai.
4. www.investopedia.com
5. www.managementstudyguide.com

Course Code	Course Title	C	H	I	E	T
17U3KMC7	Cost Accounting	4	90	25	75	100
Learning Objectives						
<ul style="list-style-type: none"> To familiarize the concept of cost accounting and its importance with various classification of cost To prepare cost sheet independently for various types of industries To acquire the skills in control of materials cost, labour cost and overhead costs To understand and ascertainment of cost by using various methods of costing 						
Learning Outcomes: Depth knowledge in Cost Accounting, Methods of Costing & Skill in Preparation of Cost Sheets						

Unit I

Introduction to Cost Accounting

Definitions – Objectives – Nature – Scope – Limitations of Financial Accounting – Financial Accounting Vs Cost Accounting – Installation of Costing system. Cost Classifications – Elements of Cost – Preparation of Cost Sheet.

Unit II

Material

Material Cost – Purchase Procedure – Various stock levels – Economic Order Quantity (EOQ) – FSN – ABC – JIT – Bin Card – Stores Ledger – Methods of Pricing issues – FIFO – LIFO – Base Stock level – Simple Average and Weighted Average method – Treatment of Scrap, Spoilage, Wastage & Defective.

Unit III

Labour and Overheads

Labour Costs – Labour Turnover – Methods of Labour Turnover – Treatment of Idle time and Over time – Methods of wage payment – Time rate – Piece rate – Taylor differential piece rate system- Incentive methods – Halsey and Rowan Plan.

Overhead Costing – Meaning – Classification – Allocation and Apportionment of Overheads – Reapportionment – Methods of Absorption – Calculation of Machine Hour Rate.

Unit IV

Methods of Costing

Job Costing – Batch Costing – Contract Costing (including escalation clause) – Operating Costing (Transport only)

Unit V

Process Costing

Application of Process Costing - Normal Loss – Abnormal Loss – Abnormal Gain – Concept of Equivalent Production – Joint Products and By products. Reconciliation between Cost Profit and Financial Profit.

Note: The Questions should be asked in the ratio of 80% Problems and 20 % for theory.

Book for Study:

S.P. Jain & K.L Narang, *Cost Accounting*, Kalyani Publishers, Ludhiana.

Books for References:

1. Dr.A.Murthy & Dr.S.Gurusamy, *Cost Accounting*, Vijay Nicole Imprints Private Limited, Chennai.
2. T.S. Reddy & Y. Hari Prasad Reddy, *Cost Accounting*, Margham Publication, Chennai.
3. Dr. M. Wilson, *Cost Accounting*, Himalaya Publishing House, Mumbai.
4. www.icaai.org.in
5. www.icmai.in
6. www.icsi.edu.in
7. www.edx.org

Course Code	Course Title	C	H	I	E	T
17U3KMC8	Partnership Accounts	4	90	25	75	100
Learning Objectives						
<ul style="list-style-type: none"> To know and understanding the concept of partnership and legal requirements of partnership firm To prepare comprehensive problems on partnership accounting under various situations viz., Admission, retirement, death and dissolution 						
Learning Outcomes: Knowledge on Legal requirements of Partnership, Skill on preparation of accounts pertaining to admission, retirement, death of a partner and dissolution of partnership.						

Unit I

Introduction to Partnership Accounts

General – Definition – Legal Requirements – Partners Capital Account – Fixed and Fluctuating system – Appropriation of Profits – Past Adjustments – Guarantee.

Unit II

Admission of a Partner

Revaluation of Assets & Liabilities – Memorandum Revaluation Method – Treatment of Goodwill – Premium – Revaluation and Memorandum Revaluation Method – Calculation of Profit sharing Ratio-

Unit III

Retirement and Death of a Partner

Retirement – Revaluation of Assets and Liabilities – Treatment of Goodwill – Revaluation and Memorandum Revaluation Methods - Calculation of Profit Sharing Ratio –Settlement of Amount Due to Retiring Partner. Death of a Partner – Treatment of Joint Life Policy.

Unit IV

Dissolution - I

Journal Entry for Dissolution – Treatment of Goodwill on Dissolution – Treatment of unrecorded and liability – Insolvency of a Partner (Garner Vs Murray) - Capital Ratio under Fixed Capital Method and Fluctuating Capital Method (Garner Vs Murray).

Unit V

Dissolution – II

Insolvency of all Partners - Piecemeal Distribution – Proportionate Capital Method – Maximum Loss Method.

Note: The Questions should be asked in the ratio of 80% Problems and 20 % for theory

Book for Study:

S.P. Jain & K.L. Narang, "*Advanced Accountancy*" Vol. I, 19th Edition, 2015, Kalyani Publishers, Ludhiana.

Books for References:

1. R.L. Gupta & M. Radhaswamy, "*Advanced Accountancy*" Vol-I, 2015, Sultan Chand & Sons, New Delhi.
2. M.A. Arulanandam & K.S. Raman, "*Advanced Accountancy*" Vol.I, Sixth Edition, 2015, Himalaya Publishing House, Mumbai.
3. Reddy & Murthy, "*Financial Accounting*", Margham Publication, Chennai.
4. www.icaai.org.in
5. www.icmai.in
6. www.icsi.edu.in
7. www.edx.org

Course Code	Course Title	C	H	I	E	T
17U3KAC2	Company Law & Practice	4	75	25	75	100
Learning Objectives <ul style="list-style-type: none"> To provide solid foundations in company law since formation of the company to winding up of the company as per the companies act 2013 To get familiarized with regulatory frame work on issues of share capital, company meetings and managerial personnel and appointment of directors 						
Learning Outcomes: Knowledge on formation of company, Managerial personnel & Directors, ability to conduct meetings and winding up procedure						

Unit I

Formation of Company

Company – Definition – Essential characteristics – Lifting up of Corporate veil - Kinds of Companies – One Person Company (OPC) – Associate Company – Licensed Company – Producer Company – Dormant Company –Public Vs Private Companies - Formation of a company – Promotion – Promoters – Functions - Incorporation – Commencement of Business - Memorandum of Association – Clauses and Alterations - Articles of Association – Contents – Prospectus – Contents – Mis-Statement of Prospectus.

Unit II

Shares and Share Capital

Meaning – Nature – Kinds of Shares –Preference shares – Equity shares – Sweat equity shares – Stock Vs Share – Share Capital – Classifications (Authorised, Issued, Subscribed, Called up and Paid-up Capital) – Share Certificate –Dematerialisation of Shares - Transfer of Shares – Transmission of Shares – Lien on Shares - Debentures - Legal provisions governing Shares and Debentures.

Unit III

Company Meetings and Proceedings

Kinds – Annual General Meeting - Extraordinary general meeting - Class meeting – Procedures and Requisites of a valid meeting – Notice – Agenda – Quorum – Proxy - Resolution – Types – Minutes.

Unit IV

Managerial Personnel and Directors

Managerial Personnel – Meaning – Key Managerial Personnel (KMP) – Types – Managing Directors Vs Whole Time Director – Independent Director – Manager – Company Secretary - Functions of Company Secretary - Remuneration. Directors – Meaning – Classification – Appointment of Directors – Committees – Audit committee – Stake holder committee – Corporate Social Responsibility (CSR) committee – Removal of Directors – Power and Duties – Concept of Corporate Governance.

Unit – V

Winding up

Meaning – Modes of Winding up – Winding up by National Company Law Tribunal (NCLT) – Company Liquidator – Official Liquidator - Duties and Powers of Liquidators – Voluntary Winding up – Members Voluntary winding up – Creditors Voluntary Winding up.

Book for Study:

S.N. Maheswari & S.K. Maheswari, *A Manual of Business Laws*, Himalaya Publishing House, Mumbai.

Books for References:

1. Kapoor N.D., *Elements of Company Law*, Sultan Chand & Co., New Delhi. Ashok and Bagrail, *Company Law*, New Delhi, S.Chand & Co.2010.
2. V. Balachandran & M. Govindarajan, *A Students Handbook on Company Law and Practice*, Vijay Nicole Imprints Private Limited, Chennai.
3. J.Shanthi, *Company Law*, Margham Publications, Chennai.
4. www.icaai.org.in
5. www.icmai.in
6. www.icsi.edu.in

Course Code	Course Title	C	H	I	E	T
18U3XAC3	Derivative Market	4	75	25	75	100
Learning objectives <ul style="list-style-type: none"> To gain knowledge on Derivatives market. To develop and apply futures contract and forward contract in Securities Market To understand the concept of derivatives and ability to construct and evaluate the portfolio To get an exposure towards Regulatory Framework & Accounting for Derivatives 						
Learning Outcomes: Advanced knowledge on derivatives market. Understanding of Futures, Forward, Option contracts and trading in derivatives market.						

Unit I

Derivative Market

Introduction- Types of Derivative Contracts- History of Financial Derivative Markets- Participants of Derivative Market- Interest rates-Stock index- Economic significances of index movements- Index construction issues- Desirable attributes of an index- Application of index

Unit II

Futures Contract and Forward Contract

Introduction to Futures- Distinction between Futures and Forwards contracts- Limitations of forward markets- Futures Terminology- Trading underlying Vs Trading single - Stock futures- Futures payoffs- Pricing futures- Pricing Stock Futures- Application of Futures Contracts

Unit III

Option Contracts

Introduction-Option terminology- Comparison between Futures and Options- Options payoffs- Application of Options- Pricing of options contracts- Variables affecting option pricing- The Black Scholes Merton Model for Option Pricing (BSO)

Unit IV

Trading of Derivatives Contracts

Futures and options trading system- The trader workstation- Futures and Option market instruments- Criteria for stocks and index- Eligibility for trading charges-Clearing and settlement- Clearing Entities- Clearing Mechanism- Settlement procedure- Risk management-Margining system

Unit V

Regulatory Framework & Accounting for Derivatives

Regulatory Body - Securities Contracts (Regulation) Act, 1956 - Securities and Exchange Board of India Act, 1992- Regulation for Derivates Trading- Adjustments for corporate Actions- Accounting for Futures- Accounting for Options- Taxation of Derivative transaction in securities.

Book for Study:

Equity Derivative, National Institute of Securities Markets, An Educational Initiative of SEBI, Edition Sep. 2015, Taxmann Publication Pvt. Ltd., New Delhi.

Course Code	Course Title	C	H	I	E	T
18U1XSM3	NSE* Learn to Trade (NLT) – III (Lab)	2	30	25	75	100
Learning Objectives: <ul style="list-style-type: none"> To acquire skill relating to capital market operations To get hands on training on NSE Learn to Trade. Portfolio Manager is a tool that allows the students to value holdings online. 						
Learning Outcomes: Knowledge on NSE portals. Skill on Capital market operations independently.						

Unit I

Tracking holdings in equities traded in the Capital Market Segment of NSE.

Unit II

Create upto 3 portfolios with not more than 100 transactions in each portfolio.

Unit III

Add/ Modify /Delete transactions to an existing portfolio

Unit IV

Modify / delete transactions in a portfolio. View/ Rename / Delete the portfolio.

Unit V

Set a portfolio as default portfolio (will be taken to this portfolio when login). Change the default settings of a portfolio

Note: 100% Lab.

NSE* National Stock Exchange

Book for Study

Study Material, National Stock Exchange, Mumbai.

IV SEMESTER

Course Code	Course Title	C	H	I	E	T
18U4XMC9	Back Office, Depository Operations, Clearing, Settlement & Risk Management	4	75	25	75	100
Learning objectives <ul style="list-style-type: none">To gain comprehensive knowledge on Depository operations.To develop knowledge and apply clearing, settlement and risk management in stock market operations						
Learning Outcomes: Advanced knowledge on back office, depository operations, clearing and settlement operations in the stock market. Gain knowledge on risk management in stock market operations						

Unit I

Back Office Operations

Introduction - Back office – Principles Client Registration- Client Information-Record Keeping- Primary Market – Types of issues - Secondary Market - National Stock Exchange -Screen based Trading System - Settlement- Depository Operations - Registrar & Transfer Agent

Unit II

Mutual Fund Operations

Mutual Fund (AMC Operations)- Mutual Fund Transactions through NSE- Qualified Foreign Investors (Equity Shares) - Qualified Foreign Investors (Mutual Funds)

Unit III

Depository Operations

Introduction - Overview of the Capital Market - Overview of the National Securities Depository Limited (NSDL) - Business partners of NSDL - Service Standards- Service offered by NSDL - Account opening –Transmission & Nomination- Dematerialisation – Trading Settlement - Special Services - Pledge and Hypothecation-Corporate Action-Debt Instruments and Government Securities-Foreign Portfolio Investors

Unit IV

Clearing Settlement

Introduction about National Securities Clearing Corporation Limited (NSCCL) - Clearing members - Custodial Participants - Liquid Asset - Minimum Deposit Requirement - Procedure for submission of Collaterals - Capital Market – Clearing –Settlement - Action for Shortages & Penalties

Unit V

Risk Management

Securities and Borrowings Scheme - New Debt Segment- Equity Derivatives Segment - Currency Derivatives Segment – Services - Provisions regarding Clearing, Settlement, Margins, Position Limits, Dealing with Clients and Actions for Shortages and Penalties

Books for Study:

1. **Back Office Operations Module**, NSE's Certification in Financial Markets (NCFM), National Stock Exchange of India Ltd, Mumbai.
2. **Hand Book for NSDL Depository Operations Module**, National Securities Depository Ltd, Mumbai, 2015.
Capital Market and NSDL – Overview (Vol.I)
Business Partners – Systems, Procedures and Practices (Vol.II)
Core Services (Vol.III)
Special Services (Vol.IV)

Clearing Settlement and Risk Management Module, NSE's Certification in Financial Markets (NCFM), National Stock Exchange of India Ltd, Mumbai.

Course Code	Course Title	C	H	I	E	T
18U4XMC10	Foreign Exchange & Currency Markets	4	75	25	75	100
Learning objectives <ul style="list-style-type: none"> • To gain knowledge on Foreign Exchange and Currency market. • To develop and apply currency futures forward and option contracts in Foreign Exchange Market • To understand the concept of foreign exchange derivatives, Clearing and settlement • To get an exposure towards Regulatory Framework on currency futures 						
Learning Outcomes: Advanced knowledge on foreign exchange and currency derivatives market. Understanding of Futures, Forward, Option contracts and trading in foreign exchange derivatives market.						

Unit I

Currency Markets and Foreign Exchange Derivatives

Currency Markets – Introduction - History of Foreign exchange markets – Overview of International currency markets – Basics of currency markets and peculiarities in India — OTC forward market – Impact of economic factors on currency prices.

Foreign Exchange Derivatives - Introduction- Definition – Derivative products – Growth drives of derivatives – Market players – Key economic function of derivatives – Financial market stability.

Unit II

Currency Futures

Definition – Future Terminology – Distinction between futures and forward contracts – Interest rate parity and pricing of currency futures. Strategies using currency futures – Market participants – Computing payoffs from a portfolio of futures and trade remittances – Trading spread using currency futures - Currency Futures Contract specification - Trader Workstation Screen (TWS)- Types of order-Rules, Regulations and bye laws of Exchange.

Unit III

Currency Options

Options – Definitions - Difference between Futures & Options - Options in Financial Market - Style of Options - Option Pricing and Option Greeks - Option Pricing Methodology - Option Strategies - Contract Specification of Option Contracts

Unit IV

Clearance, Settlement and Risk Management

Introduction – Clearing Entities — Settlement Mechanism - Risk Management measures - Market to Market Settlement - Periodic Risk Evaluation Report - Surveillance

Unit V

Regulatory Framework and Accounting for Currency Futures

Securities Contract(Regulation)Act, 1956 – RBI - SEBI standing technical committee - Foreign Exchange Management Act,1999 - Regulatory Framework for exchanges -Governing council - Accounting and Taxation - Disclosure requirements - Taxation of Currency Derivatives - Codes of Conduct and Investor Protection Measures.

Book for Study:

Currency Derivatives, National Institute of Securities Markets, An Educational Initiative of SEBI, Edition March, 2016, Taxmann Publication Pvt. Ltd., New Delhi.

Course Code	Course Title	C	H	I	E	T
17U4KMC11	Special Accounts	4	90	25	75	100
Learning Objectives						
<ul style="list-style-type: none"> To make solid foundations on various special types of business activities viz., Branch, Departmental Accounting, Hire purchase & Installment purchase system. To prepare final accounts for service industry viz., Banking and Insurance Industry To familiarize with accounting relating to shipping company and investment companies 						
Learning Outcomes: Depth working knowledge on preparation of accounts for special types of business and ability to preparation of final accounts of banking and insurance companies						

Unit I

Branch and Departmental Accounting Treatment

Branch Accounts – Dependent Branch – Accounting of Various Types of Dependent – Branches – Invoice Price Method – Independent Branches.

Departmental Accounts – Allocation of Expenses – Inter Department Transfers – Departmental Trading Profit & Loss Accounts.

Unit II

Hire Purchase and Instalment Purchase Systems

Meaning – Calculation of Interest – Cash Price – Entries – Ledger Accounts in the books of Buyer and Seller – Default and Repossession – Complete and Partial – Instalment Purchase System.

Unit III

Bank Accounts

Meaning – Rebate on Bills Discounted – Interest on Doubtful Debts – Preparation of Profit and Loss Account and Balance Sheet with Relevant Schedules (New Method) – Non Performing Assets (NPA)

Unit IV

Insurance Company Accounts

Life Insurance – Revenue Account Valuation – Balance Sheet (New Method) – General Insurance – Fire and Marine Revenue Account – Profit and Loss Appropriation Account and Balance Sheet (New Method).

Unit V

Shipping Company and Investment Accounts

Voyage – Meaning – Complete and Incomplete Voyage Account. Investment Account – Accounting Treatment – Types of Securities-cum Interest and Ex interest.

Note: The Questions should be asked in the ratio of 80% Problems and 20 % for theory

Book for Study:

S.P. Jain & K.L. Narang, "*Advanced Accountancy*" Vol-I, Nineteenth Edition, 2015, Kalyani Publishers, Ludhiana

Books for References:

- R.L. Gupta & M. Radhaswamy, "*Advanced Accountancy*" Vol-I, 2015, Sultan Chand & Sons, New Delhi.
- M.A. Arulanandam & K.S. Raman, "*Advanced Accountancy*" Vol-I, Sixth Edition, 2015, Himalaya Publishing House, Mumbai.
- Reddy & Murthy, "*Financial Accounting*", Margham Publication, Chennai.
- www.icaai.org.in
- www.icmai.in
- www.icsi.edu.in

Course Code	Course Title	C	H	I	E	T
18U4XAC4	Mutual Fund & Commodity Markets	4	75	25	75	100
Learning objectives <ul style="list-style-type: none"> To gain knowledge on Mutual fund and mutual fund services To get comprehensive knowledge on Commodity markets and National Commodity & Derivatives Exchange Limited (NCDEX) To get an exposure towards Regulatory Framework & Taxation 						
Learning Outcomes: Advanced knowledge on derivatives market. Understanding of Futures, Forward, Option contracts and trading in derivatives market.						

Unit I

Mutual Fund

Introduction – Concept and Role of a Mutual Fund - Fund Structure and Constituents- Legal and Regulatory Environment- Offer Document- Fund Distribution and Sales Practices- Accounting, Valuation and Taxation

Unit II

Mutual Fund Services

Introduction- Investor Services- Risk, Return and performance of Funds- Scheme Selection- Selecting the Right Investment products for Investors- Helping Investors with Financial Planning- Recommending Model Portfolios and Financial Plans

Unit III

Commodities Market

Introduction- Application of Futures & Options-Types of instruments -Basics and Payoffs-Pricing Commodity derivatives- Hedging- Speculation – Arbitrage- Commodity Derivatives-Difference between commodity and financial derivatives- Global and Indian commodities exchanges- Evolution of commodity market in India

Unit IV

National Commodity & Derivatives Exchange Limited (NCDEX)

Introduction-Structure of NCDEX- Exchange membership- Capital requirements- Commodities traded on NCDEX platform- Instruments available for trading- Pricing of commodity futures- Commodity futures in hedging-Speculation and arbitrage

Unit V

Regulatory Framework & Taxation

Regulatory Governing Body - Rules Governing Commodity Derivatives Exchange – Intermediaries - Investor Grievances and Arbitration- Taxation- Implications.

Books for Study:

- Mutual Fund Distributors*, National Institute of Securities Markets, An Educational Initiative of SEBI, Edition Sep. 2016, Taxmann Publication Pvt. Ltd., New Delhi.
- Commodities Market Module*, NSE's Certification in Financial Markets (NCFM), Edition March 2010, National Stock Exchange of India Ltd, Mumbai.

Course Code	Course Title	C	H	I	E	T
17U4KAC5	Business Legislation - I	4	75	25	75	100
Learning Objectives <ul style="list-style-type: none"> To gain the comprehensive knowledge on the business law viz., Contract Act To know the legal framework for special contract and sale of goods act To recognize the change in the consumerism under Consumer Protection Act and Competition Commission Act 						
Learning Outcomes: Basic knowledge on contract act, wagering and special contracts. Basic awareness about consumer protection act and competition commission act.						

Unit I

Indian Contract Act, 1872

Definitions – Kinds of Contract – Essential Elements – Offer and Acceptance – Capacities of Parties – Consideration – Legality of Object and Consideration Free and Voluntary Consent.

Unit II

Wagering and Contingent Contract

Quasi Contract – Discharge of Contract – Remedies for breach of Contract.

Unit III

Special Contracts

Contract of Indemnity – Meaning – Rights of Indemnity Holder – Implied Indemnity – Enforceability. Contract of Guarantee – Meaning – Parties – Basic Principles – Liability of Surety. Contract of Bailment – Meaning – Kinds of Bailment – Duties of Bailee and Bailor – Bailee's Lien. Contract of Pledge – Meaning – Ingredients of Pledge – Nature of Pledge.

Unit IV

Sale of Goods Act, 1930

Sale – Meaning – Difference between Sale and agreement to sell – Formation of Contract of Sale – Conditions and Warranties – Rights and Duties of Buyer and Seller – Unpaid Seller.

Unit V

Consumer Protection Act, 1986 & Competition Act, 2002

Consumer Protection Act, 1986 – Objects – Rights of Consumer – Consumer Forum – Redressal Mechanism.

Competition Act, 2002 – Definitions – Prohibition of Anti Competitive Agreement – Prohibition of Abuse of Dominant Position and Regulation of Combinations – Competition Commission of India (CCI) – Functions, Powers and Duties.

Book for Study:

S.N Maheshwari & S.K. Maheshwari, *A Manual of Business Law*, Edition 2016, Himalaya Publishing House, Delhi.

Books for References:

1. N.D. Kapoor, *Elements of Mercantile Law*, Sultan Chand & Sons, New Delhi.
2. M.C. Shukla, *Mercantile Law*, S.Chand, New Delhi.
3. P.P.S. Gogna, *Mercantile Law*, S.Chand, New Delhi.
4. All Bare Acts
5. www.icai.org.in
6. www.icmai.in
7. www.icsi.edu.in

Course Code	Course Title	C	H	I	E	T
18U4XSM4	Computer Application in Financial Markets	2	30	25	75	100
Learning Objectives <ul style="list-style-type: none"> To gain advanced knowledge on MS Excel To acquire skill on Application of Excel in Business Modelling To get exposure on VBA applications and ability to prepare power point 						
Learning Outcomes: Comprehensive knowledge and skill on business decision and finance modeling through MS Excel and VBA						

Unit I

Microsoft Excel as a tool for Financial Analytics

Introduction - MS Excel - Excel's keyboard shortcuts - Excel functions – Mathematical Functions – Statistical Functions – Logical Functions – Lookup – Date - Text – Financial – Charts - Conditional formatting - Auto & Advance filter - Sorting - Data Validation.

Unit II

Data Analysis

Histogram analysis - Descriptive analysis, covariance & correlation analysis, Regression analysis, what-if analysis, solver.

Unit III

Application of Excel in Business Modelling

Loan amortization model, NPV model, Ratio analysis model, Macros,

Unit IV

Visual Basics for Applications (VBA)

Meaning – Introduction to VBA Programming – Advantages - VBA Editor – Modules and Procedures – Interacting With Other Office Applications

Unit V

Preparation of Power Point Presentations

Introduction – Creating Basics Presentations – Using Presentation Views – Using smart art – Applying animation – Inserting Video and sound – Inserting Tables, Charts, Objects and Hyperlinks – Printing the presentation.

Note: 100% Lab.

Book for Study

Study Material, National Stock Exchange, Mumbai.

DEPARTMENT OF STATISTICS

THE MADURA COLLEGE (AUTONOMOUS), MADURAI – 625 011
DEPARTMENT OF STATISTICS
CBCS Pattern for B.Sc., Statistics – Major Course Structure

Semester	Sub. Code	Title of the Paper	Hours	Credits	
I	17U1SMC1	Foundation of Statistics	4	4	
	17U1SMC2	Probability Theory	4	4	
	17U1SES1	Environmental Studies	2	2	
	17U1SSM1	Major Skill Based Elective – I (Theory of equations and Trigonometry)	2	2	
II	17U2SMC3	Descriptive Statistics	4	4	
	17U2SMC4	Distribution Theory	4	4	
	17U2SVE1	Value Education	2	2	
	17U2SSM2	Major Skill Based Elective– II (Matrices and Fourier Series)	2	2	
III	17U3SMC5	Sampling Techniques	6	6	
IV	17U4SMC6	Theory of Estimation	2	2	
	17U4SMC7	Elements of Stochastic Processes	2	2	
	17U4SSM4	Major Skill Based Elective – III (Mathematical Analysis)	2	2	
V	17U5SMC8	Testing of Hypothesis	6	6	
	17U5SMC9	Operations Research	6	6	
	17U5SMP1	Statistical Methods With SPSS Package	6	6	
	Major Elective – I(one to be chosen)				
	17U5SME1	Principles of Economics	6	7	
	17U5SME2	Theory of Numbers and Inequalities			
	17U5SME3	Fuzzy Mathematics			
VI	17U6SMC10	Statistical Quality Control	4	4	
	17U6SMC11	Design of Experiments	4	4	
	17U6SMP2	Statistical Methods With R Software	4	4	
	17U6SSM5	Major Skill Based Elective– IV (Quantitative Aptitude)	2	2	
	Major Elective – II (one to be chosen)				
	17U6SME4	Indian Economy	5	6	
	17U6SME5	Population Studies			
	17U6SME6	Decision Theory and its Applications			
	Major Elective – III (one to be chosen)				
	17U6SME7	Queueing Theory	5	6	
	17U6SME8	Actuarial Statistics			
	17U6SME9	Automata Theory			

Course Code	Course Title	C	H	I	E	T
17U5SMC8	Testing of Hypothesis	6	6	25	75	100

Learning Objectives:

- To impart knowledge about Testing of Hypothesis.

Learning Outcomes:

After successful completion of this course, students will be able to

- Understand Type I & Type II error and its implication in making a decision.
- Develop hypothesis testing methodology for accepting or rejecting null hypothesis.

Unit I

Statistical hypothesis

Introduction – Simple and Composite – Test of a statistical hypothesis – Null and Alternative Hypothesis – Critical region – Twotypes of errors – Level of Significance – Power of the test–Most Powerful test – Neyman Pearson lemma – Likelihood Ratio (L.R) Test – Procedure and simple applications – Properties and use of L.R test.

Unit II

Large sample Theory

Introduction–Large Sample Test – Test of Significance for Single Proportion – Test of Significance for Difference of Proportions – Test of Significance for Single Mean –Test of Significance for Difference of Means – Test of Significance for the Difference of Standard Deviations.

Unit III

t-Distribution

Introduction– Student’s ‘t’ Distribution – t-Test for Single Mean – t-Test for Difference between Means - Paired ‘t’ Testfor Difference of Means – t-Test for Testing the Significance of an Observed Sample Correlation Coefficient – Simple problems.

Unit IV

F-Distribution

Snedecor’s F-Distribution – F-test for Equality of Two Population Variances –Simple problems.

Unit V

Chi-Square test

Introduction – Inferences about a population variance and goodness of fit – Association of Attributes – Order of Classes and ClassFrequencies–Yule’s coefficient of association (Simple problems).

Text book:

S.C. Gupta and V.K. Kapoor, Fundamental of Mathematical Statistics, 2013, Sultan Chand & Sons, New Delhi

Chapters:

Unit I Chapter – 18 (18.1, 18.2, 18.4 (18.4.1), 18.5, 18.6, 18.6.1).

Unit II Chapter – 14 (14.1, 14.6, 14.7, 14.8(14.8.3 – 14.8.5))

Unit III Chapter – 16 (16.1, 16.2, 16.3 (16.3.1 – 16.3.4)).

Unit IV Chapter – 16 (16.5,16.6(16.6.1 only))

Unit V Chapter–15 (15.6(15.6.1 – 15.6.3)&
Chapter–13(13.4(13.4.1 only),13.7(13.7.1 only))

Reference Books

1. A.M. Goon,M.A. Gupta and B. Das Gupta, An outline of Statistics Theory, Vol. I & II,1980, World press, Calcutta.
2. C. RadhakrishnaRao, Linear Statistical Inference and its Applications, 2ndEdition, Wiley Eastern Limited.

Course Code	Course Title	C	H	I	E	T
17U5SMC9	Operations Research	6	6	25	75	100

Learning Objectives

- To impart Optimization Techniques.
- To make the Students become familiar with the basic Principle of LPP and enrich knowledge to formulate and solve an LPP using various methods.
- To make the Students become familiar with Network scheduling by PERT/CPM.

Learning Outcomes

- On satisfying the requirement of this course, students will have the knowledge and skills to
- Formulate the LPP for a real life Problems and give the solution for the problem using suitable optimization techniques.
- Solve Transportation Problems by using various methods and solve the Assignment & Travelling Salesman Problem using Hungarian Algorithm.
- Do network scheduling by PERT/CPM.
- Apply Optimization Techniques in Various fields such as Science, Engineering, Agriculture, Industry, Business, etc.

Unit I

Linear programming problem (LPP)

Introduction – Mathematical formulation of the problem – Graphical solution method – Some exceptional cases – General LPP – Canonical & standard form of LPP.

Unit II

Simplex method

Introduction – Fundamental properties of solutions – The Computational procedure (Simplex Method) – Use of artificial variables (Two-Phase method & Big-M method).

Unit III

Duality in LPP

Introduction – General primal – Dual pair – Formulating a dual problem – Primal – Dual pair in matrix form – Duality theorems – Duality & simplex method – Dual simplex method.

Unit IV

Transportation problem and Assignment problem

Introduction – Solutions of transportation problem for finding an initial basic feasible solution & test for optimality (MODI method) – Degeneracy in transportation problem – Introduction to assignment problem – Mathematical formulation and solution – Travelling salesman problem.

Unit V

Network scheduling by PERT/CPM

Introduction – Network and basic components – Time calculation in network – Floats –CPM - PERT calculations – Distinction between PERT and CPM.

Text Book:

KantiSwarup, P.K. Gupta and Man Mohan, Operations Research, 9th Edition 2001, Sultand Chand Publication.

Chapters: 2, 3(3:1 – 3:5), 4(4:1 – 4:4), 5(5:1 – 5:5, 5:7, 5:9), 10(10:1 – 10:13), 11(11:1 – 11:6), 21(21:1- 21:8).

Reference Books

1. V. Sundaresen, K.S. Ganapathy Subramanian and K. Ganesan, Resource Management Techniques (Operations Research), 2000, A.R Publications.
2. Harvey M. Wagner, Principles of Operations Research, 2nd Edition, 1975, PHI Publications.

Course Code	Course Title	C	H	I	E	T
17U5SMP1	Statistical Methods With SPSS Package	6	6	50	50	100

Learning Objectives

- To acquire the skills to analyze the statistical data using software packages. This practical paper gives hands on experience to analyze and interpret statistical data using SPSS Package.
- To train the students in using statistical package for solving a variety of statistical problems.

Learning Outcomes

- After successful completion of this course, students will be able to analyze and interpret the statistical data using SPSS Package.

Unit I

Construction of Univariate and Bivariate Frequency distribution – Diagrammatic and Graphical representation of Statistical data (Line diagram, Bar diagram and its various types, Pie Chart, etc.) – Drawing Frequency graphs (Histogram, Frequency polygon, Frequency curve and Ogives).

Unit II

Computation of Measures of Central Tendency: Mean, Median and Mode – Calculation of Measures of Dispersion: Range, Standard Deviation, Quartile Deviation – Coefficient of Variance – Skewness – Kurtosis.

Unit III

Computation of Correlation Coefficient – Scatter diagram, Karl’s Pearson’s and Spearman’s Rank Correlation – Fitting of Simple and Multiple linear regression – Fitting of curves by the least square method up to polynomial of degree two ($y=ax+b$, $y= ax^2+bx+c$, $y=ae^{bx}$, $y = ax^b$, $y = ab^x$).

Unit IV

Computing discrete and continuous distributions (Binomial, Poisson, Normal, Multinomial, Exponential) – Fitting of Binomial, Poisson, Normal and Exponential distributions–Construction of confidence intervals for mean and variance.

Unit V

Chi Square test for independent samples–Chi Square test for goodness of fit – Testing of hypothesis parametric – One sample – Two sample independent t test –Paired t test– Test based on F statistic – Equality of two populations.

S. No.	List of Programs
1.	Construction of univariate frequency distribution
2.	Construction of bivariate frequency distribution
3.	Construction of diagram (Line diagram, Pie Chart)
4.	Construction of Bar diagram and its various types
5.	Drawing frequency graphs (Histogram, Frequency polygon, Frequency curve and Ogives)
6.	Computation of Measures of Central Tendency: Mean, Median and Mode
7.	Calculation of Measures of Dispersion-- Range, Standard Deviation, Quartile Deviation
8.	Calculation of Coefficient: Variance, Skewness, Kurtosis
9.	Computation of partial and multiple Correlation
10.	Calculation of Correlation Coefficient – Scatter diagram, Karl’s Pearson’s and Spearman’s rank correlation
11.	Fitting of Simple linear regression
12.	Fitting of Multiple linear regression
13.	Curve fitting : (i) $y=ax+b$ (ii) $y= ax^2+bx+c$ (iii) $y=ae^{bx}$
14.	Fitting Binomial distribution
15.	Fitting Poisson distribution
16.	Fitting Normal distribution
17.	Chi Square test for independent samples
18.	Chi Square test for goodness of fit
19.	Testing of hypothesis parametric – One sample – Two sample independent t test – Paired t test
20.	Test based on F statistic – Equality of two populations

Course Code	Course Title	C	H	I	E	T
17U5SME2	Theory of Numbers and Inequalities	7	6	25	75	100

Learning Objectives

- To acquire knowledge in basic fundamentals of Theory of Numbers and Inequalities which will be helpful for them to improve their ability of mathematical thinking.
- To enable the students to understand the basic structure and properties of integers.

Learning Outcomes

On satisfying the requirement of this course, students will have the knowledge and skills to

- Solve intellectual and fascinating questions in elementary Number Theory.
- Prove results involving divisibility and greatest common divisors.
- Apply Euler – Fermat’s theorem to prove relations involving prime numbers.
- Apply the concepts of congruence arithmetic to construct a method of encrypting messages in Public key Cryptography.
- Apply the acquired knowledge of elementary Number Theory in various fields.

Unit I

Theory of Numbers

Prime and Composite number – The sieve of Eratosthenes – Divisors of a given number – Problems.

Unit II

Euler’s Functions

Euler’s Functions (N) – Integral Part of a Real Numbers – Simple problems – The highest power of a prime p contained in $n!$ – The product of r consecutive integers is divisible by $r!$

Unit III

Congruence

Definition of Congruences – Problems – Criteria of Divisibility of a number – Simple Problems – Numbers in Arithmetical Progression – Fermat’s Theorem – Problems.

Unit IV

Theorems of Fermat and Wilson

Generalization of Fermat’s theorem – Wilson’s Theorem – Lagrange’s Theorem – Problems.

Unit V

Inequalities

Introduction – Geometric and Arithmetic means – Simple problems – Weirstrass inequalities – Cauchy’s inequality – Simple problems – Applications of maxima and minima – Problems.

Text Book:

T.K. ManicavachagomPillay, T. Natarajan and K.S Ganapathy,Algebra – Vol. II, Edition 2011, S. Viswanathan (Printers & Publishers) Pvt. Ltd.

Chapters: 4 and 5.

Reference Books:

1. M.K Venkataraman and Mrs. Manorama Sridhar, Theory of Numbers and Inequalities, Edition 2002, The National Publishing Company.
2. Kumaravel and SusheelaKumaravel, Elements of Number Theory, Edition 2002, SKV Publishing Company.

Course Code	Course Title	C	H	I	E	T
17U5SME3	Fuzzy Mathematics	7	6	25	75	100

Learning Objectives

- This course is to enable the students to understand the concepts of Fuzzy Logic theory and its applications.

Learning Outcomes

On satisfying the requirement of this course, students will have the knowledge and skills to

- Apply the methods of fuzzy logic in real life problems.
- Decide the difference between crisp set theory and fuzzy set theory.
- Recognize fuzzy logic and fuzzy inference systems.

Unit I

Fuzzy Logic

An overview of classical logic – Connectives – Types of sentences – Truth values and truth tables – Tautology – Algebra of statements – Validity of arguments – Logical identities of crisp logic – Well-formed formulas (WFF) – Predicates and quantifiers.

Unit II

Fuzzy Logic (Continuation)

Quantifiers and logical operators – Normal forms – Fuzzy logic – Fuzzy connectives – Fuzzy inference – Fuzzy propositions – Fuzzy quantifiers – Linguistic Hedges – Inference from conditional Fuzzy propositions.

Unit III

Fuzzy set theory

Fuzzy sets – Definition – Types of Fuzzy sets – General definition of properties of Fuzzy sets – Other important operations – General properties: Fuzzy vs crisp.

Unit IV

Operations on Fuzzy sets

Introduction – Some important theorems – Extension principle for Fuzzy sets – Fuzzy compliments – Further operations on Fuzzy sets – t-Norm and t-Conorms – Definition of intersection and union by Hamacher – Yager's union and intersection of two Fuzzy sets – Union and intersection of two Fuzzy sets and defined by Dubois and Prade.

Unit V

Fuzzy Relations

Introduction – Projections and cylindrical Fuzzy relations – Compositions – Properties of Min-Max composition – Binary relations on a single sets – Compatibility relations – Fuzzy ordering relation.

Text Book:

S. Pundir and R. Pundir, Fuzzy Sets and their Applications, 4th Revised Edition 2012, PragatiPrakashan Publications.

Chapters : 1 (1.16 – 1.21), 2 (2.1 – 2.9), 4 (4.1 – 4.7), 7 (7.1 – 7.19).

Reference Books:

1. H.J. Zimmermann, Fuzzy set Theory and its Applications, 2nd Edition 1996, Allied Publishers Ltd.
2. S. Nanda and N. R. Das, Fuzzy Mathematical Concepts, 2010, Narosa Publishing House.

Course Code	Course Title	C	H	I	E	T
17U6SMC10	Statistical Quality Control	4	4	25	75	100

Learning Objectives

- To provide an insight into quality assessment techniques.
- To provide an insight into the real-life and varied application of the object.

Learning Outcomes

After successful completion of this course, students will have the skills to

- Demonstrate the ability to use the methods of statistical process control.
- Demonstrate the ability to design, use and interpret control charts for variables.
- Demonstrate the ability to design, use and interpret control charts for attributes.

Unit I

Statistical Methods for Quality Control

Definition, Dimension of quality – Brief history of quality control and improvement –Statistical methods for quality control and improvement – Describing variation – Important distributions – Probability plots – Some useful approximations.

Unit II

Control charts for variables

Introduction – Control charts for \bar{X} and R – Control charts for \bar{X} and S – Shewhart control chart for individual measurements – Summary of \bar{X} , R and S charts – Applications of variables control charts.

Unit III

Control charts for Attributes

Introduction – Control charts for fraction non-conforming – Control chart for defects – Choice between attributes and variables control charts – Guidelines for implementing control charts.

Unit IV

Acceptance Sampling for Attributes

Introduction – Acceptance – Sampling problem – Single-sampling plans for attributes – OC curve – Dodge-Roming sampling plans – AOQL plans – LTPD plans – Estimation of process average.

Unit V

Acceptance Sampling by Variables

Introduction – Advantages and disadvantages of variable sampling – Designing a variables sampling plan with a specified OC curve – Other sampling procedures.

Text Book:

D.C. Montgomery, Statistical Quality Control, 2nd Edition 1991, John Wiley and Sons, New York.

Chapters: 1 (1.1 – 1.3), 3(3.1 – 3.5), 6, 7, 15 (15.1, 15.2, 15.5), 16(16.1 – 16.4)

Reference Books:

1. Eugene L. Grant, and Richard S. Leavenworth, Statistical Quality Control, 6th Edition 1988, McGraw Hill Book Company, New York.
2. Mahajan, Statistical Quality Control, 1997, Dhanpat Rai & Sons, New Delhi.

Course Code	Course Title	C	H	I	E	T
17U6SMC11	Design of Experiments	4	4	25	75	100

Learning Objectives

- To expose the essential ideas about designing and interpreting statistical field experiments.
- In a country like ours, which is basically an agricultural one, one ought to know how to select the best agricultural inputs best fertilizers and reap the maximum yield.

Learning Outcomes

- Through this paper, the student is enabled to acquire the knowledge about this vital area and help the society (agriculturists) with his knowledge.

Unit I

Fundamental Principle of Experiments

Terminology in Experimental Designs – Principles of an Experimental Design – Replication – Randomization and Local Control–Size of the Plot.

Unit II

The Analysis of variance

Introduction – One-way Classification– Two-way Classification – Completely Randomized Design (C.R.D.) – Statistical Analysis of C.R.D.

Unit III

Basic Designs

Randomized Block Design (R.B.D.) – Statistical Analysis of R.B.D. for one Observation per Experimental Unit – Efficiency of R.B.D. relative to C.R.D. – Estimation of Missing value in R.B.D. – Latin Square Design (L.S.D.) –Statistical Analysis of $m \times m$ L.S.D. for one Observation per Experimental Unit.

Unit IV

Factorial Experiments

Factorial Experiments – 2^2 -Design – Yates Method of Computing Factorial Effect Totals – 2^3 -Factorial Experiment and 2^n -Factorial Experiment – Confounding in Factorial Designs – Confounding in 2^3 -Experiment – Partial Confounding.

Unit V

B.I.B.D.

Balanced Incomplete Block Designs (B.I.B.D.) – Parameters of B.I.B.D. – Incidence Matrix – Symmetric B.I.B.D. – Intra block analysis of B.I.B.D.

Text Book:

S.C. Gupta, and V.K. Kapoor, Fundamentals of Applied Statistics, 3rd Extensively Revised Edition, Sultan Chand & Company.

Chapters:

Unit I Chapter 6 (6.2, 6.3, 6.3.1, 6.3.2, 6.4)

Unit II Chapter 5 (5.1, 5.2, 5.3) and Chapter 6 (6.5, 6.5.1)

Unit III Chapter 6 (6.6, 6.6.1, 6.6.3, 6.6.4, 6.7, 6.7.1)

Unit IV Chapter 6 (6.8, 6.8.1, 6.8.2, 6.8.3, 6.8.4, 6.9, 6.9.1, 6.9.2)

Unit V Chapter 6 (6.10, 6.10.1, 6.10.2, 6.10.3, 6.10.6)

Reference Books:

1. M.N. Das, N.C. Giri, Design and analysis of Experiments, 2nd Edition, 1986, New age International Publication.
2. Douglas C. Montgomery, Design and analysis of Experiments, 1976, John Wiley & Sons.

Course Code	Course Title	C	H	I	E	T
17U6SMP2	Statistical Methods With R Software	4	4	50	50	100

Learning Objectives

- To acquire the skills to analyze the statistical data using R software package. This practical paper gives hands on experience to analyze and interpret statistical data using R software.
- To train the students in using R package for solving a variety of statistical problems.

Learning Outcomes

After successful completion of this course, students will be able to

- Handle mathematical and statistical manipulations using R software.
- Analyze and interpret the statistical data using R Package.

Unit I

Basic Fundamentals – Use R as a calculator –Functions and Matrix operations – Missing data and logical operators –Control structures in R – Sequences – Sorting and ordering – Ranking, Finding duplicates and unique values – Lists: Mode – Factors –Strings – Display and Formatting – Data frames – Plot and graphics of data.

Unit II

Data handling – Importing CSV and Tabular files – Statistical Functions – Frequencies and Partition values – Graphics and plots (2D & 3D plots, Scatter diagram, Pie diagram, Histogram, bar plot, etc.) – Central Tendency and Variation: Computation of Mean, Median, Mode, Geometric Mean, Harmonic Mean, Variance, Standard deviation, Standard error, Range, Interquartile Range.

Unit III

Computation of Quartile deviation, Mean deviation – Box plot – Computation of coefficient of Skewness and coefficient of Kurtosis – Bivariate and Three Dimensional Plots–Scatter plot, Smooth scatter plot, Matrix scatter plot, 3 Dimensional scatter plot, Multiple bar plots, Grouped bar plots.

Unit IV

Computation of Correlation Coefficient, Covariance – Scatter diagram, Karl’s Pearsons and Spearman’s Rank Correlation – Graphical representation of two nominal and ordinal variables – Fitting of Simple and Multiple linear regression – Fitting of curves by the least square method.

Unit V

Discrete and continuous distributions(Uniform, Binomial, Poisson, Normal, Exponential distribution, Multinomial,etc.) – Plotting– Construction of confidence intervals for mean – Testing of hypothesis – One sample – Two sample independent t test –Paired t test – Chi Square test for independent samples – Chi Square test for goodness of fit.

S. No	List of Programs
1.	Using R as a calculator
2.	Computing Matrix operations
3.	Finding the Missing data, duplicates, unique values and its Mode
4.	Sorting and ordering of data
5.	Drawing frequency graphs (Histogram, Frequency polygon, Frequency curve and Ogives)
6.	Construction of plots (2D & 3D plots, Scatter diagram, Pie diagram and bar plot)
7.	Computation of Measures of Central Tendency: Mean, Median, Mode, Geometric Mean and Harmonic Mean
8.	Calculation of Measures of Dispersion – Variance, Standard deviation, Standard error, Range, Interquartile Range
9.	Computation of Quartile deviation, Mean deviation and construction of Box plot
10.	Computation of coefficient of Skewness and Kurtosis
11.	Construction of Three Dimensional Plots (Scatter plot, Smooth scatter plot, Matrix scatter plot, 3 Dimensional scatter plot, Multiple bar plots and Grouped bar plots)
12.	Computation of Correlation Coefficient, Covariance, Karl's Pearsons and Spearman's Rank Correlation
13.	Graphical representation of two nominal and ordinal variables
14.	Fitting of Simple and Multiple linear regression
15.	Fitting of curves by the least square method
16.	Computing and plotting Uniform, Binomial and Poisson distribution
17.	Computing and plotting Normal and Multinomial distribution
18.	Computing and plotting Exponential distribution
19.	Construction of confidence intervals for mean
20.	Testing of hypothesis: One sample, Two sample independent t test and Paired t test

Course Code	Course Title	C	H	I	E	T
17U6SSM5	Major Skill Based Elective – IV (Quantitative Aptitude)	2	2	25	75	100

Learning Objectives

- The main aim of introducing “Quantitative Aptitude” for statistics students is to develop skill to meet the competitive examinations for better job opportunity.
- Effort has been made to accommodate fundamental, mathematical aspects to instill confidence among students.
- Enrich their knowledge and to develop their logical reasoning thinking ability.

Learning Outcomes

After successful completion of this course, students will have the knowledge and skills to

- Solve the problems easily by using Short-cut method with time management which will be helpful to them to clear the competitive exams for better job opportunity.
- Analyze the Problems logically and approach the problems in a different manner.

Unit I Problems on Ages – Percentage.

Unit II Profit & Loss – Ratio & Proportion.

Unit III Time & Distance – Problems on Trains.

Unit IV Calendar – Stocks & Areas.

Unit V True Discount – Banker’s Discount.

Text Book:

R. S. Aggarwal, Quantitative Aptitude (Fully solved), 7th Fully Revised Edition 2008, S. Chand.

Chapters: 8, 10, 11, 12, 17, 18, 27, 29, 32, 33.

Reference Books

1. R.V.Praveen, Quantitative Aptitude and Reasoning, 2nd Revised Edition 2013, Prentice-Hall of India Pvt.Ltd.
2. G. K. Ranganath, C. S. Sampangiram and Y. Rajaram, A text Book of business Mathematics, 2008, Himalaya Publishing House.

Course Code	Course Title	C	H	I	E	T
17U6SME5	Population Studies	6	5	25	75	100

Learning Objectives

- Demonstrate an understanding of basic demographic concepts.
- Able to identify alternative sources of demographic data.

Learning Outcomes

On satisfying the requirement of this course, students will have the knowledge and skills to

- Explain demographic changes in the world and their major determinants.
- Apply demographic concepts and population theories to explain the past and present population characteristics.
- Able to compare and evaluate the strength and weakness of different demographic models.

Unit I

Introduction to vital statistics

Introduction – Uses of Vital Statistics – Methods of Obtaining Vital Statistics – Measurement of Population – Rates and Ratios of Vital Events.

Unit II

Mortality

Measurement of Mortality – Crude Death Rate (C.D.R) – Specific Death Rate (S.D.R) – Standardized Death Rates – Simple Problems.

Unit III

Life Table

Life Table – Assumptions, Description and Construction of Life Table – Uses of Life Tables – Abridged Life Table – Reed-Merrell and Greville's Methods.

Unit IV

Fertility

Fertility – Crude Birth Rate (C.B.R) – Specific Fertility Rate (S.F.R) – Total Fertility Rate (T.F.R).

Unit V

Population growth & rates

Measurement of Population Growth – Crude Rate of Natural Increase and Pearl's Vital Index – Gross Reproduction Rate – Net Reproduction Rate.

Text Book:

S. C. Gupta and V. K. Kapoor, Fundamentals of Applied Statistics, 3rd Edition, Reprint 1993, Sultan and Sons Publishers.

Chapters:

Unit I Chapter – 9 (9.1 – 9.3)

Unit II Chapter – 9 (9.4, 9.4.1, 9.4.2, 9.4.3)

Unit III Chapter – 9 (9.5(9.5.5&9.5.6), 9.6, 9.6.1 &9.6.2)

Unit IV Chapter – 9 (9.7, 9.7.1,9.7.3 & 9.7.4))

Unit V Chapter – 9 (9.8)

Reference Books:

1. Bogue, J Donald, Principles of Demography, 1976, John Wiley, New York.
2. O.S. Srivastava, Text Book of Demography, 1983, Vikas Publishing.

Course Code	Course Title	C	H	I	E	T
17U6SME6	Decision Theory and its Applications	6	5	25	75	100

Learning Objectives

- To enable the students to understand the basic principles for making rational, defensible decisions under uncertainty.

Learning Outcomes

On satisfying the requirement of this course, students will be able to

- Formalize a decision problems.
- Apply a structured approach for rational decision-making under risk.
- Present a scientific method for managing the company's inventory to maximize profit and maintain customer goodwill.

Unit I

Decision theory

Introduction –Decision Making Problem – Decision Making Process – Types of Decision Making Environment.

Unit II

Decision Making under uncertainty

Decision Making Under Uncertainty – Maximin Criterion – Maximax Criterion — Laplace Criterion – The Savage Criterion –HurwiczCriterion – Decisions Under Risk – EMV – EOL – EVPI – Decision Tree Analysis.

Unit III

Game Theory and strategies

Game Theory – Introduction – Two-Person Zero-Sum Games: Maximin – Minimax Principle – Games With Saddle Points – Games Without Saddle Points – Graphical Solutions of 2 x n and m x 2 Games – Dominance Property – Reducing Game Problem byLPP.

Unit IV

Sequencing problem

Sequencing Problem – Processing n Jobs on Two Machines – Problems With n JobsThrough k Machines – Processing 2 Jobs Through k Machines –Maintenance Crew Scheduling.

Unit V

Replacement problem

Replacement of Equipment's/Asset that Deteriorates Gradually – Replacement of Equipment that Fails Suddenly – Recruitment and Promotion Problem.

TextBook:

KantiSwarup, P.K. Gupta and Manmohan, Operations Research, 9thThoroughly Revised Edition, Sultan Chand & Sons, New Delhi.

Chapters: 16,17 (17.1 – 17.9 (a)),12,18 (18.1 – 18.4)

Reference Books:

1. J.K.Sharma, Operations Research, Theory and Application, 1977, McMillan IndiaLtd.
2. Nita H.Shah, Ravi M.Gor, HardikSoni, Operations Research, 2010, PHI LearningPrivate Limited, New Delhi.

Course Code	Course Title	C	H	I	E	T
17U6SME7	Queueing Theory	6	5	25	75	100

Learning Objectives

- This course aims to introduce topics in queueing theory.
- Build insights into best practices for designing service systems.

Learning Outcomes

After successful completion of this course, students will

- Understand the general concepts of a queueing system, measures of performance, arrival and service processes.
- Learns about single and multiple server models.
- Knows Channels in parallel and in series with limited and unlimited queues

Unit I

Queueing Systems

Introduction – Types of Queueing systems – Symbolic representation of Queueing model – Arrival Distribution Theorem (Pure Birth Process).

Unit II

Single server with infinite capacity ($M/M/1$):($\infty/F/FO$)

Introduction – Characteristics of the model – Relationship between L_s, L_q, W_s & W_q – Problems.

Unit III

Multiple servers with infinite capacity ($M/M/S$):($\infty/F/FO$)

Introduction – Characteristics of model ($M/M/S$) – Related problems – Single server with finite capacity ($M/M/1$):($K/F/FO$) – Characteristics – Problems.

Unit IV

Multiple servers with finite capacity ($M/M/S$):($K/FIFO$)

Multiple servers with finite capacity ($M/M/S$):($K/FIFO$) – Characteristics of model IV – Problems – ($M/M/1$):($\infty/SIRO$) – Problems.

Unit V

Non-Poisson Queueing Systems

Non-Poisson Queueing systems – Technique to analyze Non-Poisson Queueing systems with Poisson input model ($M/G/1$):(∞/GD) – Related problems.

Text Book:

P. Kandasamy, K. Thilagavathi and K. Gunavathi, Probability Statistics and Queueing Theory, 2005, S. Chand **Chapter: 7**

Reference Books:

1. KantiSwarup, P.K. Gupta and Man Mohan, Operations Research, 9th Edition 2001, Sultand Chand Publication.
2. Trivedi K S, Probability and Statistics with Reliability, Queueing and Computer Science Applications, 1984, Prentice Hall of India, New Delhi.

Course Code	Course Title	C	H	I	E	T
17U6SME8	Actuarial Statistics	6	5	25	75	100

Learning Objectives

- To study the vital application of statistics in the field of actuarial science.
- To impart basic concepts in actuarial studies.

Learning Outcomes

After successful completion of this course, students will be able to

- Understand the concept of interest and compute them.
- Apply the concept of annuity, concept of present value and future value in real life problems.
- Use the present value concept in Leasing, Capital expenditure and Valuation of Bonds.
- Understand the concept of Redemption of Loans, Mortality Table, Life Assurance and Premiums and apply it in real life situations.

Unit I

Commercial Arithmetic

Introduction – Simple Interest , Compound Interest, Accumulated value – Present value – Investment Returns Nominal and Effective rates of interest – Effective rate corresponding to a nominal rate and vice-versa – Discount and Discounted Value – Varying rates of interest – Fractional Rate of Interest Equation of value – Equated time of payment.

Unit II

Annuities

Introduction –payment Annuity – Classifications of annuities – Present accumulated values of annuities – Immediate annuity due and deferred annuity – Present value of an immediate annuity – Accumulated value of annuity – Relation between S_n and a_n – Present value of a deferred annuity – Perpetuity – Variable annuities – Accumulated values of variable annuities – Varying rate of interest – The decreasing annuity.

Unit III

Redemption of Loans

Introduction – Redemption of loans – Redemption of loans by uniform instalments payable times in a year interest being p.a. effective – Redemption of loans by a sinking fund – Lender's Sinking fund – Consideration on Redemption loan – Capital redemption policies – Policy value – Retrospective method – Prospective method – Paid up value – Office premiums – Surrender value.

Unit IV

Mortality Table

Mortality Table – Columns of mortality table – Column l_x , Column d_x , Column q_x , Column p_x , The probabilities of survival and death – Stationary population Curate Expectation of life – Complete Expectation of life – Central death rate m_x – Selection and select rates – Period of selection – Mortality tables – Select table – Ultimate table – Aggregate table.

Unit V

Life Assurance and Premiums

Introduction – Mortality table approach – Probability approach – Types of assurance – Endowment assurance, pure endowment assurance, whole life insurance and temporary assurance – Commutations function – Fixed term Endowment – Educational annuity plan .

Text Books:

Mathematical basis of Life Assurance (IC-81): Published by Insurance Institute of India, Bombay.

Chapters: 1,2,3,4,7,10.

Reference Books:

1. D.W.A. Donald, Compound Interest and Annuities Certain, Heinemann, London.
2. J.R. Frank Ayres, Theory and Problems of Mathematics of Finance, 1983, Schaum's outline series, McGraw Hill, Singapore.

Course Code	Course Title	C	H	I	E	T
17U6SME9	Automata theory	6	5	25	75	100

Learning Objectives

- To acquire fundamental understanding of the core concepts in Automata Theory and formal languages.
- To develop an understanding of computation on through finite state machines.

Learning Outcomes

On satisfying the requirement of this course, students will

- Have an ability to design grammars and automata for different language classes.
- Understand the equivalence between non-deterministic finite state automata and deterministic finite state automata.

Unit I

Finite Automata

Introduction –Finite Automata– Definition of finite Automaton–Representation of finite Automaton–Acceptability of a string by a finite Automaton–Languages accepted by a Finite Automaton.

Unit II

Non-deterministic Finite Automata

Non-deterministic Finite Automata–Acceptability of a string by Non-deterministic Finite Automata–Equivalence of FA and NFA–Procedure for finding an FA equivalent to a given NFA–Properties of regular sets–Decision Algorithm for regular sets.

Unit III

Finite State Machines

Finite state machines–The monoid of a Finite-state machine–The machine of a monoid– Phrase structure Grammars–Chomsky Hierarchy of Languages–Finite Automata and regular Languages.

Unit IV

Context-free Grammars

Derivation Tress for Context-free Grammars–Normal forms for Context-free Grammars–Ambiguity, Parsing and Polish Notation–Simple presidenceGrammar.

Unit V

Pushdown Automata

Pushdown Automata–Definition of Pushdown Automation– Instantaneous Descriptions of a PDA– Important properties of Move relation–Acceptance by PDA–Equivalence of two types of a Acceptance by PDA–Context-free Languages and PDAs.

Text Book:

M. K. Venkataraman, N. Sridharan and N. Chandrasekaran, Discrete Mathematics, Reprint September 2007, The National Publishing Company.

Chapter: XII (1 to 29).

Reference Books:

1. D.P Acariya, Theory of computation, 2010, MJP publishers.
2. Kenneth H Rosen, Discrete Mathematics & its Applications with Combinatorics and Graph theory, 6th Edition, Tata McGraw-Hill Publishing Company limited.

**CBCS Pattern for B.Sc Statistics –
Ancillary (Computer and Computational Methods)
Course Structure**

Semester	Sub. Code	Title of the Paper	Hours	Credits
III	17U3MAC1	Ancillary CCM – I: Office Automation	2	1
	17U3MAP1	LAB: Practical in Office Automation	2	1
IV	17U4MAC2	Ancillary CCM – II: Programming in C	4	2
	17U4MAP2	LAB: Practical in Programming in C	2	1
V	17U5MSA1	Skill Based Elective (CCM): Combinatorics	2	2
	17U5MAC3	Ancillary CCM – III: Programming with C++	2	1
	17U5MAP3	LAB: Practical in C++	2	1
VI	17U6MAC4	Ancillary CCM – IV: Fundamentals of JAVA Programming	4	2
	17U6MAP4	LAB: Practical in JAVA Programming	2	1

Course Code	Course Title	C	H	I	E	T
17U5MSA1	Skill Based Elective (CCM): Combinatorics	2	2	25	75	100

Learning Objectives

- To impart the knowledge of counting principles which is essential for the students to think critically and apply it in real-world problems.
- To acquire the knowledge of Lattices and its applications.

Learning Outcomes

After successful completion of this course, the students will be able to

- Solve counting problems by applying elementary counting techniques using the sum and product rules, permutations, combinations and pigeonhole principle.
- Apply the ideas of Permutations and Combinations, Combinatorial number theory in various real life situations.

Unit I

Counting

Basic Counting Principles – Sum rule principle and product rule principle – Factorial notation – Binomial coefficient – Permutations – Problems.

Unit II

Combinations

Combinations with repetitions – The Pigeonhole principle – Problems.

Unit III

Ordered partitions

Ordered partitions and Unordered partitions – The inclusion – Exclusion principle – Generation of Permutations & Combinations – Tree diagrams – Problems.

Unit IV

Ordered sets

Ordered sets – Hasse Diagrams of partially ordered sets – Consistent enumeration – Supremum and infimum – Isomorphic ordered sets – Well-ordered sets – Problems.

Unit V

Lattices

Lattices – Bounded Lattices – Distributive Lattices – Complements and complemented Lattices – Problems.

Text Book:

Seymour Lipschutz and Marc Lars Lipson, Discrete Mathematics (Schaum's Outlines), 3rd Edition, 3rd Reprint 2010, Tata McGraw Hill.

Chapters: 6, 14.

Reference Books:

1. V.K. Balakrishnan, Combinatorics, Schaum's Outlines, 1995.
2. Dr. M. K. Venkataraman, Dr. N. Sridharan and N. Chandrasekaran, Discrete Mathematics, Reprint September 2007, The National Publishing Company.

Course Code	Course Title	C	H	I	E	T
17U5MAC3	Ancillary CCM – III: Programming with C++	1	2	25	75	100

Learning Objectives

- To enable the students to have a good foundation and practical knowledge on Programming with C++.
- To enable the students to understand C++ language which improves C with Object – Oriented features.
- To learn the syntax and semantics of C++ programming language.

Learning Outcomes

On satisfying the requirement of this course, students will

- Have an ability to design C++ classes for code reuse.
- Able to design & implement programs using classes and objects.
- Acquire knowledge of writing inline functions for efficiency and performance.

Unit I

Data Types and Functions

Basic Concepts of Object-Oriented Programming – Benefits of OOP – Identifiers and Constants – Basic Data Types – The Main Function – Function Prototyping – Call by Reference – Return by reference.

Unit II

Classes and Objects

Specifying a Class – Defining Member Functions – A C++ Program with Class – Making an Outside Function Inline – Nesting of Member Functions – Private Member Functions – Arrays within a Class – Arrays of Objects – Objects as Function Arguments – Friendly Functions – Returning Objects.

Unit III

Constructors and Destructors

Introduction – Constructors – Parameterized Constructors – Multiple Constructors in a Class – Constructors with Default Arguments – Copy Constructor – Dynamic Constructors – Destructors.

Unit IV

Operator Overloading

Introduction – Defining Operator Overloading – Overloading Unary Operators – Overloading Binary Operators – Overloading Binary Operators using Friends.

Unit V

Inheritance

Introduction – Defining Derived Classes – Single Inheritance – Making a Private Member Inheritable – Multilevel Inheritance – Multiple Inheritance.

Text book:

E. Balagurusamy, Object-Oriented Programming with C++, 2nd Edition 2001, Tata McGraw-Hill Publishing Company Limited.

Chapters: 1 (1.5, 1.6), 3 (3.4, 3.5), 4 (4.2 – 4.5), 5 (5.3, 5.4, 5.6 – 5.9, 5.13 - 5.16), 6 (6.1 –6.5, 6.7, 6.8, 6.11), 7 (7.1 – 7.5), 8 (8.1 – 8.6).

Reference Books:

1. D. Ravichandran, Programming with C++, 1996, Tata McGraw-Hill Publishing Company Limited.
2. Yashvant Kanetkar, Let us C++, 2006, BPB publication.

Course Code	Course Title	C	H	I	E	T
17U5MAP3	LAB: Practical in C++	1	2	50	50	100

S.No.	List of Programs
1	Implementation of classes and objects.
2	Developing OOP to print PASCAL triangle.
3	Banking Operation Using Constructors.
4	Adding two times using parameterized constructors.
5	Using the idea of friend function returning object technique to add two complex numbers.
6	Write an object oriented programme with the help of unary operator overloading concept to check whether the given number is Armstrong or not.
7	Develop an OOP to implement operator overloading using friend function.
8	Develop an OOP to implement Single inheritance.
9	Develop an OOP to implement Single inheritance using Private Member.
10	Develop an OOP to implement Multilevel inheritance (Area of a triangle and its internal angles provided the sides of triangle).

Course Code	Course Title	C	H	I	E	T
17U6MAC4	Ancillary CCM – IV: Fundamentals of JAVA Programming	2	4	25	75	100

Learning Objectives

- To enable the students to have a good foundation and practical knowledge on Programming with JAVA.
- To understand the basics of OOP & Object oriented approach to design software.

Learning Outcomes

On satisfying the requirement of this course, students will be

- Able to understand basic concepts of Java such as objects, classes, operators, packages & various keywords.
- Able to design the applications of Java.

Unit I

Java evolution

Java history – Java features – Java and internet – Web browsers –Java environment – Overview of Java language: Java program structure – Java statements – Implementing a Java program – Java virtual machine – Command line arguments.

Unit II

Java fundamentals

Constants, variables and data types – Operations and expressions – Decision making and branching – Decision making and looping.

Unit III Classes, objects and methods

Defining a class, adding variables – Adding methods – Constructors – Method overloading inheritance – Overriding methods, arrays, strings and vectors – Creating arrays – Strings – vectors – Wrapper classes.

Unit IV Interfaces

Defining interfaces – External interfaces – Implementing interfaces, packages: creating packages – Using a package – Adding a class to a package.

Unit V Multithreaded programming

Multithreaded programming – Creating threads – Extending the thread – Stopping and blocking a thread – Life cycle of a thread.

Text Book:

E. Balagurusamy, Programming with JAVA – A primer, 2nd Edition 2000, Tata McGraw – Hill Publication.

Chapters: 2(2.1,2.2,2.4,2.9), 3(3.5,3.7,3.8,3.9,3.10),4(4.2 – 4.4),5(5.2 – 5.9),6(6.2 –6.8),7(7.2 – 7.4),8(8.2 – 8.4, 8.7, 8.8, 8.11,8.12),9(9.2 – 9.7),10(10.2 – 10.4),11(11.5 –11.8),12 (12.2 – 12.5).

Reference Books:

1. C. Xavier, JAVA Programming with JAVA 2, 2nd Reprint 2003, Scitech Publication.
2. Patrick Naughton, Herbert Schildt, The complete reference, 3rd Edition 1997, Osborne Publishing.

Course Code	Course Title	C	H	I	E	T
17U6MAP4	LAB: Practical in JAVA Programming	1	2	50	50	100

S.No.	List of Programs
1	Program to find out the area of the triangle.
2	Use a command line argument to find out the biggest of three integers.
3	Create a Java program to display student name, roll no. and marks of three subjects where the information is obtained at runtime.
4	Develop a Java program to display all prime numbers between two limits.
5	Develop a Java program to solve a quadratic equation.
6	Develop a Java program to generate sequence of numbers with the following format.
7	Generate Fibonacci sequence using a constructor.
8	Develop a Java program with the idea of multiple constructors to find the area of a triangle.
9	Use a Java program to find the area of a circle, a triangle, a square and a rectangle. Use method overloading if possible.
10	Develop a Java program which will accept the marks of all the students of various subjects in a particular semester. Find out the top scorer and the top score in each subject.
11	Develop a Java program that performs string sorting.
12	Develop a Java program with inheritance to display the area of a triangle and display the altitude of a triangle. Assume that the sides are input.
13	Develop a Java program using interface to display student details.
14	Create a Java program that will implement the usage of more than one package.
15	Develop a Java program using exception handling to find the slope of the line between two points.

Components Of C.I.A and Question Pattern for End Semester Examinations

Components of C.I.A

i) Test	- 15 marks
ii) Assignment/Quiz/Seminar	- 5 marks
iii) Attendance	- 5 marks
Total	- <u>25 marks</u>

End Semester Exam Components for U.G.

Time: 3 Hours

Maximum Marks: 75

Part – A (10 X 1 = 10 Marks)

(Answer ALL questions)

- Objective type Questions.
- Two questions from each unit.

Part – B (5 X 7 = 35 Marks)

(Answer ALL questions)

- Either or pattern.
- One question from each unit.

Part – C (3 X 10 = 30 Marks)

(Answer any THREE questions)

- Out of FIVE questions, THREE questions to be answered
- One question from each unit.

Department	Economics	Class	III B.Sc. Statistics		Semester	V
Course Title	Principles of Economics	Hours	Credit	CIA	External	Total
Course Code	17U5SME1	90	7	25	75	100

Objectives

1. To understand the fundamental principles of economics.
2. To study the pricing techniques, National Income and Economic Policies.

Learning Outcome

It enlightened the students to know about basic economic principles.

Unit I Introduction to Economics (18 hours)

Meaning - Definitions of economics - Nature – Scope - Methods – Concepts - Uses and Limitations.

Unit II Demand and Supply Analysis (18 hours)

Meaning – Law of Demand and its determinants – Meaning, types and degrees of Elasticity – Measurement of elasticity of demand - Law of diminishing marginal utility – Law of equi-marginal utility – Consumer’s surplus – Law of supply.

Unit III Costs and Revenue Analysis (18 hours)

Cost analysis – Cost concepts: TVC, TFC, TC, AVC, AFC, AC and MC – Money cost – Real cost – Explicit cost – Implicit cost – Economic cost – Social cost – opportunity cost – Sunk cost – Floating cost – Prime cost – Revenue analysis – Revenue concepts: TR, AR and MR.

Unit IV Pricing Techniques (18 hours)

Full-cost pricing- Marginal Pricing- Target pricing- Peak-load pricing- Going rate pricing- Cyclical pricing- Customary pricing- Product line pricing - Skimming pricing- Penetrating pricing.

Unit V National Income and Economic Policies (18 hours)

National Income - Concepts - Methods and Difficulties in the calculation of National Income- Monetary policy and Fiscal policy and their objectives.

Text Books

1. S.Sankaran, (2011), Micro Economics, Margham Publications, Madras.
2. Ahuja H.L. (1996), Principles of Micro Economics, A New look at Economic Theory, S.Chand, New Delhi.

References

1. Kennedy, Maria John M., (1999). Advanced Micro Economic Theory (Second Edition) Himalaya, Publishing House, NewDelhi.
2. Stigler, G.. (1996). Theory of Price (Fourth Edition) PrenticeHall of India, New Delhi.
3. Jhingan M. L., (1992). Micro Economic Theory, Konark, New Delhi.

Websites / e-books

1. Karl Menger, “Principles of Economics”, <https://www.free-ebooks.net/ebook/Principles-of-Economics>
2. N.Gregory Mankiw, “Principles of Economics”, <https://www.amazon.in/Principles-Economics-N-Gregory-Mankiw-ebook/dp/B07D6PJQ6L>

Department	Economics	Class	III B.Sc. Statistics		Semester	VI
Course Title	Indian Economy	Hours	Credit	CIA	External	Total
Course Code	17U6SME4	75	6	25	75	100

Objectives

1. To enlighten the students about the performance of Agriculture, Industries and Service Sector in India.
2. To understand the recent economic reforms.

Learning Outcome

It helped the students to take decisions in business

Unit I Introduction to Indian Economy (15 hours)

Economic growth and development – Meaning – Differences - Features of Indian Economy – Economic and Non-Economic factors – Demographic composition in India - India as Developing Economy.

Unit II Agricultural Sector in India (15 hours)

Nature and Importance of Agriculture – Green Revolution - Agricultural Production and Productivity - Factors Influencing Agricultural Development - Agricultural Marketing - Sources of Agricultural Finance - Agricultural Labour in India – Recent Developments in Agriculture - Traditional Farming – Organic Farming - Precision Farming – Corporate Farming – Genetically Modified Seeds – Sustainable Agriculture-Second Green Revolution.

Unit III Industrial Sector in India (15 hours)

Pattern of Industrialization - Industrial Policy: 1948 and 1991 – MSMEs and Large scale industries: Problems - Measures and their pros and cons - Role of Industry in Economic Development.

Unit IV Services Sector in India (15 hours)

Role of Service Sector in Economic Development – Banking – Insurance – Telecommunications – IT Industry – Education and Health – Health Tourism.

Unit V Economic Reforms in India (15 hours)

New Economic Policy 1991: Objectives - Liberalization, Privatization and Globalization – WTO – MNCs: Role and objectives – Second Generation Reforms – Demonetisation and its impact – GST salient features – FDI and economic development.

Text Books

1. Ruddar Datt, K.P.M.Sundharam(2011), “Indian Economy”, S.Chand & Company Ltd, New Delhi.
2. A.N.Agarwal(2011), “Indian Economy-problems of Development and Planning”, New Age International Publishers (P) Ltd, New Delhi.

References

1. H.S.Agarwal (2007), “Simple Indian Economics”, Lakshmi Narain Agarwal, Agra.
2. Misra & Puri (2016), “Indian Economy”, Himalaya Publishing House, Mumbai.
3. Ishwar c.dhingra(2010), “ The Indian Economy”, Sultan Chand & Sons, New Delhi.

Websites / e-books

1. Anoop Kumar Atria (2018), Indian Economic Development,
<http://www.gkpltd.com/our-books/Economics-Books/indian-economic-development>
2. Uma Kapila (2017), Indian Economy: Economic Development and Policy,
<https://www.amazon.in/Indian-Economy-Economic-Development- Policy/dp/9332703744>

DEPARTMENT OF BIOTECHONOLOGY

B.Sc. BIOTECHNOLOGY COURSE STRUCTURE

Sem	Sub code	Course title	Hours/Week	Credits
I	17U1LMC1	Cell Biology and Genetics	5	5
	17U1SM1	Bioinstrumentation	2	2
	17U1LES1	Environmental Studies	2	2
		Practicals in Cell Biology & Genetics and bioinstrumentation - Lab I	3	*
II	17U2LMC2	Biochemistry & Biophysics	5	5
	17U2LSM2	Concepts of Biotechnology	2	2
		Practicals in Biochemistry & Biophysics and Concepts of Biotechnology – Lab II	3	*
	17U2LMP1	Lab for I & II Semester papers	3	6
III	17U3LMC3	Molecular Biology	4	4
		Practicals in Molecular Biology – Lab III	2	*
IV	17U4LMC4	Animal Biotechnology	2	2
	17U4LSM3	Bioinformatics	2	2
		Practicals in Animal Biotechnology and Bioinformatics – Lab IV	2	*
	17U4LMP2	Lab for III & IV Semester papers	2	4
V	17U5LME1	Biostatistics	5	6
	17U5LMC5	Immunology	5	5
	17U5LMC6	Industrial Biotechnology	5	5
	17U5LMC7	Plant Biotechnology	3	3
		Practicals in Biostatistics and Immunology – Lab V	3	*
		Practicals in Industrial Biotechnology and Plant Biotechnology – Lab V	3	*
VI	17U6LME2	Environmental Biotechnology	6	7
	17U6LME3	Medical Biotechnology	6	7
	17U6LMC8	Genetic Engineering	4	4
	17U6LSM4	Fisheries Technology	2	2
		Practicals in Environment Biotechnology and Medical Biotechnology – Lab VI	3	*
		Practicals in Genetic Engineering & Fisheries Technology – Lab VI	3	*
	17U6LMP3	Lab for V semester papers	6	6
	17U6LMP4	Lab for VI semester papers	6	6

* Practical exams will be conducted at the even semester.

B.Sc., Ancillary Biotechnology for B.Sc., Microbiology Course Structure

SEM	Sub Code	Title of the paper	Hours /week	Credits
III	18U3LAC1	Fundamentals of Biotechnology	2	1
		Practicals in Fundamentals of Biotechnology	2	*
IV	18U4LAC2	An Introduction to Immunology	4	4
		Practicals in Immunology	2	*
	18U4LAP1	Lab for III & IV Semester ancillary Papers	2	2
V	18U5LAC3	Food preservation and processing	2	2
	18U5LSA1	Aquaculture	2	1
		Practicals in Food Preservation and processing	2	*
VI	18U6LAC4	Recombinant DNA Technology in Human Health	4	2
		Practicals in Recombinant DNA Technology in Human Health	2	*
	18U6LAP2	Lab for V and VI semester Ancillary papers	2	2

* Practical exams will be conducted at the even semester.

Course code	Course title	C	H	I	E	T
17U5LME1	Biostatistics	6	5	25	75	100

Objectives

- To understand the basic concepts in biostatistics
- To gain knowledge on the various methods of data collection and diagrammatic representation of data
- To learn about the various measures of central tendency and dispersions
- To acquire knowledge about the test of significance

Learning Outcome

- Acquire knowledge on basic concepts in Statistics
- Gain information on applications of statistics in the field of lifesciences

Unit-1

Introduction to Biostatistics

Definition, Types – Descriptive & Inferential statistics, Terms – Population, Sample, Unit, Variables, Constant, Parameter, Data, Inference, Accuracy and Precision. Collection of data-primary, secondary, qualitative and quantitative data. Classification and tabulation of data, Frequency distribution.

Unit-II

Diagrammatic and graphical representation of Data

Significance of Diagrams & Graphs: Diagrams – line, bar, pie, pictogram, cartogram, Significance and limitations of Diagrammatic representation. Graphic Representation - Types - Histogram, frequency polygon, frequency curve and cumulative frequency curve, Significance and limitations of graphical representations.

Unit-III

Measures of central tendency and dispersion

Central tendency - definition and characteristics-. Mean, median and mode. Dispersion - definition, methods of measuring dispersion - range, means, standard deviation, variance, standard error, Measures of Skewness and kurtosis

Unit-IV

Correlation and regression

Correlation - Definition & significance. Types - Positive and negative, simple and multiple, linear and non-linear, Methods of correlation analysis - Scatter diagram, graphical diagram and co-efficient of correlation. Regression – Definition, Types of regression analysis, Regression lines and equations, Regression co-efficient.

Unit-V

Test of Hypothesis and Significance

Null and alternative hypothesis. Chi- square test, t-test, ANOVA - One-way.

Textbooks

1. Ramakrishnan P. 2010. Introduction to Biostatistics. Saras Publication
2. Veer Bala Rastogi. 2006. Fundamentals of Biostatistics. Ane Books India

References

1. Khan and Khanum. 2004. Fundamentals of Biostatistics, Ukaaz Publications, Hyderabad
2. Gurumani N. 2010. An Introduction to Biostatistics. MJP Publications, Chennai
3. Ashcroft S and Pereira C. 2003. Practical Statistics for the Biological Sciences. Palgrave Macmillan.

Course Code	Course Title	C	H	I	E	T
17U5LMC5	Immunology	5	5	25	75	100

Objectives

- To understand the basic principles of immunology
- To gain knowledge on the various cells and organs of immune system
- To learn about the various mechanisms of immune response
- To acquire knowledge about the antigen-antibody interaction

Learning Outcome

- Acquire knowledge on basic concepts in Immunology
- Create awareness to hypersensitivity and transplantation
- Gain information on applications of Immunotechniques

Unit -I

Introduction to Immunology

History of Immunology, types of immunity –innate, specific, acquired, active and passive, organs of the immune system - primary and secondary lymphoid organs. Characteristic features of immunogens, antigens, haptens, epitopes, adjuvants. Cells of immunity-Neutrophils, macrophages, natural killer cells, null cells, basophils, mast cells, B cells & T Cells

Unit –II

Components of Immune System

Immunoglobulins - Classes, Structure, biological properties and functions, B cells - maturation, activation, proliferation, germinal centers, plasma cells, memory cells, class switching, T-cells - receptor, activation, maturation, differentiation, MHC- types, structure and functions, self MHC restriction

Unit- III

Immune Response

Complement – components, activation, complement pathways - Classical, Alternate, Biological activities. Hypersensitivity - Type I, II, III, IV reactions

Unit -IV

Autoimmune disorder and Transplantation

Immune tolerance and autoimmunity - autoimmune diseases-mechanisms for the induction, Organ-Specific –Hashimoto’s thyroiditis , Grave’s disease, Myasthenia gravis, Systemic- SLE, scleroderma, Rheumatoid arthritis, Multiple sclerosis. Transplantation - types of graft, graft rejection, Graft Versus Host, Tissue typing, immunosuppressive agents.

Unit V

Immunotechniques and Vaccine

Antigen-antibody interactions - Agglutination- hemagglutination, bacterial agglutination, passive agglutination, agglutination inhibition, Precipitation techniques- RID, ODD, Radio Immunoassay, ELISA- indirect, sandwich, competitive, Immunofluorescence assays - Fluorescence activated cell sorter (FACS) technique, ELISPOT, Vaccine-Active and passive immunization, attenuated, heat-killed, subunit vaccines, Vaccination schedule, route of administration, Production of monoclonal antibodies - principles, techniques and applications .

Textbooks

1. Benjamin E, Coico R, Sunshine G. 2015. Immunology: A Short Course. 7th Edition Wiley – Blackwell.
2. Owen JA, Punt J, Stranford. 2013. Kuby Immunology. W. H. Freeman & Company.

References

1. Abbas AK, Andrew H. Lichtman H, Shiv Pillai. 2015. Basic Immunology: Functions and disorders of the Immune System. Elsevier.
2. Tizard IR. 1995. Immunology –An Introduction. Saunders college publications.
3. Rao CV. 2006. Immunology. Narosa Publishing House. New Delhi.

Course Code	Course Title	C	H	I	E	T
17U5LMC6	Industrial Biotechnology	5	5	25	75	100

Objectives

- To understand the basic principles of bioprocess technology
- To gain knowledge on the various fermentation processes
- To learn about the various up-stream and down-stream process
- To acquire knowledge about the enzyme technology

Learning Outcome

- Acquire knowledge on basic concepts of fermentation technology
- Create awareness to various microbial products produced by fermentation
- Gain information on applications of Biomass to energy

Unit I

Bioprocess Technology

Bioreactors – types - continuous stirred tank, bubble column, airlift, fluidized and packed bed. Features and operation of bioreactors – sterilization, inoculation, aeration, control system. Solid state fermentation, Media for industrial fermentation - substrates used as carbon, nitrogen, growth factor sources, sterilization - heat, physical methods. Isolation of microbes - enrichment methods, strains from unusual environment, preservation. Genetic improvement of strains-selection of mutants, genetic recombination. Culture methods - batch culture, fed - batch, semi-continuous, continuous.

Unit II

Scale - up and Downstream process

Fermentation process - type I, II, III, Inoculum build up, pre-fermenter culture, production fermentation. Measurement and control of bioprocess parameters, Scale - up, Downstream process-solid liquid separation ,flotation, flocculation, filtration, centrifugation, release of intracellular products - cell disruption - mechanical, chemical and enzymatic, concentration, evaporation, extraction, membrane filtration, precipitation, purification by chromatography, formulation.

Unit III

Enzyme Technology

Applications of enzymes, commercial production of enzymes - selection of organisms, formulation of medium, production process, recovery and purification. Regulation of microbial enzyme production - induction, feedback repression, nutrient repression. Genetic engineering for microbial enzyme production - cloning strategies. Immobilization-methods, choice of immobilization techniques, applications –production of L-amino acids, production of high fructose syrup, biosensors – types and applications

Unit IV

Microbial production

Microbial production of organic solvents - ethanol, acetone and butanol, organic acids - citric acid, vinegar, antibiotics - penicillin, streptomycin, aminoacids - glutamic acid, L-lysine, Vitamin - B12, riboflavin.

Unit V

Biopolymers and biomass

Microbial polysaccharide - general features, biosynthesis, production, applications – LPS, Xanthan, Dextran, alginate, polyhydroxyalkonates, polyhydroxybutyrate. Biomass – composition - cellulose, hemicelluloses, lignin, production of alcohol and biogas from biomass.

Text book

1. Sathyanarayana U. 2017. Biotechnology, Book and Allied (P) Ltd.
2. Dubey RC. 2014. A Textbook of Biotechnology. S. Chand.

References

1. Stanbury PF. 2008. Principles of Fermentation technology, Elsevier publications.
2. Glazer AN, Nikaido H. 2007. Microbial Biotechnology. Second edition. Cambridge University Press.
3. Pandian TT, Kandavel IK. 2008. Text book of Biotechnology. International Publishing House PVT Ltd.

Course Code	Course Title	C	H	I	E	T
17U5LMC7	Plant Biotechnology	3	3	25	75	100

Objectives

- To understand the basics in Plant Tissue Culture
- To gain knowledge on the various Tissue culture methods
- To learn about the germplasm conservation and cryopreservation
- To acquire knowledge about the applications of transgenic plants

Learning Outcome

- Acquire knowledge on basic concepts in Plant tissue culture
- Create awareness to transgenic plants
- Gain information on various applications of plant tissue culture

Unit-I

Introduction to Plant tissue culture

Plant tissue culture – Definition, history, Culture media- composition, types – MS, White, constituents –inorganic, organic supplements, growth regulators

Unit-II

Plant Tissue culture methods

Callus culture - explants, factors affecting culture, applications, Organ Culture - Seed, Embryo, Anther, pollen, Cell culture - Isolation of single cells, suspension culture - types and synchronization, Protoplast-Isolation ,culture , regeneration, fusion-methods

Unit III

Micropropagation, Germplasm conservation and cryopreservation

Micropropagation - definition, technique, Factors affecting micropropagation, in vitro Clonal Propagation - Meristem and shoot tip culture, bud culture - single node, axillary, Organogenesis, Somatic embryogenesis, Applications of micropropagation, Germplasm conservation - types - *in-situ*, *ex-situ* and cryopreservation

Unit-IV

Gene Transfer methods

Vector mediated - *Agrobacterium* mediated - Ti Plasmid, Virus mediated - Caulimoviruses and Gemini Viruses, Vectorless DNA transfer - Electroporation, particle bombardment, microinjection, liposome, silicon carbide fibre mediated, Chemical methods - PEG mediated, Calcium phosphate co-precipitation, DEAE dextran method. Marker genes for plant transformation - selectable and reporter - Antibiotics resistance *npt-II*, *hpt*, *aadA*, Antimetabolite marker *dhfr*, Herbicide resistance genes - *bar*, *AroA* and *bxn*, *gfp*, bacterial luciferase.

Unit-V

Genetically modified organisms

GMOs - Bt toxin, Longer shelf - life of fruits, vegetables, oils, golden rice, plantibodies, cloning of edible vaccines, pest resistant, virus resistant, drought resistant, oxidative stress resistance-cytoplasm, plastids, cotton fibres, terminator seed technology.

Text Book

1. Satyanarayana U. 2017. Biotechnology. Books and Allied Pvt Ltd.
2. Chawla HS. 2017. An Introduction to Plant Biotechnology. CBS Publishers

References

1. Razdan MK. 2005. Introduction to Plant Tissue Culture. Oxford & Ibh.
2. Slater A. 2006. Plant Biotechnology – The Genetic Manipulation of Plants. Oxford press.
3. Altman A and Hasegawa PM. 2012. Plant Biotechnology and Agriculture: Prospects for the 21st Century. Academic Press.

Course Code	Course Title	C	H	I	E	T
	Practicals in Biostatistics and Immunology			50	50	100

1. Lymphoid organs in chick
2. Preparation of Antigens
3. Blood Grouping
4. WBC Count – Total and Differential
5. Heamagglutination
6. Radial Immunodiffusion
7. Ouchterlony double diffusion
8. Immunoelectrophoresis
9. Western Blotting
10. ELISA
11. Collection and Tabulation of Data
12. Graphical representation of Data – Histogram, Frequency Polygon
13. Calculation of Mean, Standard Deviation
14. Correlation and Regression analysis
15. Chi-Square analysis
16. t-test analysis
17. ANOVA - One way

Course code	Course title	C	H	I	E	T
	Practicals in Industrial Biotechnology and Plant Biotechnology			50	50	100

1. Isolation of Yeast
2. Immobilization of yeast cells
3. Alcohol fermentation
4. Role of yeast in bread making
5. Production of penicillin
6. Antibiotic sensitivity test
7. Isolation of lipolytic microorganisms from butter
8. Isolation of antibiotic producing microbes from soil
9. Preparation of Plant Tissue culture media
10. Shoot Culture
11. Callus Induction
12. Isolation of Plant DNA

Course Code	Course Title	C	H	I	E	T
17U6LME2	Environmental Biotechnology	7	6	25	75	100

Objectives

- To understand the basic concepts of pollution
- To gain knowledge on the various methods of bioremediation
- To learn about the various waste water treatment
- To acquire knowledge about biofertilizers and biopesticides

Learning Outcome

- Acquire knowledge on basic concepts of Environmental Pollution
- Create awareness to biofertilizers and biocides
- Gain information on waste management

Unit-I

Sewage water and Treatment

Water pollution – nature of pollutants – organic, inorganic, microbial, radioactive materials, Sewage – composition, types, Measurement – detection of pathogenic organisms, coliform bacteria, Water Treatment : Primary, Secondary – Aerobic suspended growth treatment, Aerobic attached growth treatment, Anaerobic suspended growth treatment, Anaerobic attached growth treatment, Pond Treatment, Tertiary Treatment – Solids removal, nitrogen removal, phosphorous removal.

Unit-II

Sludge and solid waste treatment

Sources and characteristics of sludge, Sludge thickening, stabilization, Composting – mechanism, methods, Vermi-composting, conditioning, disinfection of sludge, heat drying, disposal of sludge – land filling, lagooning, septage disposal, solid waste disposal, separation and composting plants.

Unit- III

Biodegradation and Bioremediation

Biodegradation – *Pseudomonas* uses, Factors affecting biodegradation, enzyme systems, Recalcitrant Xenobiotics, Types of bioremediation – *in situ*, *ex-situ* bioremediation, metabolic effects of microbes on xenobiotics, types of bioremediation reactions – aerobic and anaerobic, Biodegradation of hydrocarbons, pesticides and herbicides, Genetically engineered bacteria for bioremediation, Bioremediation of contaminated soil and water, Heavy metals – Metal microbe interaction, Mechanisms – metabolism dependent, metabolism independent, Extracellular precipitation and complexation.

Unit-IV

Biofertilizers and Biopesticides

Rhizobium, Azotobacter, Azospirillum, Blue green algae, Nostoc, VAM fungi, Azolla – production and application, Phosphate solubilizing bacteria. Biopesticides – Bacteria, fungi and virus - *Beauveria bassiana*, *Fusarium pallidoroseum*, *Trichoderma*, *Metarhizium* and *Pseudomonas fluorescens*.

Unit-V

Biofiltration and Bioleaching

Biofilters – micro-organisms used in biofilters - media, mechanisms, Microbial Leaching – microbes used, bioleaching - copper, uranium, gold, silver, silica.

Textbook

1. Satyanarayana U. 2017. Biotechnology. Books and Allied Pvt.
2. Dubey RC. 2014. A Textbook of Biotechnology. S Chand

References

1. Jogdand SN. 2015. Environmental Biotechnology. Himalaya Publishing House
2. Kumaresan V. 2014. Biotechnology. Saras Publications.
3. Scaragg A. 2007. Environmental Biotechnology. Oxford University Press.

Course Code	Course Title	C	H	I	E	T
17U6LME3	Medical Biotechnology	7	6	25	75	100

Objectives

- To understand the basic principles of gene therapy
- To gain knowledge on the various molecular based diagnostics
- To learn about the recombinant vaccines and monoclonal antibodies
- To acquire knowledge about the ART

Learning Outcome

- Acquire knowledge on basic concepts in Gene therapy
- Create awareness to Assisted Reproductive Technology
- Gain information on applications of molecular therapy and diagnostic tools.

Unit I

Gene Therapy

Gene therapy- approaches, types - *ex vivo*, *in vivo*. *ex vivo* - vectors - viral, Human Artificial Chromosomes, Retroviruses, treating ADA deficiency, hypercholesterolemia, haemophilia. *in vivo* - gene delivery by viruses system - retrovirus, Adenoviral, Adeno associated, treating Cystic Fibrosis. Non viral gene delivery - methods - pure DNA constructs, Lipoplexes, DNA molecular conjugates, efficiency of gene delivery. Antisense therapy - Cancer, AIDS.

Unit II

DNA in Disease diagnosis and Medical Forensics

Nucleic acid hybridization - DNA probes, mechanism of action of DNA probes, Radioactive and Non Radioactive detection system, PCR and signal amplification, DNA chip - Microarray - techniques and applications. DNA in diagnosis - infectious diseases - Malaria, Chagas, AIDS, genetic diseases - Cystic fibrosis, sickle cell Anemia, Duchenne's muscular dystrophy. DNA fingerprinting, RFLP, VNTR and SNP in diagnosis.

Unit III

Pharmaceutical products of DNA Technology

Human protein replacement - production of recombinant Insulin, recombinant hGH, Clotting Factor VIII. Therapeutic agents for human diseases - production of Tissue Plasminogen Activator, Interferons, Erythropoietin and DNase.

Unit IV

Recombinant Vaccine and Monoclonal Antibodies

Recombinant Vaccines - types - Subunit vaccine against - Hepatitis B, Herpes Simplex virus, HIV, DNA Vaccine - delivery methods, screening of pathogenic genome for selecting DNA vaccines,

Advantage, Attenuated - vaccine for cholera, typhoid, Vector Recombinant - vaccines against Vaccinia virus - production. Principles of Hybridoma technology, monoclonal antibodies production, purification. Production of Human Mouse MAb, production of MAb in *E. coli*, Applications of monoclonal antibodies - Diagnostics and Therapeutics.

Unit V

Assisted Reproductive Technology

Manipulations of Reproduction in animals - artificial insemination, Embryo transfer-superovulation, MOET, Embryo - splitting, biopsy, sexing. IVF- stages limitation, Embryo cloning. Manipulation of reproduction in humans - causes of infertility and applications of ART, techniques employed - IVF, ET, GIFT, ZIFT, IVC. Micromanipulation- intracytoplasmic sperm injection, Cryopreservation, Assisted Hatching, Negative aspects of ART.

Text book

1. Satyanarayana U. 2017. Biotechnology. Books and Allied Pvt.
2. Jogdand SN. 2008. Medical Biotechnology. Himalaya Publishing House.

References

1. Glick BR, Delovitch TL, Patten CL. 2014. Medical Biotechnology. ASM Press, Washington.
2. Pongracz J, Keen M. 2008. Medical Biotechnology. Elsevier Health Sciences.
3. Ignacimuthu S. 2008. Biotechnology - An Introduction. Narosa Publishing House.

Course Code	Course Title	C	H	I	E	T
17U6LMC8	Genetic Engineering	4	4	25	75	100

Objectives

- To understand the basic principles of cloning
- To gain knowledge on the various tools used in genetic engineering
- To learn about the various cloning strategies
- To acquire knowledge about the gene expression in host cells

Learning Outcome

- Acquire knowledge on basic concepts in genetic engineering
- Create awareness to Human genome project
- Gain information on applications of Genetic Engineering in various fields

Unit-I

Tools of Genetic Engineering

Introduction to genetic engineering- history of recombinant DNA technology, Molecular tools of genetic engineering -DNA modifying enzymes – exo & endo nucleases. Restriction Enzymes - nomenclature and classification, ligases, alkaline phosphatase, terminal transferase, reverse transcriptase, DNA Polymerase, Klenow polymerase. Linkers, adaptors, Homopolymer tailing.

Unit-II

Cloning Vectors

Plasmids - pBR and pUC, Bacteriophage vectors- λ vectors, M13 vector, Cosmids, Yeast Vectors. Special vectors - expression vectors and shuttle vectors, artificial mini chromosome- BAC, YAC.

Unit III

Methods of gene transfer

Physical, chemical and biological methods of Gene transfer: Bacterial Conjugation, Transformation, Transduction, Microinjection, Electroporation, Shotgun method, Ultrasonication, Liposome fusion, Calcium-mediated gene transfer.

Unit-IV

Gene cloning strategies and selection of recombinants

Isolation and purification of nucleic acid, preparation of cDNA, Purification of plasmid DNA, Insertion of gene into vectors, Screening and selection of recombinants- blue-white, antibiotic and immunochemical methods. Hybridization techniques – Southern, Northern, Western, PCR- amplification of DNA – types of PCR & applications.

Unit-V

Manipulation of gene expression in host cells

Manipulation of gene expression in prokaryotes, eukaryotes - selection of host cell for gene expression, regulatable promoters, integration of cloned DNA into the host chromosomes. Cloning in yeast- vectors for *Saccharomyces cerevisiae*, Mammalian cell expression vector. Gene expression to produce proteins, collection and purification of recombinant proteins. Human Genome project- mapping of the human genome, approaches for genome sequencing, benefits and applications of human genome sequencing.

Textbooks

1. Satyanarayana U. 2017. Biotechnology. Books and Allied Pvt.
2. Mitra S. 2015. Genetic Engineering. Principles and Practice. Second edition. Mcgraw Higher Ed.

References

1. Brown TA. 2010. Gene Cloning and DNA Analysis. 6th Edition. Blackwell Publishing Ltd.
2. Primrose SB and Twyman RM. 2006. Principles of Gene Manipulation and Genomics. 7th Edition Blackwell Publishing.
3. Ignacimuthu S. 2008. Biotechnology- An Introduction. Narosa Publishing House.

Course Code	Course Title	C	H	I	E	T
17U6LSM4	Fisheries Technology	2	2	25	75	100

Objectives

- To understand the basics of fisheries technology
- To gain knowledge on the crafts and gears used in fishing
- To learn about the preservation techniques of fish
- To acquire knowledge about by-products of fishery industries

Learning Outcome

- Acquire knowledge on fishery practices
- Create awareness about transgenic fishes and its applications

Unit-I

Fish culture Techniques

Definition, Sewage Culture - Carp culture – pond culture, Reservoir culture , Integrated fish culture - Poultry cum fish, Dairy cum fish, Pig cum fish culture, Monosex culture - necessity, Tilapia culture, breeding methods, advantages.

Unit-II

Fish Breeding and Genetic Manipulation

Methods of breeding-Natural, artificial – Stripping method, induced breeding - Hypophysation, Stages of hypophysation – Collection, preparation of pituitary extracts, selection of breeders, injection, breeding, hatching. Ovaprim – advantages. Genetic manipulation - Transgenic fish production

Unit-III

Fishing Techniques

Crafts – Trawlers - Beam, Pair, outrigger, Seiners, Dredgers, gill, nutters, lift nutters, Line vessels, Trap Setters. Fishing Gears – Nets-Surrounding, Trawler, Dredgers, lift, gill, trap nets. Electricity in fishing, electronic devices for fish detection, Bumper catching Devices.

Unit-IV

Fish Preservation

Fish Spoilage – Chemical action, Autolysis, Microbial action, Principles of Fish preservation – Cleaning, low temperature, high temperature, dehydration, radiation, Use of salt and Preservatives, Methods of Preservation – Curing-Wet, dry, drying – Solar driers, monacuring, smoking, Pickling, icing, refrigeration, Deep freezing, Freeze drying, Canning.

Unit-V

Fisheries Byproducts

Products – Liver oil, Body oil, fish meal, Fish silage, Fish glue, Isinglass, Leather, Cavier, Marconi, Shark Fin soup, Fish pulp, Fish paste, Ensilage, Amergris, Freshwater weeds, seaweeds

Textbooks

1. Zade SB, Khune CJ, Sitre SR, Tijare RV. 2011. Principles of Aquaculture. Himalaya Publishing House.
2. Santhnam R. 1990. Fisheries Science. Daya Publishing House, New Delhi.

References

1. Arumugam N. 2014. Aquaculture. Saras Publications.
2. Pandey K, Shukla JP. 2015. Fish and Fisheries. Rastogi Publications.
3. Webster CD, Jana BB. 2003. Sustainable Aquaculture. Atlantic Publishers & Distributors.

Course code	Course title	C	H	I	E	T
	Practicals in Environmental Biotechnology and Medical Biotechnology			50	50	100

1. Estimation of chloride in water
2. Estimation of nitrates in drinking water
3. Estimation of biological oxygen demand
4. Identification and enumeration of coliform bacteria
5. Isolation of xenobiotic degrading bacteria
6. Isolation of lipase producing bacteria
7. Isolation of cyanobacteria
8. ELISA
9. Separation of serum and plasma
10. Isolation of lymphocytes
11. Immunoelectrophoresis

Spotters Activated sludge, Vermicomposting, Azolla, Trichoderma, Karyotyping, Syndromes, Diseases -Cystic fibrosis, sickle cell Anemia, Duchenne's muscular dystrophy, DNA fingerprinting, RFLP, SNP

Course Code	Course Title	C	H	I	E	T
	Practicals in Genetic Engineering and Fisheries Technology			50	50	100

1. Extraction of genomic DNA from Bacterial Cells
2. Extraction of Plasmid DNA from Bacterial Cells
3. Agarose gel electrophoresis
4. Quantification of nucleic acid
5. Restriction Digestion
6. Ligation
7. Competent cell preparation & Transformation
8. Selection of recombinants – Blue White Colony Selection
9. SDS – PAGE
10. Determination of pH in water samples.
11. Estimation of salinity
12. Estimation of dissolved oxygen.
13. Visit to a fish farm and tissue culture lab

Spotter - Placoid scales, stenoid scales, cycloid scales, channa, Penaeus ,Crossostrea , raft culture, Pinctada, argulus, lernaea,artemia,diatoms, Gears and Crafts, solar dryers

Course Code	Course Title	C	H	I	E	T
18U5LAC3	Food Preservation and Processing	2	2	25	75	100

Objectives

- To understand the basic principles of food processing
- To gain knowledge on the various methods of food preservation
- To learn about packaging technology

Learning Outcome

- Acquire knowledge on basic concepts in food process technology
- Create awareness on improved methods of food processing

UNIT I

Cereal technology

Agents causing spoilages, chemical changes in the grains, storage, handling and processing.

UNIT

Legume technology

Important legume grown, toxic factors in legume, effects of processing on nutrients composition and quality. New improved technologies of legume processing.

UNIT III

Processing of Miscellaneous foods

Fatty foods, essential oils, spices and other condiments, bottled beverages, salt, nut meats.

UNIT IV

Preservation and Processing of Sugar Products

Contamination – sucrose, maple syrup, honey, candy, spoilage and preservation.

UNIT V

Packaging Technology

Introduction, packaging materials, types of packaging, effects of packaging on the nutritive value

Text Books

1. Subbulakshmi G, Udipi SA. 2001. Food processing and Preservation, New Age International Publishers
2. Frazier WC, Westhoff DC .1995. Food Microbiology, Tata McGraw-Hill, 4th Edition.

References

1. Varzakas T, Tzia C. 2015. Handbook of Food Processing: Food Preservation. CRC Press.
2. Sivasankar B. 2002. Food Processing and Preservation. PHI Learning Pvt. Ltd.
3. Fellows PJ. 2009. Food Processing Technology. Elsevier.

Course Code	Course Title	C	H	I	E	T
18U5LSA1	Aquaculture	1	2	25	75	100

Objectives

- To understand the need and scope of aquaculture
- To study the economically important fishes, culture practices and management
- To encourage students for self employment

Learning outcome

- Acquire knowledge on aquaculture practices
- Motivates students to become entrepreneurs

Unit - I

Introduction to Aquaculture

Definition, Scope, role in economic development, Types – fresh water, brackish water, mariculture

Unit - II

Culture Practices

Cultivable fishes – Qualities, Types – Fin and Shell fishes, Practices – extensive, semi-extensive, intensive, Monosex culture, cage culture, sewage fed fish culture, Integrated fish farming – Paddy cum fish – types.

Unit-III

Fish breeding and Hatchery

Breeding - Natural, Artificial breeding - Stripping, Induced – Hypophysation, Hatching – Traditional and modern methods

Unit – IV

Fish feed and feeding

Live feed, Artificial feed – simple, compound, composition of ideal feed, qualities of good artificial feed

Unit – V

Fish diseases and management

Bacterial diseases – Furunculosis, Columiariis, tail and fin rot, gill diseases, Fungal – Saprolegniasis, Branchiomyosis, Protozoans – Whirling, Trypanosomiasis, Costiasis – Treatment

Text Book

1. Zade SB, Khune CJ, Sitre SR, Tijare RV. 2011. Principles of Aquaculture. Himalaya Publishing House.
2. Arumugam N. Aquaculture. Saras Publications

References

1. Santhnam R. 1990. Fisheries Science. Daya Publishing House, New Delhi.
2. Pandey K, Shukla JP. 2015. Fish and Fisheries. Rastogi Publications.
3. Webster CD, Jana BB. 2003. Sustainable Aquaculture. Atlantic Publishers & Distributors

Course Code	Course Title	C	H	I	E	T
18U6LAC4	Recombinant DNA Technology in Human Health	2	4	25	75	100

Objectives

- To understand the basic principles of gene therapy
- To gain knowledge on the various molecular based diagnostics
- To learn about the recombinant vaccines and monoclonal antibodies
- To acquire knowledge about the ART

Learning Outcome

- Acquire knowledge on basic concepts in Gene therapy
- Gain information on applications of molecular therapy and diagnostic tools
- Create awareness to Assisted Reproductive Technology

Unit - I

Gene Therapy

Gene therapy - types, treatment - ADA deficiency, haemophilia, Cystic Fibrosis. Gene delivery methods, Gene therapy strategies and antisense therapy - Cancer, AIDS. Stem cells - types, culture, applications.

Unit - II

DNA in Disease diagnosis

Nucleic acid hybridization- DNA probes ,mechanism of action of DNA probes, Radioactive and Non Radioactive detection system, PCR and signal amplification, DNA chip – Microarray - techniques and applications.

Unit - III

Pharmaceutical products of DNA Technology

Human protein replacement - production of recombinant therapeutic agents-Insulin, hGH, Clotting Factor VIII, Tissue Plasminogen Activator, Interferons.

Unit – IV

Recombinant Vaccine and Therapeutic Products

Recombinant Vaccines - Subunit vaccines - Hep B, HIV, DNA Vaccine, RNA vaccines, Edible vaccines. Industrial production of Insulin and Humalin.

Unit – V

Assisted Reproductive Technology

Manipulations of Reproduction in animals- artificial insemination, Embryo transfer- superovulation, MOET, Embryo cloning. Manipulation of reproduction in humans- causes of infertility and applications of ART, techniques employed – IVF, GIFT, IVC. Negative aspects of ART.

Text books

1. Satyanarayana U. 2017. Biotechnology. Books and Allied Pvt.
2. Jogdand SN. 2008. Medical Biotechnology. Himalaya Publishing House

References

1. Glick BR, Delovitch TL, Patten CL. 2014. Medical Biotechnology. ASM Press.
2. Pongracz J, Keen M. 2008. Medical Biotechnology. Elsevier Health Sciences.
3. Dubey RC. 2000. A text Book of Biotechnology. S. Chand & Company Ltd.

Course Code	Course Title	C	H	I	E	T
18U6LAP2	Practicals in Food preservation and processing & Recombinant DNA Technology in human health	1	2	25	75	100

1. ELISA
2. Separation of serum and plasma
3. Isolation of lymphocytes
4. Immunoelectrophoresis
5. SNP & RFLP
6. Determination of total carbohydrate in a food sample.
7. Determination of moisture content.
8. Determination of titratable acidity in a food samples.
9. Determination of total phenols in food samples.
10. Estimation of Ascorbic acid in food samples.
11. Estimation of reducing sugar in food samples.
12. Microbial analysis of ice cream and soft drinks

Spotters

Autoclaves, Centrifuge, Chromatography assembly/ analyzer, Colony counter, Kjeldahl apparatus, Muffle furnace, UV-Vis Spectrophotometer, pH Meter,