# VYSYA COLLEGE

Re-Accredited with "A" Grade by NAAC
Recognised under section 2(f) & 12(B) of the UGC Act. 1956
(Co-Educational Institution) Affiliated to Periyar University
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Ref.

Date 25 JAN 2022

## CRITERION- 1

**Curricular Aspects**

**1.3 Curriculum Enrichment**

**1.3.2 Average percentage of courses that include experiential learning through project work/field work/internship during last five years**

This is to certify that, the following department which includes experiential learning through project work/field work/internship is authenticated by me.

1. **Periyar University** Syllabus copies for which includes experiential learning through project work/field work/internship enclosed.

| S.No | Academic Year | No of Departments | Department Offering Experimental Learning | No of Courses Offering Experimental Learning | Average percentage |
|---|---|---|---|---|---|
| 1 | 2020-2021 | 9 | 1.BBA<br>2.MA ENGLISH<br>3.MSC MATHS<br>4.MSC CS | 4 | 0.44 |
| 2 | 2019-2020 | 9 | 1.BBA<br>2.MA ENGLISH<br>3.MSC MATHS<br>4.MSC CS | 4 | 0.44 |
| 3 | 2018-2019 | 9 | 1.BBA<br>2.MA ENGLISH<br>3.MSC MATHS<br>4.MSC CS | 4 | 0.44 |
| 4 | 2017-2018 | 8 | 1.BBA<br>2.MA ENGLISH<br>3.MSC MATHS<br>4.MSC CS | 4 | 0.50 |
| 5 | 2016-2017 | 8 | 1.BBA<br>2.MA ENGLISH<br>3.MSC MATHS<br>4.MSC CS | 4 | 0.50 |

Dr.P. VENKATESAN
PRINCIPAL
VYSYA COLLEGE
SALEM-636 103

# PERIYAR UNIVERSITY

**PERIYAR PALKALAI NAGAR**

**SALEM – 636011**

## DEGREE OF BACHELOR OF MANAGEMENT

*CHOICE BASED CREDIT SYSTEM*

*Syllabus for*

# B.B.A

## (BACHELOR OF BUSINESS ADMINISTRATON)

**( SEMESTER PATTERN )**

**( For Candidates admitted in the Colleges affiliated to Periyar University from 2017-2018 onwards )**

# REGULATIONS

## 1. ELIGIBILITY

Refer this office circular No: PU/R/AD-1/UG/PG/Programmes Eligibility/2019 Dated: 16-04-2019.

## 2. ELIGIBILITY FOR AWARD OF DEGREE

A candidate shall be eligible for the award of the degree only if he / she has undergone the prescribed courses of study in a college affiliated to the university for a period of not less than three academic years comprising six semesters and passed the examinations prescribed and fulfilled such conditions as have been prescribed there for.

## 3. COURSE OF STUDY

**a). Objectives of the Programme :**

i. To provide the basic and essential knowledge regarding various activities undertaken and necessary to run socially responsible business organization ;

ii. To impact certain basic skills and aptitude which will be useful in taking up any particular activity in a business ;

iii. To furnish global view of the several industries and other organizations and their functions which support the business system ;

iv. To develop the personality so as to become responsible citizen with greater awareness about the Indian society and its culture.

**b).** Theprogramme of study shall consist of Foundation courses, Core courses, Allied courses Skill BasedElective Courses (SBEC) and Non Major Elective Courses (NMEC).

**Note:** Modern or classical languages:

| | | |
|---|---|---|
| i. Indian | - | Telugu, Kannada, Malayalam, Urdu and Hindi |
| ii. Foreign | - | French |
| iii. Classical | - | Sanskrit, Arabic & Persian |

## 4. OTHER REQUIREMENTS

i. As a part of BBA curriculum a minimum of 2 factory visits per year must be arranged for the students.

ii. Industrial training report: For Industrial training. The students are expected to have a practical training in any business unit or undertaking to enable them to acquaint himself / herself with the procedure, practice and working of companies.

iii. Each student should undergo industrial training for a minimum period of two weeks during the third semester vacation.

## 5. REQUIREMENTS FOR PROCEEDING TO NEXT SEMESTER

Candidates shall be eligible to go to next semester, only if they satisfy the conditions prescribed by the syndicate from time to time.

## 6. PASSING MINIMUM

A candidate shall be declared to have passed in each courses if he / she secures not less than 40% prescribed for the examination. He / She shall be declared to have passed the whole examination if he / she passed in all the course as per the scheme of examination.

## 7. CLASSIFICATION OF SUCCESSFUL CANDIDATE

Successful candidate passing all the examinations securing the credits in the aggregate of the marks prescribed for core allied SBEC & NMEC courses together shall be declared to have passed the examination in first and second class respectively. All other successful candidates shall be declared to have passed in the examination to the third class. Candidates who obtained 75% of marks and above any course shall be deemed to have passed that course with distinction provided they passed the examination at the first appearance.

## 8. RANKING

Candidates who pass all the examinations prescribed for the course in the **first appearance** only are eligible for ranking.

## 9. MAXIMUM DURATION FOR THE COMPLETED OF THE UG PROGRAMME

The maximum duration for completion of the UG programme shall not exceed twelve Semesters.

## 10. COMMENCEMENT OF THIS REGULATION

The regulations shall take effect from the academic year 2017-2018 i.e., for students who are admitted to the first year of the programme during the academic year 2017-2018 and thereafter.

## 11. TRANSITORY PROVISION

Candidates who were admitted to the UG programme of study before 2017-2018shall be permitted to appear for the examinations under those regulations for a period of three years i.e., up to and inclusive of the examination of April / May 2018. Thereafter, they will be permitted to appear for the examination only under the regulations there in force.

# REVISED SYLLABUS

# COURSE OF STUDY AND SCHEME OF EXAMINATION

**SEMESTER – I**

| PART | STUDY COMPONENTS | COURSES | HOURS / WEEK | CREDITS |
|---|---|---|---|---|
| Part - I | Languages | Tamil or anyone of the modern (Indian or foreign) or classical Languages - I | 6 | 3 |
| Part - II | Languages | English - I | 6 | 3 |
| Part - III | Core - I | Principles of Management | 5 | 4 |
| | Core - II | Business Communication | 5 | 4 |
| | Allied - I | Business Mathematics and Statistics-I | 6 | 4 |
| Part -IV | Non major -I | | | |
| | Value Education | Yoga | 2 | 2 |
| | | **Total** | **30** | **20** |

**SEMESTER – II**

| PART | STUDY COMPONENTS | COURSES | HOURS / WEEK | CREDITS |
|---|---|---|---|---|
| Part - I | Languages | Tamil or anyone of the modern (Indian or foreign) or classical Languages - II | 6 | 3 |
| Part - II | Language | English - II | 6 | 3 |
| Part - III | Core - III | Organizational Behavior | 5 | 5 |
| | Elective - I | Financial Accounting | 6 | 5 |
| | Allied - II | Business Mathematics and Statistics-II | 6 | 4 |
| Part - IV | Non major -II | Environmental Studies | 2 | 2 |
| | | **Total** | **30** | **22** |

## SEMESTER – III

| PART | STUDY COMPONENTS | COURSES | HOURS / WEEK | CREDITS |
|---|---|---|---|---|
| Part - III | Core - IV | Marketing Management | 6 | 4 |
| | Core - V | Financial Management | 6 | 4 |
| | Core - VI | Human Resource Management | 6 | 4 |
| | Allied - III | Managerial Economics | 4 | 3 |
| Part - IV | SBEC - I | 1. Campus to Corporate - (Viva-Voce) | 2 | 2 |
| | | 2. Fundamentals of Insurance | 2 | 2 |
| | | 3. Life Skill Education | 2 | 2 |
| | NMEC - I | 1 Principles of Management | 2 | 2 |
| | | **Total** | **30** | **23** |

## SEMESTER – IV

| PART | STUDY COMPONENTS | COURSES | HOURS / WEEK | CREDITS |
|---|---|---|---|---|
| Part - III | Core - VII | Production and Materials Management | 6 | 4 |
| | Core - VIII | Management Accounting | 6 | 4 |
| | Core - IX | Business Law | 6 | 4 |
| | Allied - IV | Money Banking and Global Business | 4 | 3 |
| Part -IV | SBEC - II | 1. Export and Import Documentation | 2 | 2 |
| | | 2. In plant Training -(Viva -Voce) | 2 | 2 |
| | | 3. Practice of Business Relations | 2 | 2 |
| | NMEC - II | 1. Human Resource Management | 2 | 2 |
| | | **Total** | **30** | **23** |

## SEMESTER – V

| PART | STUDY COMPONENTS | COURSES | HOURS / WEEK | CREDITS |
|---|---|---|---|---|
| Part - III | Core - X | Business Policy and Strategy | 5 | 5 |
| | Core - XI | Operations Research | 6 | 4 |
| | Core - XII | Cost Accounting | 6 | 5 |
| | Core - XIII | Fundamental of Research Methodology | 5 | 4 |
| | Core - XIV | Management Information System | 5 | 4 |

| | GROUP-A | GROUP-B | GROUP-C | GROUP-D | GROUP-E | HRS | CR |
|---|---|---|---|---|---|---|---|
| Electives -II | Service Marketing | Industrial Relations | Investment Management | Total Quality Management | Data Base Management System | 4 | 4 |
| | | | | | **Total** | **30** | **26** |

## SEMESTER – VI

| PART | STUDY COMPONENTS | COURSES | HOURS / WEEK | CREDITS |
|---|---|---|---|---|
| Part -III | Core - XV | Business Environment | 6 | 4 |
| | Core - XVI | Financial Institutions and Services | 6 | 4 |
| | Core - XVII | Entrepreneurial Development | 5 | 4 |
| | Core - XVIII | Project Work-Viva-voce | 3 | 5 |
| | Core - XIX | Computer Application in Business - Theory | 3 | 2 |
| | | - Practical | 3 | 2 |

| | GROUP-A | GROUP-B | GROUP-C | GROUP-D | GROUP-E | HRS | CR |
|---|---|---|---|---|---|---|---|
| Electives -III | Retail Marketing Management | Training & Develop--ment | Portfolio Management | Merchandising Management | E-Business | 4 | 4 |
| Part V | Extension Activities | | | | | - | 1 |
| | | | | | **Total** | **30** | **26** |
| | **OVER ALL TOTAL** | | | | | **180** | **140** |

**Note :** Modern or classical languages:

i. Indian – Telugu, Kanada, Malayalam, Urudu and Hindi
ii. Foreign – French
iii. Classical - Sanskrit, Arabic & Persian

## SEMESTER-I

## CORE I - PRINCIPLES OF MANAGEMENT

**UNIT – I**

Management– Definition – Importance – Nature – Scope and Functions – Principles of Management.Evolution of Management Thoughts – Contributions of F.W. Taylor - Henry Fayol – Elton Mayo –Hawthorne Experiment.

**UNIT – II**

Planning – Importance – Advantage – Steps in planning – Types of Plans – Management by Objectives (MBO) – Process – Merits – Limitations.Decision Making – Definition – Types of decision – Process of decision making.

**UNIT – III**

Organisation – Need for Organisation – Process – Organisational Structure – Line Functional, Line & Staff Organisation.Span of Management – Delegation –Centralisation and Decentralisation – Staffing – Nature & Purpose of Staffing.

**UNIT – IV**

Directing – Meaning, Importance, Principles – Leadership – Styles of Leadership – Qualities for effective leadership.Motivation – Theories of motivation – Maslow's need hierarchy theory, Herzberg's two factor theory and their comparison

**UNIT – V**

Co-ordinating – Need – Principles – Approaches to achieve effectiveCo-ordination. Controlling – Meaning – Elements and significance – Steps in control process – control techniques.

**TEXT BOOKS**


1. C.B. Gupta, Business Organization & Management, Sultan Chand & Sons.
2. L.M. Prasad, Principles of Management, Sultan Chand & Sons.


**REFERENCE BOOKS**


1. DingarPagare, Business Management, Sulthan Chand & Sons
2. Tripathi P.C. & P.N. Reddy, Principal of Management, TMH
3. Bhusan Y.K. Business Organization and Management, McGraw Hill
4. Koontz and O.Donnel, Essentials of Management, McGraw Hill
5. Ramasamy. T, Principles of Management, Macmillan India Ltd.,
6. Basu, Organisation& Management, S. Chand
7. M.C. Shukla, Business Organisation and Management, S.Chand
8. RustomDavar, Management Process, Progressive Corporation Pvt., Ltd
9. J. Jayashankar, Principal of Management, Margham Publications.
10. Dr.RupaGunaseelan& Dr. Kulandaisamy, Vikas Publishing House, SulthanChand& Sons, New Delhi.
11. Dr.V.R.Palanivelu, Principles of Management, Himalaya publishing House, Mumbai
12. Dr.S.Karthick, Principles of Management, Shanlax Publication.

## SEMESTER I

## CORE II - BUSINESS COMMUNICATION

**UNIT – I**

Communication – meaning – objectives – process – media of communication – types of communication – barriers to communication - principles of effective communication.

**UNIT – II**

Business letters – layout of Business letters - types - Business enquires and replies – offers – quotations – orders – complaints and adjustments – collection letters – circular letters – status enquires.

**UNIT – III**

Bank correspondence – insurance correspondence – agency correspondence – letters to the editors – applications for appointment.

**UNIT – IV**

Company correspondence – Duties of Secretary – correspondence with directors, Shareholders, government departments and others.

**UNIT – V**

Report – meaning – importance – characteristics of a good report – preparing report -report by individuals – report by committees – speeches – characteristics of good speech – planning to speak.

**TEXT BOOK**

1 .Rajendrapal&Koralahalli J.S. Essentials of Business Communication Sulthan Chand & Sons.

**REFERENCE BOOKS**

1. Ramesh M.S. &Pattan Shetty, Effective Business English & Correspondence RC Publications.
2. Balasubramanian, Business Communication, Vikas Publishing House Pvt., Ltd.,
3. US Rai, SM Rai, Business Communication, HPH
4. RSN Pillai, Bagavathi, Commercial Correspondence & Office Management.
5. N.S. Rashunathan and B.Santhanam, Business Communication,MarghamPublications,Chennai.
6. Chanturvedi, Business Communication Concepts, Case and Applications, Pearson Education.

## SEMESTER I

## ALLIED COURSE I - BUSINESS MATHEMATICS AND STATISTICS - I

**UNIT – I**

Series: Sequence – Series – Arithmetic Progression – Geometric Progression – Harmonic Progression (Simple Problems Only)

**UNIT – II**

Matrices : Fundamental ideas about matrices and their operational rules – matrix addition and multiplication – inverse of square matrices of not more than order third – solving Simultaneous equations.

**UNIT – III**

Description statistics: Meaning and definition of statistics – scope and limitations statistical survey – source and collection of data – classification and tabulation – presentation of statistical report.

**UNIT – IV**

Diagrams and graphs – measures of central tendency – arithmetic, geometric, Harmonic mean – Mean – median – mode – combined mean.

**UNIT – V**

Measures of variations – absolute and relative measures – range – mean deviation – standard deviation. Measures of variations – absolute and relative measures – range – mean deviation – quartile deviation – standard deviation. Measures of skewness – Kurtosis – Lorenz curve.

**TEXT BOOKS**


1. Gupta S.P., Statistical methods – Sulthan Chand & Sons, New Delhi.
2. P.R.Vittal, Business Mathematics and Statistics, Margham Publications.


**REFERENCE BOOK**


1. Stafford, Business Mathematics - Tata Mc Graw Hill
2. Sundharsan, An Introduction to Business Mathematics, Sulthan Chand & Sons, New Delhi.
3. Pillai R.S.N. & Mrs. Bagavathi, Statistics – SulthanChand& Sons, New Delhi.
4. Dr. P.R. Vittal, Business Mathematics and Statistics, Tata Mc Graw Hill
5. Sharma, Business Statistics – MarghamPublications,Chennai.
6. Dr. S.P. Gupta & Dr. M.P. Gupta, Business Statistics, SulthanChand& Sons, New Delhi.
7. RSN Pillai & V. Bagavathi, Statistics, Sulthan Chand & Sons, New Delhi.
8. M.Murali, “Business Mathematics and Statistics”, Mithila Publications,

## SEMESTER II

## CORE III - ORGANISATIONAL BEHAVIOUR

**UNIT- I**

Meaning- objectives and nature of organizational behaviour – disciplines contribution to organisationalbehaviour – important concept of organisationalbehaviour . Theories of organisation – classical – neo classical and modern theories.

**UNIT -II**

Individual behaviour – factors - personality – types of personality - attitude. Group behavior – meaning – type of groups – formation – group dynamics – group cohesiveness – group decision making.

**UNIT- III**

Morale – meaning – benefits – measurement, job satisfaction – meaning and factors – stress – causes - managing stress.

**UNIT- IV**

Work environment – good housekeeping practices – design of work places – Hawthorne experiments and their importance.

**UNIT -V**

Organisational change – meaning – nature – causes of change – resistance to change – overcoming the resistance – counseling – types of counseling. -

**TEXT BOOK**


1. LM.Prasad, OrganisationalBehaviour, Sulthan Chand & Sons, New Delhi.
2. Khanka, OrganisationalBehaviour, Sulthan Chand & Sons, New Delhi.


**REFERENCE BOOKS**


1. Fred Luthans, OrganisationalBehaviour, McGraw Hill.
2. Keith Devis, John W.Newstrom, OB –Human Behaviour at work, TMH
3. M.L.Blum, Industrial psychology and it social foundations.
4. J.Jayasankar, OrganisationalBehaviour, Margham publications, Chennai
5. P.SubbaRoa, Management and OrganisationalBehaviour – HPH
6. Robbinsstephen.P, OrganisationalBehaviour, Prentice Hall, New Delhi.

## SEMESTER II

## ELECTIVE COURSE - I

## FINANCIAL ACCOUNTING

**UNIT - I**

Basic accounting concepts and convention – Accounting equations – Meaning of accounting – Groups interested in accounting information – Journal, Ledger, Subsidiary books.

**UNIT – II**

Trial balance – Final Accounts – (Simple Problems Only). Bank reconciliation statement – Average due date – Accounts current.

**UNIT- III**

Hire purchase – methods of calculation of interest, Entries in the books of hire purchaser and hire vendor – Hire purchase trading account – Installment purchase – Entries in the books of purchaser and seller.

**UNIT-IV**

Bills of Exchange – Meaning – entries in the books of drawer and drawee – Dishonor – noting and protest – Renewal – Accommodation bill.

**UNIT- V**

Depreciation accounting – Meaning - Advantages and disadvantages - Types of depreciation – straight line method-written down value method - sinking fund - annuity method..

**TEST BOOK**

1. Gupta R.L., Advanced Accountancy – Sulthan Chand & Sons, New Delhi.

**REFERENCE BOOKS**


1. Shukla RL., Grewal, T.S., Advanced Accountancy Vol. – I, Sulthan Chand & Sons, New Delhi.
2. Tulsian P.C., Advanced Accountancy – Tata McGrawHill.
3. AmitabhaMukerjee Mohammed Anif – Modern Accounting – Tata McGrawHill.
4. T.S. Grewal, Double Entry Book – Keeping, Sulthan Chand & Sons, New Delhi..
5. T.S. Reddy, A. Moorthy, Cost Accounting, Margam Publication, Chennai.

# SEMESTER II

## ALLIED COURSE– II

### BUSINESS MATHEMATICS AND STATISTICS – II

**UNIT – I**

Mathematics of finance: simple and compound interest – annuity – present value of annuity – sinking fund – percentage – discounts.

**UNIT – II**

Basics of calculus – limits – rules of differentiation – maxima and minima (single variable case only) – simple application problems in maxima and minima.

**UNIT – III**

Linear simple correlation – scatter diagram - karlpearson's coefficient of correlation – rank correlation coefficient – regression lines-Fitting of Regression Lines

**UNIT – IV**

Time series analysis : components of time series – measures of trend – free hand curve – semi and moving average – methods of least squares – measures of seasonal variation – simple average method.

**UNIT – V**

Index numbers – definition - construction of index numbers – weighted and unweighted Index Number – fixed and chain index numbers – test for an ideal index numbers – cost of living index number

**Note:**

1. Problems: 80% & Theory: 20%

**Text book**

1. Naveneetham p, business mathemaitcs, jai publications.

**Reference books**

1. Dharmapadam, business mathematics, s. Viswanathan publications
2. Gupta S.P. Statistical methods, sultan chand& co.
3. Sundharsan&Jayaseelan, an introduction to business mathematics, sulthanchand& co
4. Pillai R.S.N. &Bagavathi v, statistics, sultan chand& co
5. Dr. P.R. Vittal, business mathematics and statistics, margham publications

## SEMESTER III

## CORE IV - MARKETING MANAGEMENT

**UNIT – I**

Marketing – Definition – Scope – Importance –changingConcepts of marketing – modern marketing concept. Marketing Environment – micro environmental factors – macro environmental factors.

**UNIT – II**

Consumer Behaviour – Factors influencing buying behaviour – consumer buying decision process – Buying motives - influences.Market segmentation – criteria - Bases of segmentation – benefits .

**UNIT – III**

Marketing Mix – Elements – Product mix – classifications of product – New product Development – Product Life cycle.Pricing mix - Pricing policies – kinds of pricing.

**UNIT – IV**

Channels of distribution – Types of middlemen – factors influencing channel selection.Promotion mix – Advertising – objectives - characteristics of Effective Advertising sales promotion – methods (levels) of sales promotion .

**UNIT – V**

Personal Selling. – kinds of salesmanship – Qualities of successful sales person - publicity.Recent trend in marketing – e-business– Telemarketing – Relationship marketing – Virtual Advertising.

**TEXT BOOK**

1. N. RajanNair , Marketing Management, Sultan Chand & Sons.

**REFERENCE BOOKS**

1. Philip Kotler, Marketing Managemetn, Millennium Edition, PHI.
2. Ramasamy V.S. and Namakumary S, Handbook of Marketing Management, Macmillan.
3. Rajagopal, Marketing Management, Vikas Publishing House Pvt., Ltd.,
4. S. Jayachandran, Marketing Management, Excel Books.
5. RajanSaxena, Marketing Management, TMH.
6. Sherlakar, S.A., Marketing Management, HPH.
7. R.S.N. Pillai, Marketing Management, Sulthan Chand & Sons, New Delhi.
8. Dr.R.Murugesan, Marketing Management, MargamPublication,Chennai.

## SEMESTER III

## CORE V - FINANCIAL MANAGEMENT

**UNIT - I**

Financial management – definition – objectives – importance – functions – role of a financial manager.

**UNIT - II**

Investment Decisions: Capital budgeting decisions – importance – Factors affecting Capital investment decisions – Methods of evaluating investment Proposals: Payback – NPV – PI – IRR – ARR (Simple Problems only).

**UNIT – III**

Financial Decisions - Long term and Short term sources of finance – Capital Structure – Meaning – Factors determining Capital Structure.Leverages - Meaning - Types – Importance.

**UNIT- IV**

Cost of capital – Concepts – Determinants of Cost of Capital – Simple and Weighted average cost of Capital (Simple Problems only).Dividend Policy – Forms of dividend – Determinants of dividend.

**UNIT-V**

Working capital management – meaning – importance – types – factors determining working capital, estimation of working capital (simple problems only).Management of cash, inventory, accounts receivables and accounts payable (theory only).

**NOTE :**

Theory-80% of Marks,Problem-20% of Marks

**TEXT BOOK**


I. M. Pandey, Financial Management – Vikas Publishing House.

2. Dr.V.R.Palanivelu-Financial Management-Sulthan Chand & Sons, New Delhi.


**REFERENCE BOOKS**


1. Dr. S.N. Maheswari, Principles of Financial Management, Himalaya Publishing House.

2. M.C.Kuchal, Financial Management – Vikas Publishing House

3. Kulkarni &Sathya Prasad, Financial Management – Himalaya Publishing House.

4. Dr. Srivastava, Financial Management, Himalaya Publishing House.

## SEMESTER III

## CORE VI -HUMAN RESOURCE MANAGEMENT

**UNIT – I**

Human Resource Management – Definition –Objectives – Scope – Functions of HRM. Job analysis – Process of job analysis, Team analysis – Employee Empowerment.

**UNIT – II**

HumanResource Planning – Objectives – Process of HRP– Recruitment – Sources of recruitment.Selection Procedure - Test and Interview - Types – reference check – final selection - Placement – Induction (orientation).

**UNIT – III**

HRD – Need – Functions – Training – Methods – Executive Development – Differences between Training and Development. Career Planning – Process – Succession Planning - Concept of Quality of Work Life (QWL) .

**UNIT – IV**

Performance appraisal – Process – Techniques – Difference between Performance appraisal and Job Evaluation.Job Evaluation – Process – potential appraisal.

**UNIT – V**

Promotion – Criteria – Benefits of effective promotion policy, Transfer – Purpose of transfer. Absenteeism – Causes – Measures - Labour Turnover – separation – VRS - retirement – dismissal .

**TEXT BOOK**

1. S.S. Khanka, Human Resource Management, SulthanChand& Sons, New Delhi.

**REFERENCE BOOKS**

1. C.B. Mamoria, Personnel Management – Humalaya publications house.
2. J. Jayasankar, Human Resource management, Margham Publications, Chennai.
3. K. Aswathappa, Human Resources and Personnel Management, TMH, New Delhi.
4. Kaushal Kumar, Human Resources Management – ABD Publishers.
5. Keith Davis, Human Relations at work – TMH.
6. G.R. Bassotia, Human Resources Management, Mangal Deep Publications.
7. Dr.K.Ramesh, "Human Resource Management", Mithila Publications,

## SEMESTER III

## ALLIED COURSE – III
## MANAGERIAL ECONOMICS

**UNIT – I**

**Business Economics**: Concept – Importance – Scope - Methods – Micro – Macro - Objectives of Business Firm. **Demand and Supply**: Law Of Demand – Elasticity Of

Demand. **UNIT – II**

**Market Structure**: Perfect Competition – Monopoly –Monopolistic Competition – Oligopoly andDuopoly.

**UNIT – III**

**Production Function:** Factors of Production – Laws Of Returns – Returns To Scale And Law OfVariable Proportions – Economies Of Scale – Mixed Economy.

**UNIT – IV**

**Business Cycle**: Characteristics – Phases – Control Of Trade Cycle. **Inflation**: Definition – Characteristics – Types – Effects – Anti-Inflationary Measures. **Deflation**: Effects – Control.

**UNIT – V**

**National Income:** GDP - GNP – NNP - Per Capita Income - Balance Of Trade - Balance of Payment.

**TEXT BOOK**

**1.** S .Sankaran, "Managerial Economics", Margham Publications, Chennai, 5th Edition, 2006

**REFERENCE BOOKS**

1. Dr.R.Sathiyakala, Business Economics, Shanlax Publication.
2. Mankar.V.G., "Business Economics", Macmillan, New Delhi, 1st Edition, 2004.
3. Mithani.D.M. "Essential Of Managerial Economics", Himalayan PublishingHouse, Mumbai, 1st Edition, 2004.
4. Sundharam.K.P.M, Sundharam.E.N, "Business Economics", Sultan Chand & Sons, 4th Edition, 2005.

## SEMESTER III

## SBEC - I (SKILL BASED ELECTIVE COURSE)

## PAPER I - CAMPUS TO CORPORATE – VIVA- VOCE

**Objective:**

To familiarize students with various communication methods that exists in business and to train them for smooth transition from campus to corporate.

**UNIT–I**

Overview of corporate – History of corporate–campus and corporate – distinction overview of BPO Industry in India and world Enhancing the reading ability of students (at a speed of minimum 150 words per minute with appropriate stress, voice modulation and correct pronunciation). Students should be exposed to the practice of reading news papers viz., TheHindu, Indian Express, Business Line, Economic Times etc., and magazines like business world, etc.,

Enhancingthe spontaneous writing skill of the students–writing articles on simple to pics given–preparing speeches–preparing reports on various events / functions held in the college.

**UNIT–II**

Enhancing the spontaneous speaking skill of the students–self introduction at various forums and during interviews – Effective Public Speaking (EPS) – Roleplaying. Mock interviews for recruitment – mockpressmeets.

**UNIT–III**

Enhancing the presentation skill of the students – Individual seminar presentation and Group seminar presentation (Students may be organized in to groups, which will prepare paper so current issues pertaining to trade, commerce and industry or any social issue and present the same to audience). Each group may consist of 3 or 4 students.

**UNIT–IV**

Enhancing the interpersonal communication skill of the students – Group Commission (Students may be organized in to 4 and 5 groups). All the groups may be give management problem relating to real life experiences of trade and industry in the country or the world. They will be asked to find group solution through discussion and the group leader will present the same to the audience in the class.

**UNIT–V**

Fundamentals of English – constructing sentences – correct use of tenses – articles –international phonetic alphabet – vowel and consonant sounds–syllable stress – in to nation – listening – principles of good listening – accent comprehension – practical exercises

Corporate etiquette – Dressing and grooming skills – Work place etiquette – Business etiquette – Email etiquette – Telephone and meeting etiquette – Presentation skills.

Professional competencies : analytical thinking – listening skills – time management – team skills – stress management – assertiveness – Facing group discussion and interview.

**TEXT BOOKS**

1. Rajendra Pal &Korlahalll, Essentials of Business Communication, Sultan Chand &Sons,2008.

**REFERENCE BOOKS**

1. NamrataPalta, The art of Effective Communication, Lotus Press, New Delhi,2007.
2. S.K.Mandal, Effective Communication and Public Speaking, Jaico Publishing.
3. V.Sasikumar,P .KiranmaiDutt, GeethaRajeevan, A. Course in Listerning and Speaking II, Cambridge University Press, 2007.

## SEMESTER III

## SBEC -I - PAPER II - FUNDAMENTALS OF INSURANCE

**UNIT – I**

Definition of Insurance – Classification of contracts of insurance – Marine and Non-Marine Insurance.

**UNIT – II**

Life Assurance – Objects of Life assurance – Principles of Life Assurance – Assignment and Nomination – Lapses and Revivals – Surrender values and loans – Claims – Double Insurance.

**UNIT – III**

Marine – Insurance – Principles of Marine insurance – Functions of marine insurance – Types of marine policies – Warranties – kinds of marine Losses.

**UNIT – IV**

Fire Insurance – Principles of law as applied to fire insurance. Fire waste – Hazard Types of fire policies.

**UNIT – V**

Cover Notes – Surveys and Inspections Average – Reinsurance Renewals.

**REFERENCE BOOKS**


1. Sharma R.S., Insurance: Principles and Practices (1960 Vora, Bombay)
2. Arifkhan M, Theory and Practice of Insurance (1976) Education Book House.
3. Srinivasan M.N., Principles of Insurance Law (1977) Ramanuja Publishers, Bangalore.
4. Dr. B.Varadharajan, Insurance : Vols. I and II (1979) Tamil Nadu Text Book SocietyIV - SBEC
5. Dr. R.Haridas, Life Insurance in India, New Century Publication, New Delhi.

## SEMESTER III

## SBEC -I - PAPER III - LIFE SKILL EDUCATION

**UNIT 1**

Definition and Importance of Life Skills, Livelihood Skills, Survival Skills and Life Skills. Life Skills Education, Life Skills Approach, Life Skills Based Education.

**UNIT II**

Self awareness: Definition, types of self. Self concept, body image, self esteem. Techniques used for self awareness: Johari window, SWOT analysis. Empathy, sympathy & Altruism.

**UNIT III**

Interpersonal relationship: Definition, factors affecting relationship. Listening: Definition & Tips for Effective listening. Thinking: Nature, Elements of thought. Types of thinking, concept formation, reasoning. Critical thinking: Definition, nature & stages.

**UNIT IV**

Goal setting. Coping with stress: Definition, stressors, source of stress. Coping skills.

**UNIT V**

Coping with emotions: Definition, Characteristics and types. Coping strategies.

**PRESCRIBED BOOKS**


1. Delors, Jacques (1997). Learning: The Treasure Within, UNESCO, Paris..
2. UNESCO (1997). Adult Education: The Hamburg Declaration, UNESCO, Paris.
3. UNESCO (2005). Quality Education and Life Skills: Darkar Goals, UNESCO, Paris.
4. WHO (1999). Partners in Life Skills Education: Conclusions from a United Nations – AgencyMeeting, WHO, Geneva.
5. SantrockW.John (2006). Educational Psychology. (2nd Edn.)New Delhi: Tata McGraw-Hill Publishing Company Ltd.


**REFERENCES**


1. Dakar Framework for Action, (2000). Education for All: Meeting our Collective Commitments, Dakar, Senegal.
2. Kumar .J. Keval, (2008).Mass Communication in India, JAICO Publication India Pvt. Ltd
3. Morgan and King, (1993). Introduction to Psychology, Tata McGraw-Hill Publishing Company Ltd, NewDelhi.
4. Rao P.L. (2008). Enriching Human Capital through Training and Development, Excel Books, Delhi.
5. Singh Madhu, (2003). Understanding Life Skills, Background paper prepared for Education for All: The Leap to Equality

## SEMESTER III

## NMEC- I - PRINCIPLES OF MANAGEMENT

**UNIT – I**

The Development of Management Thought – Contributions of F.W. Taylor. Henri Fayol – Eltonmayo and Mary Parker Follet.

**UNIT – II**

Planning – Nature – Purpose – Steps – Types – Merits and Demerits of Planning – MBO.

**UNIT – III**

Organising – Nature – Purpose – Departmentation – Span of Control – Delegation – Centralisation and Decentralisation – Line and Staff – Committees. Staffing – Nature and Purpose of Staffing – Components of Staffing.

**UNIT – IV**

Directing– Principles of Directing – Leadership – Motivation – Communication – Process of Communication – Barriers of Communication – Effective Communication.

**UNIT – V**

Controlling – Concept of Control – Methods of Controlling. Co-ordinating – Need – Principles – Approaches to Achieve Effective
Co-ordination.

**TEST BOOK**

1. L.M. Prasad - Principles of Management

**REFERENCE BOOKS**


1. Harold Koontz and O'Donnel, Principles of Management
2. Newman and Warrann, The Process of Management
3. Peter F. Drucker, Practice of Management
4. Lious A. Allen, Management and Organisation
5. Dr.RubaGunaseelan and Dr.V.Kulandaisamy, Principles and Practice of Management, S.Chand& Sons, New delhi.

## SEMESTER IV

## CORE VII - PRODUCTION AND MATERIALS MANAGEMENT

**UNIT- I**

Production Management -Definitions -Functions & scope -Plant Location -Factors - Plant Layout principles -Types -Importance.

**UNIT- II**

Production Planning & control -principles –functions -process plant maintenance - Types - Maintenance scheduling Fundamentals of Reengineering.

**UNIT-III**

Materials management -meaning, Definition Importance- functions -Integrated materials Management -concepts -Advantages -Process.

**UNIT- IV**

Management of materials -Techniques of materials planning -Inventory control -meaning & importance - Tools of inventory control -ABC, VED, FSN Analysis -EOQ.

**UNIT- V**

Purchasing -procedure -principles -vendor rating - vendor Development -Store keeping & materials handling -objectives -Functions -Equipments. .

**TEXT BOOKS**


1. Saravanavel .P &Sumathi .S, Production & Material Management., Margham publications.
2. Gopalakrishnan&Sundaresan, Materials Management, PHI


**REFERENCE BOOKS**


1. Dr.K.Arul& Dr. S.Karthick, Production and Materials Management, Shanlax Publication. Madurai.
2. Varma.M.M, Materials Management, Sultan Chand & Sons
3. Dutta, Integrated Materials Management, PHI
4. O.P. Kanna, Industrial Engineering & Management, Dhanpatrai Publications.
5. MartandTelsang, Industrial Engineering and Production Management, S.Chand.

## SEMESTER IV

## CORE VIII - MANAGEMENT ACCOUNTING

**UNIT - I**

Management Accounting – Meaning – Objectives – advantages – limitations – management accounting Vs Financial accounting – management accounting Vs cost accounting.

**UNIT - II**

Fund flow analysis – preparation of schedule of changes in working capital and fund flow statement.

**UNIT – III**

Cash flow analysis – preparation of cash flow statement – distinctions between cash and fund flow statement.

**UNIT- IV**

Accounting Ratios – Meaning – types calculation of ratios – construction of balance sheet (simple problems only).

**UNIT-V**

Budget and budgetary control – meaning – types – materials and production budget – flexible budget – cash budget – sales budget.

**NOTE :**Questions in Theory and Problems carry 30% and 70% of marks respectively.

**TEST BOOK**

1. Maheswari S.N. Principles of Management Accounting – Sultan Chand.
2. Dr. V.R. Palanivelu, "Accounting for Management"- University Science (Press- New Delhi)

**REFERENCE BOOKS**

1. Man Mohan &Goyal, S.M., Principles of Management Accounting – Sathiya.
2. Reddy T.S. &Hariprasad Reddy. Y, Management Accounting, Margham Publication.
3. R.S.N. Pillai and Bagavathi, Management Accounting – Sultan Chand.
4. Dr. P. Periyasamy, Financial & Management Accounting – Himalaya Publications.

## SEMESTER IV

## CORE IX - BUSINESS LAW

**UNIT - I**

Business Law – Meaning, Objectives – Sources – law of contract – meaning – types – essential elements of a valid contract.

**UNIT - II**

Discharge of contract – remedies for breach of contract – agreement not declared void – agreement expressly declared void – wagering agreements.

**UNIT – III**

Bailment – rights and duties of bailor and bailee - pledge – indemnity – guarantee – mortgage.

**UNIT- IV**

Law of sale of goods – sale and agreements to sale – their distinctions – types of goods – conditions and warranties – CAVEATEMPTOR– transfer of property – sale by non – owners – performance – remedies for breach – unpaid seller – auction sale.

**UNIT-V**

Law of agency – creation of agency – classification of agents – duties and rights of an agent and principal – termination of an agency.

**TEST BOOK:**

1. Kapoor N.D, Business Law, Sultan Chand & Sons

**REFERENCE BOOKS**

1. RSN Pillai, Bagavathi, Business Law, S. Chand.
2. Shukla M.C., Mercantile Law, S. Chand.
3. P.C. Tulsian, Business Law, TMH.

## SEMESTER IV

## ALLIED COURSE - IV

## MONEY AND BANKING AND GLOBAL BUSINESS

**UNIT - I**

Banking – Evolution – meaning and definition of banking – classification of banks – unit and branch banking functions of commercial banks – role of commercial banks in economic development – functions of central bank in economic development – functions of central bank (with reference to RBI) – credit creation and credit control.

**UNIT - II**

Recent Trends in Indian Banking – Types of financing – repayment methods – bank NET – Automatic Teller Machines – (ATM) – phone banking – credit cards – E-banking – reforms in banking sector.

**UNIT – III**

Inflation & Deflation – Inflation – types of inflation – cost push and demand pull inflation – control of inflation – deflation – stagflation – control of deflation – phases of trade cycle.

**UNIT- IV**

Money market – London – New York & Indian money market – capital market – functions of capital market – difference between money and capital market – monetary policy.

**UNIT-V**

Exchange – Determination of exchange rate – devaluation of money – exchange control – flow of foreign capital – euro currency- GATT & WTO.

**TEXT BOOK :**

1. R. Parameswaran& S. Natarajan, Indian Banking – S. Chand.

**REFERENCE BOOKS**


1. Methane D.M., Money Banking And International Trade, Himalaya Publishing House.
2. Ashok Desai, Indian Banking, Himalaya Publishing House.
3. M.L. Jhingan, Money Banking and International Trade, S. Chand, New Delhi.

## SEMESTER IV

## SBEC II - PAPER I - EXPORT AND IMPORT DOCUMENTATION

**UNIT – I**

Documentation Framework – EXIM Documentation – Instruments and methods of Financing Exports – Credit and Collections.

**UNIT – II**

Foreign Exchange Regulations and Formalities – Pre – Shipment; Inspection and Procedures – Role of Clearing and Forwarding Agents.

**UNIT – III**

Custom Clearance of Export and Import Cargo – Regulatory Documents – Bill of Lading – Export License – Bill of Exchange.

**UNIT – IV**

Processing of an Export Order, World Shipping, Structure, Liners and Tramps – Containerization.

**UNIT – V**

Import Documentation – Import Procedure, guidelines, key documents used in Importing – Import Licensing and other incentives.

**TEXT BOOKS**


1. Francis Cherunilam : International Trade and Export Management Mumbai, Himalaya Publishing House, 2002.
2. TAS Balagopal, Export Management Mumbai, Himalaya Publishing House, 2000.
3. Government of India Handbook of Import – Export Procedures, New Delhi, Anupam Publishers, 2002.

## SEMESTER IV

## SBEC II - PAPER II - INPLANT TRAINING-VIVA-VOCE

I. The students are expected to have a practical training in any business unit or undertaking to enable them to acquaint himself / herself with the procedure, practice and working of companies.

II. Each student should undergo industrial training for a minimum period of two weeks during the third semester vacation.

III. He / She shall undergo the above training in the institutions like banks, insurance companies, mutual funds, transport undertakings, private limited and public limited companies, hotels and hospitals, travel and tourist industries and financial institutions.

IV. Students may make their own arrangements in fixing the companies for candidates should submit a report in not less than 25 type written pages.

V. Candidates should submit the attendance certificate from the institution for having attended the training for 2 weeks.

VI. Industrial training reports shall be prepared by the students under the supervision of the faculty of the department.

VII. Industrial training report must contain the following:

- Cover page
- Copy of training certificate
- Profile of the business unit
- Report about the work undertaken by them during the tenure of training
- Observation about the concern
- Findings

VIII. Industrial training certificate shall be forwarded to the university, one month before the commencement of the fourth semester university examinations.

IX. Practical viva – voce examination will be conducted with internal & external examiners at the end of the $4^{th}$ semester and the credits will be awarded.

## SEMESTER IV

## SBEC II - PAPER III - PRACTICE OF BUSINESS RELATIONS

**UNIT – I**

Public Relations – definition – essentials of good public relations – public relations for commercial organization.

**UNIT – II**

Public Relations officer's (PRO'S) role – responsibilities –press relation – preparation of material for the media – news and news reporting – editorial reviews – articles – public relations department.

**UNIT – III**

Training of public relations officers – PR society of India – Indian institute of mass communication – Indian press – Trade fair authority of India.

**UNIT – IV**

Book Publications in India – Role of publishers, distributors and booksellers – electronic media – radio – television – house journals – documentary films – mobile film shows – film censorship – guidelines.

**UNIT – V**

Exhibition and trade fair – consumer and marketing fair – photography – folk dance – sponsorship programme – music festivals.

**TEXT BOOK**

1. Management of Public relations – S. Senguptha , vikas publishing house

**REFERENCE BOOKS**

1. Lecture on applied public relations – Prof.K.R. Balan, Sulthanchand&sons Delhi.
2. Public relations problems and prospects with case studies – Anil baby, Space age publications, New Delhi.
3. Hand book of PR in India – D.S. Menta, allied publisher (p) Ltd New Delhi.
4. The practice of public relations – Frason p. Seital,Charler E Merial Publishing Company , Columbus.

## SEMESTER IV

## NMEC - II - HUMAN RESOURCE MANAGEMENT

**UNIT – I**

Introduction – Meaning and Definition, Nature, Scope objectives and Importance of HRM – Functions of HRM.

**UNIT – II**

Human Resource Planning – Manpower planning Nature, Importance and Objectives of Manpower Planning – Process of Manpower Planning – Uses and Benefit of Manpower Planning.

**UNIT – III**

Recruitment and Selection – Source of Recruitment Selection ofEmployee – Difference between recruitment and selection.

**UNIT – IV**

Procedures for selection – tests – interviews – types of interview – Process of conducting interview - checking of references – final selection.

**UNIT – V**

Performance Appraisal — modern methods –Training and Development – Importance of training employee – Types of training – Methods of training

**TEXT BOOK**

1. J. C.B. Mamoria, Personnel Management – Humalaya publications house.

**REFERENCE BOOKS**

2. G.R. Bassotia, Human Resources Management, Mangal Deep Publications.
3. K. Aswathappa, Human Resources and Personnel Management, TMH, New Delhi.
4. Kaushal Kumar, Human Resources Management – ABD Publishers.
5. Keith Davis, Human Relations at work – TMH.
6. Jayasankar, Human Resource management, Margham Publications.
7. S.S. Khanka, Human Resource Management, S. Chand.

## SEMESTER V

## CORE X - BUSINESS POLICY AND STRATEGY

**UNIT – I**

Business policy – meaning – features – classification – process of policy – making objectives of business policy.

**UNIT – II**

Business strategy – meaning – features – importance – strategic management process – SWOT analysis – ETOP analysis – TOWS matrix – BCG matrix. 7'S' approach to quality – Motorola quality concept.

**UNIT – III**

Major Business policies – personnel policy – production policy – marketing policy – financial policy.

**UNIT – IV**

Strategic business unit – Major business strategies – stability – growth retrenchment – disinvestment – mixed strategies.

**UNIT – V**

Society and business – ethics – social responsibilities business – social audit.

**TEXT BOOK**

1. Dr.K.Arul&Dr.K.Jayaraman, Business Policy and Strategic management, Sri Guru Raja Publishers, Thiruvannamalai.
2. AzhaKazmi, Business policy and strategic management – Tata Mcgraw Hill.

**REFERENCE**

1. Dr.K.Arul&Dr.A.Subanginidevi, Business Policy and Strategy, Shanlax Publication, Madurai.
2. P. Subba Rao, Business Policy & Strategic Management.
3. Mamoria – Mamoria – Subba Rao, Business Planning and Policy.
4. Thomas, L. Wheelen, J. David Hunger, Concepts. In Strategic Management & Business Policy.
5. Francis Cherunilam, Business & Strategic Management (Text and Cases) – Himalaya.
6. Dr. S. Sankaran, Policy and Strategic management Himalaya.

## SEMESTER V

## CORE COURSE XI - OPERATIONS RESEARCH

**UNIT - I**

Operations research – meaning – scope – uses – operations research in India – models in operations research – limitations of model – general methods for solving operations research models.

**UNIT - II**

Linear programming problems – requirements – formulation of L.P.P. by graphical method – simplex method (simple problem only).

**UNIT – III**

Transportation problems – obtaining initial basic feasible solution – various methods of solving transportation problems.

**UNIT- IV**

Assignment problems – formulation and solution assignment problems.

**UNIT-V**

Decision theory – types of decision making criteria statement of Baye's theorem – application of Bay's theorem – use of probability – decision tree.

**Note :**Questions in theory and problems carry 30% and 70% of marks respectively.

**TEXTBOOK**

**1.** Kapoor V.K. Operations Research, SulthanChand& Sons, New Delhi.

**REFERENCE BOOKS**

1 Prem Kumar Gupta, Operations Research – Sultan Chand & Co.

2. P.K. Man Mohan, Operations Research – Sultan Chand & Sons.

3. Vohra N.D., Quantitative techniques in Management, Tata Mc Graw Hill

4. Agarwal B.M. Quantitative Methods, New Academic Publication.

5. Vital P.R. Introduction to Operations Research, Margham Publications, Cnennai.

## SEMESTER V

## CORE XII - COST ACCOUNTING

**UNIT – I**

Cost - Meaning – Definition – Classification of Costs - Cost Accounting - Definition – Advantages – limitations – Financial accounting Vs. Cost accounting – Preparation of Cost Sheet – Tenders and Quotations.

**UNIT – II**

Materials - Materials control – Meaning – Objectives – Advantages - Methods of Stock Control – Stock levels – EOQ – Stores ledger - FIFO, LIFO, Simple average and Weighted average.

**UNIT – III**

Labour and Overhead - Methods of wage payment – Overheads – Classification – Allocation – Apportionment and Re-distribution.

**UNIT – IV**

Process costing -Meaning – Characteristics – Process accounts – Process losses and gains (Excluding equivalent Production, By Product and Joint Product – Inter Process Profits).Contract Costing - Meaning – Definition – Contract account And Balance sheet.

**UNIT – V**

Marginal Costing - Nature of marginal Costing – Advantages – Limitations – Break Even Analysis – Decision making Problems.

**NOTE:**

Question Paper Setting - 80 % of the questions shall be problems and 20% of the questions shall be theory based.

**TEXT BOOK**

1. Cost Accounting - Principles and Practices – S.P. Jain & K.L. Narang – Kalyani Publishers.

**REFERENCE BOOKS**

1. Principles of cost Accounting – Dr. Maheswari S.N.- Sultan Chand & Sons.
2. Cost Accounting – Iyengar S.P, - Sultan Chand.
3. Cost Accounting – Rayudu, Tata McGraw Hill.

## SEMESTER V

## CORE XIII - FUNDAMENTAL OF RESEARCH METHODOLOGY

**UNIT – I**

Research Methodology – Meaning – Objectives - Types - Significance - Research Process

**UNIT – II**

Sampling – Introduction - Sample design - Sampling types – Probability, Non probability sampling - Sampling Errors.

**UNIT- III**

Data collection – Introduction.-Types of Data- Primary - Secondary - Qualitative - Quantitative. Data collection tools – Questionnaire –Schedule - Types of questions - Collection of secondary data. Scaling – scale classification bases -Non comparative scaling technique – Continuous rating - Itemized - Simple category verbal frequency scale.

**UNIT IV**

Data preparation process – Questionnaire checking – Editing – Coding - Classification-Tabulation. Hypothesis – Meaning – Null Hypothesis – Alternate hypothesis.

**UNIT V**

Report writing – Significance - Different steps - Layout- Types-Mechanics of writing a research report – Precautions.

**TEXT BOOK**

1. Research Methodology – Methods & Techniques – C.R.Kothari and Gaurav Garg – New Age International.

**REFERENCE BOOKS**

1. Research Methodology – Dr.Pawankumaroberoi – Global Academic Publishers.
2. Business Research Methods – T. Raju and R.Prabhu – MJP Publishers.
3. Research Methodology - Dipak Kumar Bhattacharyya – Excel Books.
4. Dr. S.M.Venkatachelam&M.Murali, “Basics of Business Research”, Mithila Publications,

## SEMESTER V

## CORE XIV - MANAGEMENT INFORMATION SYSTEM

**UNIT - I**

Introduction – environment of organizations – management information system – information flow – need and sources – management decisions – importance and role.

**UNIT - II**

Characteristics of computer information system – importance of computer – role of the computer – types of computer – Software – Hardware – CPU – MU – Input – Output – application and operations.

**UNIT – III**

System classification – concept characteristics – elements – feedback control – boundary – function and operations – system design – function of system analyst assignment and investigation – implementation – evaluation and maintenance of MIS.

**UNIT- IV**

Transactions processing information systems – information systems for managers – intelligence system – decision support system – integration – data collection and preparation – database – components – utility of the operation of the data base technology.

**UNIT-V**

Functional Management information systems – production, marketing, accounting, personnel, financial, relationship – impact and their role in the managerial decision – making.

**TEXT BOOK:**


1. CVS Murthy, Managements, Information System, HPH.
2. Davis & Olson, Management Information System, MGH.


**REFERENCE BOOKS**


1. R. Senapathi, MIS, Lakshmi Publications.
2. Lucas, The analysis, design and implementation of information system, MGH.
3. G.M. Scott, Principles of management information system, MGH.
4. Dr. S.P. Rajagopalan, Management information system, Margham publications.
5. S. Sadagoban, Management information system, PHI

## SEMESTER V

## ELECTIVE - II - GROUP – A

## SERVICE MARKETING

**UNIT - I**

Importance of services sector – Nature and types of services – Difference between services and goods marketing – services marketing triangle.

**UNIT - II**

Environment for services marketing – macro and micro environments – understanding service customers – models of service consumer behavior – customer expectations and perception – service quality and GAP model.

**UNIT – III**

Market segmentation and selection – service market segmentation – targeting and positioning.

**UNIT- IV**

Services marketing Mix – Need for expanded marketing mix – planning for services offer – pricing – promotion and distribution of services – management of people – process and physical evidence – matching demand for and supply of services.

**UNIT- V**

Service marketing applications – Marketing Of Financial, Hospitality, Hospital, Tourism And Educational Services – International Marketing Of Services And Gats.

**REFERENCE BOOKS**


1. Christopher, H. Lovelock, Services Marketing, Pearson Education India
2. Adrian Payne, Services Marketing, PHI
3. Zeithaml, V.A. & M.J. Bitner, Services Marketing
4. Rao, Services Marketing, Pearson Education India
5. Sinha, P.K. and Sahoo S.C. Services Marketing, HPH.
6. Ravishankar, Services Marketing, Lalvani.

# SEMESTER V
# ELECTIVE - II GROUP – B
# INDUSTRIAL RELATIONS

**UNIT – I**

Industrial Relation system – meaning – objectives – scope – Dunlop Model of Industrial Relations – Industrial Relations in India – State and Industrial Relations. Labour Policy – Tripartite Consultations – IndianLabour Conference.

**UNIT – II**

Industrial Disputes – concepts – causes of industrial disputes – Dynamics of Industrial disputes – Forms of industrial disputes – prevention of industrial disputes – settlement of industrial disputes – preventive and settlement machinery of industrial disputes in India.

**UNIT – III**

Collective bargaining – objectives – methods – Managements for negotiations – Union organisation for bargaining – Nogotiation Process – Recommendation of National Commission on Labour.

**UNIT – IV**

Trade Unionism – Theories of Trade Unionism – Principles, Philosophy and Policies of Indian Laour – Growth of trade unionism in India – Management of Trade unions – Problems of trade unions.

**UNIT – V**

Grievances – meaning – causes – procedure – disciplinary action – procedures for punishment - types of punishment.

**TEXT BOOK** :

1. Memoria, C.B., “Dynamics of Industrial Relations in India”, Himalaya Publishing House, Bombay, 1992.

**REFERENCE BOOKS**

1. John T. Dunlop : “Industrial Relations System”, Henry Holt and Company, New York, 1958.
2. Flanders Allen : “Trade Unions”, The English Languages Book Society, London, 1963.
3. Loyd G. Reynolds : “Labour Economics and Labour Relations”, Prentice Hall of India PVT. Ltd., New York, 1978.
4. Danial Quinn Mills : “Labour Management Relations”, MacGraw Hill Books Company, New York, 1978.
5. Marry. S, “Collective bargaining”, Asia Publishing House, Bombay, 1980.
6. R. Stagner and H. Rosen ; “Psychology of Unions – Management Relations” Tavistock Publication Ltd., London, 1968.
7. R.C. Saxena ; “Labour Problems and Social Welfare”, K. Nath& Company Meerut, 1990.
8. A.M. Sharma, “Aspects of labour Welfare and Social Security, “Himalaya Publishing House, Bombay, 1990.Memoria, C.B., “Dynamics of Industrial Relations in India”, Himalaya Publishing House, Bombay, 1992.
9. 9. Dr.K.Ramesh,“Industrial Relations and Labour Development”, 1st Edition, MithilaPublications, 2016, ISBN : 978-93-80506-17-3. (Semester VI, Electrives II)

## SEMESTER V

## ELECTIVE – II - GROUP - C

## INVESTMENT MANAGEMENT

**UNIT – I**

Meaning of investment – Nature and scope of investment management - factors favourable for investments – features of an investment programme.

**UNIT – II**

Investment avenues – Real assets – Financial assets – Fixed income and variable income securities – mutual fund – derivatives etc.,

**UNIT – III**

Risk- Return concept – Return measurement - Basic valuationmodels – equity valuation, Preference share and bond valuation .Risk - risk classification – systematic and unsystematic risk - measurement or risk.

**UNIT – IV**

New issue market and stock exchange – kinds of trading – Securities and Exchange Board of India.

**UNIT – V**

Sources of Investment informations – Credit rating agencies – CARE – CRISIL – ICRA – credit rating methodology – Indices.

**TEXT BOOK**

1. Investment mgt – Preetisingh, Himalays publishing house.
2. Investment mgt – V.K.Bhalla.

**REFERENCE BOOKS**

1. Investment mgt – V. Avadhani - Himalays publishing house.
2. Investment mgt – Punithavathypondian, PHI

## SEMESTER V

## ELECTIVE II - GROUP D

## TOTAL QUALITY MANAGEMENT (TQM)

**UNIT-I**

Concept of Quality – Quality as customer delight – Quality as meeting. Standards–Introduction to total Quality – Concept of total Quality Design, inputs, process and output – Quality as business performance – Attitude and involvement of top management.

**UNIT-II**

Quality Management – Fundamentals – Evolution and objectives –Planning for Quantity – Quality Process – Statistical Process Control (SPC)–Quality Assurance – Total Quality management.

**UNIT–III**

Quality Management System – ISO 9000 series – Techniques of TQM –5' S Concepts – 7' Q tools – Cause – Effect Analysis stratification, Pareto diagram Histogram, Control charts (SQC) check sheet & Pie-

**UNIT-IV**

Bench marking – Essence of Bench Marketing–Benefits and Strategic Bench marking – Global bench marking – Business Process Re-engineering.

## UNIT - V

Core competence and strategic alliance for ensuring quality – role of MNCS, in emergence of global quality – Barriers to TQM.

**TEXTBOOK**


1. Armond.V.Feigerbaum, Total Quality Control, McGraw Hill.
2. JohnBark, Essence of TQM, PHI, Delhi.


**REFERENCEBOOKS**


1. Joel, E.Ross,TotalQualityManagement
2. RonCollard, TotalQuality,Jaico,Delhi
3. Willborn&T.C.EdwinCheng, Global Management of Quality Assurance systems, Mc GrawHill.
4. J.M.Juran,JuranOnleadershipforQuality–AnExecutiveHandBook.
5. ISOManuals.

# SEMESTER V

## ELECTIVE II - GROUP E

## DATA BASE MANAGEMENT SYSTEM

**UNIT -I**

Introduction: Database System Applications -Purpose of Database Systems -View of

Data -Database Languages -Transaction Management -Database Architecture -Database users and Administrators. Relational Model: Structure of Relational Databases -Database Design -ER Model - Overview of the Design Process –The Entity- relationship Model -Constraints -Entity Relationship Diagrams.

**UNIT -II**

Relational Algebra Operations -Relational Languages: The Tuple —Relational Calculus - The Domain Relational Calculus -SQL: Background -Data Definition - Basic Structure of SQL Queries - Set Operations -Aggregate Functions -Null Values - Nested Sub- Queries -Views -Modification of the Database

**UNIT-III**

PL/SQL: A Programming Language: History -Fundamentals -Block Structure Comments- Data Types - Other Data Types -Declaration -Assignment operation – Bind variables -Substitution - Variables - Arithmetic Operators. Control Structures and Embedded SQL: Control Structures -Nested Blocks -SQL in PL/SQL –Data Manipulation -Transaction Control statements.

**UNIT IV**

PL/SQL Cursors and Exceptions: Cursors -Implicit & Explicit Cursors and Attributes -Cursor FOR loops -SELECT...FOR UPDATE -WHERE CURRENT OF clause- Cursor with Parameters - Cursor Variables -Exceptions -Types of Exceptions.

**UNIT -V**

PL/SQL Composite Data Types: Records. -Tables -Varrays. Named Blocks: Procedures -Functions - Packages -Triggers -Data Dictionary Views

**TEXTBOOKS**


1. "Database System Concepts", Abraham Silberschatz, Henry F .Korth, S.Sudarshan , TMH 5th Edition (Units -I, II)
2. DATABASE SYSTEMS USING ORCLE -Nilesh Shah, 2nd edition, Prentice Hall 25 of India Private Limited, New Delhi.

## SEMESTER VI

## CORE XV - BUSINESS ENVIRONMENT

**UNIT – I**

Business environment Meaning – various environments affecting Business – social economic political and legal, culture, competitive, demographic, technological and international environment.

**UNIT – II**

Business and culture : Culture – elements of culture – impact of foreign culture traditional values and its impact – change and resistance to change – castes and communities – linguistics religious groups – joint family system.

**UNIT – III**

Business and society : Social responsibilities of Business – responsibilities to share holders, customer, community, the government –Business Ethics – population – demographic pattern changes – standard of living – urbanization – migration.

**UNIT – IV**

Business and Government : State regulations on business – industrial licensing policy – technology – indigenous technology – import of technology – impact of technological changes in business.

**UNIT – V**

Economic system : Socialism – capitalism – mixed economy – their impact of business – public sector, private sector, joint sector – objectives, growth, achievements and failures of public sector in India.

**TEXT BOOK**

1. Francis Cherrunilam, Business Environment
2. Aswathappa, K. Essentials of Business Environment.

**REFERENCE BOOKS**

1. Sankaran,S., Business and Society
2. Lakshmirattan, Business and Society
3. Adhikary, M. Economic Environment of Business
4. Sampath, Mukerji, Economic Environment of Business
5. Ghosh P.K., Business and Government

## SEMESTER VI

## CORE XVI - FINANCIAL INSTITUTIONS AND SERVICES

**UNIT - I**

Indian Financial system – financial system and economic development – Banks as financial intermediaries – Co-operative Banks – functions.

**UNIT - II**

Non – Banking financial intermediaries – Unit trust of India – Mutual Funds – Hire Purchase Finance Companies – Lease Finance Companies – National Housing Bank – Housing Development Finance Corporation – Housing Urban Development Corporation Functions and Services.

**UNIT – III**

Financial institutions – IDBI, ICICI, IFCI, IRCI, LIC, TIIC – EXIM Bank – SFCS – SIDCS – functions and services.

**UNIT- IV**

National Stock Exchange (NSE) – OTCEI – SEBI – Powers and function – Discount and Finance House of India (DFHI).

**UNIT-V**

Merchant banking – functions and services, underwriting – credit rating agencies in India.

**TEXT BOOK:**

1. Gorden and Natarajan, Financial Institution and Services, HPH.

**REFERENCE BOOKS**


1. Bhole L.M. Financial Institutions and Market, TMH.
2. Avadhani V.A., Investment and Securities markets in India, HPH.
3. KulKarni P.V., Corporate Finance – HPH
4. Khan M.Y. Financial Services, TMH.
5. Bhatia &Batra, Management of financial services, Deep & Deep.

## SEMESTER VI

## CORE XVII - ENTREPRENEURIAL DEVELOPMENT

**UNIT – I**

Entrepreneurship : Concepts, types and functions of entrepreneurs – Entrepreneurial Development in India – Role of entrepreneurs in economic development – Entrepreneurial Development Programme – Phases of Entrepreneurial Development Programme – influence of environmental factors – Training and development of entrepreneurs

**UNIT – II**

Business ideas: Project identification and formulation – classification of project feasibility studies – project appraisal methods – project design, network analysis Financial analysis.

**Unit – III**

Institutions and development of entrepreneurs – Role of DIC, SISI, SIDCO, NSIC, MAYE, KVIC, TCO'S, ITCOT and Entrepreneurial Guidance Bureau – incentives and subsides to entrepreneurs and commercial banks in financing entrepreneurs.

**UNIT – IV**

Promoting enterprises – SSI – MSME – Role and growth of SSI – Regulations governing SSI – incentives and concessions for SSI units – sickness in SSI – causes and remedies

**UNIT – V**

Problems and prospects of entrepreneurs – Developing women and rural entrepreneurs – entrepreneurs' motivation.

**TEXT BOOK**


1. Gupta, C.B. and Srinivasan N.P., Entrepreneurical Development
2. Dr.V.R.Palanivelu, Himalaya Publishing House Mumbai.


**REFERENCE BOOKS**


1. Dr.K.Arul&Dr.A.Subanginidevi, Entrepreneurial Development, Shanlax Publication, Madurai.
2. Khanha, Entrepreneurial Development
3. Vasanth Desai, Organisation and Management of Small Industires
4. Saravanavel, P., Entrepreneurship Development
5. Tandon, B.C., Environment and Entrepreneurship
6. Rao T.V., and Udaipareek, Developing Entrepreneurship

## SEMESTER VI

## CORE - XVIII

### PROJECT WORK VIVA-VOCE

**Specimen – I**

**TITLE**

A project report submitted to the Periyar University in partial fulfillment of the requirements for the award of the degree of

BACHELOR OF BUSINESS ADMINISTRATION

By

Name of the student

Reg. No……..

Under the guidance of

Name of the guide

Department, College Name and place

Month and year of submission

**Specimen – II**

# CERTIFICATE

This is to certify that the project entitled, "TITLE", is a bonafide work carried out by ……. Reg. No. ……..under my supervision and guidance during the academic year …….. in partial fulfillment of the requirements for the award of the degree of BACHELOR OF BUSINESS ADMINISTRATION and the work is an original one and has not formed basis for the award of any degree, diploma, associate ship, fellowship of any other similar title.

**GUIDE SIGNATURE** **HOD SIGNATURE**

Project work evaluation viva – voce examination conduced on …….

**INTERNAL EXAMINER** **EXTERNAL EXAMINER**

**Specimen – III**

# DECLARATION

I hereby declare that this project work entitled “TITLE” submitted to the PERIYAR UNIVERSITY, SALEM in partial fulfillment of the requirements for the award of BACHELOR OF BUSINESS ADMINISTRATION is an original one and has not been submitted earlier either to this university or to any other institution for the award of any degree / diploma.

**Date :** **Candidate signature**

**Place:**

## SEMESTER VI

## CORE XIX - COMPUTER APPLICATION IN BUSINESS

**(Theory and Practical)**

**UNIT – I**

Introducing to programming languages – meaning requisites, an overview of programming language – basic coding structures of a programming languages clarifications, comparison.

**UNIT – II**

Introduction to Microsoft Office – Ms Word – creating and editing documents – Menus, commands, tool bars and icons – formatting documents – creating tables – mail merge.

**UNIT – III**

MS Excel : Spread sheet overviews – menus, tools bars, icons – creating worksheet – Editing and formatting – excel formulas and functions – creating a chart – MS Power Point introduction – Menus – Tools bars – Text and formats – animations, art and sound – making and presentation templates.

**UNIT – IV**

Data processing –types of data – objectives of data processing techniques steps in developing a computer program for processing business data – operation of a computer assembler and Translator – file processing – editing and coding of data – data management.

**UNIT – V**

Internet concept – creating E-mail ID, Receiving and sendinge-mail, Searching Information and Downloading – World Wide Web (www) – Domain Name Service.

**NOTE:** Theory – practical carry equal credits

**TEXT BOOK**

1. Sanjay Saxena, MS Office 2000 for everyone, (Vikas Publishing House Pvt., Ltd.,)

**REFERENCE BOOKS**

1. T.W. Pral, Programming languages, (Prentice hall of India)
2. V.K.Kapoor, Introduction to computer data, (Sultan Chand and Sons)
3. R.K. Taxali, Foxpro 2.5 made simple for dos & windows (BPB Publications).

# COMPUTER PRACTICALS GUIDELINES

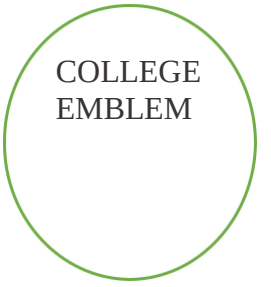
**SPECIMEN – I**

Periyar University

College Name

Address

Bachelor of Business Administration




Computer Application in Business

(Msoffice and Internet)

Record Note book

Department of Business Administration

Month and Year of submission

**Specimen – II**

**CERTIFICATE**

Department of Business Administration

Practical record work in “Ms – office and Internet”

Name :

Register No :

Programme : Bachelor of Business Administration

Course :**COMPUTER APPLICATIONS IN BUSINES – Practical-I**

This is to certify to be a bonafide work done by the student in our college laboratory.

**Signature of the staff incharge Signature of HOD – BBA**

(Seal)

Submitted for the practical examination held on ……

**Internal Examiner** **External Examiner**

## SEMESTER VI

### ELECTIVE - III - GROUP - A

# RETAIL MARKETING MANAGEMENT

**UNIT – I**

Definition of Retail Marketing — Features of Modern Retail Marketing –Importance of Retail Marketing – Types of Retail Marketing – Retail Marketing Mix.

**UNIT – II**

Functions of Retail Marketing - Buying - Assembling - Selling - Transporting.

**UNIT – III**

Storage and Warehousing – Risk Bearing – Retail Market Information – Grading and Standardization – Retail Market Function.

**UNIT – IV**

Buyer Behavior – Consumer Goods and Industrial Goods – Buyer Behavior Model – Factors Influencing Buyer Behavior - Market Segmentation – Need and Basis – Targeting – Positioning.

**UNIT – V**

Retail Sales Forecasting – Methods – Analysis and Application – Products – Classification – New Product Development Process – Product Life Cycle –Line and Product Mix Decision.

**TEXT BOOK**

Retail Marketing Management – David Gilbert, Perason Education.

**REFERENCE BOOK**


1. Golabal Marketing Management – Warren J. Keejan, Printice – Hall of India.
2. Retail Management – Chetan Bajaj, RajnishTuli, Nidhi V Srivastav - Oxford University Press.
3. Retailing Management – Michael Levy, Barton A Weitz and Ajay Pandit– McGraw Hill.
4. Retailing Management – Text & Cases – SwapnaPradhan – McGraw Hill.
5. Retail Marketing Management – David Gilbert – Pearson Education.

## SEMESTER VI

## ELECTIVE - III GROUP – B

## TRAINING AND DEVELOPMENT

**UNIT – I**

Concepts of training and development –Identifying training needs – Types of training – Organisation for training – Objectives, structures and functions of Training Department – Execution of Training Programmes – Evaluation of Training Programmes.

**UNIT – II**

Techniques of on-the-job training – coaching – Apprenticeship – Job rotation – Job instruction – Training by Supervisors – Techniques of off-the-job Training, Case studies, Role playing Programmed Instructions, T-Group training – simulations.

**UNIT – III**

Leader central Techniques of Management Development - Lecturers, coaching, Student centred Techniques ; Dicussions - Case studies – Conferences – Workshops – Syndicate – Brain stroming – Role playing – Psycho drama – Simulation – inbasketGames.a

**UNIT – IV**

Sensitivity Training, Self – learning techniques, Planned reading – Correspondence Courses – Programmed instructions – Audio Visual lessons – Manuals and Hand-outs.

**UNIT – V**

Counseling - Assistant to position – Under – study – Junior Board, Committee Assignments – Relative merits and limitations of M.D. Techniques.

**TEXT BOOK :**

1. M.C. Larney, William J : Management Training : Cases and Principles, Richard, D. Irwin, Illinois.

**REFERENCE BOOKS :**

1. M.C. Gehee, William and Tahayer, Paul W. Training in Busines and Industry, JohnWiley&Sons,New York.
2. Sikula, A.F. Personnel Administration and Human Resources Development, John Wiley, New York.
3. Hacoon, R.J. Management Training : Aims and Methods, English Universities Press, London.
4. Ahmed, Abad : Management and Organisational Development, RachanaPrakasham, New Delhi.
5. Memoria, C.B. Personnel Management, Himalayas Publishing House, Bombay.
6. RudraBaswaraj : Personnel Administration Practice in India – VaikuntaLal Mehta Institute of Co-operative Management Poona
7. Muniramappa C.M. Shankaraiah, A adnKamarajuPanthulu ; Personnel Management and Industrial Relations, Excel Publications, New Delhi, 1991.

## SEMESTER VI

## ELECTIVE - III - GROUP – C

## PORTFOLIO MANAGEMENT

**UNIT – I**

Portfolio management –meaning – Elements of portfolio management- portfolio risk –Diversification.

**UNIT – II**

Fundamental analysis – Economic analysis – Industry analysis – Company

analysis. **UNIT – III**

Technical analysis – tools of technical analysis – Dow theory–major trends – Principles of technical analysis – Charts and trends – different patterns.

**UNIT – IV**

Efficient market hypothesis – weak form – semi-strong form - strong form –Random walk theory – assumptions and limitations.

**UNIT – V**

Portfolio management– Stages – portfolio construction – revision – evaluation of portfolio performance - criteria

**TEXT BOOK**

1. Security analysis and portfolio management – V.A. Avadhani– Himalaya publishing house.

**REFERENCE BOOKS**

1. Security analysis and portfolio management – Donald Fisher and Ronald Jorden –
2. Security analysis and portfolio management – PunithavathyPondian- Vikas publication.

## SEMESTER VI

## ELECTIVE - III - GROUP – D

## MERCHANDISING MANAGEMENT

**UNIT - I**

Concept of Retail Merchandising: Meaning of Merchandising, Major Areas of Merchandise Management, Role and Responsibilities of Merchandisers Merchandise Mix: Merchandise Mix, Concept of Assortment Management, Merchandise Mix of Show off

**UNIT - II**

Merchandise Displays and Space Management: Concept of Merchandise Displays, Importance of Merchandise Displays, Concept of Space Management, Role of IT in Space Management,

**UNIT - III**

Visual Merchandising: Meaning of Visual Merchandising, Objectives of Visual Merchandising, Growth of Visual Merchandising, Visual Merchandising in India, Product Positioning and Visual Merchandising,

**UNIT - IV**

Merchandise Planning: Concept of Merchandise Planning, Applications of Merchandise Planning, Elements of Merchandise Planning, Role of Merchandiser in Planning, Category Management and Merchandise Budgeting: Concept of Category Management, Merchandise Forecasting, Merchandise Budgeting

**UNIT – V**

Merchandise Sourcing: Concept of Merchandise Sourcing, Historical Perspective of Sourcing, Stock Management and Distribution, International Sourcing, Merchandise Replenishment: Retail Replenishment, Importance of Replenishment, Direct Store Delivery (DSD), Managing Retail Home Delivery, Measures for Retail Distribution and Replenishment, Role of IT in Retail Distribution and Replenishment

**SUGGESTED READINGS:**


1. Berman, Barry and Joel Evans Retail Management
2. Cooper, J. Strategy planning in Logistics and Transportation
3. Cox, Roger and Paul Brittain Retail Management
4. Levy &Weitz Retailing Management
5. Philip Kotter, Marketing Management

## SEMESTER VI

## ELECTIVE - III - GROUP –E

## E -BUSINESS

**UNIT I**

Basic Internet Fundamentals: Overview of the Internet, Browsing the world wide web, Electronic Mail, Basics of using FTP, Newsgroups, Searching the web to gain Market Intelligence, Internet Technology

**UNIT II**

eCRM -Meaning -Difference between CRM &eCRM - Features of eCRM -eCRM Software.

**UNIT III**

MS-office -Data entry -graphs -aggregate function - Formulas & functions -Different No. System & conversion.

**UNIT IV**

An Electronic Market place of buyers & sellers - Collaborating on a distribution chain -Online catalog.

**UNIT V**

Commercial Websites -Types of online business -Sales of Products & Services One to one Marketing Strategies.

**TEXT BOOKS**

1. Greg Holden, Starting an E.commerce Business for Dummics H Edition
2. David Kodiur, Understanding Electronic Commerce.

**REFERENCE BOOKS**

1. PI' Josep , E. Commerce -A ManagenPespective, PHI
2. Daniel Amor, E Business Revolution, Pearson EducationAsia, PHI
3. Shurethy, E -Business with Net Commerce
4. Samanthashurethy, E-Businesswithnet.commerce.

**PERIYAR UNIVERSITY**

**PERIYAR PALKALAI NAGAR**

**SALEM 638 011**

# MASTER OF SCIENCE IN COMPUTER SCIENCE

**(M.Sc Computer Science)**

SEMESTER PATTERN

Under Choice Based Credit System

## REGULATIONS AND SYLLABUS

FOR AFFILIATED COLLEGES

**(Effective from the Academic year 2017-2018 onwards)**

**PERIYAR UNIVERSITY**

**PERIYAR PALKALAI NAGAR**

**SALEM 638 011**

**Regulations**
**Effective from the Academic year 2017 - 2018**

## 1. OBJECTIVE OF THE COURSE

To Develop the Post Graduate in Computer Science with strong knowledge of theoretical computer science and who can be employed in research and development units of industries and academic institutions.

## 2. CONDITION FOR ADMISSION

A candidate who has passed in B.Sc Computer Science / B.C.A / B.Sc Computer Technology / B.Sc Information Science / B.Sc Information Technology degree of this University or any of the degree of any other University accepted by the syndicate as equivalent thereto subject to such conditions as may be prescribed therefore shall be permitted to appear and qualify for the M. Sc Computer Science degree examination of this University after a course of study of two academic years.

## 3. DURATION OF THE COURSE

The programme for the degree of Master of Science in Computer Science shall consist of two Academic years divided into four semesters.

## 4. EXAMINATIONS

The examination shall be of three hours duration for each course at the end of each semester. The candidate failing in any subject(s) will be permitted to appear in the subsequent examination.

The practical / project should be an individual work. The University examination for practical / project work will be conducted by the internal and external examiners jointly at the end of each semester.

## 5. STRUCTURE OF M.Sc., (Computer Science) PROGRAMME UNDER CBCS PATTERN FOR AFFILIATED COLLEGES (FROM 2017 AND THEREAFTER)

## CURRICULUM AND SCHEME OF EXAMINATIONS

| Courses | Number of Credits | Hours Per Week | Exam Duration (hrs) | Marks | | |
|---|---|---|---|---|---|---|
| | | | | CIA | EA | Total |
| **Semester-I** | | | | | | |
| Core Course-I-17PCS01- Design and Analysis of Algorithms | 4 | 4 | 3 | 25 | 75 | 100 |
| Core Course-II-17PCS02- Advanced Computer Architecture | 4 | 4 | 3 | 25 | 75 | 100 |
| Core Course-III-17PCS03- Advanced Java Programming | 4 | 4 | 3 | 25 | 75 | 100 |
| Core Course-IV-17PCS04- Principles of Programming Languages | 4 | 4 | 3 | 25 | 75 | 100 |
| Core Course-V-17PCS05- Advanced Operating Systems | 4 | 4 | 3 | 25 | 75 | 100 |
| Core Course-VI - 17PCSP01- Lab – I - Advanced Java Programming Lab | 2 | 5 | 3 | 40 | 60 | 100 |
| Core Course-VII- 17PCSP02- Lab - II Algorithms Using C++ Lab | 2 | 5 | 3 | 40 | 60 | 100 |
| **Semester-II** | | | | | | |
| Core Course-VIII-17PCS06- .NET Programming | 4 | 4 | 3 | 25 | 75 | 100 |
| Core Course-IX - 17PCS07- Discrete Structures | 4 | 4 | 3 | 25 | 75 | 100 |
| Core Course-X-17PCS08- Data Mining Techniques | 4 | 4 | 3 | 25 | 75 | 100 |
| Elective Course I - 17PCSE_ _ | 4 | 4 | 3 | 25 | 75 | 100 |
| EDC –I | 4 | 4 | 3 | 25 | 75 | 100 |
| Core Course-XI-17PCSP03- Lab – III .Net Programming Lab | 2 | 4 | 3 | 40 | 60 | 100 |
| Core Course-XII-17PCSP04- Lab – IV Data Mining Lab | 2 | 4 | 3 | 40 | 60 | 100 |
| 17PHR01 - Human Rights | - | 2 | 3 | 25 | 75 | 100* |

| Courses | Number of Credits | Hours Per Week | Exam Duration (hrs) | Marks | | |
|---|---|---|---|---|---|---|
| | | | | CIA | EA | Total |
| **Semester-III** | | | | | | |
| Core Course-XIII-17PCS09- Open Source Computing | 4 | 4 | 3 | 25 | 75 | 100 |
| Core Course-XIV-17PCS10- Network Security and Cryptography | 4 | 4 | 3 | 25 | 75 | 100 |
| Core Course-XV-17PCS11- Mobile Computing | 4 | 4 | 3 | 25 | 75 | 100 |
| Core Course-XVI-17PCS12 - Digital Image Processing | 4 | 4 | 3 | 25 | 75 | 100 |
| Elective Course II - 17PCSE_ _ | 4 | 4 | 3 | 25 | 75 | 100 |
| Core Course-XVII -17PCSP05 - Lab – V - Python Programming Lab | 2 | 5 | 3 | 40 | 60 | 100 |
| Core Course-XVIII-17PCSP06-Lab - VI - Mobile Application Development Lab | 2 | 5 | 3 | 40 | 60 | 100 |
| **Semester-IV** | | | | | | |
| Elective Course III - 17PCSE _ _ | 4 | 5 | 3 | 25 | 75 | 100 |
| Elective Course IV - 17PCSE _ _ | 4 | 5 | 3 | 25 | 75 | 100 |
| Core Course-XIX-17PCSPR1 Project Work and Viva-Voce | 10 | - | - | 50 | 150 | 200 |
| Total Core | 70 | | | 590 | 1410 | 2000 |
| EDC | 04 | | | 25 | 75 | 100 |
| Elective | 16 | | | 100 | 300 | 400 |
| Human Rights | - | | | 25* | 75* | 100* |
| Grand Total | 90 | | | 715 | 1785 | 2500 |

*** Human Rights mark is excluded for aggregation**

**Electives**

**Elective Course -I**

Course 17PCSE01 Theory of Automata
Course 17PCSE02 Compiler Design
Course 17PCSE03 Embedded System
Course 17PCSE04 E–Technologies

**Elective Course -II**

Course 17PCSE05 Soft Computing
Course 17PCSE06 Internet of Things
Course 17PCSE07 Object Oriented Analysis and Design
Course 17PCSE08 Reso urce Management Techniques

**Elective Course -III**

Course 17PCSE09 Cyber Security
Course 17PCSE10 Cloud Computing
Course 17PCSE11 Big Data Analytics
Course 17PCSE12 Social Computing

**Elective Course -IV**

Course 17PCSE13 Artificial Intelligence
Course 17PCSE14 Web Technologies
Course 17PCSE15 Software Engineering
Course 17PCSE16 Wireless Application Protocols

**EDC-EXTRA DISCIPLINARY COURSE**
Students are expected to opt EDC (Non major elective) offered by other departments.

1. 17PCSED1 - Principles of Information Technology
2. 17PCSED2 - Fundamentals of Computers and Communications
3. 17PCSED3 - E-Commerce

**CIA** – CONTINUOUS INTERNAL ASSESSMENT **EA** – EXTERNAL ASSESSMENT

## 6. EXAMINATIONS

### 6.1THEORY

### 6.1.1 EVALUATION OF CONTINUOUS INTERNAL ASSESSMENT

| | | |
|---|---|---|
| Test | : | 10 Marks |
| Seminar | : | 05 Marks |
| Assignment | : | 05 Marks |
| Attendance | : | 05 Marks |
| | | --- |
| Total | : | 25 Marks |
| | | --- |

**(No passing minimum)**

### 6.1.2 EVALUATION OF EXTERNAL ASSESMENT QUESTION PAPER PATTERN

Time: 3 Hours Max. Marks: 75

**PART- A: 5x5 = 25 marks**
Answer all the questions
One question from each unit (either or type)

**PART- B: 5x10 = 50 marks**
Answer all the questions
One question from each unit (either or type)

**The Passing minimum shall be 50% out of 75 marks (38 marks)**

### 6.2 PRACTICAL / SOFTWARE DEVELOPMENT

### 6.2.1 EVALUATION OF CONTINUOUS INTERNAL ASSESSMENT

| | | |
|---|---|---|
| Test 1 | : | 15 Marks |
| Test 2 | : | 15 Marks |
| Record | : | 10 Marks |
| | | --- |
| Total | : | 40 Marks |
| | | --- |

**(No passing minimum)**

### 6.2.2 EVALUATION OF EXTERNAL ASSESSMENT

#### I) PRACTICAL

**QUESTION PAPER PATTERN**

Time: 3 Hours Max. Marks: 60

There will be two questions with or without subsections to be asked for the practical examination. Every question should be chosen from the question bank prepared by the examiner(s). Every sixth student should get a new question i.e. each question may be used for at most five students.

**Distribution of Marks**

| | |
|---|---|
| Each question | : 30 Marks |
| Problem Understanding | : 05 Marks |
| Program writing | : 10 Marks |
| Debugging | : 10 Marks |
| For Correct Results | : 05 Marks |

#### II) SOFTWARE DEVELOPMENT

| | |
|---|---|
| Viva-voce (jointly) | : 30 Marks |
| Modification | : 30 Marks |

Students should write about their software development briefly.

i. Aim
ii. Features
iii. Modules
iv. Modification

#### III) PROJECT WORK

| | |
|---|---|
| Continuous Internal Assessment | : 50 Marks |
| Evaluation (External) | : 50 Marks |
| Viva-voce (jointly) | : 100 Marks |

## 7. REGULATIONS OF PROJECT WORK

- Students should do their Project work in Company / Institutions during the fourth semester.
- The Candidate should submit the filled in format as given in Annexure-I to the department for approval during the First Week of December.
- Periodically the project should be reviewed.
- The Student should submit three copies of their Project work.
- A Sample format is enclosed in Annexure-II.
- Format of the Title page and Certificate are enclosed in Annexure III.
- The students may use power point presentation during their viva voce examination.

## 8. PASSING MINIMUM

The candidate shall be declared to have passed in the Theory / Practical / Project Work examination, if the candidate secures not less than 50% marks in EA and also in Total of the prescribed marks. However submission of a record notebook is a must.

## 9. CLASSIFICATION OF SUCCESSFUL CANDIDATES

Candidates who obtain 75% and above in the aggregate shall be deemed to have passed the examination in **First Class with Distinction** provided they pass all the examinations prescribed for the programme at the first appearance. Candidates, other than the above, who secure not less than 60% of the aggregate marks in the whole examinations shall be declared to have passed the examination in **First Class**. The remaining successful candidates shall be declared to have passed in **Second Class**.

Candidates who pass all the examinations prescribed for the programme in first instance and within a period of two academic years from the year of admission are only eligible for **University Ranking.**

## 10. MAXIMUM DURATION FOR THE COMPLETION OF THE PROGRAMME

The maximum duration to complete the programme shall be three academic years after normal completion of the programme.

## 11. COMMENCEMENT OF THIS REGULATION

These regulations shall take effect from the academic year 2017-18, that is, for students who are admitted to the first year of the programme during the academic year 2017-18 and thereafter.

## 12. TRANSITORY PROVISION

Candidates who were admitted to the M.Sc., Computer Science programme of study before 2017-2018 shall be permitted to appear for the examinations under those regulations for a period of three years after completion of the programme. Thereafter, they will be permitted to appear for the examination only under the regulations then in force.

**ANNEXURE - I**

**PERIYAR UNIVERSITY**

Name of the College :

Programme :

Name of the Student :

Register Number :

Title of the Project Work :

Address of Organization / Institution :

Name of the External :

Guide Designation :

Place :

Date : Signature of External Guide

(with seal)

Name of the Internal Guide :

Qualification :

Teaching Experience :

Place :

Date : Signature of Internal Guide

Principal

[Approved or not Approved]

[ University Use]

**ANNEXURE II**

**CONTENTS**


Chapter Page No.

COLLEGE BONAFIDE CERTIFICATE

COMPANY ATTENDANCE CERTIFICATE
ACKNOWLEDGEMENT
SYNOPSIS

1. INTRODUCTION
   - 1.1 ORGANIZATION PROFILE
   - 1.2 SYSTEM SPECIFICATION
     - 1.2.1 HARDWARE CONFIGURATION
     - 1.2.2 SOFTWARE SPECIFICATION
2. SYSTEM STUDY
   - 2.1 EXISTING SYSTEM
     - 2.1.1 DESCRIPTION
     - 2.1.2 DRAWBACKS
   - 2.2 PROPOSED SYSTEM
     - 2.2.1 DESCRIPTION
     - 2.2.2 FEATURES
3. SYSTEM DESIGN AND DEVELOPMENT
   - 3.1 FILE DESIGN
   - 3.2 INPUT DESIGN
   - 3.3 OUTPUT DESIGN
   - 3.4 CODE DESIGN
   - 3.5 DATABASE DESIGN
   - 3.6 SYSTEM DEVELOPMENT
     - 3.6.1 DESCRIPTION OF MODULES
     - (Detailed explanation about the project work)
4. TESTING AND IMPLEMENTATION CONCLUSION
   BIBLIOGRAPHY

APPENDICES

A. DATA FLOW DIAGRAM
B. TABLE STRUCTURE
C. SAMPLE CODING
D. SAMPLE INPUT
E. SAMPLE OUTPUT

**ANNEXURE III**

***A. Format of the title page***

TITLE OF THE PROJECT WORK

A Project Work submitted in partial fulfillment of

the requirements for the degree of

**Master of Science in Computer Science**

to the

**Periyar University, Salem - 11**

By

*NAME OF THE STUDENT*

*REG. NO.*

College emblem

***COLLEGE NAME***

**(AFFILIATED TO PERIYAR UNIVERSITY)**

PLACE with Pin Code

**MONTH – YEAR**

***B. Format of the Certificate***

Name and Address of the Internal Guide

Place

Date

**CERTIFICATE**

This is to certify that the Project Work entitled _____ submitted in partial fulfillment of the requirements of the degree of Master of Science in Computer Sciences to the Periyar University, Salem is a record of bonafide work carried out by .....…… Reg. No. .....… under my supervision and guidance.

Internal Guide

Head of the Department

Date of Viva-voice:

Internal Examiner

External Examiner

**SEMESTER I**

**Core Course-I-17PCS01 DESIGN AND ANALYSIS OF ALGORITHMS**

**Credits: 4**

**Course Objectives:**

- Apply the algorithms and design techniques to solve problems
- Analyze the complexities of various problems in different domains.

**UNIT-I**

Introduction: Notion of Algorithm – Fundamentals of Algorithmic Problem Solving – Important Problem Types – Fundamentals of the Analy sis of Algorithm Efficiency – Analysis Frame Work – Asymptotic Notations and Basic Efficie ncy Classes – Mathematical Analysis of Non-recursive Algorithms – Non-recursive Solutio n to the Matrix Multiplication – Mathematical Analysis of Recursive Algorithms – Rec ursive Solution to the Tower of Hanoi Puzzle.

**UNIT-II**

Divide and Conquer: Merge sort – Quick sort – Binar y Search – Binary Tree Traversals – Multiplication of Large Integers – Strassen's Matri x Multiplication – Closest Pair and Convex Hull Problems – Greedy Technique: Prim's Alg orithm – Kruskal's Algorithm – Dijkstra's Algorithm.

**UNIT-III**

Dynamic Programming: Computing a Binomial Coefficient – Warshall's and Floyd's Algorithms – Warshall's Algorithm – Floyd's Algorit hm for the All-Pairs Shortest-Paths Problem – Optimal Binary Search Trees – The Knapsac k Problem and Memory Functions.

**UNIT-IV**

Backtracking: N-Queens Problem – Hamiltonian Circui t Problem – Subset Sum Problem – Branch and Bound: Assignment Problem – Knapsack Pro blem – Travelling Salesman Problem.

**UNIT-V**

P, NP and NP-Complete Problems – Approximation Algo rithms for NP-Hard Problems – Approximation Algorithms for the Travelling Salesman Problem – Approximation Algorithms for the Knapsack Problem.

**TEXT BOOK**

1. Anany Levitin, "Introduction to the Design and Anal ysis of Algorithms", Pearson Education, 2008.

**REFERENCE BOOKS**

1. S.K. Basu, "Design Methods and Analysis of Algorith ms", Prentice Hall, 2005.
2. E.Horowitz, S.Sahni and Sanguthevar Rajasekaran, "F undamentals of Computer Algorithms", 2nd Edition, Universities Press, 1998.
3. Thomas H.Cormen, Charles E.Leiserson, Ronald L.Rivest, "Introduction to Algorithms", Prentice Hall 1990.

## Core Course-II-17PCS02 ADVANCED COMPUTER ARCHITECTURE

**Credits: 4**

**Course Objectives:**

- To study parallel computer architecture, design and micro-operations
- To understand the interconnection networks and synchronization mechanism

**UNIT-I**

Evolution of Computer systems – Parallelism in Unip rocessor Systems: Architecture, Mechanisms – Parallel Computer Structures: Pipeline , Array, Multiprocessor.

**UNIT - II**

Linear Pipeline processors: Asynchronous and Synchronous Models – Non-linear Pipeline Processors: Reservation and Latency Analysis – Coll ision-free scheduling – Instruction Pipeline Design: Instruction Execution Phases – Mechanisms f or Instruction Pipelining – Arithmetic Pipeline Design: Computer Arithmetic Principles – S tatic Arithmetic Pipelines – Multifunctional Arithmetic Pipelines - Superscalar Pipeline Design.

**UNIT- III**

SIMD Array Processor – SIMD Interconnection Network : Static vs Dynamic Network – Mesh connection Illiac Network- Tube interconnection Network. Associative Array Processing: Associative memory organisation.

**UNIT - IV**

Multiprocessor System Interconnects : Hierarchical Bus System - Crossbar Switch and Multiport Memory - Multistage and Combining Networks – Cache Coherence and Synchronization Mechanisms: The Cache Coherence Problem – Snoopy Bus Protocols – Directory-Based Protocols – Hardware Synchronizatio n Mechanisms – Message-Passing Mechanisms: Message-Routing Schemes – Deadlock and Virtual Channels – Flow Control Strategies – Multicast Routing Algorithms.

**UNIT - V**

Multiprocessor Operating Systems - Interprocessor Communication Mechanisms - Multiprocessor Scheduling Strategies.

**TEXT BOOKS:**


1. Kai Hwang, Faye A.Briggs, “Computer Architecture an d Parallel Processing,” McGraw-Hill, 1985.
2. Kai Hwang, “Advanced Computer Architecture,” McGraw -Hill International Editions, 2001.


**REFERENCE BOOKS:**


1. Grama, "An Introduction to Parallel Computing: Design and Analysis of Algorithms," 2nd Edition, Pearson, 2004.
2. Gita Alaghband, Harry Frederick Jordan, "Fundamentals of Parallel Processing," Prentice Hall, 2003.
3. Seyed H Roosta, "Parallel Processing and Parallel Algorithms: Theory and Computation," Springer Science & Business Madia, 1999

## Core Course-III-17PCS03 ADVANCED JAVA PROGRAMMING

**Credits: 4**

**Course Objectives:**

- Provides a platform for learning Java language, packing the programs into modules and network programs
- Helps to develop web based applications and Learn the advanced concepts of Java

**UNIT – I**

**Multithreading**: Java Thread Model-Main Thread-Creating a Thread-Creating Multiple Threads-Using isAlive() and join()-Synchronization-Interthread Communication-Suspending, Resuming and Stopping Threads-Using Multithreading. **I/O Exploring java.io:** Java I/O classes and interfaces-File-Closeable and Flushable Interfaces- The stream classes-Byte Streams-Character Streams-Console Class-Using Stream I/O-Serialization. **Networking:** Basics-Networking classes and interface-Inet Address-Inet4 Address and Inet6Address-TCP/IP Client Socket-URL-URL connection-http URL Connection-URI class-Cookies-TCP/IP server socket-Datagrams. **Event Handling**: Event Handling mechanisms-Delegation Event model-Event classes-Source of Events-Event Listener Interfaces-Using delegation Event model-Adapter classes-Inner classes.

**UNIT – II**

**AWT**: AWT classes-Window Fundamentals-Working with frame windows-Creating a frame window in an applet-Creating a windowed program-Displaying information within a window-Working with Graphics, color and font-Managing text output using font metrics.AWT Controls: Control Fundamentals, Labels, Using Buttons, Checkboxes, Choice Control, List ,Scroll Bars and Text Field, AWT Layouts and Menus: Understanding Layout Managers - Menu Bars and Menus-Dialog Boxes-File Dialog-Handling Events.

**UNIT – III**

**Images, Animation and Audio**: File Format-Image fundamentals-Image Observer-Double Buffering-Media Tracker-Image Producer, Consumer and Filter-Cell Animation. **Swing**: Features of Swing-MVC Connection-Components and containers-Swing packages-Event handling-Creating a swing-Exploring swing. **JDBC**: Introduction-Relational Databases-SQL-Manipulating Database with JDBC.

**UNIT – IV**

**Java Servlets**: Life Cycle-Simple Servlet - Servlet API-javax.servlet package-javax.servlet.http Package-Handling HTTP requests and responses-cookies-session tracking. **Java Server Pages**: Overview-Implicit Objects-Scripting- Standard actions- Directives. **Remote Method Invocation**-Client/Server Application using RMI.

**UNIT – V**

**EJB:** EJB Architecture-overview-Building and Deploying EJB-Roles in EJB-Design and Implementation-**EJB Session Bean**: Constraints-Life Cycle-Stateful Session Bean-Stateless Session Bean- **EJB Entity Bean**: Bean managed versus Container managed persistence - Life Cycle- Deployment.

**TEXT BOOKS**


1. Herbert Schildt, "The Complete Reference – JAVA," 7 th Edition, TMH,2012
2. Deitel H.M. & Deitel P.J, "Java: How To Program," P rentice-Hall of India, 5th Edition, 2003.

3. Tom Valesky, “Enterprise JavaBeans – Developing com ponent based Distributed Applications,” Pearson 2000.

**REFERENCE BOOKS**

1. C.Muthu, “Programming with Java,” Vijay Nicole Impr ints Private Ltd., 2004
2. Cay.S. Horstmann, Gary Cornel, “Core Java 2 – Vol. II- Advanced Features,” Pearson Education, 2004.
3. S.Gokila, “Advanced JAVA Programming,” Vijay Nicole Imprints Private Ltd., 2014

## Core Course-IV-17PCS04 PRINCIPLES OF PROGRAMMING LANGUAGES

**Credits:4**

**Course Objectives:**

- To introduce the programming paradigms and to understand the principles and techniques involved in design and implementation of different programming languages
- To introduce notations to describe syntax and semantics of programming languages

**UNIT - I**

Language Design Issues: History-Role of Programming languages - environments - Impact of machine Architectures - Language Translation Issues: Programming language Syntax- Stages in Translation - formal Translation models - recursive descent Parsing

**UNIT - II**

Modeling Language Properties: Formal Properties of Languages- Language Semantics- Elementary data Types: Properties of Types and Object- Scalar Data Types - Composite Data Types

**UNIT - III**

Encapsulation: Structure data types - Abstract data types - Encapsulation by sub programs Type Definitions Inheritance: - Polymorphisms

**UNIT -IV**

Functional Programming: Programs as Functions- Functional Programming in an Imperative Language - LISP - Functional Programming with static typing - delayed evaluation- Mathematical functional programming- recursive functions and lambda calculus - Logic programming : Logic and Logic Programs - Horn Clauses - Prolog - Problems with logic programming

**UNIT V**

Formal Semantics: Sample small language - operational Semantics - Denotation Semantics - Axiomatic Semantics - Program correctness - Parallel Programming: Parallel Processing and programming languages - threads - Semaphore - monitors-message passing - parallelism Non Imperative Languages

**TEXT BOOKS**

1. Terrence W Pratt, Marvin V Zelkowitz, “Programming Languages - Design and Implementation,” PHI Publications, 4 th edition, 2008
2. Kenneth C. Louden , “Programming Languages-Principl es and Practices,” Cengage Learning Publications , 2nd Edition, 2008

**REFERENCE BOOK**

1. Daniel P Friedman, Mitchell Wand, Christopher T Haynes, "Essentials of programming languages," 2 nd Edition, PHI Publishers, 2005

## Core Course-V-17PCS05 ADVANCED OPERATING SYSTEMS

**Credits: 4**

**Course Objectives:**

- To study the concepts of synchronization mechanisms and deadlock models
- To learn the theoretical foundation of clock, mutual exclusion, deadlock detection, resource sharing and concurrency control in distributed environment

**UNIT - I**

Process Synchronization: Overview: Functions of an OS – Design approaches. Synchronization mechanisms: Concept of a process – concurrent process – Critical section problem – Other synchronization problems. Process D eadlocks: Preliminaries – Models of Deadlocks – Models of resources – A Graph theoretic model of a system state – Systems with only reusable Resources.

**UNIT - II**

Distributed Operating System: Communication networks – Communication primitives. Theoretical foundations: Inherent limitations – Lam port's logical clocks – Vector clocks — Termination detection. Distributed Mutual exclusion: Preliminaries – Non- Token based and Token Based Algorithms – Comparative Performance an alysis. Distributed Deadlock detection: Deadlock handling strategies – Control o rganization – Centralized and Distributed deadlock detection algorithm.

**UNIT – III**

Distributed Resource Management: Architecture – Mec hanisms – Design Issues – case studies – Distributed shared memory: Architecture – Algorithms – Memory coherence – Coherence protocols – Design Issues. Distributed sc heduling: Issues – components – Load-distributing algorithms – Performance Comparison.

**UNIT - IV**

Multiprocessor Operating Systems: Motivations – Bas ic Architectures – Interconnection Networks – Caching – MOS Structures – Design Issues – Threads – Process Synchronization – Processor Scheduling – Memory Management.

**UNIT – V**

Database Operating Systems: Introduction – Concurre ncy Control: Database Systems – Serializability Theory – Distributed database syste ms – Lock based and Timestamp based algorithm – Concurrency control algorithms.

**TEXT BOOK**

1. Mukesh Singhal, Niranjan G.Shivaratri, "Advanced Co ncepts in Operating Systems: Distributed, Database and Multiprocessor Operating Systems," TMH,2001.

**REFERENCE BOOKS**

1. Andrew S. Tanenbaum, "Modern Operating System," PHI , 2003.
2. Pradeep K.Sinha, "Distributed Operating System conc epts and Design," PHI, 2003

## Core Course-VI-17PCSP01 LAB–I ADVANCED JAVA PROGRAM MING LAB

**Credits: 2**

**Course Objective:**

- To implement various Java concepts such as multi threading, exception and event handling etc., and write programs using AWT, Swing, JDBC, Servlets, JSP, and RMI

1. Implementation of Multi threading and Exception handling concepts
2. Write a program to read, write and copy a file using byte streams.
3. Write a program to read, write and copy a file using character streams.
4. Develop a programs using AWT to display the personal detail of an employee.
5. Develop a banking system using Swing.
6. Write a program to handle Mouse and Key events.
7. Implement TCP/IP protocol for message communication.
8. Implement UDP protocol for message communication.
9. Using JDBC develop a student information system.
10. Implement client/server communication using servlets.
11. Develop a web page using JSP.
12. Implementation of RMI.

## Core Course-VII-17PCSP02 LAB-II ALGORITHMS USING C++ LAB

**Credits: 2**

**Course Objective:**

- To study about various designing paradigms of algorithms for solving real world problems and introduce the methods of designing and analyzing algorithms

1. Apply the Divide and Conquer technique to arrange a set of numbers using Merge Sort method.
2. Perform Strassen's matrix multiplication using Divide and Conquer method.
3. Solve the Knapsack problem using Dynamic Programming.
4. Construct a Minimum Spanning Tree using Greedy method.
5. Perform Warshall's Algorithm using Dynamic Programming.
6. Solve Dijkstra's Algorithm using Greedy Technique.
7. Solve Subset Sum problem using Backtracking
8. Implement the 8-Queens Problem using Backtracking.
9. Implement Knapsack Problem using Backtracking.
10. Find the solution of Traveling Salesperson Problem using Branch and Bound technique.

**II SEMESTER**

**Core Course-VIII-17PCS06 .NET PROGRAMMING**

**Credits: 4**

**Course Objectives:**

- To study the concepts of .NET framework
- To learn the programming concepts in visual basic.Net, ASP.Net web services, ADO.Net Data Access, and C#

**UNIT – I**

Microsoft .NET Framework: The .NET Framework classes –Common Language Runtime – Common Type system and Common Language specification – Visual studio .NET IDE. Visual Basic .NET – Visual Basic .NET IDE –Variable s – Data types – Constants – Arrays – Dynamic arrays – Controlling the flow – if statemen t – select case – Loops.

**UNIT – II**

Procedures: Modular coding, arguments – Structures- Collections: Advanced array, Array, list and hash table. Lists- sorted list. Creating custom class, adding methods and properties. Building Windows Applications – working with forms.

**UNIT – III**

Basic windows controls- common dialog controls- Rich text box control- Debugging and Error Handling: types of errors, Exceptions and structured exception handling – Accessing databases – Building Database applications with ADO .Net- ADO .Net objects.

**UNIT – IV**

ASP .NET – Introducing web developer tools – Introd uction to ASP .NET server Programming – Using variables and constants in web forms – Working with web objects to store data – Designing .NET web Applications –Progr amming with Visual Basic .NET – Advanced web controls – Managing data with ASP .NET

**UNIT – V**

C# Programming – Evolution of C# and .NET – Why C# - Elements of C# program – Programming Example – Data types and Expressions – Making decisions – Repeating Instructions – Arrays and Collection – Controls – P rogramming based on events – Database access with ADO .NET

**TEXT BOOKS**


1. Evangelos Petroutsos, "Mastering Visual Basic .NE T," BPB Publications, 2002
2. Barbara Doyle, "Programming in C#," Cengage Learni ng publications, 1st Edition, 2008
3. Kathleen Kalata , "Web Applications using ASP.NET 2.0 ," Cengage Learning publications, 2009.


**REFERENCE BOOKS**


1. C.Muthu, "VB.NET," Vijay Nicole Imprints Private Lt d., 2007
2. David Chappell, "Understanding .NET," Pearson educ ation, 2002
3. David.S.Platt, "Introducing Microsoft .Net," PHI, 2 003.
4. G.Andrw Duthie , "Microsoft ASP .NET Programming wi th Microsoft Visual C# .NET step by step," PHI, 2003.
5. George Shepherd, "Microsoft ASP .NET 3.5," PHI, New Delhi, 2008.
6. Steven Holzner, "Visual Basic .NET Programming," Bl ack Book, Dreamtech Press, 2005.

## Core Course-IX-17PCS07 DISCRETE STRUCTURES

**Credits: 4**

**Course Objectives**

- To extend student's Logical and Mathematical maturity and ability to deal with abstraction.
- To introduce most of the basic terminologies used in computer science courses and application of ideas to solve practical problems.
- To have knowledge of the concepts which needed to test the logic of a program.
- To be aware of a class of functions which transform a finite set into another finite set which relates to input output functions in computer science.
- To be aware of the Combinatorics principles
- To be exposed to concepts and properties of graphs & trees.

**UNIT - I**

Mathematical Logic: Propositions – Connectives – Or der of Precedence for Logical Connectives – Conditional and Biconditional Proposi tions – Tautology and Contradiction – Equivalence of Propositions – Duality Law – Duality Theorem – Algebra of Propositions – Tautological Implication – Normal Forms – Disjuncti ve and Conjunctive Normal Forms – Principal Disjunctive and Principal Conjunctive Normal Forms.

**UNIT - II**

Theory of Inference – Truth Table Technique – Rules of Inference – Form of Argument – Rule CP – Inconsistent Premises – Indirect Method o f Proof – Predicate Calculus or Predicate Logic – Quantifiers – Existential Quantifier – Nega tion of a Quantified Expression – Nested Quantifiers – Free and Bound Variables – Inference Theory of Predicate Calculus.

**UNIT - III**

Set theory: Basic Concepts and Notations – Ordered Pairs and Cartesian Product – Set Operations – Relations – Types of Relations – Compo sition of Relations – Properties of Relations – Equivalence Classes – Partition of a Se t – Partitioning of a Set Induced by an Equivalence Relation. Functions: Representation of a Function – Types of Functions – Classification of Functions – Composition of Functi ons – Inverse of a Function – Binary and n-ary Operations – Properties of Binary Operations – Some Special Functions – Characteristic Function of a Set – Hashing Function s – Recursive Functions – Composition of Functions of Several Variables – Recursion – Pri mitive Recursive Function – Recursive Relations and Sets – Permutation Function.

**UNIT - IV**

Combinatorics: Permutations and Combinations – Pasc al's Identity – Vandermonde's Identity – Permutations with Repetition – Circular Permutation – Pigeonhole Principle – Generalisation of the Pigeonhole Principle – Princi ple of Inclusion-Exclusion – Mathematical Induction –Recurrence Relations – Particular Soluti ons – Solution of Recurrence Relations by using Generating Functions.

**UNIT - V**

Graph Theory: Basic Definitions – Degree of a Verte x – Some Special Simple Graphs – Matrix Representation of Graphs – Paths, Cycles and Connectivity – Eulerian and Hamiltonian Graphs – Connectedness in Directed Grap hs – Shortest Path Algorithms – Trees

– Spanning Trees – Minimum Spanning Tree – Rooted a nd Binary Trees – Binary Tree – Tree Traversal – Expression Trees.

**TEXT BOOK**

1. T.Veerarajan, "Discrete Mathematics with Graph Theo ry and Combinatorics", McGraw Hill Education (India), 2007.

**REFERENCE BOOKS**

1. N.Chandrasekaran and M.Umaparvathi, "Discrete mathe matics", PHI Learning Private Limited, New Delhi, 2010
2. J.P.Trembley and R.Manohar, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw Hill, New Delhi, 199 7.
3. T. Sengadir, "Discrete Mathematics and Combinatoric s", Pearson New Delhi 2009.
4. RakeshDube, AdeshPandeyRitu Gupta, "Discrete Struct ures and Automata Theory", Narosa publishing House New Delhi 2007.

## Core Course-X-17PCS08 DATA MINING TECHNIQUES

**Credits: 4**

**Course Objectives:**

- To understand the fundamental processes, concepts and techniques of data mining.
- Investigate different applications, algorithms and trends of data mining.

**UNIT - I**

Introduction to Data Mining: Data Miners – The Need for Human Direction of Data Mining – The Cross-Industry Standard Process for Data Mining – CRISP-DM: The Six Phases – Fallacies of Data Mining – Tasks – Data Preprocessi ng: Data Cleaning – Handling Missing Data – Identifying Misclassification – Graphical Me thods for Identifying Outliers – Measures of Center and Spread – Data Transformation – Min-Ma x Normalization – Z-Score Standardization – Decimal Scaling – Transformations to Achieve Normality – Numerical Methods for Identifying Outliers – Flag Variables – Transforming Categorical Variables into Numerical Variables – Binning Numerical Variables – Reclassifying Categorical Variables – Removing Variables that are not Useful – Variables that Should Probably not be Removed – Removal of Duplicate Records

**UNIT - II**

Dimension-Reduction Methods: Need for Dimension-Reduction in Data Mining – Principal Components Analysis – Applying PCA to the Houses Da ta Set – The Eigenvalue Criterion – The Proportion of Variance Explained Criterion – Th e Minimum Communality Criterion – The Scree Plot Criterion – Profiling the Principal Components – Communalities –Validation of the Principal Components – Factor Analysis – App lying Factor Analysis to the Adult Data Set – Factor Rotation – User-Defined Composite.

**UNIT - III**

Classification: Classification Task – k-Nearest Nei ghbor Algorithm: Distance Function – Combination Function – Simple Unweighted Voting – W eighted Voting – Quantifying Attribute Relevance: Stretching the Axes – Database Considerations – k-Nearest Neighbor

Algorithm for Estimation and Prediction – Choosing k – Application of k-Nearest Neighbor Algorithm Using IBM/SPSS Modeler – Decision Tree **:** Requirements for Using Decision Trees – Classification and Regression Trees – C4.5 Algorithm – Decision Rules – Comparison of the C5.0 and CART Algorithms Applied to Real Data.

**UNIT - IV**

Clustering: The Clustering Task – Hierarchical Clus tering Methods – Single-Linkage Clustering – Complete-Linkage Clustering – k-Means Clustering – Example of k-Means Clustering at Work – Behavior of MSB, MSE, and Pseu do-F as the k-Means Algorithm Proceeds – Application of k-Means Clustering Usin g SAS Enterprise Miner – Using Cluster Membership to Predict Churn – Kohonen Networks **:** Self-Organizing Maps – Kohonen Networks – Example of a Kohonen Network Study – Clu ster Validity – Application of Clustering Using Kohonen Networks – Interpreting Th e Clusters – Cluster Profiles – Measuring Cluster Goodness: Rationale for Measuring Cluster Goodness – The Silhouette Method – Silhouette Example – Silhouette Analysis o f the IRIS Data Set – The Pseudo-F Statistic – Example of the Pseudo-F Statistic – Pse udo-F Statistic Applied to the IRIS Data Set – Cluster Validation – Cluster Validation Appli ed to the Loans Data Set.

**UNIT - V**

Association Rules: Affinity Analysis and Market Basket Analysis – Data Representation for Market Basket Analysis – Support, Confidence, Frequ ent Item sets, and the a Priori Property – Generating Frequent Item sets – Generating Associ ation Rules – Extension from Flag Data to General Categorical Data – Information-Theoretic Approach: Generalized Rule Induction Method – J-Measure – Association Rules are Easy to do Badly – Local Patterns Versus Global Models – Case Study: Business understanding, Data Preparation and EDA – Clustering and Principal Components analysis

**TEXT BOOK**

1. Daniel T. Larose, Chantal D. Larose, “Data mining a nd Predictive analytics”, 2 nd Edition, Wiley Publication, 2015.

**REFERENCE BOOKS**

1. David L. Olson DursunDelen, “Advanced Data Mining T echniques,” Springer-Verlag Berlin Heidelberg, 2008
2. Jiwei Han, Michelien Kamber, “Data Mining Concepts and Techniques”, Morgan Kaufmann Publishers an Imprint of Elsevier, 2006.
3. John Wang, “Encyclopedia of Data Warehousing and Mi ning,” Idea Group Publishing, 2005

## Core Course-XI-17PCSP03 LAB–III .NET PROGRAMMING L AB

**Credits: 2**

**Course objectives:**

- To design/develop programs with GUI interfaces
- To write programs and develop interface using Visual Basic.Net

1. Create minimum two simple applications using controls. Eg: Calculator, Drawing Pictures using GDI, Animation and Trainer Kit.
2. Write a program to simulate MS – OFFICE word and Ex cel packages with minimum five features.
3. Develop a website using ADO.Net to implement online shopping with registration, login, product page (minimum 3 pages), and contact-us page. While clicking cart icon allow to modify and display final purchase details for check-out.
   **Note:** create menu for navigation and also maintain session that expires after inactive of 5 min.
4. Develop a website using ADO.Net to implement online Banking with login page, account details, deposit, withdraw, fund transfer and report of transaction with following options – last 10 days, last 1 month, last 6 month, last 1 year.
   **Note:** create menu for navigation and also maintain session that expires after inactive of 5 min.
5. Develop a web page to insert, update, delete student details using web service for accessing database.
6. Develop Console application.
   i) Using Structure
   ii) Using arrays
   iii) Creating functions and Procedures
   iv) Create a new class, add methods and properties.

## Core Course-XII-17PCSP04 LAB-IV DATA MINING LAB

**Credits: 2**

**Course Objectives:**

- To make students able to write programs in R
- To learn the implementation concepts of data mining operations

Develop **R** Script for the following:

1. To get the input from user and perform numerical operations (MAX, MIN, AVG, SUM, SQRT, ROUND).
2. To perform data import/export (.CSV, .XLS, .TXT) operations using data frames.
3. To get the input matrix from user and perform Matrix addition, subtraction, multiplication, inverse transpose and division operations using vector concept.
4. To perform statistical operations (Mean, Median, Mode and Standard deviation).
5. To perform data pre-processing operations
   i) Handling Missing data ii) Min-Max normalization

6. To perform dimensionality reduction operation using PCA.
7. To perform Simple Linear Regression and Multi Linear Regression.
8. To perform K-Means clustering operation and visualize it.
9. To diagnose any disease using KNN classification.
10. To perform market basket analysis using Apriori algorithm.

**17PHR01 - HUMAN RIGHTS**
**(Common Paper for all PG Programmes)** **Credits:0**

**Elective Course -I-17PCSE _ _**

**Elective Course-I-17PCSE01 THEORY OF AUTOMATA**

**Credits: 4**

**Course Objectives:**

- To introduce the concepts of automata theory and make the students to identify different formal language classes and their relationships
- To develop the skill to determine the decidability of computational problems

**UNIT - I**

Regular sets and finite state automata: Finite State Automata – Deterministic and Non-deterministic models – Languages accepted by Finite State Automata – Regular Expression - Pumping Lemma for regular set.

**UNIT - II**

Context free languages: Grammar – Context Free Gram mars – Derivation trees – Simplification of context free grammar (only construction and no proof of equivalence of grammars) – Chomsky Normal Form – Greibach Normal F rom.

**UNIT - III**

Pushdown automata: Pushdown Automata – Pushdown Aut omata and Context Free Languages – Pumping lemma for Context Free Language s.

**UNIT - IV**

Turing machines and undecidability: Turing Machine model – Computational languages and functions – Modifications of Turing Machines (only descriptions, no proof for theorems on equivalence of the modifications). – Properties of recursive and recursively enumerable languages – Universal Turing Machines and the undec idable problems.

**UNIT - V**

The Chomsky hierarchy: Regular Grammar – Unrestrict ed Grammar – Context sensitive languages – Linear bounded Automata – Relation betw een classes of languages.

**TEXT BOOK**

1. Hopcroft,J.E. and Ullman, J.D. “Introduction to Automata Theory, Languages and Computation,” Naraosa Publishing House, 2002.

**REFERENCE BOOKS**

1. S.P.Eugene Xavier, "Theory of Automata, Formal Languages and Computation," New Age International, 2004.
2. A.M.Natarajan, A.Tamilarasi, P.Balasubramani, "Theory of Computation," New Age International, 2003.

3. E.V.Krishnamurthy, "Introductory Theory of Computer Science," East-West Press Pvt. Ltd, 1983.
4. Bernard M. Moret, "The Theory of Computation," Pearson Education, 1998.

## Elective Course-I-17PCSE02 COMPILER DESIGN

**Credits: 4**

**Course Objectives:**

- To develop a greater understanding of the issues involved in programming language design and implementation
- To learn basic principles and advanced techniques of compiler design
- To understand the theory and practice of compiler design

**UNIT - I**

**Introduction**: Compilers – Analysis of source program – Phases o f a compiler – cousins of compiler – Grouping of phases – compiler constructi on tools. **Lexical analysis**: Introduction – definition of lexical analyzer – Input Buffering – specification of Tokens – Recognition of tokens – Regular expression to NFA – Conversion of NFA to DFA – minimization of DFA – optimization of DFA from Regular Expression.

**UNIT - II**

**Syntax Analysis**: Introduction – Role of the Parser – Writing Gramm ars – Grammars – Context free grammar. **Parsing**: Introduction – Types of parsing – shift-reduce pa rsing – Operator Precedence Parsing – LR Parsers.

**UNIT - III**

**Intermediate Code Generation**: Introduction – Generation of Intermediate Code – Declarations – Assignment statements – Boolean expr ession – Case statements – Back patching – Procedure calls – Type Conversion. **Code Generation**: Introduction – Issues of the Design of Code Generator – The Target Machine – Runtime Storage management – Basic Blocks and Flow Graphs – Next-Use Information – A S imple Code generator- DAG Representation of Basic Blocks – Peephole Optimizat ion.

**UNIT - IV**

**Code Optimization**: Introduction – Principal Sources of Optimization – Optimization of Basic Blocks – Introduction to Global Data-Flow Ana lysis.

**UNIT - V**

**Runtime Environments**: Introduction – Source language issues – Storage organization – Storage Allocation strategies – Access to Non-local names – Parameter Passing.

**TEXT BOOK**

1. Dr. R. Venkatesh, Dr. N. Uma Maheswari and Ms. S. Jeyanthi , “Compiler Design”, Yes Dee Publishing Ltd., 2015.

**REFERENCE BOOKS**

1. S.Godfrey Winster, S. Arunadevi, R.Sujatha, “Compil er Design,” Yesdee Pub., 2016
2. Alfred V. Aho, Ravi Sethi, Jeffery D. Ullman, “Comp lier Principles Techniques and Tools”, Pearson Education, 2008.
3. Kenneth C. Louden, “Compiler Construction, Principl es and Practice”, Thomson Learning Inc, 2007.

## Elective Course-I-17PCSE03 EMBEDDED SYSTEMS

**Credits: 4**

**Course Objectives**

- To Know about Embedded processor Modeling , Bus Communication in processors, Input/output interfacing
- To Know about processor scheduling algorithms , Basics of Real time operating system

**UNIT - I**

Introduction to Embedded System: Embedded Systems – Processor Embedded into a System –Embedded Hardware Units and devices in a system– E mbedded Software in a System – Examples of Embedded Systems.

**UNIT - II**

Advanced Processor Architecture and Memory Organization: Introduction to advanced Architectures–Processor and Memory organization. De vices and Communication Buses for Device Networks: I/O Types and Examples – Timer and Counting Devices – Serial bus Communication and Parallel bus Communication protocols. Device Drivers and Interrupts Service Mechanism: ISR concept – Interrupt Servicin g (Handling) Mechanism – Context and the periods for context switching, Interrupt Latency and Deadline- Direct Memory Access – Device driver programming.

**UNIT - III**

Programming Concepts and Embedded Programming in C and C++ and Java: Software Programming in Assembly Language (ALP) and in High Level Language 'C' – Embedded Programming in C++ - Embedded Programming in Java – Inter-Process Communication and Synchronization of Processes, Threads and Tasks: Multiple Processes in an Application - Multiple Threads in an Application– Tasks- Shared D ata - Inter Process Communication.

**UNIT - IV**

Real Time Operating Systems: Interrupt Routines in RTOS Environment and Handling of Interrupt Source Calls- - RTOS Task Scheduling Models, Interrupt Latency and Response Time of the Tasks as Performance Metrics - OS Security Issues-RTOS Programming I: Basic functions and types of RTOS . RTOS Programming II: Linux 2.6.x and RTLinux.

**UNIT - V**

Design Examples and Case study: Case Study of an Embedded System for a Smart Card. Embedded Software Development Process and Tools: Introduction to Embedded Software Development Process and Tools –Host and Target Mach ines- Linking and Locating Software- Getting Embedded Software into the Target System - Issues in Hardware - Software Design and Co -design.

**TEXT BOOK**

1. Raj Kamal, "Embedded Systems – Architecture, Progra mming and Design", Second Edition, Tata McGraw-Hill, , 2008

**REFERENCE BOOKS**

1. David E. Simson, "An Embedded Software Primer," Addisons-Wesley, 2001.
2. Steve Heath, Embedded Systems Design, Elsevier, 2003.
3. Frank Vahid and Tony Givargis, "Embedded System Design," John Wiley And Sons, Inc, 2002.

**Elective Course-I-17PCSE04 E–TECHNOLOGIES**

**Credits: 4**

**Course Objectives:**

- Provides a better understanding of the orientation in the current development of the modern network technologies which are used in E-business
- Provides an idea about B2B, E-Payment and M-Commerce

**UNIT – I**

**The second wave of Global E-Business**: Introduction - Electronic Commerce– Business Models, Revenue Models, and Business Processes – Ad vantages and disadvantages of Electronic Commerce - Economic Forces and Electronic Commerce – Identifying Electronic Commerce Opportunities – International Nature of El ectronic Commerce. **E-Business Technology Basics**: The Internet and the World Wide Web– Packet – Swi tched Networks – Internet Protocols – Markup Languages and the Web – Intranets and Extranets – Internet Connection Options - Internet2 and The Semantic Web.

**Web server and E-Mail Technologies**: Introduction – web server basics-software for web servers - web site utility programs - web server hardware.

**UNIT – II**

**E-Business Revenue Models:** Introduction - Revenue Models - Creating an effective Web Presence. **Selling to Consumers Online**: Introduction – Web Marketing strategies. **Selling to Businesses Online**: Introduction - Electronic Data Interchange. **Virtual Communities**: From Virtual Communities to Social Networks - Mobile Commerce - Online Auctions. **E-Business Law and Taxation**: The Legal Environment of E-Commerce - Ethical issues - Taxation and E-commerce.

**UNIT – III**

**Web Hosting and E-Business Software:** Basic Functions – Advanced Functions – E-commerce Software for Small and Midsize companies, Mid size to Large Businesses, Large Businesses. **Online Security**: Online Security Issues overview - security for client and server computers. **Online payment systems**: Basics - Payment Cards – Electronic cash - Electr onic wallets. **Implementing E- Business Initiatives:** Identifying Benefits and Estimating cost of Electronic Commerce initiatives – Strategies for De veloping E-commerce Web sites - Managing E-Commerce Implementations.

**UNIT - IV**

**E-Marketing:** Traditional Marketing – Identifying Web Presence Go als – The Browsing Behaviour Model – Online Marketing – E-Advertising - Internet Marketing Trends – Target Markets – E-Branding – Marketing Strategies. - E-se curity – **E-Payment Systems:** E-Customer Relationship Management: E Supply Chain Management.

**UNIT – V**

**E-Strategy:** Information and Strategy – The Virtual Value Chain – Seven Dimensions of E-Commerce Strategy – Value Chain and E-Strategy – Planning the E-Commerce Project – E-Commerce Strategy and Knowledge Management – E-Bu siness Strategy and Data Warehousing and Data mining. **Mobile Commerce:** Wireless Applications – Technologies for Mobile Commerce – WAP Programming Model – Wirel ess Technologies – Different Generations in Wireless Communication – Security is sues Pertaining to Cellular Technology –M-Commerce in India. **Customer Effective Web Design:** Legal and Ethical Issues.

**TEXT BOOKS**

1. Gary P. Schneider, "E-Commerce Strategy, Technology and Implementation," Cengage Learning INDIA Private Limited,. Reprint 2008
2. T. Joseph, "E-Commerce an Indian Perspective," 3rd Edition Prentice Hall of India,

**REFERENCE BOOKS**

1. Mike Papazologn, "E-Business, Organizational and Technical Foundations," Wiley India Pvt Ltd, 2008
2. Elias M. Awad, "Electronic Commerce," Prentice-Hall of India, 2008
3. Kenneth C.Laudon, Carlo Guercio Traver, " E- Commerce-business, Technology, Society," Pearson Education 2009.

## III SEMESTER

### Core Course- XIII-17PCS09 OPEN SOURCE COMPUTING

**Credits: 4**

**Course Objective:**

- To understand the basic Concepts of Python

**UNIT - I**

**Python**: Introduction – Numbers – Strings – Variables – Lists – Tuples – Dictionaries – Sets – Comparison.

**UNIT - II**

**Code Structures**: if, elif, and else – Repeat with while – Iterate with for – Comprehensions – Functions – Generators – Decorators – Namespaces and Scope – Handle Errors with try and except – User Exceptions.

**Modules, Packages, and Programs**: Standalone Programs – Command-Line Arguments – Modules and the import Statement – The Python Standard Library. **Objects and Classes**: Define a Class with class – Inheritance – Override a Method – Add a Method – Get Help from Parent with super – In self Defense – Get and Set Attribute Values with Properties – Name Mangling for Privacy – Method Types – Duck Typing – Special Methods – Composition

**UNIT-III**

**Data Types:** Text Strings – Binary Data. **Storing and Retrieving Data**: File Input/Output – Structured Text Files – Structured Binary Files - Relational Databases – NoSQL Data Stores.

**UNIT-IV**

**Web:** Web Clients – Web Servers – Web Services and Automation – **Systems:** Files – Directories – Programs and Processes – Calendars and Clocks

**UNIT-V**

**Concurrency**: Queues – Processes – Threads – Green Threads and gevent – twisted – Redis. **Networks:** Patterns – The Publish-Subscribe Model – TCP/IP – Sockets – ZeroMQ –Internet Services – Web Services and APIs – Remote Processing – Big Fat Data and MapReduce – Working in the Clouds.

**TEXT BOOK**

1. Bill Lubanovic, “Introducing Python”, O’Reilly, First Edition-Second Release, 2014.

**REFERENCE BOOKS**

1. Mark Lutz, “Learning Python”, O’Reilly, Fifth Edition, 2013.

David M. Beazley,“Python Essential Reference”, Developer’s Library, Fourth Edition, 2009.

**Core Course-XIV-17PCS10 NETWORK SECURITY AND CRYPTOGRAPHY**

**Credits: 4**

## Course Objectives:

- To introduce the classical encryption techniques for information hiding
- To analyze cryptographic techniques, protocols, formats, and standards

**UNIT - I**

Types of Physical Medium – Topologies – Wireless Ne tworking: Wireless Protocols, Data Link Layer: Layered Data Link Protocols – SLIP and PPP – MAC and ARP, Network Layer: Routing Risks – Addressing – Fragmentation

**UNIT - II**

Internet Protocol: IP Addressing – ICMP – Security options. Transport Layer: Common Protocols – Transport Layer Functions – Gateways. T CP: Connection Oriented Protocols – TCP Connections – UDP. SSL: SSL Functionality – Cer tificates. SSH : SSH and Security – SSH Protocols. STMP: E-Mail Goals – Common Servers.

**UNIT - III**

Security: Threat Models – Concepts – Common Mitigat ion Methods. Network Theory: Standards Bodies – Network Stacks – Multiple Stacks – Layers and Protocols – Common Tools. Cryptography: Securing Information – Authent ication and Keys – Cryptography and Randomness - Hashes – Ciphers – Encryption – Stegan ography.

**UNIT - IV**

Data Encryption Techniques – Data Encryption Standa rds – Symmetric Ciphers. Public Key Cryptosystems – Key Management.

**UNIT - V**

Authentication – Digital Signatures – E-Mail Securi ty – Web Security – Firewall.

**TEXT BOOKS**


1. Neal Krawetz, “Introduction Network Security”, Indi a Edition, Thomson Delmar Learning,2007.
2. V.K. Pachghare, “Cryptography and Information Secur ity”, PHI Learning Private Limited 2009.


**REFERENCE BOOKS**


1. William Stallings,” Cryptography and Network Securi ty”, Prentice – Hall of India, 2008.
2. Lincoln D.Stein, “Web Security”, Addison Wesley 199 9.
3. Behrouz A. Forouzan, Cryptography and Network Security, Tata McGraw-Hill, 2007.

## Core Course-XV-17PCS11 MOBILE COMPUTING

**Credits: 4**

**Course Objectives**

- To introduce the characteristics, basic concepts and system issues in mobile computing
- To study the various concepts like GSM, CDMA, and 3G of Mobile Communications
- To illustrate architecture and protocols in mobile computing

**UNIT - I**

Mobile Computing - Dialog Control - Networks - Middleware and Gateways - Application and Services - Developing Mobile Computing Applications - Standards - Standard Bodies - Players in Wireless Space. Mobile Computing Architecture: Architecture for Mobile Computing - Three Tier Architecture - Design Considerations for Mobile Computing

**UNIT - II**

Mobile Computing Through Telephony: Evolution of Telephony - Multiple Access Procedure - Mobile Computing Through Telephone - Voice XML - TAPI - Emerging Technologies: Bluetooth - RFID - Mobile IP - IPV6.

**UNIT - III**

GSM: Global System for Mobile Communications - GSM Architecture - GSM Entities - Call Routing in GSM - GSM Address and Identifiers - Network Aspects in GSM. SMS: Mobile Computing Over SMS - SMS - Value Added Services through SMS.

**UNIT - IV**

GPRS: GPRS and Packet Data Network - GPRS Network Architecture - Data Services in GPRS - Billing and Charging in GPRS. WAP: Evolution of Wireless Data and WAP - GPRS Applications.

**UNIT - V**

CDMA and 3G: Introduction - Architecture CDMA versus GSM - IEEE 802.11Standards - Wireless Data. Wireless LAN: Introduction - Wireless Advantages - Wireless LAN Architecture - Types of Wireless LAN - Mobility in Wireless LAN - Wireless LAN Security. Next Generation Networks - OFDM - MPLS - Wireless asynchronous transfer Mode - Multimedia Broadcast Services.

**TEXT BOOK**

1. Asoke K Talukder, Roopa R Yavagal, Mobile Computing, Second Edition, Tata McGraw Hill Publishing Company Limited, 2010.

**REFERENCE BOOKS**

1. Jochen Schiller, Mobile Communications, Pearson Education, Second Edition, 2011
2. William C.Y. Lee , Mobile Cellular Telecomunications, Second Edition, McGraw Hill, *1995*

## Core Course-XVI-17PCS12 DIGITAL IMAGE PROCESSING

**Credits: 4**

**Course Objectives:**

- To develop a theoretical foundation for fundamental concepts of digital image processing
- To understand the mathematical background for image representation, pre-processing, segmentation, object recognition and image compression

**UNIT - I**

**Introduction:** Digital Image Processing – Fields that Use Digital Image Processing – Fundamental Steps in Digital Image Processing – Com ponents of an Image processing System – **Digital Image Fundamentals:** Elements of Visual Perception – Light and Electro Magnetic Spectrum – Image sensing and Acquisition – Image Sampling and Quantization – Some Basic Relationships between Pixels.

**UNIT - II**

**The Image and Mathematical Background:** Overview – Linear Integral Transforms. **Data Structures for Image Analysis:** Level of Image Data Representation – Traditional Im age Data Structures – Hierarchical Data structures. **Image Pre-processing**: Pixel Brightness Transformations - Geometric transformations – **Local pre-processing**: Image smoothing, Edge Detectors – Image Restoration.

**UNIT - III**

**Segmentation :** Thresholding – Edge Based Segmentation : Edge Image Thresholding, Border tracing - Region Based Segmentation – Matchi ng – Mean Shift Segmentation – Active Contour Models- Snakes – Fuzzy Connectivity **Shape Representation and Description:** Region Identification – Contour Based Shape Represe ntation and Description - Chain codes, Simple Geometric Border Representation - Region Based Shape Representation and Description

**UNIT - IV**

**Object recognition:** Knowledge Representation – Statistical Pattern Reco gnition – Neural Nets – Fuzzy Systems - Mathematical Morphology – Ba sic Morphological concepts – Binary Dilation and Erosion.

**UNIT - V**

**Image Data Compression:** Image Data Properties – Discrete Image Transforms i n Image Data Compression – Predictive Compression Methods – Vector Quantization – Hierarchal and Progressive Compression Methods – Comparison of Compression Methods – Coding – JPEG Image Compression.

**TEXT BOOKS**


1. Rafael C. Gonzalez, Richard E.Woods, "Digital Image Processing," Prentice Hall, Third Edition, 2008.
2. Sonka, Hlavac, Boyle, "Digital Image Processing and Computer Vision," Cengage Learning, 2009


**REFERENCE BOOKS**


1. Anil.K.Jain, "Fundamentals of Digital Image Processing," Prentice-Hall, 1989.
2. Chanda and Majumdar, "Digital Image Processing and Analysis," Second Edition, Prentice Hall, 2011.

**Core Course-XVII - 17PCSP05 LAB–V PYTHON PROGRAMMI NG LAB Credits: 2**

**Course Objective:**

- To understand the concepts and develop the programming skills in Python

Implement the following in Python:

1. Programs using elementary data items, lists, dictionaries and tuples
2. Programs using conditional branches, loops.
3. Programs using functions
4. Programs using exception handling
5. Programs using classes and objects
6. Programs using inheritance
7. Programs using polymorphism
8. Programs to implement file operations.
9. Programs using modules.
10. Programs for creating dynamic and interactive web pages using forms.
11. Program using database connection.
12. Program using web services.

**Core Course-XVIII - 17PCSP06 - LAB - VI – MOBILE AP PLICATION DEVELOPMENT LAB**

**Credits: 2**

**Course Objective:**

- To understand the concepts and develop the programming skills in J2ME

1. Study of WML and J2ME simulators
2. Design of simple Calculator having +,-,* and / using WML/J2ME
3. Design of Calendar for any given month and year using WML/J2ME
4. Design a Timer to System Time using WML/J2ME
5. Design of simple game using WML/J2ME
6. Animate an image using WML/J2ME
7. Design a personal phone book containing the name, phone no., address, e-mail, etc.
8. Simulation of Authentication and encryption technique used in GSM
9. Browsing the Internet using Mobile phone simulator
10. Study of GlomoSim Simulator

**SOFTWARE REQUIREMENTS FOR J2ME PROGRAM**

- Nebeans7.0 ml Windows
- Java setup 6.0
- Jdk 6- nb7.0

**Elective Course - II**
**Elective Course-II-17PCSE05 SOFT COMPUTING**

**Credits: 4**

**Course Objectives:**

- To understand the basic Concept of neural network, various models of Neural networks and supervised and unsupervised learning techniques
- To get familiar with the basis of Fuzzy logic, fuzzy relations, fuzzy inference system and defuzzification techniques

**UNIT – I**

**Introduction:** Neural Networks – Application scope of Neural Netw orks – Fuzzy Logic. **Artificial Neural Networks:** Fundamental Concept – Evaluation Neural Networks – **Basic Models of Artificial Neural Networks:** Learning - Terminologies of ANNs - McCulloch-Pitts Neuron - Linear Separability - Hebb Network.

**UNIT – II**

**Supervised Learning Network:** Perceptron Networks – Adaptive Linear Neuron - Mul tiple Adaptive Linear Neurons – Back-Propagation Networks . **Associative Memory Networks:** Introduction – Training Algorithm for Pattern Assoc iation – **Hopfield Networks:** Discrete Hopfield Networks.

**UNIT – III**

**Unsupervised Learning Network:** Introduction – Maxnet – Maxican Hat Net – Hamming Network - Kohonen Self-Organizing Feature Maps - Learning Vector Quantization-Adaptive Resonance theory Network.

**UNIT – IV**

**Fuzzy logic:** Introduction – Classical Sets – Fuzzy Sets. **Fuzzy Relations:** Cardinality of Fuzzy Relation – Operations and properties of Fuzzy Relations – Fuzzy Composition – Noninteractive fuzzy sets. **Membership Functions:** Introduction – Features of Membership functions – Fuzzification.

**UNIT – V**

**Defuzzification:** Introduction – Lambda cut for Fuzzy Sets and Relat ions – Defuzzification Methods. **Fuzzy Arithmetic and Fuzzy Measures:** Introduction – Fuzzy Arithmetic – Fuzzy Measures.

**TEXT BOOK**

1. Dr. S. N. Sivanandam and Dr. S. N. Deepa, **"Principles of Soft Computing",** Wiley, Second Edition, 2007.

**REFERENCE BOOKS**

1. Bart Kosko, "A dynamical system approach to Machine Intelligence, PHI, 1992.
2. George J.Klirl Bo Yuen, "Fuzzy sets and Fuzzy Logic Theory and Application", PHI, 1995.
3. Naresh H.Sinha, Madan M. Gupta, " Soft Computin g & Intelligent System – Theory & Application" - Academic press serving in Engin eering, 1999.

**Elective Course-II-17PCSE06 INTERNET OF THINGS Course Objectives:**

- To understand the technology behind Internet of Things
- To get familiar with the design principles of connected devices
- To know about business models and ethics in Internet of Things

**UNIT – I**

**The Internet of Things**: An Overview –The Internet of Things – The Technol ogy of the Internet of Things - Enhanced objects. **Design Principles for Connected Devices**: Calm and Ambient Technology – metaphor – Privacy – Web think ing for connected Devices.

**UNIT – II**

**Internet Principles:** Internet Communications overview – IP – TCP – TCP/I P – UDP. IP Addresses: DNS – Static and Dynamic IP Address Assi gnment – MAC Addresses – TCP and UDP Ports – Application Layer Protocols. **Prototyping:** Sketching – Familiarity – Prototypes and Production – Open Source versus Closed Source.

**UNIT – III**

**Prototyping Embedded Devices:** Electronics - Embedded Computing Basics – Arduino - Raspberry Pi - Beagle Bone Black - Electric Imp. **Prototyping the Physical Design:** Non digital Methods - Laser Cutting - 3D printing - CNC Milling - Repurposing/Recycling.

**UNIT – IV**

**Prototyping Online Components:** API - Writing a New API - Real-Time Reactions - Other Protocols. **Techniques for Writing Embedded Code:** Memory Management - Performance and Battery Life – Libraries - Debugging.

**UNIT – V**

**Business Models:** History of Business Models – Model – Internet of St arting up – Lean Startups. **Moving to Manufacture:** Designing Kits - Designing Printed circuit boards – Certification – Costs - Scaling Up Software. **Ethics:** Privacy – Control – Environment – Solutions.

**TEXT BOOK**

1. Adrian McEwen and Hakim Cassimally, “Designing the Internet of Things”, Wiley, 2014.

**REFERENCE BOOKS**

1. OvidiuVermesan and Peter Friess, “Internet of Thing s – From Research and Innovation to Market Deployement” , River Publishers, 2014.
2. Peter Waher, “Learning Internet of Things” ,Packt P ublishing, 2015.
3. Donald Norris, “The Internet of Things: Do-It-Yours elf at Home Projects for Arduino, Raspberry Pi and BeagleBone Black”,McGraw Hill, 201 5.

**Elective Course-II-17PCSE07 OBJECT ORIENTED ANALYSIS AND DESIGN**

**Credits: 4**

**Course Objectives:**

- Describe Object Oriented Analysis and Design concepts to solve many real life problems and to develop Software.
- Helps to prepare Object Oriented Analysis and Design documents for a given problem using Unified Modeling Language

**UNIT – I**

**Introduction:** Role of Analysis and Design in Software Development – Meaning of Object Orientation - Overview of Various OOAD Methodologies - Goals of UML. **Use case Modeling:** Actors and Use Cases - Use Case Relationships - Writing Use Cases formally - Choosing the System Boundary - Finding Actors - Finding Use Cases - Use of Use Cases for Validation and Verification - Use Case Realization.

**UNIT - II**

**Concept:** The Object Model - The Evolution of the Object Model - Foundations of the Object Model - Elements of the Object Model - Applying the Object Model**. Classes and Object:** The Nature of an Object - Relationships among Objects - The Nature of a Class - Relationships among Classes - The Interplay of Classes and Objects - On Building Quality Classes and Objects **Classification:** The importance of proper classification - Identifying classes and objects - Key abstractions and Mechanisms.

**UNIT - III**

**Notations:** The Unified Modeling Language - Package Diagrams - Component Diagrams - Deployment Diagrams - Use Case Diagrams - Activity Diagrams.

**UNIT – IV**

**Class Diagrams:** Sequence Diagrams - Interaction Overview Diagrams - Composite Structure Diagrams - State Machine Diagrams - Timing Diagrams - Object Diagrams - Communication Diagrams.

**UNIT – V**

**Applications:** System Architecture: Satellite-Based Navigation - Control System: Traffic Management - Web Application: Vacation Tracking System - Data Acquisition: Weather Monitoring Station.

**TEXT BOOKS**


1. Mahesh P. Matha, "Object – Oriented Analysis and D esign Using UML" , PHI Learning Private Limited, New Delhi, 2008.
2. Grady Booch Robert A. Maksimchuk Michael W. Engle Bobbi J. Young, Ph.D. Jim Conallen Kelli A. Houston "Object-Oriented Analysis and Design with Applications" Third Edition, Pearson Education, Inc.,April 2007.


**REFERENCE BOOKS**


1. Martin Fowler, Kendall Scott, "UML Distilled, A Bri ef Guide to the Standard Object Modeling Languages", Second Edition, Pearson Educat ion., 2000.
2. James Rumbaugh et al, " Object - Oriented Modeling and Design With UML" sec ond Edition, Pearson Education, 2007.

**Elective Course-II-17PCSE08 RESOURCE MANAGEMENT TECHNIQUES (Theory and Proof are not expected)**

**Credits: 4**

**Course Objectives:**

- To understand the concept of optimization
- To develop mathematical model of real life cases
- To study and implement Optimization algorithms

**UNIT - I**

**Linear Programming Problem** (LPP): Formulations and graphical solution of (2 variables) canonical and standard terms of linear programming problem. Algebraic Solution: Simplex algorithm, Simplex methods – solving problems with slack variable.

**UNIT - II**

**Transportation Model**: North West corner Method, Least cost method, and Vogel's approximation method to find initial basic feasible solution and Modi method to find optimal solution. **Assignment Model**: Hungarian assignment model – Travelling sales man problem.

**UNIT - III**

**Queueing Models**: (M/M/1):(∞/FIFO), (M/M/1):(N/FIFO), (M/M/C):(∞/FIFO) and (M/M/1):(N/FIFO) (Problem and Solution only)

**UNIT - IV**

**Replacement Problem**: Replacement policy for equipment that deteriorate gradually, Replacement of item that fail suddenly-Individual and group replacement, Problems in mortality and staffing.

**UNIT - V**

**Project Scheduling**: PERT/CPM Networks – Fulkerson's Rule – Measure Of Activity – PERT Computation – CPM Computation – Resource Sched uling.

**TEXT BOOK**

1. Kanthi Swarup, P.K.Gupta and Man Mohan, "Operations Research", Fourteenth Edition, Sultan Chand and Sons New Delhi, 2008.

**REFERENCE BOOKS**

1. Hamdy. A. Taha, "Operations Research an Introductio n", Seventeenth Edition, Pearson Education, 2002.
2. S.D Sharma, "Operation Research", Kedar Nath and Ra m Nath - Meerut, 2008.

## IV SEMESTER
## Elective Course-III

### Elective Course-III-17PCSE09 CYBER SECURITY

**Credits: 4**

**Course Objectives:**

- To learn the basics of cyber security
- To know the security policies and cyber management issues

**UNIT - I**

Introduction: Cyber Security – Cyber Security polic y – Domain of Cyber Security Policy – Laws and Regulations – Enterprise Policy – Technolo gy Operations – Technology Configuration - Strategy Versus Policy – Cyber Secu rity Evolution – Productivity – Internet – E-commerce – Counter Measures - Challenges.

**UNIT - II**

Cyber Security Objectives and Guidance: Cyber Security Metrics – Security Management Goals – Counting Vulnerabilities – Security Framewo rks – E-Commerce Systems – Industrial Control Systems – Personal Mobile Devices – Securit y Policy Objectives – Guidance for Decision Makers – Tone at the Top – Policy as a Pro ject – Cyber Security Management – Arriving at Goals – Cyber Security Documentation – The Catalog Approach – Catalog Format – Cyber Security Policy Taxonomy.

**UNIT - III**

Cyber Security Policy Catalog**:** Cyber Governance Issues – Net Neutrality – Interne t Names and Numbers – Copyright and Trademarks – Email and Messaging-Cyber User Issues - Malvertising Impersonation – Appropriate Use – Cybe r Crime – Geolocation – Privacy - Cyber Conflict Issues – Intellectual property Theft – Cyber Espionage – Cyber Sabotage – Cyber Welfare.

**UNIT - IV**

Cyber Management Issues: Fiduciary Responsibility – Risk Management – Professional Certification – Supply Chain – Security Principles – Research and Development – Cyber Infrastructure Issue – Banking and finance – Health care – Industrial Control systems.

**UNIT - V**

Case Study: A Government's Approach to Cyber Security Policy.

**TEXT BOOK**

1. Jennifer L, Bayuk J, Heale P, Rohmeyer, Marcus Sachs, Jeffrey Schmidt and Joseph Weiss "Cyber Security Policy Guidebook", John Wiley & Sons ,2012.

**REFERENCE BOOKS**

1. Rick Howard, "Cyber Security Essentials", Auerbach Publications, 2011.
2. Richard A, Clarke, Robert Knake, "Cyber war: The Ne xt Threat to National Security & What to Do About It", Ecco, 2010.
3. Dan Shoemaker, "Cyber security The Essential Body O f Knowledge", Cengage Learning, 2011.

**Elective Course-III-17PCSE10 CLOUD COMPUTING**

**Credits: 4**

**Course Objective:**

- To learn the concepts of cloud computing , cloud services and platforms
- To understand real-world cloud applications

**UNIT - I**

**Introduction to Cloud Computing:** Introduction - Characteristics of Cloud Computing - Cloud Models – Cloud Service Examples - Cloud Base d Services & Applications - Cloud concepts and Technologies.

**UNIT - II**

**Cloud Services and Platforms:** Compute Service - Storage Services - Cloud Database Services - Application Services - Content Delivery Services - Analytics Services - Deployment And Management Service - Identity And Access Management Services - Open Source Private Cloud Software- Apache Hadoop - Hadoop Map Reduce Job Execution – Hadoop Schedulers - Hadoop Cluster Setup.

**UNIT - III**

**Application Design:** Cloud Application Design - Reference Architecture for Cloud Application - Cloud Application Design Methodologies - Data Storage Approaches. **Development in Python:** Design Approaches – Image Processing App - Documen t Storage App - Map Reduce App - Social Media Analytics App.

**UNIT - IV**

**Python for Cloud:** Python for Amazon Web Services – Python for Google Cloud Platform - Python for Windows Azure – Python for Map Reduced – Python Packages of Interest - Python Web Application Frame Work-Django – Designin g a RESTful Web API.

**UNIT - V**

**Big Data Analytics:** Clustering Big data - Classification of Big Data - Recommendation systems. **Multimedia Cloud:** Live Video Stream App - Streaming Protocols - Video Transcoding App. **Cloud Security:** CSA Loud Security Architecture - Authentication - Authorization - Identity and Access management - Data Security - Key Management.

**TEXT BOOK**

1. Arshdeep Bahga, Vijay Madisetti, “Cloud Computing: A Hands – On Approach” Universities press (India) pvt limited 2016.

**REFFRENCE BOOKS**

1. Michael Miller “Cloud Computing Web based applicati on that change the way you work and collaborate online”. Pearson edition, 2008.
2. Kris Jamsa “Cloud Computing Saas , PaaS , IaaS , Vi rtualization , BusinessModels , Security, And more”. Jones & Bartlett Student Editi on, 2014.

**Elective Course-III-17PCSE11 BIG DATA ANALYTICS**

**Credits: 4**

**Course Objectives:**

- To study the Big Data Platform, DFS Concepts, Interfacing with DFS, and programming framework for writing applications
- To understand the concept of document-oriented database management systems

**UNIT - I**

**Digital data**: Types of Digital Data - Classification of Digital Data - **Big Data**: Characteristics of Data - Evolution of Big Data - Definition of Big Data - Challenges with Big Data - Volume, Velocity, Variety - Other Characteristics of Data - Need for Big Data - Information Consumer or Information Producer - Traditional Business Intelligence (BI) versus Big Data - A Typical Data Warehouse Environment - A Typical Hadoop Environment - Coexistence of Big Data and Data Warehouse - Changing in the Realms of Big Data. **Big Data Analytics**: Big Data Analytics - Sudden Hype Around Big Data Analytics - Classification of Analytics - Greatest Challenges that Prevent Businesses from Capitalizing on Big Data - Top Challenges Facing Big Data - Importance of Big Data Analytics - Technologies to Meet the Challenges Posed by Big Data - Data Science - Data Scientist - Terminologies Used in Big Data Environments - Basically Available Soft State Eventual Consistency (BASE) - Few Top Analytics Tools. **The Big Data Technology Landscape**: NoSQL (Not Only SQL) - Hadoop.

**UNIT - II**

**Hadoop**: Introducing Hadoop - Need for Hadoop - RDBMS versus Hadoop - Distributed Computing Challenges - History of Hadoop - Hadoop Overview - Use Case of Hadoop - Hadoop Distributors - HDFS (Hadoop Distributed File System) - Processing Data with Hadoop - Managing Resources and Applications with Hadoop YARN (Yet another Resource Negotiator) - Interacting with Hadoop Ecosystem. **Hadoop I/O**: Data Integrity - Data Integrity in HDFS - LocalFileSystem - ChecksumFileSystem. Compression - Codecs - Compression and Input Splits - Using Compression in MapReduce. Serialization - The Writable Interface - Writable Classes - Implementing a Custom Writable - Serialization Frameworks - Avro. File-Based Data Structures - SequenceFile - MapFile.

**UNIT - III**

**MapReduce**: Anatomy of a MapReduce Job Run - Classic MapReduce (MapReduce 1) - YARN (MapReduce 2). **Failures**: Failures in Classic MapReduce - Failures in YARN. Job Scheduling - The Fair Scheduler - The Capacity Scheduler. Shuffle and Sort - The Map Side - The Reduce Side - Configuration Tuning. Task Execution - The Task Execution Environment - Speculative Execution - Output Committers - Task JVM Reuse - Skipping Bad Records**.** **Map Reduce Programming**: Introduction - Mapper - Reducer - Combiner - Partitioner - Searching - Sorting - Compression.

**UNIT - IV**

**MongoDB**: MongoDB - Need for MongoDB - Terms Used in RDBMS and MongoDB - Data Types in MongoDB - MongoDB Query Language. **Cassandra**: Apache Cassandra - An Introduction - Features of Cassandra - CQL Data Types - CQLSH - Keyspaces - CRUD (Create, Read, Update and Delete) Operations - Collections - Using a Counter - Time to Live

(TTL) - Alter Commands - Import and Export - Querying System Tables - Practice Examples.

**UNIT - V**

**Hive**: Introduction - Hive Architecture - Hive Data Types - Hive File Format - Hive Query Language (HQL) - RCFile Implementation - SerDe - User-Defined Function (UDF). **Pig:** Introduction - The Anatomy of Pig - Pig on Hadoop - Pig Philosophy - Use Case for Pig: ETL Processing - Pig Latin Overview - Data Types in Pig - Running Pig - Execution Modes of Pig - HDFS Commands - Relational Operators - Eval Function - Complex Data Types - Piggy Bank - User-Defined Functions (UDF) - Parameter Substitution - Diagnostic Operator - Word Count Example using Pig - Uses of Pig - Pig at Yahoo! - Pig versus Hive. **JasperReport using JasperSoft**: Introduction to Jasper Reports - Connecting to MongoDB NoSQL Database - Connecting to Cassandra NoSQL Database.

**TEXT BOOKS**


1. Seema Acharya, Subhasini Chellappan, "Big Data and Analytics" Wiley 2015.
2. Tom White, “Hadoop: The Definitive Guide” Third Edi tion, O’reily Media, 2012.


**REFERENCES**


1. Michael Berthold, David J. Hand, "Intelligent Data Analysis”, Springer, 2007.
2. Jay Liebowitz, “Big Data and Business Analytics” Au erbach Publications, CRC press, 2013
3. Bill Franks, “Taming the Big Data Tidal Wave: Findi ng Opportunities in Huge Data Streams with Advanced Analytics”, John Wiley & sons , 2012.
4. Pete Warden, “Big Data Glossary”, O’Reily, 2011.


## Elective Course-III-17PCSE12 SOCIAL COMPUTING

**Credits: 4**

**Course Objectives:**

- Understand the important features of social computing
- Learn to analyze the data left behind in social media

**UNIT - I**

**Mining Twitter**: twitter in all the rage – Exploring Twitter’s API , Analyzing the 140 characters. **Mining Facebook**: Exploring Facebook’s social Graph API – Analyzing social graph connections. **Mining Google+:** Exploring the Google+ API. **Mining web pages**: Scraping, Parsing and crawling the Web.

**UNIT - II**

**Analyzing the social web:** Nodes, Edges and Network Measures, Basics of network structure, Representing networks, Basic Network structures and properties – Network Structure and Measures, Describing nodes and edges, Describing networks. Entity Resolution and Link Prediction.

**UNIT - III**

Community Maintained Resources, Supporting technologies for community maintained resources, User motivations-Location based social interaction , location technology, mobile location sharing- Social Information Sharing and social filtering, Automated recommender system – Social Media in the public sector, Analyzi ng public sector social media.

**UNIT - IV**

**Random walks in social networks and their applications a survey:** Random walks on Graphs - Background – **Related work**: Algorithms , Applications , Evaluation and datasets. **A survey of link prediction in social networks**: Feature based link prediction, Bayesian probabilistic models. **Privacy in social networks**: Privacy breaches in social networks.

**UNIT - V**

**Visualizing social networks**: A Taxonomy of visualizations – The convergence of Visualization, Interaction and Analytics. Data mining in social media – Text mining in social networks – Integrating sensors and social networks – Multimedia information networks.

**TEXT BOOKS**


1. Matthew A. Russell, "Mining the Social Web: Data Mining Facebook, Twitter, Linkedin, Google+, Github, and More," 2nd Edition, O'Reilly Media, 2013.
2. Jennifer Golbeck, "Analyzing the social web," Morgan Kaufmann, 2013.
3. Charu Aggarwal (ed.), "Social Network Data Analytics," Springer, 2011.


**REFERENCE BOOKS**


1. Tina Yesayan, "Social Networking: A Guide to Strengthening Civil Society Through Social Media(SMGuide4CSO)," U S Agency for International Development, 2014.
2. Subhasish Dasgupta, "Social Computing: Concepts, Methodologies, Tools, and Applications," Information Science Reference, Hershey, New York, 2010.
3. Todd Kelsey, "Social Networking Spaces: From Facebook to Twitter and Everything in Between," Apress the experts voice, 2010.
4. Parongama Sen, Bikas K. Chakrabarti, " Sociophysics: AnIntroduction," Oxford University press, 2014.
5. Liu, Huan, Salerno, John, Young, Michael J. (Eds.), "Social Computing, Behavioral Modeling, and Prediction," Springer, 2008.
6. Davina Rungen, "Web 2.0 and Social Computing," Lambert Academic Publishing, 2011.

## Elective Course - IV

## Elective Course-IV-17PCSE13 ARTIFICIAL INTELLIGENCE

**Credits: 4**

**Course Objectives:**

- To understand about the basic theory of problem solving paradigms and search strategies in artificial intelligence.
- To make the students familiar with knowledge representation, planning, learning, natural language processing and robotics.

**UNIT – I**

Introduction - Intelligent Agents- Problem Solving - by Searching - Informed Search Strategies-Optimization Problems - Adversarial Search

**UNIT – II**

Knowledge and Reasoning - Logical Agents - First-Order Logic - Inference in First-Order Logic - Knowledge Representation

**UNIT – III**

Planning – Planning and Acting in the Real World - Uncertain knowledge and reasoning - Uncertainty - Probabilistic Reasoning - Probabilistic Reasoning Over Time - Making Simple Decisions - Making Complex Decisions

**UNIT – IV**

Learning - Learning from Examples - Knowledge in Learning - Statistical Learning Methods - Reinforcement Learning

**UNIT – V**

Communicating, Perceiving, and Acting - Natural Language Processing – Communication - Perception – Robotics.

**TEXT BOOK**

1. Stuart Russell, Peter Norvig, "Artificial Intelligence: A Modern Approach," Third Edition, Prentice Hall of India, New Delhi, 2010.

**REFERENCE BOOKS**

1. Elaine Rich, Kevin Knight, B. Nair, "Artificial Intelligence," Third Edition, Tata McGraw-Hill, New Delhi, 2017.
2. Eugene Charniak, Drew McDermott, "Introduction to Artificial Intelligence," Pearson, 2002.
3. Mick Benson, "Artificial Intelligence: Concepts and Applications," Willford Pr, 2018.

## Elective Course-IV-17PCSE14 WEB TECHNOLOGIES

**Credits: 4**

**Course Objectives:**

- To transform graduates with potential in computational into experts in information technology that the industry requires from time to time
- To study the basics involved in publishing content on the World Wide Web
- To learn the basic tools and applications used in Web publishing.

**UNIT – I**

**Internet Concept:** Fundamental of Web, History of Web, Web development overview, Domain Name System (DNS), DHCP, and SMTP and other servers, Internet service provider (ISP), Concept of IP Address, Internet Protocol, TCP/IP Architecture and protocol (IP), Web Browser and Web Server.

**UNIT – II**

**HTML and DHTML:** HTML Tag, Rules of HTML, Text Formatting & Style, List, Adding Graphics to Html Document, Tables and Layout, Linking Documents, Frame, Forms, Project in HTML, Introduction to DHTML, CSS, Class & DIV, External Style Sheet.

**UNIT – III**

**Scripting Languages:** Java Script (JS) in Web Page, Advantage of Java Script, and JS object model and hierarchy, Handling event, Operators and syntax of JS, Function, Client side JS Vs Server side JS, JS Security. Introduction to VB Script, Operator & Syntax of VB Script, Dialog Boxes, Control & Loop, Function in VBs.

**UNIT – IV**

**XML:** Introduction to XML, XML in Action, Commercial Benefits of XML, Gaining Competitive Advantage with XML, Programming in XML, XML Schema, XSLT, DOM structure model, XML quires and transformation.

**UNIT – V**

**Active Server Page (ASP):** Introduction, Internet Information System (IIS), ASPobject, Server object File system Object, session, accessing data base with an ASP page, ODBC – ADO connection object, Common Methods and properties, ADO record set object.

**TEXT BOOK**

1. N.P.Gopalan, J.Akilandeswari, “Web Technology: A de velopers Perspective”, Second Edition, PHI Publications, 2014**.**

**REFERENCE BOOKS**

1. Thomas A. Powel “HTML The complete Reference”,Third Edition,TMH publication, 1999
2. Sean Mc GrathPentice, “XML By Example”, Hall Public ation, 1998
3. David Flangan, “JavaScript: The definite Guide”, Si xth Edition, O Reilly Publication, 2011
4. Doug Tidwell ”Introduction to XML”, IDG Publicatio n,2002
5. Christopher J.Goddard, Mark White,”Mastering VB Scr ipt”, BPB Publication,2000
6. David Buser, john Kauffman, “Beginning ASP 3.0”, Wr oxpress Publications,2000

**Elective Course-IV-17PCSE15 SOFTWARE ENGINEERING**

**Credits: 4**

**Course Objectives:**

- A broad perspective on widely used techniques for developing large scale systems.
- The area of Software Testing has acquired wider horizon and significance.
- Easier to grasp and gives students a clear understanding to overall SE process.

**UNIT – I**

**Overview:** Introduction - Emergent System Properties - Systems Engineering - Legacy Systems - A Simple Safety Critical System - System Dependability – Availability And Reliability – Safety – Security - Software Process Model - Process Iteration- Process Activities - Project Planning – Project Scheduling – Risk Management **. UNIT – II**

**Requirements:** Functional and Non Functional Requirements – User Requirements - System Requirements - Interface Specification - The Software Requirement document -Feasibility Studies – Requirement elicitation and Analysis - Requirements Validation - Context Model - Behavioral Models - Data Models - Object Models - Structured Methods – Risk-Driven Specification - Safety Specification – Security Spe cification – Formal Specification in the Software Process.

**UNIT – III**

**Design:** Architectural Design Decisions– System Organization –Modular Decomposition Style – Control Styles – System Design – Real Time Operating System – Design Issues - UI Design Process – User Analysis – Interface Evolutio n. **Development:** Rapid Software Development – Agile Methods – Extreme Programming – Rapid Application Development – Software Prototyping - Application Framework – App lication System Reuse – Program Evolution Dynamics – Software Maintenance – Evolut ion Process**. UNIT – IV**

**White Box Testing**: Introduction **–** Static Testing – Structural Testing – Challenges in White Box Testing . **Black Box Testing:** Introduction – Need of Black Box Testing – Perform Black Box Testing. **Integration Testing:** Integration Types of Testing – Integration Testing as a Phase of Testing – Scenario Testing . **System and Acceptance Testing:** Functional Versus Non-Functional Testing – Functional System T esting – Non–Functional Testing .**Performance Testing:** Factors Governing Performance Testing – Methodology For Performance Testing. **Regression Testing:** Introduction – Types of Regression Testing – Perform Regression Testing.

**UNIT – V**

**Internationalization Testing:** Primer on Internationalization - Test Phase for Internationalization – Internationalization Validat ion – Fake Language Testing – Language Testing – Localization Testing. **Specialized and Organizational Testing:** Primer on Object-Oriented Software – Difference in OO Testing. **Usability and Accessibility Testing:** usability Testing – Quality Factors of Usability Te sting – Accessibility Testing – Tools for Usability Testing. **Organization Structures for Testing Terms:** Structure in Single –

Product Companies - Structure for Multi-Product Companies – Testing Service Organizations.

**TEXT BOOKS**

1. Ian Sommerville, *"* Software Engineering", Eighth Edition, Pearson, 201 1.
2. Srinivasan Desikan, Gopalaswamy Ramesh. "Software T esting Principles and Practices", Dorling Kindersley (India) Private Ltd , Pearson edition, 2013.

**REFERENCE BOOKS**

1. Carlo Ghezzi, Mehdi Jazayeri, Dino Mandrioli, "Fund amentals of Software Engineering", Second Edition, Pearson edition, PHI Learning Private Ltd., 2003.
2. Roger S Pressman, "Software Engineering", Sixth Ed ition, Tata McGraw-Hill Edition, 2010.

**Elective Course-IV-17PCSE16 WIRELESS APPLICATION PROTOCOLS**

**Credits: 4**

**Course Objectives:**

- To learn the Mobile Concepts.
- To know the Wireless Markup Language and its Applications.

**UNIT - I**

The Rise of Mobile Data - Market Convergence Enabling Convergence – Key Services for the Mobile Internet - Overview of the Wireless Application Protocol - The Origins of WAP – Overview of the WAP Architecture – Components of th e WAP Standard – Network Infrastructure Services Supporting WAP Clients – WA P Architecture Design Principles – Relationship to Other Standards.

**UNIT - II**

The Wireless Markup Language - Overview – The WML D ocument Model – WML Authoring – URLs Identify Content – Markup Basics – WML – Basics – Basic Content – Events, Tasks and Bindings.

**UNIT - III**

Variables – Controls – Miscellaneous Markup – Sendi ng Information – Application Security – Other Data - The Meta Element – Document Type De clarations – Errors and Browser Limitations – Content Generation – WML Version Nego tiation.

**UNIT - IV**

User Interface Design - Making Wireless Applications - Easy to Use - Web Site Design - Computer Terminals Vs Mobile Terminals – Designing a Usable WAP Site – Structured Usability Methods – User Interface Design Guideline s – Design Guidelines for Selected WML Elements.

**UNIT - V**

Wireless Telephony Applications - Overview of the WTA Architecture – WTA Client Framework – WTA Server & Security – Design Consider ations – Application Creation Toolbox – Future WTA Enhancements. The Mobile Inter net Future: Better Content, Easier Access – Beyond Browsing – Beyond Cellular – Mobile Data Unleashed.

**TEXT BOOK**

1. Sandeep Singhal, Thomas Bridgman, Lalitha Suryanarayana, Daniel Mauney, Jari Alvinen, David Bevis, Jim Chan, Stefan Hild,." The Wireless Application Protocol", Pearson Education,.2007.

**REFERENCE BOOKS**

1. Sandeep Singal et al. "WAP writing applications for Mobile Internet", Pearson Education 2001.
2. Data Bubrook, "WAP: A beginner's guide", Tata McGra w Hill 2001.

**Core Course-XIX-17PCSPR1 PROJECT WORK AND VIVA-VOCE**

**Credits: 10**

The students are expected to do their dissertation by attaching themselves with a well reputed organization/research institution and should submit the filled in format as given in Annexure-I to the department for approval of their Guide during the First Week of December. Periodically the project should be reviewed. The three copies of the project report should be submitted as per the format provided in Annexure II. Format of the Title page and Certificate are enclosed in Annexure III.

## EXTRA DISCIPLINARY PAPERS
## COMPUTER SCIENCE

List of **Extra Disciplinary Courses** (Non-Major Electives) offered by the Department of Computer Science/Applications for other PG programmes

### EDC-17PCSED1 - PRINCIPLES OF INFORMATION TECHNOLOGY Credits: 4

**UNIT-I**

Business Environment: Business and Information technology – business in the information age – about information technology – what is an inf ormation system – Information Technology in the Modern Organization.

**UNIT-II**

Computer Hardware – Significance of Hardware – Cent ral Processing Unit – Computer Memory – Computer Hierarchy – Input Technologies – Output Technologies – Strategic Hardware issues. Computer Software: Software History and Significance – System Software – Application Software – Software issues – Programm ing languages – Enterprise Software.

**UNIT-III**

Managing Organizational Data and Information: Basics of Data arrangement and Access – Traditional file environment – modern approach: dat abase management systems – logical data models – data warehouses – Telecommunications and Networks: The telecommunication system – Networks – Telecommunications applications – Internet- Evolution of the Internet – Operation of the Internet – WWW- Intranets and Extr anets.

**UNIT-IV**

Functional, Enterprises, and Interorganizational Systems: Information system to support business functions – transaction processing informa tion systems – accounting and finance system – marketing and sales system – production an d operations management system – Integrated information system and enterprises resource planning – interorganizational / Global information system. - Electronic Commerce

**UNIT-V**

Information Systems Development: Information system planning – Traditional systems development life cycle – alternative methods for sy stem development –system development outside the IS department – building Internet and I ntranet applications – Implementing: Ethics, Impacts and Security.

**TEXT BOOK**

1. Turban, Rainer, Potter "Introduction to Information Technology," 2nd edition, Wiley India, 2007

**REFERENCE BOOK**

1. V. Rajaraman – Introduction to Information Technolo gy, Prentice Hall of India, 2007

## EDC-17PCSED2 - FUNDAMENTALS OF COMPUTERS AND COMMUNICATIONS

**Credits: 4**

**UNIT- I**

Computer: Introduction – Components of Computers – Advantages and Disadvantages of using computers – Computer Software – Categories of Computers -Elements of an information Systems. The Components of the Systems Unit: Processor – Data representation – Memory – Expansion Slot and Adapter Cards – Ports and Connectors - Buses – Bays – Power Supply – Mobile Computers and Devices.

**UNIT – II**

Input and Output Device:: What is input - what are input devices – keyboard –pointing device – mouse – other pointing devices – controllers for gaming and media players – Voice input – Input for PDAs, Smart phones and Tablet PCs- Digital Cameras – Video input – Scanners and Reading devices Terminals – Biometric input - I nput devices for physically challenged users- Output: What is output – display devices – F lat panel displays – CRT monitors – Printers – Speakers, Headphones and Ear phones – ot her output devices – output device for physically challenged users – Storage devices.

**UNIT-III**

Operating Systems and Utility Programs: System software – Operating system – Operating system functions – operating system utility program s – types of operating systems – stand alone operating systems – network operating systems – embedded operating system – Standalone utility programs. Application Software: Application software – Business software – Graphics and Multimedia Software – Application so ftware for Communication.

**Unit-IV**

Internet and World Wide Web: Internet – History of the Internet – How the Internet works – WWW – E-commerce – Other Internet Services – Netiqu ette. Communications and Networks: Communications – Uses of Computer Communi cations – Networks – Network communication standards – Communication software – Communication over the telephone network – Communication devices – Home networks – C ommunications Channel – Physical transmission media and Wireless transmission media.

**Unit-V**

Database Management: Databases, Data and Information, The Hierarchy of data – Maintaining data – File processing versus databases – database management systems – relational, object oriented and multidimensional databases – web databases – database administration. Computer Security : Computer security risks – Internet and network attacks – Unauthorized access and use.

**TEXT BOOK**

1. Gary B. Shelly, Thomas j. Cashman, Misty E.Vermaat, "Introduction to Computers," Cengage Learning, 2008

**REFERENCE BOOKS**

1. Reema Thareja, “Fundamentals of Computers,” Oxford Univ. Press, 2015
2. Deborah Morley, Charles S. Parker, “Understanding C omputers- Today and Tomorrow”, 14th Edition, Thomson Course Technology, 2012
3. Alexis Leon, Mathew’s Leon, “Fundamentals of Comput er Science and Communication Engineering”, Vikas Publishing House, New Delhi, 1998.

## EDC - 17PCSED3 - E-COMMERCE

**Credits: 4**

**UNIT - I**

Electronic Commerce- Electronic Commerce Framework-The Anatomy of Electronic Commerce Applications- Electronic Commerce Consumer Applications- Electronic Commerce Organization Applications- Components of I-Way – Network Access Equipment.

**UNIT - II**

Architecture Framework for Electronic Commerce- World Wide Web as the Architecture – Consumer Oriented Applications – Mercantile Process Models – Mercantile Models from the Consumer's Perspective and Merchant's Perspective.

**UNIT - III**

Electronic Payment Systems: Types of Electronic Payment Systems – Digital Token based Electronic Payment Systems – Smart Card and Credit Card Based Electronic Payment Systems – Risk and Electronic Payment Systems – Des igning Electronic Payment Systems.

**UNIT - IV**

Electronic Data Interchange – EDI Applications in B usiness – EDI: Legal, Security and Privacy issues EDI and Electronic Commerce – Standa rdization and EDI – EDI Software Implementation.

**UNIT – V**

Internet and World Wide Web: origin of the Internet – New uses for the Internet – Commerical use of the Internet – Growth of the Inte rnet- Advertising on the Internet.

**TEXT BOOKS**


1. Kalakota and Whinston, "Frontiers of Electronic Commerce," Pearson Education, 2004.
2. Gray P. Scheider, "Fourth Annual Edition Electronic Commerce," Thomson Course Technology, 2003.


**REFERENCE BOOKS**


1. Kamalesh K. Baja, Debjani Nag, "E-Commerce – The Cu tting Edge of Businesss," TMH Publications, 2005.
2. Agarwala, K.N, Deeksha Agarwala, "Business on the Net: What's and How's of E-Commerce;" Macmillan, New Delhi.
3. Parag Diwan, Sunil Sharma, "Electronic Commerce: A Manager's Guide to E-Business," Excel books, 2005.

# PERIYAR UNIVERSITY

**PERIYAR PALKALAI NAGAR**

**SALEM – 636011**

## DEGREE OF MASTER OF ARTS

CHOICE BASED CREDIT SYSTEM

## SYLLABUS FOR

# M.A. ENGLISH

**( SEMESTER PATTERN )**

**( For Candidates admitted in the Colleges affiliated to Periyar University from 2017-2018 onwards )**

# REGULATIONS

The following regulations for the M.A., Economics are framed the academic year 2017-18 and thereafter in the affiliated colleges of the Periyar University, Salem.

## 1. CONDITIONS FOR ADMISSION

A Candidate who has passed B.A., Economics or B. Com., or B.B.M., or B.B.A., or B.Sc., (Maths) B.A (Sociology) or B.A., Women Studies degree examination of Periyar University or an examination of some other University accepted by the syndicate as equivalent thereto shall be permitted to appear and qualify for the M.A., Economics in the affiliated colleges of the Periyar University.

## 2. ELIGIBILITY FOR THE AWARD OF DEGREE

A candidate shall be eligible for the award of the degree only is he/she undergone the prescribed course of study in the college affiliated to the University for a period of not less than two academic years, passed the examination of all the four semesters prescribed by earning minimum 50 percent of marks and fulfilled such conditions as have been prescribed thereafter.

## 3. DURATION OF THE COURSE

The course of the degree of Master of Arts shall consist of two academic years, consisting of four semesters. The course of study shall be based on Choice Based Credits System (CBCS) pattern with internal assessment. For this purpose each academic year shall be divided into two semesters. The First and Third Semesters cover the period from July to November and Second and Fourth Semester from December to April.

## 4. EXAMINATION

There shall be four examinations. The First Semester Examination will be held at the middle of the First Academic Year and the Second Semester Examination at the end of the First Academic Year. Similarly examination will be held at the middle and at the end of the second academic year.

# COURSE OF STUDY AND SCHEME OF EXAMINATION

| S.No. | Subject | Subject Title | Hours | University Examination | | | Credits |
|---|---|---|---|---|---|---|---|
| | | | | Internal(25 %) | External(75 %) | Total | |
| | | **I SEMESTER** | | | | | |
| 1. | Core – I | Chaucer and the Elizabethan Age | 6 | 25 | 75 | 100 | 4 |
| 2. | Core – II | Restoration and the Augustan Age | 6 | 25 | 75 | 100 | 4 |
| 3. | Core – III | The Romantic Age | 6 | 25 | 75 | 100 | 4 |
| 4. | Core – IV | Indian Writing in English | 6 | 25 | 75 | 100 | 4 |
| 5. | Elective - I | American Literature | 6 | 25 | 75 | 100 | 4 |
| | | **Total** | **30** | | | | **20** |
| | | **II SEMESTER** | | | | | |
| 6. | Core – V | The Victorian Age | 6 | 25 | 75 | 100 | 5 |
| 7. | Core – VI | 20th Century Literature | 6 | 25 | 75 | 100 | 5 |
| 8. | Core – VII | Shakespeare | 6 | 25 | 75 | 100 | 5 |
| 9. | Elective - II | Linguistics and Stylistics | 6 | 25 | 75 | 100 | 4 |
| 10. | EDC | Journalism and Mass Communication | 4 | 25 | 75 | 100 | 4 |
| 11. | Commom Paper | Human Rights | 2 | 25 | 75 | 100 | 2 |
| | | **Total** | **30** | | | | **25** |
| | | **III SEMESTER** | | | | | |
| 12. | Core – VIII | New Literatures in English | 6 | 25 | 75 | 100 | 5 |
| 13. | Core – IX | Literary Criticism | 6 | 25 | 75 | 100 | 5 |
| 14. | Core – X | Comparative Literature and Translation | 6 | 25 | 75 | 100 | 5 |
| 15. | Core – XI | Women's Writing | 6 | 25 | 75 | 100 | 5 |
| 16. | Elective III | The English Language | 6 | 25 | 75 | 100 | 4 |
| | | **Total** | **30** | | | | **24** |

| S.No. | Subject | Subject Title | Hours | University Examination | | | Credits |
|---|---|---|---|---|---|---|---|
| | | | | Internal(25 %) | External(75 %) | Total | |
| | | **IV SEMESTER** | | | | | |
| 17. | Core – XII | Research Methodology and Rhetoric | 6 | 25 | 75 | 100 | 5 |
| 18. | Core – XIII | English Language Teaching | 6 | 25 | 75 | 100 | 5 |
| 19. | Core – XIV | Journalism and Mass Communication | 6 | 25 | 75 | 100 | 4 |
| 20. | Core | Project | 6 | 25 | 75 | 100 | 5 |
| 21. | Elective IV | English Literature for Competitive Exams | 6 | 25 | 75 | 100 | 4 |
| | | **Total** | **30** | | | | **23** |

# M.A. ENGLISH

## SEMESTER - I

## CORE I - CHAUCER AND THE ELIZABETHAN AGE

**Unit – I - Detailed Poetry**

| | | |
|---|---|---|
| Geoffrey Chaucer | - | Prologue to the Canterbury Tales |
| Andrew Marvell | - | To His Coy Mistress |
| John Donne | - | A Valediction: Forbidding Mourning |
| George Herbert | - | The Pulley |

**Unit – II - Non Detailed Poetry**

| | | |
|---|---|---|
| Edmund Spenser | - | Epithalamion |
| Thomas Wyatt | - | I Find no Peace |
| Henry HowardEarl of Surrey | - | My friend, the things that do attain |

**Unit – III - Detailed Drama**

| | | |
|---|---|---|
| Christopher Marlowe | - | Tamburlaine the Great |

**Non-detailed Drama**

| | | |
|---|---|---|
| Ben Jonson | - | The Alchemist |
| Thomas Middleton | - | The Spanish Gypsy |

**Unit- IV – Prose**

Detailed Study

Selections from Francis Bacon's essays.

1. Of travel
2. Of love
3. Of death
4. Of youth & Age
5. Of Garden

**Unit – V – Criticism**

| | | |
|---|---|---|
| Philip Sidney | - | An Apology for poetry |
| Bible reading | - | St Luke's version of the New testament |

# M.A. ENGLISH

## SEMESTER - I

## CORE II - RESTORATION AND THE AUGUSTAN AGE

**Unit - I - Poetry Detailed**

| | | |
|---|---|---|
| John Milton | - | Paradise Lost : Book IV |

**Unit – II – Non- detailed Poetry**

| | | |
|---|---|---|
| Thomas Grey | - | Elegy Written in a Country Churchyard |
| John Dryden | - | Mac Flecknoe |
| John Milton | - | L'Allegro and Il Penseroso |
| William Blake | - | A Poison Tree |
| Robert Burns | - | For a' That and a' That |

**Unit – III – Drama Detailed**

| | | |
|---|---|---|
| R.B.Sheridan | - | The Rivals |

**Non-detailed**

| | | |
|---|---|---|
| Oliver Goldsmith | - | The Good- Natur'd Man |
| John Dryden | - | All for Love |

**Unit – IV – Fiction**

| | | |
|---|---|---|
| Samuel Richardson | - | Pamela |
| Daniel Defoe | - | Robinson Crusoe |

**Unit – V - Prose & Criticism**

| | | |
|---|---|---|
| Joseph Addison | - | Sir Roger and Will Wimble |
| Sir Richard Steele | - | A Ramble from Richmond to |
| | - | London The Spectator Club |
| | - | Sir Roger de Coverley's Portrait |
| Alexander Pope | - | Gallery On Epic Poetry |
| Jonathan Swift | - | The Battle of the Books |

# M.A. ENGLISH

## SEMESTER - I

## CORE III - THE ROMANTIC AGE

**Unit – I - Poetry Detailed**

| | | |
|---|---|---|
| William Wordsworth | - | Ode on Intimations of Immortality<br>Guilt and Sorrow (on war)<br>Peter Bell |
| John Keats | - | Ode to Autumn<br>Ode to Psyche |
| P.B.Shelley | - | Dejection near Naples |

**Unit – II – Non-detailed Poetry**

| | | |
|---|---|---|
| Samuel Coleridge | - | Christabel |
| Lord Byron | - | When We Two Parted |
| William Wordsworth | - | Loadamia |

**Unit – III – Drama Detailed**

| | | |
|---|---|---|
| P.B.Shelley | - | Prometheus Unbound |

**Non-detailed Drama**

| | | |
|---|---|---|
| Colley Cibber | - | The Careless Husband |

**Unit – IV – Fiction**

| | | |
|---|---|---|
| Jane Austen | - | Emma |
| Walter Scott | - | Kenilworth |

**Unit – V - Prose and Criticism**

| | | |
|---|---|---|
| Charles Lamb | - | A Dissertation upon Roast Pig<br>Dream Children - A Reverie |
| William Hazlitt | - | On the Pleasure of Hating<br>On Going A Journey |
| Thomas Carlyle | - | The Hero as a Man of Letters |

# M.A. ENGLISH

## SEMESTER - I

## CORE IV - INDIAN WRITING IN ENGLISH

**Unit – I – Poetry Detailed**

| | | |
|---|---|---|
| Rabindranath Tagore | - | Gitanjali |

**Unit – II – Poetry Non-detailed**

| | | |
|---|---|---|
| Toru Dutt | - | Our Casuarina Tree |
| Sri Aurobindo | - | Surreal Science |
| Gopal Honnalgere | - | Of Crows |
| R. Parthasarathy | - | Exile |
| | - | Home coming |
| V.Iraianbu | - | Giving and Taking |
| | - | Determination (From Ripples, New Century Book House) |

**Unit – III – Drama Detailed**

| | | |
|---|---|---|
| Vijay Tendulkar | - | Ghashiram Kotwal |
| Badal Sircar | - | Procession |

**Non-detailed Drama**

| | | |
|---|---|---|
| Girish Karnad | - | Bali: The Sacrifice |

**Unit – IV – Fiction**

| | | |
|---|---|---|
| Amitav Ghosh | - | The Shadow Lines |
| R.K.Narayan | - | Waiting for the Mahatma |
| Khushwant Singh | - | Train To Pakistan |

**Unit – V – Prose & Criticism**

| | | |
|---|---|---|
| Abdul Kalam | - | Turning Points<br>A Journey through Challenges |
| Tagore | - | Sadhana – Collection of Prose<br>1. The Relation of the individual to the Universe<br>2. Soul Consciousness |

**Non-detailed**

| | | |
|---|---|---|
| Jawaharlal Nehru | - | The Discovery of India (ch-1)<br>(No-5) The past in its relation to the present<br>(No-6) Lifes Philosophy |

# M.A. ENGLISH

## SEMESTER - I

## ELECTIVE PAPER I - AMERICAN LITERATURE

**Unit – I - Poetry Detailed**

| | | |
|---|---|---|
| Walt Whitman | - | Crossing Brooklyn Ferry |
| Edgar Poe | - | The Raven |

**Unit – II – Non- detailed Poetry**

| | | |
|---|---|---|
| Emily Dickenson | - | 'Hope' is the thing with feathers |
| | | Just lost, when I was saved! |
| Robert Frost | - | Home Burial |
| James Russell Lowell | - | Cathedral |

**Unit – III – Drama Detailed**

| | | |
|---|---|---|
| Samuel Shepard | - | Curse of the Starving Class |

**Non-detailed**

| | | |
|---|---|---|
| Lanford Wilson | - | Talley's Folly |

**Unit – IV – Fiction**

| | | |
|---|---|---|
| Ralph Ellison | - | The Invisible Man |
| Lloyd C.Douglas | - | Magnificent Obsession |

**Unit – V - Prose & Criticism**

| | | |
|---|---|---|
| Ralph Waldo Emerson | - | Self- Reliance |
| Edgar Allan Poe | - | The Philosophy of Composition |

# M.A. ENGLISH

## SEMESTER - II

## CORE V – THE VICTORIAN AGE

**Unit – I - Poetry Detailed**

| | | |
|---|---|---|
| Robert Browning | - | A Grammarian's Funeral |
| Alfred Tennyson | - | Tithonus |
| Mathew Arnold | - | A wish |

**Unit – II – Non- detailed Poetry**

| | | |
|---|---|---|
| Thomas Hardy | - | The Darling Thrush |
| A.C. Swinburne | - | Before The Beginning of Years |
| Robert Browning | - | My Last Duchess |
| Christina Rossetti | - | After Death |

**Unit – III – Drama Detailed**

| | | |
|---|---|---|
| John Millington Barrie | - | Peter Pan |

**Drama :Non-detailed**

| | | |
|---|---|---|
| J.M. Synge | - | The Playboy of the Western World |

**Unit – IV – Prose Detailed**

| | | |
|---|---|---|
| Lytton Strachey | - | Eminent Victorians - Florence Nightingale |

**Non Detailed**

| | | |
|---|---|---|
| Macaulay | - | Oliver Goldsmith |

**Unit – V Fiction**

| | | |
|---|---|---|
| Emily Bronte | - | The Wuthering Heights. |
| George Eliot | - | Middlemarch |

# M.A. ENGLISH

## SEMESTER - II

## CORE VI – 20TH CENTURY LITERATURE

**Unit – I - Poetry Detailed**

| | | |
|---|---|---|
| T.S. Eliot | - | The Love Song of J. Alfred Prufrock |
| W.B.Yeats | - | Adam's Curse |
| | | The Wild Swans at Coole |
| | | Easter, 1916 |
| G.M. Hopkins | - | The Wind Hover |

**Unit – II – Non- detailed Poetry**

| | | |
|---|---|---|
| G.M. Hopkins | - | Gods Grandeur, |
| | | Pied Beauty |
| Louis MacNeice | - | Prayer Before Birth |
| Dylan Thomas | - | Poem in October |
| Charles Madge | - | Ode |
| Wilfred Owen | - | Insensibility |

**Unit – III – Drama Detailed**

| | | |
|---|---|---|
| G.B Shaw | - | Saint Joan |

**Drama :Non-detailed**

| | | |
|---|---|---|
| Sean O' Casey | - | Juno and the Paycock |
| Harold Pinter | - | The Caretaker |

**Unit – IV – Prose and Criticism Detailed**

| | | |
|---|---|---|
| D.H. Lawrence | - | Why The Novel Matters |

**Prose Non-detailed**

| | | |
|---|---|---|
| Robert Lynd | - | The Unexpected |
| R.L. Stevenson | - | Walking Tours |

**Unit – V Fiction**

| | | |
|---|---|---|
| Somerset Maugham | - | The Moon and Sixpence |
| Joseph Conrad | - | Heart of Darkness |

# M.A. ENGLISH

## SEMESTER - II

## CORE VII – SHAKESPEARE

**Unit – I - Detailed Study**

Hamlet

Non - Detailed Study

A Midsummer Night's Dream

**Unit – II – Detailed**

Twelfth Night

**Non - Detailed**

Henry IV, Part 1

**Unit – III – Sonnets**

**Detailed 14,60,73,91,104**

**Non-detailed**

The Themes in Sonnets

**Unit – IV**

1. Elizebethan theatre and audience
2. Historical Plays
3. Tragedies of Shakespeare

**Unit – V Fiction**

1.Shakespeare's Last Plays

2. Dark Comedies

3. Supernatural elements in Shakespeare

# M.A. ENGLISH
## SEMESTER - II
## ELECTIVE II - LINGUISTICS AND STYLISTICS

**Unit I – Introduction to modern Linguistics**

1. Nature and scope of linguistics
2. Branches of Linguistics
3. Significance of the study of Linguistics

**Unit II – Semantics**

1. Theories of Meanings
2. Association , connotations , collocation
3. Semantic Field
4. Varities of English

**Unit III - Pragmatics**

1. Emergence of Pragmatics
2. Speech act theory
3. Speech situation and Speech event
4. Co-operative principle and Politeness principle

**Unit IV Discourse Analysis**

1. Cohesion
2. Coherence
3. Deixis

**Unit V Stylistics**

1. Elements of Style
2. Style and Literary meaning
3. Principles of Stylistics Analysis

Ref.: S.K Verma and Krishnaswamy : Modern Linguistics

# M.A. ENGLISH
## SEMESTER - II
## EDC – JOURNALISM AND MASS COMMUNICATION

**Unit I**

1. What is News – Concept and Definition – News Values
2. Duties and Responsibilities of a Journalist
3. Various types of News-Follow-up,Curtain Raiser, Human Interest Story etc.
4. News - Story, Structure, Headlines - exercise in writing Headlines-Lead-Significance and its Types
5. Page make-up – Importance and its types

**Unit II – Reporting – Editing**

1. News gathering - Sources of news-Hard and Weak sources of News – Beats
2. Reporting (translation)
3. Editing – Translation and its role

**Unit III**

1. Definition of Mass Communication – Nature and Scope – role of Communicator – Communication process
2. Types of Communication – Downward, Upward, Horizontal, Lateral, Extra-organisational.
3. Communication Barriers – How to remove them.

**Unit IV**

1. Functions of Mass Media
2. Mass Media-Role of Press-Role of Radio-Role of T.V

**Unit V**

1. Importance of Film Communication-Different types of films-Division-Censor Board-Film Awards
2. Precision Newswriting
3. Communication in the coming decade-Computer and Mass Communication – Internet

**REFERENCE BOOKS**

1. KevalJ.Kumar – Mass Communication in India(Third Edition ) Jaico Publishing House, Mumbai
2. N.Vembusamy – ABC of Mass Media, Blackie Books
3. Rangaswami Parthasarathy – Basic Journalism, Macmillan
4. G.K Puri – A Complete Guide to Journalism for All MS Publications
5. K.M Shrivastava – News Reporting and Editing. Sterling Publishers Private Limited
6. PLV.Narasimha Rao- Style in Journalism, Orient Longman Semester - III

# M.A. ENGLISH

## SEMESTER - III

## CORE VIII - NEW LITERATURES IN ENGLISH

**Unit I Detailed Poetry**

| | | |
|---|---|---|
| Wole Soyinka | - | Telephonic Conversation |
| Sir Charles G.D. Roberts | - | The Solitary Woods Man |
| Mervyn Morris | - | Judas |
| A.D. Hope | - | The Death of a Bird |
| Judith Wright | - | Full Moon Rhyme |
| Chitra Banerjee | - | Indigo |

**Unit II – Non-Detailed Poetry**

| | | |
|---|---|---|
| Maki Kureshi | - | The Kittens |
| Ahmed Ali | - | Dialogue with Lee San |
| Jean Arasanayagam | - | In the Month of July |

**Unit III Detailed Drama**

| | | |
|---|---|---|
| Patrick White | - | The Ham Funeral |
| John Pepper Clark | - | The Masquerade |

**Unit IV Prose and Short Story**

**Detailed**

| | | |
|---|---|---|
| B.R. Ambedkar | - | Why go for Conversion? |
| Carold Shield | - | A Scarf |
| Nasibu Mwanukuzi | - | Killing Time |

**Unit V Fiction**

| | | |
|---|---|---|
| Saul Bellow | - | The Dangling Man |
| Chitra Banerjee | - | Clothes |
| Beverley Farmer | - | Among Pigeons |

# M.A. ENGLISH

## SEMESTER - III

## CORE IX - LITERARY CRITICISM

**Unit I Introduction to Literary Criticism and Key Terms**

1. Archetypal Criticism
2. Deconstruction
3. Feminism, Gynocriticism, Ecofeminism, Magic - realism
4. Formalism
5. Hermeneutics, Reader Response theory
6. Marxism
7. Modernism and Postmodernism
8. New Historicism
9. Psychoanalysis
10. Structuralism & Post Structuralism

**Unit II**

| | | |
|---|---|---|
| Sigmund Freud | - | Creative Writers and Day - Dreaming |
| Juliet Mitchell | - | Feminity, narrative and psycho analysis. |

**Unit III**

| | | |
|---|---|---|
| C.G. Jung | - | Psychology and Literature |
| Northrop Frye | - | The Archetypes of Literature |

**Unit IV**

| | | |
|---|---|---|
| Saussure | - | Signs of the Fathers |
| Levi Strauss | - | Incest and Myth |

**Unit V**

| | | |
|---|---|---|
| Barry | - | Culture and Nature |
| Gayatri Spivak | - | Can the Subaltern Speak? |

**REFERENCES**

1. Twentieth Century Literary Criticism – A Reader - David Lodge, Longman, London & New York.
2. Modern Criticism and Theory- David Lodge/ Nigel Wood. Second edition.
3. Beginning Theory – Peter Barry
4. A History of Literary criticism and theory – Habib
5. Introduction to Literary Theory – M.H. Abrams

# M.A. ENGLISH

## SEMESTER - III

## CORE X - COMPARATIVE LITERATURE AND TRANSLATION

**Unit I**

Comparative Literature – Definitions-Theoretical Component –Scope and Relevance – Methodology –Study of Influences –Study of Reception

**Unit II**

Study of Translation- Theory of Literary Translation – Adaptation, Abridgement, literal Vs literacy rendering – literature and other arts – music, architecture, theatre, dance and other disciplines

**Unit III Detailed**

Thirukural – Translation by G.U. Pope 20 couplets – Porutpaal Kalvi and Olukkam Bharathiar - Kuil Pattu in comparison with Shelley's – Skylark

Tagore – Wings of Death – Last Poem of Tagore
Borderland Poems 12, 13 in comparison with
Emily Dickenson's – I felt a Funeral, in my Brain
There came a Day at Summer's full

**Unit IV Drama Detailed**

Arjun Deo Charan – Yatra ( Translated from Rajasthani)

**Non- Detailed**

Sriranga – Agnisakshi (from Kannada)

**Unit V Fiction & Short Stories**

T.S. Pillai – In the Flood (Malayalam)

Anita Desai – Fire on the Mountain - A Comparative Study with Toni Morison – Beloved

# M.A. ENGLISH

## SEMESTER - III

## CORE XI - WOMEN'S WRITING

**Unit I Poetry**

**Detailed**

Kamala Das – Spoiling the Name

Judith Wright – Woman to Man

Margaret Atwood – Journey to the Interior

**Unit II**

**Non-Detailed**

Sylvia Plath – Lady Lazarus

Shiv K. Kumar – Indian Women

Yasmine Gooneratne – There Was a Country

Pratiba Nandakumar – Poem

**Unit III Prose**

**Detailed**

Sojourner Truth – Ain't I a Woman?

**Non-Detailed**

Indra Gandhi (1) Prison Memories (2) On Being a Mother

Mother Teresa- Nobel Lecture

**Unit IV Drama Detailed**

Mahesh Dattani – Where There's a Will

**Non-detailed:**

Susan Glaspell – Trifles

**Unit V Fiction & Short Stories**

Githa Hariharan – The Thousand faces of Night

Gloria Naylor – Mama Day

# M.A. ENGLISH

## SEMESTER - III

## ELECTIVE III - THE ENGLISH LANGUAGE

**Unit I**

What is language

Varieties of Language

**Unit II**

Language, Grammar and People

**Unit III**

Problems in Pronunciation

How Speech Organs Work

Consonants of English

**Unit IV**

Vowels of English

Words in Company

**Unit V**

Transcription Practice

Reference: J.D.O'Connor : Better English Pronunciation. Cambridge: CUP.

# M.A. ENGLISH

## SEMESTER - IV

## CORE XII - RESEARCH METHODOLOGY AND RHETORIC

**Unit I**

The Fundamentals of Research

Types of Research

Literary Research and Research in Science

**Unit II**

Choosing the Topic

Data Collection

Primary and Secondary Sources

**Unit III**

Organization of Materials

Thesis Format

Foot notes, Bibliography, Parenthetical Documentation

Conventions: Abbreviation, punctuation, margin, spacing and quotation

**Unit IV**

Jargon, Terminology, Slang, Colloquialism, Vogue and Concrete Words

Denotation and Connotation

Sentence Structure

Hypothesis

**Unit V**

Induction and Deduction

Description, Exposition, Argumentation, Tone, Style, Plagiarism

**REFERENCE**

1. MLA VIII edition to be followed; VII to be referred.
2. C.J. Parsons - Thesis Writing
3. Kothari – Educational Research
4. Anderson – Thesis and Assignment Writing
5. Amalraj D – Research Methodology

# M.A. ENGLISH

## SEMESTER - IV

## CORE XIII - ENGLISH LANGUAGE TEACHING

**Unit I**

A Brief History of Language Teaching

The Nature of Approaches and Methods in Language Teaching

Total Physical Response

**Unit II**

The Oral Approach and Situational Language Teaching

The Audio lingual Method

The Silent Way

**Unit III**

Multiple Intelligence

Neurolinguistic Programming, Teaching of Four Skills

Community Language Learning

**Unit IV**

Communicative Language Teaching

The Natural Approach

Suggestopedia

Whole Language

**Unit V**

Cooperative Language Learning

The Post-Methods Era

The Lexical Approach

Competancy based Language teaching

**REFERENCE**

1. Holliday A. 1994. Appropriate Methodology. Cambridge: Cambridge University Press.
2. Jack C. Richards and Theodore S. Rodgers. 2006. Approaches and Methods in Language Teaching Second Edition, Cambridge: Cambridge University Press
3. Krishnaswamy N. & Lalitha Krishnaswamy.2007. The Story of English in India.New Delhi: Foundation Books.

# M.A. ENGLISH
# SEMESTER - IV
# CORE XIV - JOURNALISM AND MASS COMMUNICATION

**Unit I**

1. What is News – Concept and Definition – News Values
2. Duties and Responsibilities of a Journalist
3. Various types of News-follow-up,Curtain Raiser,Human Interest Story etc.
4. News Story Structure Headlines-exercise in writing Headlines-Lead-Significance and its Types
5. Page makeup – its importance and types

**Unit II Reporting – Editing**

1. News gathering-sources of news-Hard and Week sources of News – Beats
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3. Editing – Translation& its role

**Unit III**

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**Unit IV**

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2. Preci in news writing
3. Communication in the coming decade-Computer and Mass Communication – Internet

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2. N.Vembusamy – ABC of Mass Media, Blackie Books
3. Rangaswami Parthasarathy – Basic Journalism, Macmillan
4. G.K Puri – A Complete Guide to Journalism for All MS Publications
5. K.M Shrivastava – News Reporting and Editing. Sterling Publishers Private Limited
6. PLV.Narasimha Rao- Style in Journalism, Orient Longman

**M.A. ENGLISH**

**SEMESTER - IV**

**CORE - PROJECT**

MLA VIII edition to be followed

VII ed. Should be referred for easy understanding

# M.A. ENGLISH

## SEMESTER - IV

## ELECTIVE IV

## ENGLISH LITERATURE FOR COMPETITIVE EXAMINATIONS

**REFERENCE**

1. Upkar's Text

2. Trueman's-CBSE-UGC – NET / SET

# QUESTION PAPER PATTERN

Total Marks: 75 Hours: 3

***For Core Papers I, II, III, IV, V, VI, VII, VIII, XI, and Elective Paper I the following is the pattern to be followed***

a. 5 questions to be asked (5 X 3=15 marks)
b. Either/or pattern
c. Question 1 from Prose, 2 from Poetry, 3 from Drama, 4 and 5 from either Prose/poetry or Drama.
d. Each annotation carries 3 marks

**Section – B**

a. 6 Short Essays in 200 words each to be answered. ( 6X5 =30 marks)
b. Either / or pattern
c. First five questions to be asked from all five Units
d. Question 6 to be asked either from Units-I/II/III/IV or V
e. Each question carries five marks

**Section – C**

a. 3 essays out of 5 in 600 words each to be answered ( 3X10 =30 marks)
b. open Choice
c. One question to be asked from each unit
d. Each question carries ten marks

# QUESTION PAPER PATTERN

***For Elective Papers II and III and Core Papers IX,X,XII,XIII and XIV the following pattern is to be followed***

**Section – A**

a. 5 out of 8 short answers in 100 words each to be answered (5 X 3=15 marks)

b. Open Choice questions

c. The first 5 questions from all five units, the 6, 7 and 8 question to be asked from any of the five units.

**Section – B**

a. 6 Short Essays in 200 words each to be answered ( 6X5 =30 marks)

b. Either / or pattern

c. First five questions to be asked from all five Units

d. Question 6 to be asked either from Units-I/II/III/IV or V

d. Each question carries five marks

**Section – C**

a. 3 essays out of 5 in 600 words each to be answered ( 3X10 =30 marks)

b. open Choice

c. One question to be asked from each unit

d. Each question carries ten marks

**III For Elective Paper IV English Literature for competitive Examination the following pattern is to be followed.**

a. 75 multiple choice questions, genre wise in all areas to be asked from the prescribed text.

b. 75x 1 (75 x1=75)

# PERIYAR UNIVERSITY

**PERIYAR PALKALAI NAGAR**

**SALEM – 636011**

**DEGREE OF MASTER OF SCIENCE**

CHOICE BASED CREDIT SYSTEM

## SYLLABUS FOR

# M.SC. MATHEMATICS

**( SEMESTER PATTERN )**

**( For Candidates admitted in the Colleges affiliated to Periyar University from 2017-2018 onwards )**

# REGULATIONS

## 1. OBJECTIVES OF THE COURSE

In recent days Mathematics is penetrating all fields of human endeavor and therefore it is necessary to prepare the students to cope with the advanced developments in various fields of Mathematics. The objectives of this course are the following:

(a) To impart knowledge in advanced concepts and applications in various fields of Mathematics.

(b) To provide wide choice of elective subjects with updated and new areas in various branches of Mathematics to meet the needs of all students.

## 2. COMMENCEMENT OF THIS REGULATION:

These regulations shall take effect from the academic year 2017-2018, that is, for students who are admitted to the first year of the course during the academic year 2017-2018 and thereafter.

## 3.DEFINITIONS:

Programme : Programme means a course of study leading to the award of the degree in a discipline.

Course : Course refers to the subject offered under the degree Programme.

## 4. ELIGIBILITY FOR ADMISSION:

A candidate who has passed B.Sc., Mathematics / B.Sc., Mathematics (Computer Applications) degree of this University or any of the above degree of any other University accepted by the Syndicate equivalent thereto, subject to such condition as may be prescribed therefore are eligible for admission to M.Sc., Degree Programme and shall be permitted to appear and qualify for the Master of Science (M.Sc.) Degree Examination in Mathematics of this University.

## 5. DURATION OF THE COURSE:

The course of study of Master of Science in Mathematics shall consist of two academic years divided into four semesters. Each Semester consists of 90 working days.

**6. SYLLABUS:**

The syllabus of the PG degree Programme has been divided into the following courses:

i. Core Courses,

ii. Elective Courses, and

iii. Extra Disciplinary Course (EDC).

i. Core Courses:

The core courses related to the programme concerned including practicals and project work offered under the programme.

ii. Elective Courses :

There are FOUR Elective Courses offered under the programme related to the major or non major but are to be selected by the students.

iii. Extra Disciplinary Course (EDC):

There is an Extra Disciplinary Course offered under the programme related to the nonmajor but are to be selected by the students.

**7. CREDITS:**

Weightage given to each course of study is termed as credit.

**8. CREDIT SYSTEM:**

The weightage of credits are spread over to four different semester during the period of study and the cumulative credit point average shall be awarded based on the credits earned by the students. A total of 92 credits are prescribed for the Post Graduate programme.

**9. COURSE OF STUDY:**

The course of study for the degree shall be in Branch I-Mathematics (under Choice Based Credit System) with internal assessment according to syllabi prescribed from time to time.

# COURSE OF STUDY AND SCHEME OF EXAMINATION

| S.No. | Subject | Subject Title | Hours | University Examination | | | Credits |
|---|---|---|---|---|---|---|---|
| | | | | Internal (25%) | External (75%) | Total | |
| **SEMESTER I** | | | | | | | |
| 1 | Core I | LINEAR ALGEBRA | 6 | 25 | 75 | 100 | 5 |
| 2 | Core II | REAL ANALYSIS | 6 | 25 | 75 | 100 | 5 |
| 3 | Core III | MECHANICS | 6 | 25 | 75 | 100 | 4 |
| 4 | Core IV | ORDINARY DIFFERENTIAL EQUATIONS | 6 | 40 | 60 | 100 | 4 |
| 5 | Elective I | FROM GROUP - A | 6 | 25 | 75 | 100 | 4 |
| **SEMESTER II** | | | | | | | |
| 6 | Core V | ALGEBRA | 6 | 25 | 75 | 100 | 5 |
| 7 | Core VI | FLUID DYNAMICS | 6 | 25 | 75 | 100 | 5 |
| 8 | Core VII | COMPLEX ANALYSIS | 6 | 25 | 75 | 100 | 4 |
| 9 | Common Paper | HUMAN RIGHTS | 2 | - | 75 | 100 | 2 |
| 10 | EDC - I | FROM THE LIST | 4 | 25 | 75 | 100 | 4 |
| 11 | Elective II | FROM GROUP - B | 6 | 25 | 75 | 100 | 4 |

| S.No. | Paper Code | Subject Title | Hours | University Examination | | | Credits |
|---|---|---|---|---|---|---|---|
| | | | | Internal (25%) | External (75%) | Total | |
| | | **SEMESTER III** | | | | | |
| 12 | Core VIII | PARTIAL DIFFERENTIAL EQUATIONS | 6 | 25 | 75 | 100 | 5 |
| 13 | Core IX | TOPOLOGY | 6 | 25 | 75 | 100 | 5 |
| 14 | Core X | MEASURE THEORY AND INTEGRATION | 6 | 25 | 75 | 100 | 5 |
| 15 | Core XI | CALCULUS OF VARIATIONS AND INTEGRAL EQUATIONS | 6 | 40 | 60 | 100 | 4 |
| 16 | Elective III | FROM GROUP - C | 6 | 25 | 75 | 100 | 4 |
| | | **SEMESTER IV** | | | | | |
| 17 | Core XII | FUNCTIONAL ANALYSIS | 6 | 25 | 75 | 100 | 5 |
| 18 | Core XIII | PROBABILITY THEORY | 6 | 25 | 75 | 100 | 4 |
| 19 | Core XIV | GRAPH THEORY | 6 | 25 | 75 | 100 | 5 |
| 20 | Elective IV | FROM GROUP – D<br>(Theory Paper or Practical Paper)<br>T-Theory Paper ; P-Practical Paper. | T-6<br>P-6 | T-25<br>P-40 | T-75<br>P-60 | 100 | T-4<br>P-4 |
| 21 | Core XV | PROJECT | 6 | - | 100 | 100 | 5 |
| 22 | | **TOTAL** | **120** | **--** | **--** | **2100** | **92** |

**(i) List of Elective Courses:**

| Semester / Elective Course | Paper Code | Paper Title |
|---|---|---|
| | **GROUP A** | |
| I | Paper I<br>Paper II | Numerical Analysis<br>Difference Equations |
| | **GROUP B** | |
| II | Paper I<br>Paper II | Discrete Mathematics<br>Combinatorial Mathematics |
| | **GROUP C** | |
| III | Paper I<br>Paper II | Differential Geometry<br>Programming with C++ |
| | **GROUP D** | |
| IV | Paper I<br>Paper II<br>Practical | Number Theory (T)<br>Optimization techniques (T)<br>C++ Programming Lab (P) |

**(ii) List of Extra Disciplinary Courses (EDC):**

| S. No. | PAPER CODE | PAPER TITLE |
|---|---|---|
| 1 | Paper I | Numerical & Statistical Methods |
| 2 | Paper II | Statistics |

**11. EXAMINATIONS:**

The examination shall be of Three Hours duration for each paper at the end of each semester. The candidate failing in any subject(s) will be permitted to appear for each failed subject(s) in the subsequent examination. Practical examinations for PG course should be conducted at the end of the even semester only. At the end of fourth semester viva-voce will be conducted on the basis of the Dissertation/ Project report by one internal and one external examiner.

**12. QUESTION PAPER PATTERN AND MARKS DISTRIBUTION:**

**(i) Question Paper Pattern and Marks Distribution for Theory Examination:**

**TITLE OF THE PAPER**

Time: Three Hours  Maximum Marks: 75

**Part – A (10 X 2 = 20 Marks)**

Answer ALL Questions

(Two Questions from each unit)

**Part – B (5 X 5 = 25 Marks)**

Answer ALL Questions

(Two Questions from each unit with internal choice)

**Part – C (3 X 10 = 30 Marks)**

Answer any Three questions out of Five questions

(One question from each unit).

(ii) Question Paper Pattern and Marks Distribution for C++ Programming Lab :

**Question Paper Pattern:**

There will be ONE question with or without subsections to be asked for the Practical examination. Every question should be chosen from the question bank prepared by the examiner(s). Every fourth student get a new question i.e. each question may be used for at most three students.

The answer should contain i) Algorithm (A), ii) Flow Chart (F), iii) Program (P), iv) Execution of the Program with correct output (E & OP), and v) viva-voce (V).

**Marks Distribution for C++ Programming Lab :**

Maximum marks:100

Internal (CIA) : 40

External Assessment (EA- Practical Examination) : 60

( Practical Written Exam.: 50 Marks (The split up marks of this total marks 50 is, for A-05 , F-05, P- 10, E -20 & OP-05 and V-05) and Record:10 Marks).

**13. Dissertation:**

(a) Topic:

The topic of the dissertation shall be assigned to the candidate before the beginning of third semester and a copy of the same should be submitted to the University for Approval.

(b) No. of copies project / dissertation:

The students should prepare Three copies of dissertation and submit the same for the evaluation by Examiners. After evaluation one copy is to be retained in the college library and one copy is to b submitted to the university (COE) and the student can have the rest.

(c) Format to be followed:

The format of the Project / Dissertation to be prepared and submitted by the students in Semester IV is given below:

Format for the preparation of Project work:

i) Title page:

# TITLE OF THE PROJECT / DISSERTATION

Project / dissertation Submitted in partial fulfillment of the requirement for the award of the Degree of Master of Science in MATHEMATICS (under Choice Base Credit System) to the Periyar University, Periyar Palkalai Nagar, Salem -636 011.

By

**(Student's Name )**

**(Register Number)**

Under the Guidance of

**(Guide Name and Designation)**

(College Logo)

**(Name of the Department)**

**(College Address)**

(Month and Year )

**ii) BONAFIDE CERTIFICATE:**

## CERTIFICATE

This is to certify that the dissertation entitled .....submitted in partial fulfillment of the requirement of the award of the Degree of Master of Science in MATHEMATICS (Under Choice Based Credit System) to the Periyar University, Salem is a record of bonafide research work carried out by.....under my supervision and guidance and that no part of the dissertation has been submitted for the award of any degree, diploma, fellowship or other similar titles or prizes and that the work has not been published in part or full in any scientific or popular journals or magazines

Date:

Place: Signature of the Guide

Signature of the Head of the Department.

(iii) Acknowledgement:

( Drafted by the student )

(iv) Table of contents:

**TABLE OF CONTENTS**

| Chapter No. | Title | Page No. |
|---|---|---|
| 1. | Introduction | |
| 2. | Review of Literature | |
| 3,4.. | Results | |
| | Summary | |
| | References | |

**14. MINIMUM MARKS FOR PASSING:**

i) Theory Papers: The candidate shall be declared to have passed the examination if the candidate secures not less than 50 marks in total (CIA mark + Theory Exam mark) with minimum of 38 marks in the Theory Exam conducted by the University. The Continuous Internal Assessment (CIA) Mark 25 is distributed to four components viz., Tests, Assignment, Seminar and Attendance as 10, 05, 05 and 05 marks, respectively.

ii) Practical paper: A minimum of 50 marks out of 100 marks in the University examination and the record notebook taken together is necessary for a pass. There is no passing minimum for the record notebook. However submission of record notebook is a must.

iii)Project Work/Dissertation and Viva-Voce: A candidate should secure 50% of the marks for pass. The candidate should attend viva-voce examination to secure a pass in that paper.

Candidate who does not obtain the required minimum marks for a pass in a Paper / Practical/ Project/Dissertation shall be declared Re-Appear (RA) and he / she has to appear and pass the same at a subsequent appearance.

**15. CLASSIFICATION OF SUCCESSFUL CANDIDATES:**

Candidates who secure not less than 60% of the aggregate marks in the whole examination shall be declared to have passed the examination in First Class. All other successful candidate shall be declared to have passed in the Second Class. Candidates who obtain 75% of the marks in the aggregate shall be deemed to have passed the examination in the First Class with Distinction provided they pass all the

examinations prescribed for the course at the first appearance. Candidates who pass all the examinations prescribed for the course in the first instance and within a period of two academic years from the year of admission to the course only are eligible for University Ranking.

**16. MAXIMUM DURATION FOR THE COMPLETION OF THE PG PROGRAMME:**

The maximum duration for completion of the PG Programme shall not exceed Four Years from the year of admission.

**17. TRANSITORY PROVISION:**

Candidates who were admitted to the PG course of study before 2017-2018 shall be permitted to appear for the examinations under those regulations for a period of three years, that is, up to end inclusive of the examination of April / May 2020. Thereafter, they will be permitted to appear for the examination only under the regulations then in force.

# M.Sc. MATHMATICS
## SEMESTER - I
## CORE I - LINEAR ALGEBRA

**UNIT I : Linear Transformation**

The algebra of linear transformations-Isomorphism of vector spaces-Representations of linear transformations by matrices - Linear functional-The double dual - The transpose of a linear transformation. (Chapter 3: Sections: 3.1 - 3.7).

**UNIT II : Algebra of Polynomials**

The algebra of polynomials - Lagrange interpolation - Polynomial ideals - The prime factorization of a polynomial - Determinant functions. (Chapter 4: Sections: 4.1 - 4.5, Chapter 5: Sections: 5.1 & 5.2).

**UNIT III Determinants**

Permutations and the uniqueness of determinants-Classical adjoint of a (square) matrix - Inverse of an invertible matrix using determinants - Characteristic values - Annihilating polynomials. (Chapter 5: Sections: 5.3 & 5.4, Chapter 6: Sections : 6.1 - 6.3 ).

**UNIT IV : Diagonalization**

Invariant subspaces - Simultaneous triangulations - Simultaneous diagonalizations - Direct-sum decompositions - Invariant sums - Primary decomposition theorem. ( Chapter 6: Sections: 6.4 -6.8 ).

**UNIT V : The Rational and Jordan Forms**

Cyclic subspaces and annihilators-Cyclic decompositions and rational form-The Jordan form-Computation of invariant factors.(Chapter 7: Sections 7.1 - 7.4 ).

**TEXT BOOK:**

1. Kennath M. Hoffman and Ray Kunze, Linear Algebra,2nd Edition, Pearson India Publishing, New Delhi, 2015.

**REFERENCE BOOKS:**

1. M.Artin,Algebra, Prentice Hall of India Pvt. Ltd., New Delhi ,2005
2. S.H.Friedberg,A.J.Insel and L.E.Spence, Linear Algebra,4th Edition, Prentice Hall of India Pvt. Ltd., New Delhi,2009.
3. I.N Herstein : Topics in Algebra, 2nd Edition, Wiley Eastern Ltd. New Delhi, 2013.
4. J.J.Rotman,Advanced Modern Algebra,2nd Edition, Graduate Studies in Mathematics, Vol.114, AMS, Providence, Rhode Island,2010.
5. G.Strang, Introduction to Linear Algebra,2nd Edition, Prentice Hall of India Pvt. Ltd., New Delhi,2013.

# M.Sc. MATHMATICS
# SEMESTER - I
# CORE II - REAL ANALYSIS

**UNIT I : Differentiation:**

Differentiation - The derivative of a real function – Mean value Theorems – The continuity of the Derivative – L' Hospital's Rule – Derivatives of Higher order – Taylor's theorem – Differentiation of Vector–valued functions. (Chapter 5: Page Number: 103 – 119).

**UNIT II : Riemann – Stieltjes Integral:**

The Riemann - Stieltjes Integral – Definition and Existence of the Integral – Properties of the Integral – Integration and Differentiation – Integration of Vector–valued functions – Rectifiable curves. (Chapter 6: Page Number: 120 – 142).

**UNIT III : Sequences and Series of Functions:**

Sequences and Series of Functions – Discussion of main problem – Uniform Convergence - Uniform Convergence and Continuity - Uniform Convergence and Integration-Uniform Convergence and Differentiation, Equicontinuous families of functions – Stone Weierstrass Theorem. (Chapter 7: Page Number: 143 – 171).

**UNIT IV : Some Special Functions:**

Some Special Functions – Power Series – The Exponential and Logarithmic functions – The Trigonometric functions- The algebraic completeness of the complex field – Fourier series - The Gamma function. (Chapter 8: Page Number: 172 – 203).

**UNIT V:**

Linear transformations, Differentiation, the contraction principle, the inverse function theorem, the implicit function theorem.(Chapter 9).

**TEXT BOOK:**

1. Walter Rudin – Principles of Mathematical Analysis, 3rd edition, Mc Graw Hill Book Co., Kogaskusha, 1976.

**BOOKS FOR REFERENCE:**

1. T.M. Apostol, Mathematical Analysis, Narosa Publ. House, New Delhi, 1985.

2. H.L.Royden, Real Analysis, Macmillian Publn.Co.Inc.4th Edition, New York,1993

3. V.Ganapathy Iyer, Mathematical Analysis, Tata McGraw Hill, New Delhi,1970.

# M.Sc. MATHMATICS
# SEMESTER - I
# CORE III - MECHANICS

**UNIT I : Mechanical Systems:**

The Mechanical System – Generalized co–ordinates – Constraints – Virtual work – Energy and Momentum. (Chapter 1 Sections 1.1 to 1.5).

**UNIT II : Lagrange's Equations:**

Lagrange's Equation – Derivation of Lagrange's Equations – Examples – Integrals of motion. (Chapter 2 Sections 2.1 to 2.3).

**UNIT III : Hamilton's Equation:**

Hamilton's Equation – Hamiltons Principle – Hamilton's Equation – Other Variational Principle. (Chapter 4 Sections 4.1 to 4.3).

**UNIT IV : Hamilton – Jacobi Theory:**

Hamilton – Jacobi Theory – Hamilton Principle Function – Hamilton – Jacobi Equation – Separability. (Chapter 5 Sections 5.1 to 5.3).

**UNIT V : Canonical Transformation:**

Canonical Transformation – Differential forms and generating functions – Special Transformations – Lagrange and Poisson brackets. (Chapter 6 Sections 6.1 to 6.3) .

**TEXT BOOK:**

1. D. Greenwood, Classical Dynamics, Prentice Hall of India, New Delhi, 1985.

**BOOKS FOR REFERENCE:**

1. H.Goldstein, Classical Mechanics, Narosa Publishing House, NewDelhi, 2001.
2. J.L. Synge and B.A. Griffth, Principles of Mechanics, McGraw Hill Book Co. New York,1970.
3. N.C. Rane and P.S.C. Joag, Classical Mechanics, Tata McGraw Hill, New Delhi, 1991.

# M.Sc. MATHMATICS

## SEMESTER - I

## CORE IV - ORDINARY DIFFERENTIAL EQUATIONS

**UNIT I : Linear Equations with Constant Coefficients:**

Introduction – Second order homogeneous equations – Initial value problem – Linear dependence and independence – A formula for the Wronskian. (Chapter 2: Section 1 to 5).

**UNIT II : Linear Equations with Constant Coefficients (Contd.):**

Non-homogeneous equations of order two – Homogenous and non-homogeneous equations of order n – Initial value problem – Annihilator method to solve a non-homogeneous equation. (Chapter 2: Section 6 to 11).

**UNIT III : Linear Equations with Variable Coefficients:**

Initial value problems for homogeneous equations – solutions of homogeneous equations- Wronskian and linear independence – Reduction of the order of homogeneous equation. (Chapter 3: Section 1 to 5).

**UNIT IV : Linear Equations with Regular Singular Points:**

Linear equation with regular singular points – Euler equation – second order equations with regular singular points – solutions and properties of Legendre and Bessel equation. (Chapter 3: Section 8 & Chapter 4: Section 1 to 4 and 7 and 8).

**UNIT V : First Order Equation – Existence and Uniqueness:**

Introduction – Existence and uniqueness of solutions of first order equations – Equations with variable separated – Exact equations – Method of successive approximations – Lipschitz Condition – Convergence of the successive approximations. (Chapter 5: Section 1 to 6 ).

**TEXT BOOK:**

1. E.A.Codington, An Introduction to Ordinary Differential Equation, Prentice Hall of India, New Delhi, 1994.

**BOOKS FOR REFERENCE:**

1. R.P Agarwal and Ramesh C.Gupta, Essentials of Ordinary Differential Equation. McGraw Hill,New York,1991.
2. D.Somasundram, Ordinary Differential Equations, Narosa Publ.House, Chennai – 2002.
3. D.Raj, D.P.Choudhury and H.I.Freedman, A Course in Ordinary Differential Equations, Narosa Publ.House,2004.

# M.Sc. MATHMATICS

## SEMESTER - II

## CORE V - ALGEBRA

**UNIT I** :

Another Counting Principle-Sylows Theorem. (Chapter 2: Sections 2.11 & 2.12 in [1]).

**UNIT II :**

Direct Product - Finite Abelian Groups. (Chapter 2: Sections 2.13 & 2.14 in [1] ).

**UNIT III :**

Modules and homomorphisms-Classical isomorphism theorems-Direct sums and products – Finitely generated and free modules. (Chapter 4 : Sections 4.4 and 4.5 in [2])

**UNIT IV :**

Elements of Galois Theory-Solvability by Radicals-Galois Group over the Rationals. (Chapter5 Sections 5.6, 5.7 and 5.8 in [1]).

**UNIT V :**

Finite Fields-Wedderburn's Theorem on Finite Division Rings - A Theorem of Frobenius . (Chapter 7: Sections 7.1, 7.2, and 7.3 in [1]).

**TEXT BOOK:**

[1] I.N Herstein, Topics in Algebra, 2nd Edition, John Wiley and Sons, New York, 2003 (For Units I, II, IV and V).

[2] Michiel Hazewinkel, Nadiya Gubareni and V.V.Kirichenko, Algebras, Rings and Modules, Vol.1, Springer International Edition,2011( Indian Print).

**BOOKS FOR REFERENCE:**

1. S.Lang, Algebra, 3rd Edition, Addison Wesley, Mass 1993.
2. John B.Fraleigh, A first course in abstract Algebra, Addison Wesley, Mass 1982.
3. M.Artin, Algebra, Prentice Hall of India, New Delhi, 1991.
4. Bhupendra Singh, Advanced Abstract Algebra, Pragati Prakashan, Meerat, First Edition 2006.

# M.Sc. MATHMATICS

## SEMESTER - II

## CORE VI - FLUID DYNAMICS

**UNIT I : Kinematics of Fluids in Motion:**

Real fluids and Ideal fluids - Velocity of a fluid at a point –Stream lines and path lines - Steady and Unsteady flows - The Velocity Potential - The Vorticity Vector - Local and Particle Rates of Change - The Equation of Continuity - Worked Examples. (Chapter 2: Sections 2.1 - 2.8).

**UNIT II : Equations of Motion of a Fluid:**

Pressure at a point in a fluid at rest - Pressure at a point in a moving fluid - Euler's equations of Motion - Bernoulli's equation -Worked Examples - Discussion of the case of steady motion under Conservative Body Forces - Some flows involving axial symmetry(examples 1 and 2 only). (Chapters 3: Sections 3.1, 3.2,3.4 - 3.7, 3.9).

**UNIT III : Some Three-Dimensional Flows:**

Introduction - Sources, Sinks and Doublets-Images in rigid infinite plane - Images in solid spheres – Axis symmetric flows. (Chapter 4: Sections 4.1 - 4.4).

**UNIT IV : Some Two-Dimensional Flows:**

The Stream Function - The Complex Velocity Potential for Two Dimensional Irrotational, Incompressible Flow - Complex Velocity Potentials for Standard Two-Dimensional Flows - Some Worked Examples - Two Dimensional Image Systems - The Milne-Thomson Circle Theorem. (Chapter 5: Sections 5.3 - 5.8).

**UNIT V : Viscous Fluid:**

Stress components in a real fluid - Relation between Cartesian Components of Stress - Translational motion of fluid element – The Coefficient of Viscosity and Laminar flow - The Navier- Stokes equation of a viscous fluid - Some solvable problems in viscous flow - Steady motion between parallel planes only. (Chapter 8: Sections 8.1 - 8.3, 8.8, 8.9 and 8.10.1).

**TEXTBOOK**

1. Frank Chorlton, Textbook of Fluid Dynamics, CBS Publishers & Distributors, 2004.

**BOOKS FOR REFERENCE**

1. L.M. Milne-Thomson, Theoretical Hydrodynamics, Macmillan, London, 1955.
2. G.K. Batchelor, An Introduction to Fluid Dynamics Cambridge Mathematical Library, 2000.

# M.Sc. MATHMATICS

## SEMESTER - II

## CORE VII - COMPLEX ANALYSIS

**UNIT I Complex Integration :**

Complex Integration – Fundamental Theorems – Line integrals –Rectifiable Arcs-Line Integrals as Arcs – Cauchy's Theorem for a Rectangle and in a disk – Cauchy's Integral Formula – Index of point with respect to a closed curve- The Integral formula – Higher order derivatives – Local properties of analytic functions – Taylor's Theorem – Zeros and Poles –Local mapping - Maximum Principle. (Chapter 4 : Sections 1 to 3).

**UNIT II Complex Integration (Contd.):**

The general form of Cauchy's Theorem – Chains and Cycles – Simple connectivity – Homology – General statement of cauchy's theorem – Proof of Cauchy's theorem – Locally exact differentials – Multiply connected regions – Calculus of residues – Residue Theorem – Argument Principle-Evaluation of Definite Integrals. (Chapter 4 : Sections 4 and 5) .

**UNIT III Harmonic Functions and Power Series Expansions :**

Harmonic Functions – Definition and basic properties- Mean-Value Property-Poisson's formula –Schwarz's Theorem – Reflection Principle- Weierstrass's theorem-Taylor's series –Laurent series. (Chapter 4 : Sections 6 and Chapter 5 : Sections 1).

**Unit IV Entire functions: Jenson's formula – Hadamards theorem.**

Normal Families: Equicontinuity – Normality and compactness – Arzela's theorem – Familiesof analytic functions – The classical definition. (Chapter 5: Sections 3 and 5).

**UNIT V Conformal Mapping:**

The Riemann Mappping Theorem, Conformal Mapping of Polygons. A closure look at harmonic functions.(Chapter 6 : Sections 1,2 and 3).

**TEXTBOOK**

1. L.V Ahlfors, Complex Analysis, 3rd edition, Mc Graw Hill Inter., Edition, New Delhi,1979.

**BOOKS FOR REFERENCE**

1. J.B Conway, Functions of one Complex variable, Narosa Publ. House, New Delhi,1980.
2. S.Ponnusamy, Foundations of Complex Analysis, Narosa Publ. House, New Delhi,2004.
3. S.Lang, Complex-Analysis, Addison – Wesley Mass,1977.

# M.Sc. MATHMATICS

## SEMESTER - III

## CORE VIII - PARTIAL DIFFERENTIAL EQUATIONS

**UNIT I Second order Partial Differential Equations:**

Origin of second order partial differential equations – Linear differential equations with constant coefficients – Method of solving partial (linear ) differential equation – Classification of second order partial differential equations – Canonical forms – Adjoint operators – Riemann method. (Chapter 2 : Sections 2.1 to 2.5) .

**UNIT II Elliptic Differential Equations:**

Elliptic differential equations – Occurrence of Laplace and Poisson equations – Boundary value problems – Separation of variables method – Laplace equation in cylindrical – Spherical co-ordinates, Dirichlet and Neumann problems for circle – Sphere.(Chapter 3 : Sections 3.1 to 3.9).

**UNIT III Parabolic Differential Equations:**

Parabolic differential equations – Occurrence of the diffusion equation – Boundary condition – Separation of variable method – Diffusion equation in cylindrical – Spherical co-ordinates. (Chapter 4: Sections 4.1 to 4.5).

**UNIT IV Hyperbolic Differential Equations:**

Hyperbolic differential equations – Occurrence of wave equation – One dimensional wave equation – Reduction to canonical form – D'Alembertz solution – Separation of variable method – Periodic solutions – Cylindrical – Spherical co-ordinates – Duhamel principle for wave equations.(Chapter 5 : Sections 5.1 to 5.6 and 5.9).

**UNIT V Integral Transform:**

Laplace transforms – Solution of partial differential equation – Diffusion equation – Wave equation – Fourier transform – Application to partial differential equation – Diffusion equation – Wave equation – Laplace equation. (Chapter 6 : Sections 6.2 to 6.4).

**TEXTBOOK**

1. J.N. Sharma and K.Singh, Partial Differential Equation for Engineers and Scientists, Narosa publ. House, Chennai, 2001.

**BOOKS FOR REFERENCE**

1. I.N.Snedden, Elements of Partial Differential Equations, McGraw Hill, New York 1964.
2. K.Sankar Rao, Introduction to partial Differential Equations, Prentice Hall of India, New Delhi, 1995.
3. S.J. Farlow, Partial Differential Equations for Scientists and Engineers, John Wiley sons, New York, 1982

# M.Sc. MATHMATICS

## SEMESTER - III

## CORE IX - TOPOLOGY

**UNIT I : Topological spaces:**

Topological spaces - Basis for a topology – The Order Topology - The Product Topology on XxY – The Subspace Topology – Closed sets and Limit points. (Chapter 2: sections 12 to 17).

**UNIT II : Continuous functions:**

Continuous Functions– The Product Topology – The Metric Topology. (Chapter 2: Sections 18 to 21).

**UNIT III : Connectedness:**

Connected Spaces – Connected Subspaces of the Real line – Components and Local Connectedness. (Chapter 3: Sections 23 to 25)

**UNIT IV : Compactness:**

Compact spaces – Compact Subspace of the real line –Limit Point Compactness – Local Compactness. (Chapter 3: Sections 26 to 29).

**UNIT V : Countability and Separation axioms:**

The Countability Axioms – The Separation Axioms – Normal Spaces – The Urysohn Lemma – The Urysohn Metrization Theorem – The Tietze extension theorem. (Chapter 4: Sections 30 to 35).

**TEXTBOOK :**

1. James R.Munkres – Topology, 2nd edition, Prentice Hall of India Ltd., New Delhi, 2005.

**BOOKS FOR REFERENCE :**

1. J. Dugundji, Topology, Prentice Hall of India, New Delhi,1975.
2. G.F.Simmons, Introduction to Topology and Modern Analysis, McGraw Hill Book Co, New York, 1963.
3. S.T. Hu, Elements of General Topology, Holden Day, Inc. New York, 1965.

# M.Sc. MATHMATICS

## SEMESTER - III

## CORE X - MEASURE THEORY AND INTEGRATION

**UNIT I : Lebesgue Measure:**

Lebesgue Measure – Introduction – Outer measure – Measurable sets and Lebesgue measure – Measurable functions – Little Woods' Three Principles. (Chapter 3: Sections 1 to 3, 5 and 6).

**UNIT II : Lebesgue integral :**

Lebesgue integral – The Riemann integral – Lebesgue integral of bounded functions over a set of finite measure – The integral of a nonnegative function – The general Lebesgue integral. (Chapter 4: Sections 1 to 4).

**UNIT III : Differentiation and Integration :**

Differentiation and Integration – Differentiation of monotone functions – Functions of bounded variation – Differentiation of an integral – Absolute continuity. (Chapter 5: Sections 1 to 4).

**UNIT IV : General Measure and Integration :**

General Measure and Integration – Measure spaces – Measurable functions – Integration – Signed Measure – The Radon – Nikodym theorem. (Chapter 11: Sections 1 to 3, 5 and 6) .

**UNIT V : Measure and Outer Measure :**

Measure and outer measure – outer measure and measurability – The Extension theorem – Product measures. (Chapter 12: Sections 1, 2 and 4).

**TEXTBOOK:**

1. H.L.Royden, Real Analysis, Mc Millian Publ. Co, New York, 1993.

**BOOKS FOR REFERENCE:**

1. G. de Barra, Measure Theory and integration, Wiley Eastern Ltd, 1981.
2. P.K. Jain and V.P. Gupta, Lebesgue Measure and Integration, New Age Int. (P) Ltd., New Delhi, 2000.
3. Walter Rudin, Real and Complex Analysis, Tata McGraw Hill Publ. Co. Ltd., New Delhi, 1966.

# M.Sc. MATHMATICS
## SEMESTER - III
## CORE XI - CALCULUS OF VARIATIONS AND INTEGRAL EQUATIONS

**UNIT I : Variational Problems with Fixed Boundaries:**

The concept of variation and its properties – Euler's equation- Variational problems for Functionals – Functionals dependent on higher order derivatives – Functions of several independent variables – Some applications to problems of Mechanics. (Chapter 1: Sections 1.1 to 1.7 of [1]).

**UNIT II : Variational Problems with Moving Boundaries:**

Movable boundary for a functional dependent on two functions – one-side variations - Reflection and Refraction of extermals - Diffraction of light rays. (Chapter 2: Sections 2.1 to 2.5 of [1]).

**UNIT III : Integral Equation:**

Introduction – Types of Kernels – Eigen Values and Eigen functions – Connection with differential equation – Solution of an integral equation – Initial value problems – Boundary value problems. (Chapter 1: Section 1.1 to 1.3 and 1.5 to 1.8 of [2]).

**UNIT IV : Solution of Fredholm Integral Equation:**

Second kind with separable kernel – Orthogonality and reality eigen function – Fredholm Integral equation with separable kernel – Solution of Fredholm integral equation by successive substitution – Successive approximation – Volterra Integral equation – Solution by successive substitution. (Chapter 2: Sections 2.1 to 2.3 and Chapter 4 Sections 4.1 to 4.5 of [2]).

**UNIT V : Hilbert – Schmidt Theory:**

Complex Hilbert space – Orthogonal system of functions- Gram Schmit orthogonlization process – Hilbert – Schmit theorems – Solutions of Fredholm integral equation of first kind. (Chapter 3: Section 3.1 to 3.4 and 3.8 to 3.9 of [2]).

**TEXTBOOKS :**

1. A.S Gupta, Calculus of Variations with Application, Prentice Hall of India, New Delhi, 2005.(For Units I and II),
2. Sudir K.Pundir and Rimple Pundir, Integral Equations and Boundary Value Problems, Pragati Prakasam, Meerut, 2005. (For Units III, IV and V)

**BOOKS FOR REFERENCE :**

1. F.B. Hildebrand, Methods of Applied Mathematics, Prentice – Hall of India Pvt. New Delhi, 1968.
2. R. P. Kanwal, Linear Integral Equations, Theory and Techniques, Academic Press, New York, 1971.
3. L. Elsgolts, Differential Equations and Calculus of Variations, Mir Publishers, Moscow, 1973.

# M.Sc. MATHMATICS

## SEMESTER - IV

## CORE XII - FUNCTIONAL ANALYSIS

**UNIT I : Banach Spaces:**

Banach Spaces – Definition and examples – Continuous linear transformations – Hahn Banach theorem. (Chapter 9 : Sections 46 to 48).

**UNIT II : Banach Spaces and Hilbert Spaces:**

The natural embedding of N in N** - Open mapping theorem – Conjugate of an operator – Hilbert space – Definition and properties. (Chapter 9: Sections 49 to 51, Chapter 10 : Sections 52).

**UNIT III : Hilbert Spaces:**

Orthogonal complements – Orthonormal sets – Conjugate space H* - Adjoint of an operator (Chapter 10 : Sections 53 to 56).

**UNIT IV : Operations on Hilbert Spaces:**

Self adjoint operator – Normal and Unitary operators – Projections. (Chapter 10: Sections 57 to 59) .

**UNIT V: Banach Algebras:**

Banach Algebras – Definition and examples – Regular and simple elements – Topological divisors of zero – Spectrum – The formula for the spectral radius – The radical and semi simplicity. (Chapter 12 : Sections 64 to 69).

**TEXTBOOKS :**

1. G.F.Simmons, Introduction to Topology and Modern Analysis, McGraw Hill Inter. Book Co, New York, 1963.

**BOOKS FOR REFERENCE :**

1. W. Rudin, Functional Analysis, Tata McGraw Hill Publ. Co, New Delhi, 1973.
2. H.C. Goffman and G.Fedrick, First Course in Functional Analysis, Prentice Hall of India , New Delhi, 1987.
3. D. Somasundaram, Functional Analysis S. Viswanathan Pvt.Ltd., Chennai,1994.

# M.Sc. MATHMATICS

## SEMESTER - IV

## CORE XIII - PROBABILITY THEORY

**UNIT I :**

Random Events and Random Variables - Random events – Probability axioms – Combinatorial formulae – conditional probability – Bayes Theorem – Independent events – Random Variables – Distribution Function – Joint Distribution – Marginal Distribution – Conditional Distribution – Independent random variables – Functions of random variables. (Chapter 1: Sections 1.1 to 1.7, Chapter 2: Sections 2.1 to 2.9).

**UNIT II :**

Parameters of the Distribution - Expectation- Moments – The Chebyshev Inequality – Absolute moments – Order parameters – Moments of random vectors – Regression of the first and second types. ( Chapter 3: Sections 3.1 to 3.8).

**UNIT III :**

Characteristic functions - Properties of characteristic functions – Characteristic functions and moments – semi-invariants – characteristic function of the sum of the independent random variables – Determination of distribution function by the Characteristic function – Characterstic function of multidimensional random vectors – Probability generating functions. (Chapter 4: Sections 4.1 to 4.7).

**UNIT IV :**

Some probability distributions - One point , two point , Binomial – Polya – Hypergeometric – Poisson (discrete) distributions – Uniform – normal gamma – Beta – Cauchy and Laplace (continuous) distributions. ( Chapter 5: Section 5.1 to 5.10 (Omit Section 5.11).

**UNIT V :**

Limit Theorems - Stochastic convergence – Bernoulli law of large numbers – Convergence of sequence of distribution functions – Levy-Cramer Theorems – De Moivre-Laplace Theorem – Poisson, Chebyshev, Khintchine Weak law of large numbers – Lindberg Theorem – Lyapunov Theroem – Borel-Cantelli Lemma - Kolmogorov Inequality and Kolmogorov Strong Law of large numbers. (Chapter 6: Sections 6.1 to 6.4, 6.6 to 6.9, 6.11 and 6.12 only).

**TEXTBOOK:**

1. M. Fisz, Probability Theory and Mathematical Statistics, John Wiley and Sons, New York, 1963.

**BOOKS FOR REFERENCE :**

1. R.B. Ash, Real Analysis and Probability, Academic Press, New York, 1972.
2. K.L.Chung, A course in Probability, Academic Press, New York, 1974.
3. Y.S.Chow and H.Teicher, Probability Theory, Springer Verlag. Berlin, 1988 (2nd Edition).
4. R.Durrett, Probability : Theory and Examples, (2nd Edition) Duxbury Press, New York, 1996.
5. V.K.Rohatgi, An Introduction to Probability Theory and Mathematical Statistics, Wiley Eastern Ltd., New Delhi, 1988(3rd Print).
6. S.I.Resnick, A Probability Path, Birhauser, Berlin, 1999.
7. B.R.Bhat, Modern Probability Theory (3rd Edition), New Age International (P)Ltd, New Delhi, 1999.
8. J.P. Romano and A.F. Siegel, Counter Examples in Probability and Statistics, Wadsworth and Brooks / Cole Advanced Books and Software, California, 1968.

# M.Sc. MATHMATICS

## SEMESTER - I

## CORE XIV - GRAPH THEORY

**UNIT I : Basic Results:**

Introduction-Basic Concepts-Subgraphs-Degrees of Vertices - Paths and Connectedness - Automorphism of a Simple Graph. (Chapter 1: Sections 1.1 - 1.6).

**Directed Graphs:** Introduction-Basic Concepts-Tournaments.(Chapter 2 : Sections 2.1 - 2.3).

**UNIT II : Connectivity and Trees:**

Connectivity: Introduction-Vertex cut and Edge Cut-Connectivity and Edge Connectivity.(Chapter 3: Sections 3.1- 3.3). Trees: Introduction-Definition, Characterization and Simple Properties-Centers and Centroids- Cutting the Number of Spanning Trees-Cayley's Formula. (Chapter 4: Sections 4.1- 4.5).

**UNIT III : Independent Sets, Matchings and Cycles:**

Independent Sets and Matchings: Introduction-Vertex-Independent Sets and Vertex Coverings-Edge-Independent sets-Matchings and Factors-Matchings in Bipartite Graphs. (Chapter 5: Sections 5.1- 5.5) . Cycles: Introduction-Eulerian Graphs-Hamiltonian Graphs. (Chapter 6: Sections 6.1- 6.3) .

**UNIT IV : Graph Colorings:**

Introduction-Vertex colorings-Critical Graphs-Edge colorings of Graphs-Kirkman's Schoolgirl- Problem-Chromatic Polynomials.(Chapter 7: Sections 7.1 ,7.2 ,7.3 (7.2.1 & 7.2.3 only) ,7.6, 7.8, and 7.9).

**UNIT V : Planarity:**

Introduction- Planar and Nonplanar Graphs –Euler Formula and its Consequences- $K_5$ and $K_{3,3}$ are Nonplanar Graphs – Dual of a Plane Graph- The Four-Color Theorem and the Heawood Five- Color Theorem-Hamiltonian Plane Graphs-Tait Coloring.(Chapter 8: Sections 8.1 - 8.6 ,8.8 and 8.9).

**TEXT BOOK :**

1. R.Balakrishnan and K.Ranganathan, Text Book of Graph Theory, (2nd Edition), Springer, New York,2012.

**BOOKS FOR REFERENCE :**

1. J.A.Bondy and U.S.R. Murty, Graph Theory with Applications, North Holland, New York, 1982.
2. Narasing Deo, Graph Theory with Application to Engineering and Computer Science, Prentice Hall of India, New Delhi. 2003.
3. F. Harary, Graph Theory, Addison – Wesely Pub. Co. The Mass. 1969.
4. L. R.. Foulds, Graph Theory Application, Narosa Publ. House, Chennai, 1933.

# M.Sc. MATHMATICS

## SEMESTER - I

## ELECTIVE I - PAPER I - NUMERICAL ANALYSIS

**UNIT I : Numerical solutions to ordinary differential equation:**

Numerical solutions to ordinary differential equation – Power series solution – Pointwise method – Solution by Taylor's series – Taylor's series method for simultaneous first order differential equations – Taylor's series method for Higher order Differential equations – Predictor – Corrector methods – Milne's method – Adam – Bashforth method. (Chapter 11: Sections 11.1 to 11.6 and Sections 11.8 to 11.20) .

**UNIT II : Picard and Euler Methods:**

Picard's Method of successive approximations – Picard's method for simultaneous first order differential equations – Picard's method for simultaneous second order differential equations – Euler's Method – Improved Euler's method – Modified Euler's Method. (Chapter 11: Sections 11.7 to 11.12).

**UNIT III : Runge – Kutta Method:**

Runge's method – Runge-Kutta methods – Higher order Runge-Kutta methods- Runge-Kutta methods for simultaneous first order differential equations – Runge-Kutta methods for simultaneous second order differential equations.(Chapter 11: Sections 11.13 to 11.17) .

**UNIT IV : Numerical Solutions to Partial Differential Equations:**

Introduction Difference Quotients – Geometrical representation of partial differential quotients – Classifications of partial differential equations – Elliptic equation – Solution to Laplace's equation by Liebmann's iteration process. (Chapter 12: Sections 12.1 to 12.6).

**UNIT V : Numerical Solutions to Partial Differential Equations (Contd.):**

Poisson equation – its solution – Parabolic equations – Bender – Schmidt method – Crank – Nicholson method – Hyperbolic equation – Solution to partial differential equation by Relaxation method. (Chapter 12: Sections 12.7 to 12.10).

**TEXTBOOK :**

1. V.N Vedamurthy and Ch. S.N.Iyengar, Numerical Methods, Vikas Publishing House Pvt Ltd., 1998.

**BOOKS FOR REFERENCE :**

1. S.S. Sastry, Introductory methods of Numerical Analysis, Printice of India, 1995.
2. C.F. Gerald, and P.O. Wheathy, Applied Numerical Analysis, Fifth Edition, Addison Wesley, 1998.
3. M.K. Venkatraman, Numerical methods in Science and technology, National Publishers Company, 1992.
4. P. Kandasamy, K. Thilagavathy, K. Gunavathy, Numerical Methods, S. Chand & Company, 2003.

# M.Sc. MATHMATICS

## SEMESTER - I

## ELECTIVE I - PAPER II - DIFFERENCE EQUATIONS

**UNIT I :Difference Calculus:**

Difference operator – Summation – Generating function – Approximate summation. (Chapter 2 Sections 2.1 to 2.3).

**UNIT II : Linear Difference Equations:**

First order equations – General results for linear equations. (Chapter 3 Sections 3.1 to 3.2).

**UNIT III : Linear Difference Equations(Contd.):**

Equations with constant coefficients – Equations with variable coefficients – z – transform. (Chapter 3 Sections 3.3,3.5 AND 3.7).

**UNIT IV :**

Initial value problems for linear systems – Stability of linear systems. (Chapter 4 Sections 4.1 to 4.3).

**UNIT V :**

Asymptotic analysis of sums – Linear equations. (Chapter 5 Sections 5.1 to 5.3).

**TEXT BOOK:**

1. W.G.Kelley and A.C.Peterson, Difference Equations, Academic press, New York,1991.

**BOOKS FOR REFERENCE:**

1. S.N.Elaydi, An Introduction to Difference Equations, Springer – Verleg, NewYork,1990
2. R.Mickens, Difference Equations, Van Nostrand Reinhold, New York, 1990.
3. R.P.Agarwal, Difference Equations and Inequalities Marcel Dekker, New York,1992.

# M.Sc. MATHMATICS

## SEMESTER - II

## ELECTIVE II - PAPER I - DISCRETE MATHEMATICS

**UNIT I : The Foundations: Logic and Proofs :**

Propositional - Applications of Propositional -Propositional Equivalences - Predicates and Quantifiers. (Chapter 1: Sections 1.1 - 1.3). Algorithms: The Growth of Functions. ( Chapter 3: Section 3.2).

**UNIT II : Counting:**

The Basics of Counting- The Pigeonhole Principle -Permutations and Combinations - Generalized Permutations and Combinations - Generating Permutations and Combinations . (Chapter 5: Sections 5.1- 5.3, 5.5 and 5.6).

**UNIT III : Advanced Counting Techniques:**

Applications of Recurrence Relations - Solving Linear Recurrence Relations Generating Functions . (Chapter 6: Sections 6.1, 6.2 and 6.4).

**UNIT IV : Boolean Algebra:**

Boolean Functions- Representing Boolean Functions - Logic Gates - Minimization of Circuits. (Chapter 10: Sections 10.1 -10.4).

**UNIT V : Modeling Computation:**

Finite-State machines with Output- Finite-State machines with No Output-Turing Machines. (Chapter 12: Sections 12.2, 12.3 and 12.5).

**TEXT BOOK:**

1. Kenneth H.Rosen, Discrete Mathematics and it's Applications,7th Edition, WCB / McGraw Hill Education ,New York,2008.

**BOOKS FOR REFERENCE:**

1. J.P. Trembley and R.Manohar, Discrete Mathematical Structures applications to Computer Science, Tata McGraw Hills, New Delhi.
2. T.Veerarajan,Discrete Mathematics with Graph Theory and Combinatorics, Tata McGraw Hills Publishing Company Limited ,7th Reprint,2008.

# M.Sc. MATHMATICS

## SEMESTER - II

## ELECTIVE II - PAPER II - COMBINATORIAL MATHEMATICS

**UNIT I** : Permutations and combinations.

**UNIT II** : Generating functions.

**UNIT III** : Recurrence relations.

**UNIT IV** : Principle of inclusion and exclusion.

**UNIT V** : Polya's theory of counting

**TEXT BOOK:**

1. C.L. Liu, Introduction to Combinatorial Mathematics, Tata McGraw Hill, Book Co., New York, 1968. (Chapters: 1 to 5.)

**BOOKS FOR REFERENCE:**

1. C.L. Liu, M. Eddberg, Solutions to problems in Introduction to Combinatorial Mathematics, MC Grow-Hill Book & Co., New York, 1968.

2. J.H. Van Lint, R.M. Wilson, A Course in Combinatorics, 2nd Edition, Cambridge University Press, Cambridge, 2001.

3. R.P. Stanley, Enumerative Combinatorics, Volume I, Cambridge Studies in Advanced Mathematics, Volume 49, Cambridge University Press, 1997. 4. P.J. Cameron, Combinatorics: Topics, Techniques, Algorithms, Cambridge University Press, Cambridge, 1998.

# M.Sc. MATHMATICS

## SEMESTER - III

## ELECTIVE III - PAPER I - DIFFERENTIAL GEOMETRY

**UNIT I :Theory of Space Curves:**

Theory of space curves – Representation of space curves – Unique parametric representation of a space curve – Arc-length – Tangent and osculating plane – Principle normal and binormal – Curvature and torsion – Behaviour of a curve near one of its points – The curvature and torsion of a curve as the intersection of two surfaces. (Chapter 1 : Sections 1.1 to 1.9) .

**UNIT II : Theory of Space Curves (Contd.):**

Contact between curves and surfaces – Osculating circle and osculating sphere – Locus of centre of spherical curvature – Tangent surfaces – Involutes and Evolutes – Intrinsic equations of space curves – Fundamental Existence Theorem – Helices. (Chapter 1 : Sections 1.10 to 1.13 and 1.16 to 1.18) .

**UNIT III : Local Intrinsic properties of surface:**

Definition of a surface – Nature of points on a surface – Representation of a surface – Curves on surfaces – Tangent plane and surface normal – The general surfaces of revolution – Helicoids – Metric on a surface – Direction coefficients on a surface. (Chapter 2 : Sections 2.1 to 2.10).

**UNIT IV : Local Intrinsic properties of surface and geodesic on a surface:**

Families of curves – Orthogonal trajectories – Double family of curves – Isometric correspondence – Intrinsic properties – Geodesics and their differential equations – Canonical geodesic equations – Geodesics on surface of revolution. (Chapter 2: Sections 2.11 to 2.15 and Chapter 3: Sections 3.1 to 3.4) .

**UNIT V : Geodesic on a surface:**

Normal property of Geodesics – Differential equations of geodesics using normal property – Existence theorems – Geodesic parallels – Geodesic curvature – Gauss Bonnet Theorems – Gaussian curvature – Surface of constant curvature . (Chapter 3: Sections 3.5 to 3.8 and Sections 3.10 to 3.13) .

**TEXT BOOK:**

1. D.Somasundaram,Differential Geometry, Narosa Publ. House, Chennai, 2005.

**BOOKS FOR REFERENCE:**

1. T. Willmore, An Introduction to Differential Geometry, Clarendan Press, Oxford, 1959.
2. D.T Struik, Lectures on Classical Differential Geometry, Addison – Wesely, Mass. 1950.
3. J.A. Thorpe, Elementary Topics in Differential Geometry, Springer – Verlag, New York, 1979.

# M.Sc. MATHMATICS

## SEMESTER - III

## ELECTIVE III - PAPER II - PROGRAMMING WITH C++

**UNIT I :**

Software Evolution – Procedure oriented Programming – Object oriented programming paradigm – Basic concepts of object oriented programming – Benefits of oops – Object oriented Languages – Application of OOP – Beginning with C++ - what is C++ - Application of C++ - A simple C++ Program – More C++ Statements – An Example with class – Structure of C++ Program.

**UNIT II :**

Token, Expressions and control structures: Tokens – Keywords – Identifiers and Constants – Basic Data types – User defined Data types – Derived data types – Symbolic Constants in C++ - Scope resolution operator – Manipulators – Type cost operator – Expressions and their types – Special assignment expressions – Implicit Conversions – Operator Overloading – Operator precedence – Control Structure.

**UNIT III : Function in C++:**

Main Function – function prototyping – Call by reference – Return by reference – Inline functions – default arguments – Const arguments – Function overloading – Friend and Virtual functions – Math library function. Class 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 – Memory allocations for objects – Static data member – Static member functions – Array of the object – Object as function arguments – Friendly functions – Returning objects – Const member functions – Pointer to members – Local classes.

**UNIT IV : Constructors and Destructors:**

Constructors – Parameterized Constructors in a Constructor – Multiple constructors in a class – Constructors with default arguments – Dynamic Initialization of objects – Copy constructors – Dynamic Constructors – Constructing Two-dimensional arrays – Const objects – Destructors. Operator overloading and type conversions: Defining operator overloading – overloading unary operators – overloading binary operators - overloading binary operators using friends – Manipulation of strings using operators – Rules for overloading operators – Type conversions.

**UNIT V : Files:**

Introduction – Class for file stream operations – opening and closing a file – detecting End-of file – More about open () File modes – File pointer and their manipulations – Sequential input and output operations. Exception Handling: Introduction – Basics of Exception Handling – Exception Handling Mechanism – Throwing Mechanism – Catching Mechanism – Rethrowing an Exception.

**TEXT BOOK:**

1 E.Balagrurusamy, Object-Oriented Programming with C++ ,2nd Edition, Tata McGraw Hill Pub. 1999.

**BOOKS FOR REFERENCE:**

1. Robert Lafore – "The Waite Group's Object Oriented Programming In Turbo C++ - Galgotia Publication Pvt. Ltd. 1998.

2. Allan Neibaver – Office 2000.

# M.Sc. MATHMATICS

## SEMESTER - IV

## ELECTIVE IV - PAPER I - NUMBER THEORY

**UNIT I : Divisibility and Congruence:**

Divisibility – Primes - Congruences – Solutions of Congruences – Congruences of Degree one. (Chapter 1: Sections 1.1 to 1.3 and Chapter 2: Sections: 2.1 to 2.3).

**UNIT II : Congruence:**

The function $\varphi(n)$ – Congruence of higher degree – Prime power moduli – Prime modulus – Congruence's of degree two, prime modulus – power Residues. (Chapter 2: Sections 2.4 to 2.9).

**UNIT III : Quadratic Reciprocity:**

Quadratic residues – Quadratic reciprocity – The Jacobi symbol – Greatest Integer function. (Chapter 3: Sections 3.1 to 3.3 and Chapter 4: Section 4.1)

**UNIT IV : Some Functions of Number Theory:**

Arithmetic functions –The Mobius inverse formula – The multiplication of arithmetic functions. (Chapter 4: Sections 4.2 to 4.4).

**UNIT V : Some Diaphantine Equations:**

The equation ax + by= c-Positive solutions-Other linear equations-The equation $x^2 + y^2 = z^2$- The equation $x^4 + y^4 = z^2$ Sums of four and five squares – Waring's problem – Sum of fourth powers – Sum of Two squares. (Chapter 5: Sections 5.1 to 5.10).

**TEXT BOOK:**

1. Ivan Niven and H.S Zuckerman, An Introduction to the Theory of Numbers, 3rd edition, Wiley Eastern Ltd., New Delhi, 1989.

**BOOKS FOR REFERENCE:**

1. D.M. Burton, Elementary Number Theory, Universal Book Stall, New Delhi 2001.
2. K.Ireland and M.Rosen, A Classical Introduction to Modern Number Theory, Springer Verlag, New York, 1972.
3. T.M Apostol, Introduction to Analytic Number Theory, Narosa Publication, House, Chennai, 1980.

# M.Sc. MATHMATICS

## SEMESTER - IV

## ELECTIVE IV- PAPER II - OPTIMIZATION TECHNIQUES

**UNIT I : Integer linear programming:**

Introduction – Illustrative applications integer programming solution algorithms: Branch and Bound (B & B) algorithm – zero – One implicit enumeration algorithm – Cutting plane Algorithm. (Sections 9.1,9.2,9.3.1.,9.3.2,9.3.3).

**UNIT II : Deterministic dynamic programming:**

Introduction – Recursive nature of computations in DP – Forward and backward recursion – Selected DP applications cargo – Loading model – Work force size model – Equipment replacement model–Investment model–Inventory models. (Sections 10.1,10.2,10.3,10.4.1,10.4.2,10.4.3,10.4.4,10.4.5).

**UNIT III : Decision analysis and games:**

Decision environment – Decision making under certainty (Analytical Hierarchy approach) Decision making under risk – Expected value criterion – Variations of the expected value criterion – Decision under uncertainty Game theory – optimal solution of two – Person Zero – Sum games – Solution of mixed strategy games. (Sections 14.1,14.2,114.3.1,14.3.2,14.4,14.5.1,14.5.2) .

**UNIT IV : Simulation modeling:**

What is simulation? – Monte Carlo Simulation – Types of Simulation – Elements of Discrete Event Simulation – Generic definition of events – Sampling from probability distributions. Methods for gathering statistical observations – Sub Interval Method – Replication Method – Regenerative (Cycle) method – Simulation Languages. Sections 18.1,18.2,18.3,18.4.1,18.4.2,18.5,18.6,18.7.1,18.7.2,18.7.3,18.8).

**UNIT V : Nonlinear programming algorithms:**

Unconstrained non linear algorithms – Direct search method – Gradient method Constrained algorithms: Separable programming – Quadratic programming – Geometric programming – Stochastic programming – Linear combinations method – SUMT algorithm. (Sections : 21.1.1, 21.1.2, 21.2.1, 21.2.2, 21.2.3, 21.2.4, 21.2.5, 21.2.6) .

**TEXT BOOK:**

1. Hamdy A.Taha, Operations Research an Introduction, 6th Edison, University of Arkansas Fayetteville.

**BOOKS FOR REFERENCE:**

1. F.S. Hillier and G.J. Lieberman Introduction to Operation Research 4th edition, Mc Graw Hill Book Company, New York, 1989.
2. Philips D.T.Ravindra A. and Solbery.J. Operations Research, Principles and Practice John Wiley and Sons, New York.
3. B.E.Gillett, Operations research – A Computer Oriented Algorithmic Approach, TMH Edition, New Delhi, 1976.

# M.Sc. MATHMATICS

## SEMESTER - IV

## ELECTIVE IV - PRACTICAL - C++ PROGRAMMING LAB

### LIST OF PRACTICALS

1. Create two classes DM and DB, which store the value of distances. DM stores distances in meters and centimeters in DB in feet and inches. Write a program that can create the values for the class objects and add object DM with another object DB.
2. Create a class FLOAT that contains on float data member overload all the four arithmetic operators so that operates on the objects of FLOAT.
3. Design a class polar, which describes a part in a plane using polar coordinates radius and angle. A point in polar coordinates is as shown below. Use the overloads +operator to add two objects of polar. Note that we cannot add polar values of two points directly. The requires first the conversion points into rectangular coordinates and finally creating the result into polar coordinates.

   [Where rectangle co-ordinates: x = r*cos(a); y = r* sin(a); Polar co-ordinates: a = atan (x/y) r = Sqrt (x*x + y*y)]
4. Create a class MAT of size m*m. Define all possible matrix operations for MAT type objects verify the identity. (A-B)^2+B^2-2*A*B.
5. Area computation using derived class.
6. Define a class for vector containing scalar values. Apply overloading concepts for vector additions, multiplication of a vector by a scalar quantity, replace the values in a position vector.
7. Integrate a function using Simson's 1/3 rule.
8. Solve the system of equations using Guass Seidel method.
9. Solve differential equations using Runge Kutta forth order method.

# M.Sc. MATHMATICS

## SEMESTER II

## EXTRA DISCIPLINARY COURSE (EDC)

## EDC - PAPER I - NUMERICAL & STATISTICAL METHODS

**(Theorems and proof are not expected)**

**UNIT I :**

Algebraic and Transcendental Equations: Bisection Method – Iteration Method – The Method of False Position – Newton- Raphson – Method.

**UNIT II :**

System of Linear Equation: Gauss Elimination, Gauss Jordon elimination – Triangularization method –Iterative Methods, Jacobi, Gauss-Seidel iteration, Iterative method for A-1.

**UNIT III :**

Interpolation with equal intervals – Newton forward and backward formula - Central Difference Interpolation formula – Gauss forward and backward formula – Stirling's formula – Bessel's Formula - Numerical differentiation: Maximum and minimum values of a tabulated function. Numerical Integration: Trapezoidal Rule – Simpson's Rule – Numerical double Integration.

**UNIT IV :**

Correlation Coefficient – Rank correlation coefficient of determination – Linear regression – Method of least squares – Fitting of the curve of the form $ax+b$, $ax^2+bx+c$, $ab^x$ and $ax^b$ – Multiple and partial correlation (3-variable only).

**UNIT V :**

Binominal distribution – Poisson distribution – Normal distribution – Properties and Applications.

**TEXT BOOKS :**

1. S.S. Sastry, Introductory Methods of Numerical Analysis, Prentice Hall of India, Pvt. Ltd., 1995.(For Units I, II and III).
2. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand & Sons, (1994).(For Units IV and V).

**BOOKS FOR REFERENCE:**

1. S.Kalavathy, Numerical Methods, Vijay Nicole, Chennai, 2004.
2. Dr.Kandasamy, Numerical Methods, Sultan Chand, New Delhi.

# M.Sc. MATHMATICS

## SEMESTER II

## EXTRA DISCIPLINARY COURSE (EDC)

## EDC - PAPER II - STATISTICS

**(Theorems and proof are not expected)**

**UNIT I :**

Collection, classification and tabulation of data, graphical and diagrammatic representation – Bar diagrams, Pie diagram, Histogram, Frequency polygon, frequency curve and Ogives.

**UNIT II :**

Measures of central tendency – Mean, Median and Mode in series of individual observations, Discrete series, Continuous series (inclusive), More than frequency, Less than frequency, Mid-value and open-end class.

**UNIT III :**

Measures of dispersion – Range, Quartile deviation, Mean deviation about an average, Standard deviation and co-efficient of variation for individual, discrete and continuous type data.

**UNIT IV :**

Correlation – Different types of correlation – Positive, Negative, Simple, Partial Multiple, Linear and non-Linear correlation. Methods of correlation – Karl-Pearson's coefficient of correlation- Spearman's rank correlations and Concurrent deviation.

**UNIT V :**

Regression types and method of analysis, Regression line, Regression equations, Deviation taken from arithmetic mean of X and Y, Deviation taken from assumed mean, Partial and multiple regression coefficients – Applications.

**TEXT BOOK :**

1. S.C.Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand and Sons, New Delhi, 1994.

**BOOKS FOR REFERENCE:**

1. Freund J.E. (2001); Mathematical Statistics, Prentice Hall of India.
2. Goon, A.M., Gupta M.K., Dos Gupta, B, (1991), Fundamentals of Statistics, Vol. I, World Press, Calcutta.