
# Choice Based Credit System (CBCS)

Name of the Programme (PG): M.C.A

Syllabus for III - Semester and IV - Semester
With effect from 2017 - 2018

## Specialization /Branch: Master of Computer Applications

Chaitanya Bharathi Institute of Technology (A)
Chaitanya Bharathi (P.O), Gandipet
Hyderabad-500075, Telangana

# CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY(A)

**Choice Based Credit System (with effect from 2017-18)**

**MCA (Master of Computer Applications)**

**SEMESTER - III**

| S.No | Course Code | Title of the Course | Scheme of Instruction | | Scheme of Examination | | | Credits |
|---|---|---|---|---|---|---|---|---|
| | | | Hours per week | | Duration of SEE in Hours | Maximum Marks | | |
| | | | L/T | P/S | | CIE | SEE | |
| **THEORY** | | | | | | | | |
| 1 | 16MCC113 | Database Management Systems | 3/1 | - | 3 | 30 | 70 | 4 |
| 2 | 16MCC114 | Web Technologies | 3/1 | - | 3 | 30 | 70 | 4 |
| 3 | 16MCC115 | Design and Analysis of Algorithms | 3/1 | - | 3 | 30 | 70 | 4 |
| 4 | 16MCC116 | Operating Systems | 3/1 | - | 3 | 30 | 70 | 4 |
| 5 | 16MBC04/ 16CEC03 / 16MEE20/ 16CEE21 | Open Elective | 3 | - | 3 | 30 | 70 | 3 |
| **PRACTICALS** | | | | | | | | |
| 6 | 16MCC117 | Database Management Systems Lab | - | 3 | 3 | 25 | 50 | 2 |
| 7 | 16MCC118 | Web Technologies Lab | - | 3 | 3 | 25 | 50 | 2 |
| 8 | 16MCC119 | Operating Systems Lab | - | 3 | 3 | 25 | 50 | 2 |
| **TOTAL** | | | **19** | **9** | **-** | **225** | **500** | **25** |

**L: Lecture T: Tutorial P: Practical S: Seminar**

**CIE: Continuous Internal Evaluation SEE: Semester End Examination**

| **Open Elective** | |
|---|---|
| 16MB C04 | Organizational Behavior |
| 16CE C03 | Human Values and Professional Ethics |
| 16ME E20 | Entrepreneurship |
| 16CE E21 | Disaster Mitigation and Management |

## ASSESSMENT PROCEDURES FOR AWARDING MARKS

The distribution of marks is based on internal assessment (Sessional) by concerned teacher and the Semester end examination shall be as follows:

| Course (in terms of credits) | CIE (Marks) | Semester End Examination (Marks) | Remarks | Duration of Semester End Examination |
|---|---|---|---|---|
| Three(3)Credits/ Four(4)credits | 30* | 70** | Theory Course | 3 Hours |
| Two(2) Credits | 25 | 50 | Lab Course / Mini project | 3 Hours |
| Two(2) Credits | 50 | --- | Seminar | --- |
| Twelve(12) Credits | 100 | 100 | Major Project Work | Viva |

* Out of 30 sessional marks, 10 marks are allotted for home assignments (at least two assignments must be given, which covers the entire syllabus of that particular course/subject), and the remaining 20 marks are based on the average of two tests (weightage for each test is 20 marks of one hour duration).The question paper for tests will be in two parts, Part-A and Part-B. Part A is compulsory and carries six (6) marks. Part-B carries fourteen (14) marks (student has to answer two out of three questions).

** The question paper will be in two parts, Part-A and Part-B. Part A is compulsory, and covers the entire syllabus, and carries 10 marks. Part-B carries 60 marks and covers all the units of the syllabus (student has to answer five out of seven questions)

A candidate has earned the credits of a particular course, if he/she secures not less than the minimum marks/ grade as prescribed. **Minimum pass marks in the Semester End Examinations plus CIE shall be 40%**.**Where as for the lab course/project/mini project is 50%.**

**A course that has CIE but no semester end examination as per scheme is treated as pass/fail for which pass marks are 50% CIE.**

**16MCC113 DATABASE MANAGEMENT SYSTEM**

| | |
|---|---|
| Instruction | 3L+1T Hours per week |
| Duration of Semester End Examination | 3 Hours |
| Semester End Examination | 70 Marks |
| Continuous Internal Evaluation | 30 Marks |
| Credits | 4 |

**Course Objectives:**

Students will:

1. Learn the basic fundamentals of database.
2. Understand the data models.
3. Make a study of SQL and relational database design.
4. Know about data storage techniques and query processing.
5. Impart knowledge in transaction processing, concurrency control techniques.
6. Study the concepts of system crash and recovery management.

**Course Outcomes:**

After completion of the course the students would be able to:

1. Acquire the knowledge of the basic concepts of the database.
2. Create the data models.
3. Map ER models into Relations and normalize the relations
4. Acquire the knowledge of query evaluation.
5. Gain the knowledge of concurrent execution and transaction management.
6. Understand the issues in system crash and recovery measures.

**UNIT-I**

**Introduction to DBMS and DB Models**: File system Vs. DBMS, Advantages of DBMS, Data Abstraction, Database Design, and ER diagrams, Entities, Attributes and Entity Sets, Relationship Sets, Additional features of ER model, Conceptual Design with the ER model. The Relational Model: Introduction to the Relational Model, Integrity Constraints over relations, Logical Database design(ER to Relational), creating tables, views, Destroying / Altering Tables and Views.

**UNIT-II**

**Schema Refinement and Normal Forms**: Introduction to Schema Refinement, Functional Dependencies, Normal Forms, Decompositions, Normalizations. **Structured Query Language**: Overviews, Basic Structure of SQL, Queries, Set Operations, Null Values, Additional Basic Operations, Aggregate Functions, Nested Sub queries, Join Expression. **Advanced SQL**: SQL Data Types, Integrity Constraints, Authorization, Functions and Procedural Constructs, Cursors, Triggers.

**UNIT-III**

**Indexing and Hashing**: Basic Concepts, File Organization Indexing, Index Data Structures, Tree-Structured indexing: Indexed sequential Access Method (ISAM) B+ Trees: A dynamic index structure, format of a node, search, Insert, Delete, Duplicates+ Trees in Practice.

**Hash-Based Indexing**: Static Hashing, Extendable Hashing, Linear Hashing, Extendable Hashing versus Linear Hashing. Comparison of Ordered Indexing and Hashing.

**UNIT-IV**

**Transaction Management**: ACID Properties, Transactions and Schedules, Concurrent Execution of Transactions, Lock-Based Concurrency Control. **Concurrency Control**: 2PL, Serializability, and Recoverability, Introduction to Lock Management, Dealing with Deadlock, Specialized Locking Techniques, Concurrency Control without Locking.

**UNIT-V**

**Crash Recovery**: Introduction to ARIES, The Log, Other Recovery Related Structures, The WAL, Check pointing, recovering from a system Crash, Media recovery. Security and Authorization: Introduction to database security, Access Control Discretionary Access control, Mandatory access control. Additional Issues related to Security.

**Text Books:**

1. Silberschataz, Korth, Sudarshan "Database System Concepts", 5th Edition McGraw Hill 2011.

**Suggested Reading:**

1. Raghu Ramakrishna, Johannes, Gehrke "Database Management Systems", 3rd Edition, Mc-Graw Hill 2003
2. Ramez Elmasri, Shamkant B. Navathe, Somayajulu, Gupta "Fundamentals of Database systems", Pearson Education 2006.

**16MCC114** **WEB TECHNOLOGIES**

| | |
|---|---|
| Instruction | 3L+1T Hours per week |
| Duration of Semester End Examination | 3 Hours |
| Semester End Examination | 70 Marks |
| Continuous Internal Evaluation | 30 Marks |
| Credits | 4 |

**Course Objectives:**
Students will:
1. Acquire knowledge on XHTML and CSS.
2. Learn basics of JavaScript.
3. Know how to create interactive web pages.
4. Acquire knowledge on XML.
5. Learn basics of PHP and MYSQL databases.
6. Acquire knowledge on client side and server side programming.

**Course Outcomes:**
After completion of the course, the students would be able to:
1. Develop the web pages using XHTML and CSS.
2. Perform client side validations.
3. Create interactive web pages.
4. Store and transport data using XML.
5. Access MYSQL database using PHP.
6. Design and Develop simple websites.

**UNIT – I**
**Introduction to XHTML:** origins and evolution of HTML and XHTML, basic syntax, standard XHTML document structure, basic text markup, images, hypertext links, lists, tables, forms, frames, syntactic differences between HTML and XHTML.
**Cascading Style Sheets (CSS):** Introduction, levels of style sheets, style specification formats, selector forms, property value forms, font properties, list properties, color, alignment of text, box model, background images, positioning.

**UNIT – II**
**Basics of JavaScript:** overview of JavaScript, object orientation and JavaScript, general syntactic characteristics, primitives, operations, expressions, screen output and keyboard input, control statements, object creation and modification, arrays, functions, constructors, pattern matching using regular expressions, errors in scripts.

**UNIT- III**
**JavaScript and XHTML Documents:** JavaScript execution environment, document object model, element access in JavaScript, events and event handling, handling events from body elements, handling events from button elements, Handling events from text box and password elements.
**Dynamic Documents with JavaScript:** Introduction, positioning elements, moving elements, element visibility, changing colors and fonts, dynamic content, stacking elements, locating the mouse cursor, reacting to a mouse click, slow movement of elements, dragging and dropping elements.

**UNIT – IV**
**Introduction to XML:** Introduction, syntax of XML, XML document structure, document type definitions, namespaces, XML schemas, displaying raw XML documents, displaying XML documents with CSS, XSLT style sheets, XML processors.

**UNIT – V**
**Introduction to PHP:** origins and uses of PHP, overview of PHP, general syntactic characteristics, primitives, operations, expressions, output, control statements, arrays, functions, pattern matching, form handling, cookies, session tracking.
**Database Access through the web:** MYSQL database system, database access with PHP and MYSQL.

**Text Book:**

1. Robert W.Sebesta, "**Programming the World Wide Web**", 4th Edition, Pearson Education, 2008.

**Suggested Reading:**

1. Thomas Powell "HTML & XHTML: The Complete Reference", 4th Edition, Tata McGraw-Hill, 2003.
2. Thomas A Powell, Fritz Schneider "JavaScript: The Complete Reference", 3rd edition, Tata McGraw Hill, 2013**.**
3. Steven Holzner "PHP: The Complete Reference", McGraw Hill Education, 2008**.**

**16MCC115 DESIGN AND ANALYSIS OF ALGORITMS**

| | |
|---|---|
| Instruction | 3L+1T Hours per week |
| Duration of Semester End Examination | 3 Hours |
| Semester End Examination | 70 Marks |
| Continuous Internal Evaluation | 30 Marks |
| Credits | 4 |

**Course Objectives:**

Students will:

1. Learn the various asymptotic notations and amortized analysis.
2. Acquire knowledge on divide and conquer and Greedy designing techniques.
3. Learn the concepts of dynamic programming techniques.
4. Acquire knowledge on backtracking and branch and bound designing techniques.
5. Learn the concepts of NP-Hard and NP-completeness.
6. Learn important algorithmic design paradigms and methods of analysis.

**Course Outcomes:**

After completion of the course, the students would be able to:

1. Analyze the time and space complexities of algorithms.
2. Solve various problems using divide and conquer and greedy method.
3. Solve various problems using dynamic programming, backtracking and branch and bound techniques.
4. Identify the complexity classes such as P, NP, NP-Complete and NP-Hard to which an algorithm belongs and design a feasible solution.
5. Determine the amortized running time of the problem.

**UNIT-I**

**Introduction**: Algorithm Definition, Algorithm Specification, Performance Analysis.

**Review of Elementary Data Structures**: Stacks, Queues, Trees, Dictionaries, Priority Queues, Sets and Disjoint Set Union.

**UNIT-II**

**Divide and Conquer**: General Method, Finding the Maximum and Minimum, Merge Sort, Quick Sort, Stassen's Matrix Multiplication.

**Greedy Method:** General method**,** Knapsack problem, Job Sequencing with Deadlines, Minimum Cost Spanning Trees, Optimal Storage on Tapes, Optimal Merge Patterns.

**UNIT-III**

**Dynamic Programming**: General Method, Multistage Graphs, All-Pairs Shortest Paths, Optimal Binary Search Trees, 0/1 Knapsack, Reliability Design, Traveling Salesmen Problem.

**Basic Traversal and Search Techniques**: Breadth First Search (DFS) and Traversal, Depth First Search (DFS) and Traversal, Connected Components and Spanning Trees, Bi-connected Components and DFS.

**UNIT-IV**

**Backtracking:** General Method, 8-Queen's Problem, Sum of Subsets, Graph Coloring, Hamiltonian Cycles, Knapsack Problem.

**Branch and Bound**: The Method, 0/1 Knapsack Problem, Traveling Salesperson Problem.

**UNIT -V**

**NP-Hard and NP-Complete Problems**: Basic Concepts, Cook's Theorem, NP-Hard Graph Problems and NP-Hard Scheduling Problems.

**Text Book:**

1. Ellis Horowitz, Sartaj Shani, Sanguthevar Rajasekaran, "Fundamentals of Computer Algorithms", 2nd Edition, University Press, 2007.

**Suggested Reading:**


1. R. Pannerselvam “Design and Analysis of Algorithms”, PHI, 2007.
2. Hari Mohan Pandey "Design and Analysis of Algorithms", University Science Press, 2009.
3. Aho, Hopcroft, Ullman “The Design and Analysis of Computer Algorithms”, Pearson Education, 2000.
4. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein “Introduction to Algorithms”, 2nd Edition, Prentice Hall of India Private Limited, 2006.
5. Anany Levitin “Introduction to the Design & Analysis of Algorithms”, Pearson Education, 2003.
6. Parag H.Dave, Himanshu B. Dave “Design and Analysis of Algorithms”, Pearson Education, 2nd Edition, 2014.

**16MCC116** **OPERATING SYSTEMS**

| | |
|---|---|
| Instruction | 3L+1T Hours per week |
| Duration of Semester End Examination | 3 Hours |
| Semester End Examination | 70 Marks |
| Continuous Internal Evaluation | 30 Marks |
| Credits | 4 |

**Course Objectives:**

Students will:

1. Aware of the evolution and fundamental principles of operating system, processes and their communication.
2. Aware of the process execution in terms of threads and they came to know about different thread libraries.
3. Aware of the various process synchronization tools and they came to know about dead lock and its issues.
4. Aware of the various operating system components like process management, memory management.
5. Know about file management and I/O subsystems concepts in operating systems.
6. Aware of components of operating system in LINUX with relevant case study.

**Course Outcomes:**

After completion of the course the students would be able to:

1. Get the knowledge of operating system components and its services.
2. Understand the basic process execution in terms of threads and they came to know about different thread libraries.
3. Learn the various process synchronization tools and they came to know about dead lock and its issues.
4. Distinguish the mapping between the physical memory and virtual memory.
5. Apply file handling concepts in OS perspective.
6. Acquire the knowledge of components and services of LINUX Operating System.

**UNIT-I**

**Operating System Introduction:** Operating Systems Objectives and functions, Computer System Architecture, OS Structure, OS Operations, Evolution of Operating Systems - Simple Batch, Multi programmed, time shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, Special - Purpose Systems**.**

**System structures**: Operating System Services, System Calls, Types of System Calls, System Programs, Operating System Design and Implementation, Operating System Structure, Virtual Machines, Operating System debugging.

**Process Concept**: Process Concept, Process Scheduling, Operations on process, Inter process Communication.

**Multithreaded Programming**: Multithreading Models, Thread Libraries, Threading Issues.

**UNIT–II**

**Process Scheduling**: Scheduling Criteria, Scheduling Algorithms, Thread Scheduling, Multiple Processor Scheduling.

**Process Synchronization**: Critical Section Problem, Peterson's Solution, Semaphores, Classic Problems of Synchronization, Monitors.

**Deadlocks**: System Model, Deadlock Characterization, Methods in Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

**UNIT- III**

**Memory Management Strategies**: Swapping, Contiguous Memory Allocation, Paging, Structure of the Page Table, Segmentation.

**Virtual Memory Management**: Demand Paging, Copy on Write, Page Replacement Algorithms, Allocation of Frames, Thrashing.

**System Protection**: Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix.

**UNIT- IV**

**File System**: File Concept, Access Methods, Directory and Disk Structure, File System Mounting, File Sharing, Protection.

**Implementing File System**: File System Structure, File System Implementation, Directory Implementation, Allocation Methods, Free Space Management, Efficiency and Performance, Recovery.

**Secondary Storage Structure**: Overview of Mass Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling, Disk Management, Swap Space Management, RAID Structure.

**UNIT- V**

**I/O Systems**: I/O Hardware, Application I/O Interface, Kernel I/O Subsystem, Transforming I/O Request to Hardware Operations, STREAMS.

**Case Study**: **The Linux System**: Linux History, Design Principles, Kernel Modules, Process Management, Scheduling, Memory Management, File Systems, Input and Output, Inter process Communication.

**Text Book:**

1. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, "Operating System Concepts", 7th Edition, John Wiley and Sons, 2011.
2.

**Suggested Reading:**

1. Gary Nutt, "Operating Systems", 3rd Edition, Pearson Education, 2004.
2. Harvey M. Deital, "Operating Systems", 3rd Edition, Pearson Education, 2004.

**16MBC04 ORGANIZATIONAL BEHAVIOUR (Open Elective)**

| | |
|---|---|
| Instruction | 3 Hours per week |
| Duration of Semester End Examination | 3 Hours |
| Semester End Examination | 70 Marks |
| Continuous Internal Evaluation | 30 Marks |
| Credits | 3 |

**Course Objectives:**
Students will:

1. Familiarize the students with the basic understanding of individual behavior and explore issues of motivation, communication, leadership, power, politics and organizational change.
2. Provide a comprehensive, up-to-date, practical knowledge base that provides an engaging introduction and concepts of organizational behavior.
3. Orient the students with real life examples that correlate the theory to actual practice from the industry.
4. Enable the students to practically implement the Organizational Behavior principles and practice in real time situations in their careers and life.

**Course Outcomes:**
After completion of this course students would be able to:

1. Analyze the behavior, perception and personality of individuals and groups in organizations in terms of the key factors that influence organizational behavior.
2. Assess the potential effects of organizational-level factors on organizational behavior.
3. Critically evaluate the potential effects of motivating and leading the individuals in the Organization.
4. Analyze organizational behavioral issues in the context of groups, power, politics and conflict issues.

**UNIT – I**
Organizational behavior – Nature and levels of organizational behavior – Individuals in organization – Individual differences – Personality and Ability – The Big 5 Model of personality – Organizationally relevant personality traits. The nature of perception – characteristics of the perceiver, target and situation – perceptual problems.

**UNIT – II**
Organizational Designs and Structures – Traditional and Contemporary organizational designs. Organizational culture and ethical behavior – factors shaping organizational culture– creating an ethical culture.

**UNIT – III**
Motivation–early and contemporary theories of motivation. Leadership – early and contemporary approaches to leadership.

**UNIT – IV**
Groups and group development – turning groups into effective teams. Managing change – process, types and challenges. Communicating effectively in organizations – communication process–barriers to communication–overcoming barriers to communication–persuasive communication–communication in crisis situations.

**UNIT – V**
Power, Politics, Conflict and Negotiations–Sources of individual, functional and divisional Power. Organizational politics. Conflict – causes and consequences – Pondy's model of organizational conflict–conflict resolution strategies.

**Text Books:**


1. Jennifer George and Gareth Jones "Understanding and Managing Organizational Behavior", Pearson Education Inc., 2012
2. Jon L Pierce and Donald G. Gardner, "Management and Organizational behavior", Cengage Learning India (P) Ltd., 2001.
3. Richard Pettinger "Organizational Behaviour", Routledge, 2010


**Suggested Reading:**


1. Stephen P. Robbins, Jennifer George and Gareth Jones "Management and Organizational Behavior", Pearson Education. Inc., 2009.
2. K. Aswathappa "Organizational Behavior", Himalaya Publishing House., 2013.
3. John Schermerhorn, Jr. James G. Hunt and Richard N. Osborn "Organizational Behavior", 10th Edition, Wiley India, Edition. 2009.

**16CEC03 HUMAN VALUES AND PROFESSIONAL ETHICS (Open Elective)**

| | |
|---|---|
| Instruction | 3 Hours per week |
| Duration of Semester End Examination | 3 Hours |
| Semester End Examination | 70 Marks |
| Continuous Internal Evaluation | 30 Marks |
| Credits | 3 |

**Course Objectives:**

Students will:

1. Develop the critical ability among students to distinguish between what is of value and what is superficial in life
2. Enable the students understand the values, the need for value adoption and prepare them meet the challenges
3. Enable the students develop the potential to adopt values, develop a good character and personality and lead a happy life
4. Motivate the students practice the values in life and contribute for the society around them and for the development of the institutions /organization around they are in.
5. Make the students understand the professional ethics and their applications to engineering profession

**Course Outcomes:**

After completion of the course, students would be able to:

1. Develop the capability of shaping themselves into outstanding personalities, through a value based life.
2. Turn themselves into champions of their lives.
3. Take things positively, convert everything into happiness and contribute for the happiness of others.
4. Become potential sources for contributing to the development of the society around them and institutions / organizations they work in.
5. Shape themselves into valuable professionals, follow professional ethics and are able to solve their ethical dilemmas.

**UNIT-I**

**Concepts and Classification of Values –Need and challenges for value Adoption**

Definition of Values – Concept of Values – Classification of Values – Hierarchy of Values – Types of Values –Espoused and Applied Values – Value judgement based on Culture – Value judgement based on Tradition – Interdependence of Values Need for value education – Findings of Commissions and Committees - Corruption and illegal practices – Science and Technology without values- Exploitation of nature – Increasing use of violence and intoxicants – Lack of education in values – Implications of education in values – Vision for a better India Challenges for Value adoption – Cultural, Social, Religious, Intellectual and Personal challenges.

**UNIT – II**

**Personal Development and Values in Life**

Personal Development: Enlightened self-interest – Accountability and responsibility – Desires and weaknesses – Character development – Good relationships, self-restraint, Spirituality and Purity – The quest for Character – Tests of Character – The key to good character.

Values in Life: Building an ethical policy – Integrating values in everyday life – Archaic Social Values – Parenting practices – Critical Thinking - Analyzing and Prioritizing values – Practicing Yoga and Meditation.

**UNIT – III**

**Practicing Values for the development of Society**

Resentment Management and Self-analysis – Positive Thinking and Emotional Maturity – The importance of Women , Children and Taking care of them – Helping the poor and needy – Fighting against addictions and atrocities – Environmental awareness – Working for the Sustainable development of the society. Values in

Education system: Present Scenario- Engineering education –Current trends-Need for quality improvement-Adoption of value education – Principles of Integrity-Institutional Development.

**UNIT – IV**

**Basic Concepts of Professional Ethics**

Ethics, Morals and Human life , Types of Ethics, Personal Ethics, Professional ethics, Ethical dilemmas, Indian and Global thoughts on ethics, Profession, Professional and Professionalism, Ethical role of a professional Basic ethical principles, Some basic ethical theories, use of ethical theories. Science, Religion Ethics, Genders and ethics, Media and ethics, Computer Ethics, Case Studies on Professional Ethics, Exemplary life sketches of prominent Indian personalities.

**UNIT-V**

**Ethics in engineering profession**

Engineering profession-Technology and Society-Engineering as Social Experimentation-Engineering ethics-Ethical obligations of Engineering Professionals-Role of Engineers-Engineers as Managers-Professional responsibilities of Engineers- Engineers Responsibility for Safety- A few Case Studies on Risk management. Conflicts of Interest- Occupational Crimes- Plagiarism-Self plagiarism-Ethics Audit-Consideration for ethics audit-Ethics Standards and Bench Marking.

**Text Books:**


1. Subramanian. R. "Professional Ethics" , Oxford University Press , 2013
2. Nagarajan R.S. "A Text Book on Human Values and Professional Ethics" New Age, Pub. 2007.
3. Dinesh Babu S., "Professional Ethics and Human Values" , Laxmi Publications , 2007


**Suggested Reading:**


1. SantoshAjmera and Nanda Kishore Reddy "Ethics, Integrity and Aptitude",Mc Grawhill Education Private Limited, 2014.
2. GovindaRajan M., Natarajan S., Senthil Kumar V.S. "Professional Ethics and Human Values" Prentice Hall India Private Limited, 2012.
3. Course Material for Post Graduate Diploma In "Value Education & Spirituality" Prepared by Annamalai University in Collaboration with Brahma Kumaris, 2010

**16MEE20** **ENTREPRENUERSHIP (Open Elective)**

| | |
|---|---|
| Instruction | 3 Hours per week |
| Duration of Semester End Examination | 3 Hours |
| Semester End Examination | 70 Marks |
| Continuous Internal Evaluation | 30 Marks |
| Credits | 3 |

**Course Objectives:**

Students will:

1. Understand the essence of Entrepreneurship
2. Know the environment of industry and related opportunities and challenges
3. Know the concept a procedure of idea generation
4. Understand the elements of business plan and its procedure
5. Understand project management and its techniques
6. Know behavioral issues and Time management

**Course Outcomes:**

After completion of the course, students would be able to:

1. Apply the entrepreneurial process
2. Analyze the feasibility of a new business venture and preparation of Business plan
3. Ability to evaluate entrepreneurial tendency and attitude
4. Brainstorm ideas for new and innovative products or services
5. Use a variety of feasibility studies, assess and select prospective new venture concepts
6. Describe how to investigate financing alternatives for specific new venture concepts

**UNIT-I**

**Indian Industrial Environment**-competence, Opportunities and Challenges. Entrepreneurship and Economic growth. Small Scale Industry in India, Objectives, Linkage among small, medium and heavy industries. Types of enterprises, Corporate Social Responsibility.

**UNIT-II**

**Identification and characteristics of entrepreneurs**: Emergence of First generation entrepreneurs, environmental influence and women entrepreneurs. Conception and evaluation of ideas and their sources. Choice of Technology - Collaborative interaction for Technology development.

**UNIT-III**

**Business plan**: Introduction, Elements of Business Plan and its salient features. Technical Analysis, Profitability and Financial Analysis, Marketing Analysis. Feasibility studies, Executive Summary.

**UNIT-IV**

**Project Management during construction phase**: project organization, project planning and control using CPM, PERT techniques. Human aspects of project management. Assessment of tax burden.

**UNIT-V**

**Behavioral aspects of entrepreneurs**: Personality - determinants, attributes andmodels. Leadership concepts and models. Values and attitudes. Motivation aspects. Change behaviour. Time Management: Various approaches of time management, their strengths and weaknesses. The urgency addiction and time management matrix

**Text Books:**

1. Vasant Desai "Dynamics of Entrepreneurial Development and Management", Himalaya Publishing House, 1997.

2. Prasanna Chandra “Project-Planning, Analysis, Selection, Implementation and Review”, Tata Mc Graw-Hill Publishing Company Ltd. 1995.

**Suggested Reading:**

1. Stephen R. Covey and A. Roger Merrill “First Things First”, Simon and Schuster Publication, 1994.
2. G.S. Sudha “Organizational Behaviuor”, 1996.
3. Robert D. Hisrich, Michael P. Peters “Entrepreneurship”, Tata Me Graw Hill Publishing Company Ltd., 5th Edition, 2005
4. Robert D. Hisrich, Michael P. Peters “Entrepreneurship”, Tata Me Graw Hill Publishing Company Ltd., 5th Edition, 2005

**16CEE21 DISASTER MITIGATION AND MANAGEMENT (Open Elective)**

| | |
|---|---|
| Instruction | 3 Hours per week |
| Duration of Semester End Examination | 3 Hours |
| Semester End Examination | 70 Marks |
| Continuous Internal Evaluation | 30 Marks |
| Credits | 3 |

**Course Objectives:**
Students will:

1. Equip the students with the basic knowledge of hazards, disasters, risks and vulnerabilities including natural, climatic and human induced factors and associated impacts.
2. Impart knowledge in students about the nature, mechanism causes, consequences and mitigation measures of the various natural disasters including hydro metrological and geological based disasters.
3. Enable the students to understand risks, vulnerabilities and human errors associated with human induced disasters including chemical, biological and nuclear warfare agents.
4. Equip the students with the knowledge of various chronological phases in the disaster management cycle.
5. Create awareness about the disaster management framework and legislations in the context of national and global conventions.
6. Enable students to understand the applications of geospatial technologies like remote sensing and geographical information systems in disaster management.

**Course Outcomes:**
After completion of the course, students would be able to:

1. Analyze and critically examine existing programs in disaster management regarding vulnerability, risk and capacity at local level
2. Choose the appropriate activities and tools and set up priorities to build a coherent and adapted disaster management plan.
3. Understand various mechanisms and consequences of natural and human induced disasters for the participatory role of engineers in disaster management.
4. Develop an awareness of the chronological phases of disaster preparedness, response and relief operations for formulating effective disaster management plans
5. Understand various participatory approaches/strategies and their application in disaster management
6. Understand the concepts of remote sensing and geographical information systems for their effective application in disaster management.

**UNIT-I**

Introduction to Natural, human induced and human made disasters – Meaning, nature, types and effects; International decade of natural disaster reduction (IDNDR); International strategy of natural disaster reduction (ISDR)

**UNIT-II**

Natural Disasters– Hydro meteorological disasters: Causes, impacts, Early warning systems, structural and non-structural measures for floods, drought and cyclones; Tropical cyclones: Overview, cyclogenesis, drought monitoring and management.; Geographical based disasters: Earthquakes and Tsunami- Overview, causes, impacts, zoning, structural and non-structural mitigation measures; Tsunami generation; Landslides and avalanches: Overview, causes, impacts, zoning and mitigation measures. Case studies related to various hydro meteorological and geographical based disasters.

**UNIT - III**

Human induced hazards: Risks and control measures in a chemical industry, Causes, impacts and mitigation measures for chemical accidents, chemical disaster management, current status and perspectives; Case studies related to various chemical industrial hazards eg: Bhopal gas tragedy; Management of chemical terrorism disasters and biological disasters; Radiological Emergencies and case studies; Case studies related to major power break downs, fire accidents and traffic accidents.

**UNIT – IV**

Use of remote sensing and GIS in disaster mitigation and management; Scope of application of ICST (Information, communication and space technologies in disaster management, Critical applications& Infrastructure; Potential application of Remote sensing and GIS in disaster management and in various disastrous conditions like earthquakes, drought, Floods, landslides etc.

**UNIT - V**

Concept of disaster management: Introduction to disaster management, Relationship between Risk, vulnerability and a disaster, Disaster management cycle, Principles of disaster mitigation: Hazard identification and vulnerability analysis, Early warning systems and forecasting; Infrastructure and development in disaster management; Disaster management in India: National disaster management framework at central, state, district and local levels. Community based disaster management.

**Text Books:**


1. Rajib, S and Krishna Murthy "Disaster Management Global Challenges and Local Solutions", Universities Press Hyderabad, R.R ,2012.
2. Notes / Reading material published by National Disaster Management Institute, Ministry of Home Affairs, Govt. of India.


**Suggested Reading:**


1. Navele, P & Raja, C.K. "Earth and Atmospheric Disasters Management, Natural and Manmade", B.S. Publications, Hyderabad.
2. Fearn-Banks "Crises computations approach: A case book approach", Route ledge Publishers, Special Indian Education, New York & London, 2011.
3. Battacharya. T "Disaster Science and Management", Tata McGraw Hill Company, New Delhi.

**16MCC117 DATABASE MANAGEMENT SYSTEMS LAB**

| | |
|---|---|
| Instruction | 3 Hours per week |
| Duration of Semester End Examination | 3 Hours |
| Semester End Examination | 50 Marks |
| Continuous Internal Evaluation | 25 Marks |
| Credits | 2 |

**Course Objectives:**

Students will:

1. Present SQL and procedural interfaces to SQL comprehensively.
2. Give an introduction integrity constraints on a database using a state-of-the-art RDBMS
3. Understand the concepts of Views and their usability.
4. Impart the knowledge PL/ SQL including stored procedures, stored functions, cursors, packages
5. Understand the Data Control Language (DCL) privileges and roles.
6. Present the concepts of Forms and Reports

**Course Outcomes:**

After completion of the course, the students would be able to:

1. Populate and query a database using SQL DML/DDL commands.
2. Declare and enforce integrity constraints on a database using a state-of-the-art RDBMS
3. Implement the views with multiple options.
4. Programming PL/SQL including stored procedures, stored functions, cursors, packages.
5. Access and control authorization.
6. Design and build a Forms and Reports

**List of Programs:**

**I. SQL**

1. Creating tables using commands in DDL
2. Manipulating the data using DML
3. Using Aggregate functions Set operators
4. Simple condition query creation using SQL Plus
5. Complex condition query creation using SQL Plus
6. Exercising all types of Joins, views
7. Exercising Data Control Language and Transaction Control Language

**II. PL/SQL**

8. Demonstration of Blocks, Cursors,
9. Procedures, Functions and Packages.
10. Creation of Triggers

**III. FORMS**

11. Designing forms for various databases.(Creating, Inserting, Updating, Deleting)

**IV. REPORTS**

12. Generation using SQL Reports
13. Creation of Reports based on different queries.

Note:-The creation of sample database for the purpose of the experiments is expected to be pre-decided by the instructor.

**Suggested Reading:**


1. Nilesh Shah "**Database Systems Using Oracle**", PHI, 2007.
2. Rick F Van der Lans "**Introduction to SQL**", 4th Edition, Pearson Education, 2007.
3. Benjamin Rosenzweig, Elena Silvestrova "**Oracle PL/SQL by Example**", 3rd Edition, Pearson Education, 2004.
4. Albert Lulushi "**Oracle Forms Developer's Handbook**", Pearson Education, 2006.

**16MCC118 WEB TECHNOLOGIES LAB**

| | |
|---|---|
| Instruction | 3 Hours per week |
| Duration of Semester End Examination | 3 Hours |
| Semester End Examination | 50 Marks |
| Continuous Internal Evaluation | 25 Marks |
| Credits | 2 |

**Course Objectives:**

Students will:

1. Practice various tags in XHTML and CSS.
2. Practice programs using JavaScript control statements, arrays, functions etc.
3. Practice programs using events on the XHTML elements.
4. Practice programs using XML.
5. Practice programs using PHP control statements, arrays, functions etc.
6. Practice programs using MYSQL database.

**Course Outcomes:**

After completion of the course, the students would be able to:

1. Create static web pages using XHTML and CSS.
2. Create dynamic web pages and perform client side validations using JavaScript.
3. Store and Transport data using XML.
4. Write programs using PHP.
5. Access MYSQL database through PHP.
6. Design and Develop websites.

**List of programs:**

**XHTML:** Create programs using the following concepts

1. Text Markup Tags.
2. Images.
3. Hyperlinks.
4. Ordered and Unordered Lists.
5. Tables and Nested Tables.
6. Forms.
7. Frames.

**CSS:** Create programs using the following concepts

8. Inline Styles.
9. Internal Stylesheet.
10. External Stylesheet.
11. Pseudo Classes.
12. Font properties. Borders, Margins, Paddings and Background Images.

**JAVASCRIPT:** Create programs using the following concepts

13. Pre-defined objects (Date, String, Math etc.,).
14. Selection statements switch statements and loop statements.
15. Demonstrate user defined objects.
16. Array object.
17. Functions.
18. Illustrate pattern matching using regular expressions.
19. Handle various events occurred in the HTML document.
20. Validate the form data.
21. Illustrate positioning of the HTML elements in the web page.
22. Demonstrate moving elements, elements visibility, stacking elements and dragging and dropping elements.

**XML:** Create programs using the following concepts

24. XML Documents.
25. XML Schema for the XML documents.
26. CSS style sheets for the XML documents.
27. XSLT style sheet for the XML documents.
28. Design an XML document to store information about patients in a hospital.

**PHP:** Create programs using the following concepts

29. Selection statements and loop statements.
30. Arrays.
31. Functions.
32. Pattern matching.
33. Handling forms.
34. Access MYSQL database through PHP.

**Suggested Reading:**


1. Robert W.Sebesta "**Programming the World Wide Web**", 4th Edition, Pearson Education, 2008.
2. Thomas Powell "**HTML & XHTML: The Complete Reference**", 4th Edition, Tata McGraw-Hill, 2003.
3. Thomas A Powell, Fritz Schneider "**JavaScript: The Complete Reference**", 3rd Edition, Tata McGraw Hill, 2013**.**
4. Steven Holzner "**PHP: The Complete Reference**", McGraw Hill Education, 2008**.**

**16MCC119 OPERATING SYSTEMS LAB**

| | |
|---|---|
| Instruction | 3 Hours per week |
| Duration of Semester End Examination | 3 Hours |
| Semester End Examination | 50 Marks |
| Continuous Internal Evaluation | 25 Marks |
| Credits | 2 |

**Course Objectives:**

Students will:

1. Learn programs on system calls, threads and signals
2. Learn programs on process scheduling algorithms
3. Learn programs on Inter process Communication.
4. Learn programs on synchronization problems
5. Learn programs on files
6. Learn about the basic Linux commands.
7. Learn basic shell programs.

**Course Outcomes:**

After completion of the course, the students would be able to:

1. Write programs on system calls, threads and signals.
2. Write programs on process scheduling algorithms
3. Write programs on Inter process Communication.
4. Write programs on synchronization problems
5. Write programs on files
6. Use basic Linux commands
7. Write basic shell programs

**List of Programs:**

1. Programs using process related systems calls.
2. Print type of file for each command line arguments.
3. Programs to create threads.
4. Program using Signals.
5. Programs on process scheduling algorithms
6. Echo server-using pipes.
7. Echo server-using message Queues.
8. Producer & Consumer Problem using Semaphores and Shared memory
9. Producer & Consumer Problem using message passing.
10. Readers & Writers Problem using Semaphores and Shared memory
11. Dining philosopher's problem using semaphores.
12. Programs related to files
13. Program using File Locking.
14. Basic Linux Commands
15. Basic shell scripts

**Suggested Reading:**


1. W. Richard Stevens, "**Unix Network Programming**", Pearson Education Inc, PHI Learning 1990.
2. Behrouz A. Forouzan, Richard F. Gilberg, "**UNIX and Shell Programming: A Textbook**", Books/Cole-Thomson Learning, 2003.

# CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY(A)

**Choice Based Credit System (with effect from 2017-18)**

**MCA (Master of Computer Applications)**

**SEMESTER - IV**

| S.No | Course Code | Title of the Course | Scheme of Instruction | | Scheme of Examination | | | Credits |
|---|---|---|---|---|---|---|---|---|
| | | | Hours per week | | Duration of SEE in Hours | Maximum Marks | | |
| | | | L/T | P/S | | CIE | SEE | |
| **THEORY** | | | | | | | | |
| 1 | 16MCC120 | Computer Networks | 3/1 | - | 3 | 30 | 70 | 4 |
| 2 | 16MCC121 | Data warehousing and Data Mining | 3/1 | - | 3 | 30 | 70 | 4 |
| 3 | 16MCC122 | Advanced Java Programming | 3/1 | - | 3 | 30 | 70 | 4 |
| 4 | 16MCE101 / 102/103/104 | Elective-I | 3 | - | 3 | 30 | 70 | 3 |
| 5 | 16MCE105/ 106/107/108 | Elective-II | 3 | - | 3 | 30 | 70 | 3 |
| **PRACTICALS** | | | | | | | | |
| 6 | 16MCC123 | Computer Networks Lab | - | 3 | 3 | 25 | 50 | 2 |
| 7 | 16MCC124 | Data warehousing and Data Mining Lab | - | 3 | 3 | 25 | 50 | 2 |
| 8 | 16MCC125 | Mini Projects | - | 3 | 3 | 25 | 50 | 2 |
| **TOTAL** | | | **18** | **9** | **-** | **225** | **500** | **24** |

**L: Lecture T: Tutorial P: Practical S: Seminar**

**CIE: Continuous Internal Evaluation SEE: Semester End Examination**

| **Elective – I** | |
|---|---|
| 16MCE101 | Microprocessor |
| 16MCE102 | Software Testing |
| 16MCE103 | Artificial Neural Networks |
| 16MCE104 | Principles of Multimedia |

| **Elective – II** | |
|---|---|
| 16MCE105 | Advanced Operating Systems |
| 16MCE106 | Cloud Computing |
| 16MCE107 | Software Project Management |
| 16MCE108 | Pattern Recognition |

## ASSESSMENT PROCEDURES FOR AWARDING MARKS

The distribution of marks is based on internal assessment (Sessional) by concerned teacher and the Semester end examination shall be as follows:

| Course (in terms of credits) | CIE (Marks) | Semester End Examination (Marks) | Remarks | Duration of Semester End Examination |
|---|---|---|---|---|
| Three(3)Credits/ Four(4)credits | 30* | 70** | Theory Course | 3 Hours |
| Two(2) Credits | 25 | 50 | Lab Course / Mini project | 3 Hours |
| Two(2) Credits | 50 | --- | Seminar | --- |
| Twelve(12) Credits | 100 | 100 | Major Project Work | Viva |

* Out of 30 sessional marks, 10 marks are allotted for home assignments (at least two assignments must be given, which covers the entire syllabus of that particular course/subject), and the remaining 20 marks are based on the average of two tests (weightage for each test is 20 marks of one hour duration).The question paper for tests will be in two parts, Part-A and Part-B. Part A is compulsory and carries six (6) marks. Part-B carries fourteen (14) marks (student has to answer two out of three questions).

** The question paper will be in two parts, Part-A and Part-B. Part A is compulsory, and covers the entire syllabus, and carries 10 marks. Part-B carries 60 marks and covers all the units of the syllabus (student has to answer five out of seven questions)

A candidate has earned the credits of a particular course, if he/she secures not less than the minimum marks/ grade as prescribed. **Minimum pass marks in the Semester End Examinations plus CIE shall be 40%**.**Where as for the lab course/project/mini project is 50%.**

**A course that has CIE but no semester end examination as per scheme is treated as pass/fail for which pass marks are 50% CIE.**

**16MCC120** **COMPUTER NETWORKS**

| | |
|---|---|
| Instruction | 3L+1T Hours per week |
| Duration of Semester End Examination | 3 Hours |
| Semester End Examination | 70 Marks |
| Continuous Internal Evaluation | 30 Marks |
| Credits | 4 |

**Course Objectives:**

Students will:

1. Learn the basics of data communication and networks.
2. Get the idea of different layers of OSI model.
3. Learn the concepts of Data Link layer such as Flow and Error control.
4. Study various Routing Algorithms and concepts of Network layers.
5. Learn Transport layer protocols and concepts of Application layer.
6. Obtain the concepts of Socket programming.

**Course Outcomes:**

After completion of the course, the students would be able to:

1. Gain good knowledge of the basics of data communication and networks.
2. Get an overview of the different layers of OSI model.
3. Gain knowledge of Flow and Error control mechanisms of Data Link layer.
4. Design various Routing Algorithms of Network layer.
5. Formulate Transport layer protocols and concepts of Application layer.
6. Acquire the knowledge of Socket programming.

**UNIT - I**

Data Communications: Components – Data Representation - Data Flow, Networks- Network Criteria – Physical Structure- Network Models – Categories of Networks – Internetwork, Internet, Protocols and Standards, Network models - ISO/OSI model and its layers, TCP/IP model, Addressing, Physical layer and Media – Digital to Digital conversion, Line coding, Transmission modes, Transmission Media- Guided media – Unguided media, Modem, RS232 Interfacing.

**UNIT-II**

Data link Layer: Error detection and Correction – Block coding, Hamming code, CRC, Flow and Error control, Noiseless channels - Simple and Stop and Wait protocols, Noisy channels-Stop and Wait ARQ – Go back-N ARQ – Selective repeat ARQ – Piggybacking, HDLC.

Multiple Access: LAN-Pure and Slotted ALOHA, Ethernet IEE 802.3, IEEE 802.4,IEEE 802.5, Bridges.

**UNIT-III**

Network Layer- Internetworks - Switching– Virtual Circuit and Datagram Network concepts, Logical Addressing, Internet Protocol. Routing – Unicast Routing Protocols - Distance Vector Routing, RIP, Link State Routing, OSPF, Path Vector Routing, BGP.

**UNIT-IV**

**Transport Layer**: Services of Transport Layer, Multiplexing.

Transmission Control Protocol (TCP) – Congestion control and Quality of Services - User Datagram Protocol (UDP).

Application Layer: Domain Name Space (DNS), SMTP and FTP, WWW and HTTP, Fire Walls.

**UNIT-V**

Socket Programming: Socket address, elementary socket system calls, advanced socket system calls, reserved ports, socket option, asynchronous I/O input/output Multiplexing out-of-band data, sockets and signals, Internet super server.

**Text Books:**


1. Behroz A Forouzan, "Data Communications and Networking", 4th Edition, Tata McGraw – Hill, 2009.
2. W. Richard Stevens, "Unix Network Programming", Pearson Education Inc, PHI Learning 1990.


**Suggested Reading:**


**1.** Andrew S. Tanenbaum, "Computer Networks", 5th Edition, Pearson Education, 2011.

**16MCC121 DATA WAREHOUSING AND DATA MINING**

| | |
|---|---|
| Instruction | 3L+1T Hours per week |
| Duration of Semester End Examination | 3 Hours |
| Semester End Examination | 70 Marks |
| Continuous Internal Evaluation | 30 Marks |
| Credits | 4 |

**Course Objectives:**

Students will:

1. Identify the scope and necessity of Data Mining & Warehousing for the society.
2. Describe and designing of Data Warehousing to integrate the Data Mining system
3. Understand Data Mining functionalities to solve the real world problems.
4. Develop ability to design various algorithms based on data mining techniques.
5. Understand various interesting patterns and presentation techniques for decision making
6. Gain the interest in research and design of new Data Mining Techniques.

**Course Outcomes:**

After completion of the course, the students would be able to:

1. Identify the scope of Data Mining & Warehousing for the society.
2. Design of Data Warehouses and integrate the Data Mining system for various organizations.
3. Apply Data Mining functionalities to solve the real world problems
4. Design and implement the various data mining algorithms based on various requirements
5. Identify interesting patterns and presentation techniques in making decisions
6. Make base for further research on advanced Data Mining Techniques

**UNIT-I:**

**Introduction**: What Motivated Data Mining? Why Is It Important, What Is Data Mining, Data Mining—On What Kind of Data, Data Mining Functionalities—What Kinds of Patterns Can Be Mined?, Are All of the Patterns Interesting? Classification of Data Mining Systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or Data Warehouse System, Major Issues in Data Mining,. Data Preprocessing: Why Preprocess the Data, Descriptive Data Summarization, Data Cleaning, Data Integration and Transformation, Data Reduction, Data Discretization and Concept Hierarchy Generation.

**UNIT-II:**

**DataWarehouse and OLAP Technology**: What Is a DataWarehouse, A Multidimensional Data Model, DataWarehouse Architecture, DataWarehouse Implementation, From DataWarehousing to Data Mining, Data Cube Computation and Data Generalization: Efficient Methods for Data Cube Computation, Further Development of Data Cube and OLAP Technology, Attribute-Oriented Induction—An Alternative Method for Data Generalization and Concept Description.

**UNIT-III:**

Mining Frequent Patterns, Associations, and Correlations: Basic Concepts, Efficient and Scalable Frequent Item set Mining Methods, Mining Various Kinds of Association Rules, From Association Mining to Correlation Analysis, Constraint-Based Association Mining,

**UNIT-IV:**

**Classification and Prediction**: What Is Classification? What Is Prediction, Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Rule-Based Classification, Classification by Back propagation, Support Vector Machines, Classification by Association Rule Analysis, Lazy Learners, Other Classification Methods, Prediction Accuracy and Error Measures, Evaluating the Accuracy of a Classifier or Predictor, Ensemble Methods—Increasing the Accuracy, Model Selection.

**UNIT-V**

**Cluster Analysis**: What Is Cluster Analysis, Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based

Methods, Model-Based Clustering Methods, Clustering High-Dimensional Data, Constraint-Based Cluster Analysis, Outlier Analysis.

**Text Books:**


1. Jaiwei Han and Micheline Kamber "Data Mining- Concepts and Techniques", Morgan and Kaufmann, 2nd Edition, 2006.


**Suggested Reading:**


1. Pang-Ning Tan,Micheal Steinbach, Vipin Kumar, "Introduction to data Mining", Pearson Education, 2008.
2. Ian. H. Witten, Eibe Frank and Mark.A.Hall "Data Mining:Practical Machine Learning Tools and Techniques", 3rd Edition(Then Morgan Kufmann series in Data Management systems), 2011
3. "Statistical and Machine learning –Learning Data Mining, Techniques for Better Predictive Modeling and Analysis to Big Data".
4. Arun K Pujari "Data Mining Techniques", University Press, 2nd Edition, 2009
5. MH Dunham "Data Mining" Pearson Education, 2009.

**16MCC122 ADVANCED JAVA PROGRAMMING**

| | |
|---|---|
| Instruction | 3L+1T Hours per week |
| Duration of Semester End Examination | 3 Hours |
| Semester End Examination | 70 Marks |
| Continuous Internal Evaluation | 30 Marks |
| Credits | 4 |

**Course Objectives:**

Students will:

1. Servlets, session management and usage of JDBC in servlets.
2. Java beans, Application builder tool and java beans API.
3. EJB Architecture, EJB requirements and EJB entity beans.
4. EJB clients, deployment tips and perl control structures and operators.
5. JSP scripting elements & directives and java messaging services.
6. JDBC driver connection to database, Row set object and Result set.

**Course Outcomes:**

After completion of the course, the students would be able to:

1. Get the knowledge of servlets, session management and usage of JDBC in servlets.
2. Employ the java beans, Application builder tool and java beans API.
3. Demonstrate the EJB Architecture, EJB requirements and EJB entity beans.
4. Demonstrate the EJB clients, deployment tips and perl control structures and operators.
5. Identify the JSP scripting elements & directives and java messaging services.
6. Examine the JDBC driver connection to database, Row set object and Result set

**UNIT - I**

**J2EE Platform**: Enterprise Architecture Styles, Containers and Technologies.

**Servlet overview**: The Java web server – your first servlet – servlet chaining – server side includes- Session management – security – HTML forms – using JDBC in servlets – applet to servlet communication.

**UNIT - II**

**Java Beans**: The software component assembly model- The java beans development kit- developing beans – notable beans – using infobus - Glasgow developments - Application Builder tool- JAR files-Introspection-Bound Properties-Persistence-customizers - java beans API.

**UNIT - III**

**EJB**: EJB architecture- EJB requirements – design and implementation – EJB session beans- EJB entity beans-EJB Clients – deployment tips, tricks and traps for building distributed and other systems – implementation and future directions of EJB-Variable in perl- perl control structures and operators – functions and scope.

**UNIT - IV**

**JSP**: Introduction JSP-Examining MVC and JSP -JSP scripting elements & directives-Working with variables scopes-Error Pages - using Java Beans in JSP Working with Java Mail-Understanding Protocols in Javamail-Components-Javamail API-Integrating into J2EE-Understanding Java Messaging Services-Transactions.

**UNIT – V**

**JDBC :** Introduction to JDBC, JDBC Drivers, Packages related to JDBC, JDBC Data Sources, Retrieving Meta Information from database and Result set, Distributed Transactions and Row Set objects, Accessing a Database through Servlets and JDBC**.**

**Text Books:**


1. H. Schildt, 2002 "Java 2 Complete Reference", 5th Edition, Tata McGraw Hill, New Delhi.
2. Subramanyan AllamRaju "Professional Java Server Programming", J2EE 1.3 Edition, A Press Publications.

**Suggested Reading:**


1. K. Moss "Java Servlets", 2nd Edition, Tata McGraw Hill, New Delhi, 1999.
2. Joseph O'Neil "Java Beans from the Ground Up", Tata McGraw Hill, New Delhi, 1998.
3. J. McGovern,R. Adatia,Y. Fain, "J2EE 1.4 Bible", Wiley-Dreamtech India Pvt. Ltd, New Delhi, 2003.

**16MCE101 MICROPROCESSOR (ELECTIVE-I)**

| | |
|---|---|
| Instruction | 3 Hours per week |
| Duration of Semester End Examination | 3 Hours |
| Semester End Examination | 70 Marks |
| Continuous Internal Evaluation | 30 Marks |
| Credits | 3 |

**Course Objectives:**
Students will:
1. Understand the basic principles of Microprocessors.
2. Impart the basic knowledge of architecture of 8085.
3. Learn the instruction set of 8085.
4. Verse with the programming concepts of 8085.
5. Facilitate the principles of 8085 interrupt cycles.
6. Learn the basic functionality and interfacing of various peripheral devices.

**Course Outcomes:**
After completion of the course, the students would be able to:
1. Gain the knowledge of basic principles of Microprocessors.
2. Understand the architecture of 8085.
3. Verse with the knowledge of Instruction sets of 8085.
4. Understand the knowledge of programming concepts of 8085.
5. Facilitate themselves with the knowledge of Interrupt cycles of 8085.
6. Gain the knowledge of the functionality and interfacing of various peripheral devices.

**UNIT-I**
**8085 Microprocessor Architecture:** Introduction to Microprocessors, The 8085 MPU: The 8085 Microprocessor, A Detailed Look at the 8085 MPU and its Architecture, Microprocessor Communication and Bus Timings.

**UNIT-II**
Decoding and Executing an Instruction, De-multiplexing the Bus $AD_7$-$AD_0$, Generating Control Signals, Introduction to 8085 instructions: Data Transfer (Copy) Operations, Arithmetic Operation, Logic Operations, Branch Operations, Writing Assembly Language Programs, Debugging a Program

**UNIT-III**
**Programming techniques with Additional instructions**: Programming Techniques-Looping, Counting and Indexing, Additional Data Transfer and 16-Bit Arithmetic Instructions, Arithmetic Operations Related to memory, Logic Operations: Rotate and Compare, Dynamic Debugging.

**UNIT-IV**
**Stacks and subroutines**: Stack, Subroutine, Restart, Conditional CALL and RETURN instructions, Advanced Subroutine Concepts.
**Interrupts:** The 8085 Interrupt, 8085 Vectored Interrupts: TRAP, RST 7.5, 6.5, AND 5.5, Additional I/O Concepts and Processes: Programmable Interrupt Controller (8259A), Direct Memory Access (DMA).

**UNIT-V**
**Interfacing Data Converters**: Digital to Analog (D/A) Converters, Analog to Digital (A/D) Converters.
Programmable Peripheral Interface (Intel 8255A), Programmable Communication Interface (Intel 8251), Programmable Interval Timer (Intel 8253 and 8254), Programmable Keyboard /Display Controller (Intel 8279), Serial and Parallel bus Standards: RS 232 C and IEEE 488.

**Text book:**
1. Ramesh S Gaonkar, "Microprocessor Architecture, Programming and Applications with the 8085", 5th Edition, Prentice Hall, 2002.

**Suggested Reading:**
1. Douglass V. Hall, "Microprocessors and Interfacing: Programming and Hardware", 2nd Edition,

**16MCE102** **SOFTWARE TESTING (Elective-I)**

| | |
|---|---|
| Instruction | 3 Hours per week |
| Duration of Semester End Examination | 3 Hours |
| Semester End Examination | 70 Marks |
| Continuous Internal Evaluation | 30 Marks |
| Credits | 3 |

**Course Objectives:**

Students will:

1. Learn the basic concepts of Testing.
2. Follow the methodology of White Box Testing.
3. Learn the concepts of Functional Testing.
4. Obtain knowledge of Integration and System Tastings.
5. Understand the concepts of Object Oriented Testing.
6. Obtain the concepts Millennium Testing.

**Course Outcomes:**

After completion of the course, the students would be able to:

1. Gain the basic knowledge of Testing.
2. Acquire the knowledge of White Box Testing methods.
3. Test an application using Functional Testing.
4. Gain knowledge about Integration and System Testing.
5. Use Object Oriented Testing and Millennium Testing methods.
6. Explore on testing types which are to be applied for various applications.

**UNIT-I**

**Introduction to Software Testing** Concepts, White Box Approach, Basis Path Testing, Cyclomatic Complexity, Independent paths, D-D Graphs, Dataflow Testing,

**UNIT-II**

**Functional Testing:** Boundary Value Testing, Equivalence Class Testing, Decision Table-Based Testing, Retrospective on Functional Testing.

**UNIT-III**

**Integration and System Testing:** Levels of Testing, Unit testing, Integration Testing, System Testing, Interaction Testing.

**UNIT-IV**

**Object-Oriented Testing**: Issues in Object-Oriented Testing, Class Testing, GUI Testing, Object-Oriented System Testing.

**UNIT-V**

**Millennium Testing:** Exploratory Testing, Model-Based Testing, Test-Driven Development, All Pairs Testing, Software Testing Excellence.

**Text Books:**


1. Paul C. Jorgensen, "Software Testing: A Craftsman's Approach", 3rd Edition, CRC Press, 2007.
2. Roger S. Pressman "Software Engineering", 7th Edition, Pearson Education.


**Suggested Reading:**


1. Boris Beizer "Software Testing Techniques", 2nd Edition, Dreamtech, 2013.
2. M.G. Limaye "Software Testing: Principles – Techniques and Tools", 1st Edition, Tata Mc. Hill, 2009
3. Mauro Pezze, Michal Young "Software Testing and Analysis: Process, Principles and Techniques", Wiley India Pvt. Ltd.

**16MCE103 ARTIFICIAL NEURAL NETWORKS (Elective-I)**

| | |
|---|---|
| Instruction | 3 Hours per week |
| Duration of Semester End Examination | 3 Hours |
| Semester End Examination | 70 Marks |
| Continuous Internal Evaluation | 30 Marks |
| Credits | 3 |

**Course Objectives:**

Students will:

1. Basics of Biological Neural Networks.
2. Basics of Artificial Neural Networks.
3. Applications of Artificial Neural Networks.
4. Different pattern recognition tasks using Artificial Neural Networks.
5. Competitive learning neural networks.
6. ART networks.

**Course Outcomes:** After completion of the course, the students would be able to:

1. Gain the knowledge of ANN techniques and their applications.
2. Understand the various algorithms for ANN.
3. Apply various algorithms for ANN.
4. Understand the clustering concepts and algorithms
5. Bring out structural ART networks and feature extraction techniques.
6. Identify, Analyze, Formulate and solve different application oriented problems.

**UNIT – I**

Introduction to ANN - Features, structure and working of Biological Neural Network Trends in Computing Comparison of BNN and ANN.

Basics of Artificial Neural Networks - History of neural network research, characteristics of neural networks terminology, models of neuron Mc Culloch – Pitts model, Perceptron, Adaline model, Basic learning laws, Topology of neural network architecture

**UNIT – II**

Backpropagation networks (BPN) - Architecture of feed forward network, single layer ANN, multilayer perceptron, back propagation learning, input - hidden and output layer computation, backpropagation algorithm, applications, selection of tuning parameters in BPN, Numbers of hidden nodes, learning.

Activation & Synaptic Dynamics - Introduction, Activation Dynamics models, synaptic Dynamics models, stability and convergence, recall in neural networks.

**UNIT – III**

Basic functional units of ANN for pattern recognition tasks - Basic feedforward, Basic feed back and basic competitive learning neural network. Pattern association, pattern classification and pattern mapping tasks. Feedforward neural networks – Linear responsibility X-OR problem and solution.

- Analysis of pattern mapping networks summary of basic gradient search methods.

Feedback neural networks Pattern storage networks, stochastic networks and simulated annealing, Boltzmann machine and Boltzmann learning.

**UNIT – IV**

Competitive learning neural networks - Components of CL network pattern clustering and feature mapping network, ART networks, Features of ART models, character recognition using ART network.

**UNIT – V**

Applications of ANN - Pattern classification – Recognition of Olympic games symbols, Recognition of printed Characters. Neocognitron – Recognition of handwritten characters.

NET Talk - to convert English text to speech. Recognition of consonant vowel (CV) segments, texture classification and segmentation.

**Text Books:**


1. B. Yegnanarayana "Artificial Neural Networks", PHI, 2010.
2. S. Raj Sekaran , Vijayalakshmi Pari "Neural networks, Fuzzy logic and Genetic Algorithms", 2015.


**Suggested Reading:**


1. Simon Hhaykin "Neural Networks A comprehensive Foundations", Pearson Education, 2nd Edition 2004.
2. Li Min Fu "Neural Networks in Computer Intelligence", TMH 2003.
3. James A Feeman David M S Kapura "Neural Networks", Pearson Education 2004.

**16MC E104 PRINCIPLES OF MULTIMEDIA (ELECTIVE-I)**

| | |
|---|---|
| Instruction | 3 Hours per week |
| Duration of Semester End Examination | 3 Hours |
| Semester End Examination | 70 Marks |
| Continuous Internal Evaluation | 30 Marks |
| Credits | 3 |

**Course Objectives:**

Students will:

1. Impart the knowledge of Multimedia concepts.
2. Elaborate the elements and techniques of Multimedia to the students.
3. Verse with the global applications of Multimedia in various domains.
4. Verse with the compression techniques.
5. Understand the various streaming techniques.
6. Understand incorporation of Multimedia principles in Client oriented projects.

**Course Outcomes:**

After completion of the course, the students would be able to:

1. Understand the knowledge of Multimedia concepts.
2. Learn the elements and techniques of Multimedia to the students.
3. Understand with the global applications of Multimedia in various domains.
4. Learn the various compression techniques.
5. Understand the various streaming techniques.
6. Learn the Multimedia principles in client oriented projects.

**UNIT – I**

**Multimedia and Digital Representation:** Characteristics of Multimedia Presentation, Multiple Media, Hardware and Software Requirements, Steps for Creating a Multimedia Presentation, Digital Representation, Relation between Sampling and Bit Depth.

**UNIT – II**

**Visual Display Systems – Text – Image:** Video Adapter Card, Liquid Crystal Display (LCD), Plasma Display Panel (PDP), Text Compression, File Formats, Image Types, Basic Steps for Image Processing, Image Processing Software.

**UNIT – III**

**Graphs and Audio :** Advantages of Graphs, Uses of Graphs, Components of Graphics Systems, Clipping Algorithms, 3D Graphics, Audio Mixer, Musical Instrument Digital Interface (MIDI), Audio File Formats.

**UNIT – IV**

**Video and Compression :** Types of Animation, Computer Assisted Animation, 3D Animation, Special Effects, Lossy / Perceptual Compression Techniques, JPEG Image Coding Standard, MPEG Image Coding Standard, MPEG-2 Video, MPEG-4, MPEG-7.

**UNIT – V**

**Multimedia Architecture and Application Development :** Multimedia Architecture, Hardware Support, Real time Protocols, Streaming Techniques, Multimedia Database Systems (MMDBS), Software Life Cycle Overview, Virtual Reality, Virtual Reality Modeling Language (VRML).

**Text Books:**

1. Ranjan Parekh "Principles of Multimedia", 12th Edition, Tata Mc Graw Hill, 2012

**Suggested Reading:**

1. James E. Shuman "Multimedia in Action", Cengage India Pvt. Ltd., 1998.
2. John F Koegel Boford "Multimedia Systems", 3rd Edition, Pearson Education.

**16MCE105 ADVANCED OPERATING SYSTEMS (ELECTIVE-II)**

| | |
|---|---|
| Instruction | 3 Hours per week |
| Duration of Semester End Examination | 3 Hours |
| Semester End Examination | 70 Marks |
| Continuous Internal Evaluation | 30 Marks |
| Credits | 3 |

**Course Objectives:**

Students will:

1. Understand global view of distributed operating systems and provides theoretical foundation for distributed systems.
2. Study the characteristics of OS for Multiprocessor and Multicomputer.
3. Learn Security & protection related issues in computer systems and mechanisms used in building multiprocessor operating systems
4. Learn how to manage different resources in distributed systems.
5. Learn issues related to Real – Time Operating systems.

**Course Outcomes:**

After completion of the course, the students would be able to:

1. Gain knowledge about advanced concepts in OS
2. Develop OS for distributed systems
3. Implement protection and security for distributed systems
4. Develop Fault tolerant systems
5. Understand multiprocessor operating systems
6. Analyze and design modules for Real time operating systems

**UNIT-I**

**Overview of Advanced O.S:** Design approaches, Motivation, Types of Advanced OS.

**Architecture:** Motivations, System Architecture types, Issues in Distributed Operating system. **Theoretical Foundations:** Limitations, Lamport's logical clock, vector Clocks, Global state, Cuts, Termination Detection.

**UNIT-II**

**Distributed Mutual Exclusion:** Classification, Requirements, Performance, Simple Solution, Non-token-based Algorithms- Lamport's Algorithm, Recart-agrawala Algorithm, Token-based Algorithms - Suzuki-kasami's broadcast algorithm, Singhal's Heuristic Algorithm.

**Distributed Deadlock Detection**: Resource Vs. Communication Deadlocks, Graph-Theoretic model Strategies to handle Deadlocks, Issues in Deadlock detection and Resolution, Control organizations, Centralized Deadlock detection Algorithms- Completely centralized, Ho-Ramamoorthy Algorithms, Distributed Deadlock detection Algorithms - Path-Pushing, Edge-Chasing Algorithms. Hierarchical Deadlock detection Algorithms – Menasce - Muntz, Ho-Ramamoorthy Algorithm.

**Agreement Protocols**: System model, Classification of agreement problems, Solutions to Byzantine agreement problems.

**UNIT-III**

**Distributed File Systems:** Mechanisms for building DFSs, Design Issues, Case studies - Sun NFS, and Sprite File System.

**Distributed Shared Memory**: Algorithms for implementing DSMs, Memory Coherence, and Coherence Protocols, Design Issues, Case Studies - IVY.

**Distributed Scheduling:** Issues in Load Distribution, Components of a load distribution algorithm, Stability, Load Distributing Algorithms, Performance. Task migration.

**UNIT-IV**

**Recovery:** Classification of failures, backward and Forward Error Recovery. Backward Error Recovery, Recovery in concurrent systems, Consistent set of Checkpoints Synchronous and Asynchronous Check pointing and Recovery.

**Protection and Security**: Access Matrix Model, Implementation of access matrix, Introduction to Data Security. Private Key, Public key, Kerberos System.

**UNIT-V**

**Multiprocessor Operating System:**

Motivation, Basic Multiprocessor System Architecture, Interconnection Networks for Multiprocessor System, caching, Hypercube Architecture. Threads, Process Synchronization, Processor Scheduling, memory management

**Real Time Operating System:** Fundamentals, real time multitasking, embedded application, preemptive task scheduling, inter-task communication and synchronization..

**Text Books:**

1. M Singhal and NG Shivaratri "Advanced Concepts in Operating Systems", Tata McGraw Hill Inc, 2001

**Suggested Reading:**

1. A S Tanenbaum "Distributed Operating Systems", Pearson Education Asia, 2001
2. Pradeep K. Sinha "Distributed Operating System Concepts & Design", PHI,2003

**16MCE106** **CLOUD COMPUTING (ELECTIVE-II)**

| | |
|---|---|
| Instruction | 3 Hours per week |
| Duration of Semester End Examination | 3 Hours |
| Semester End Examination | 70 Marks |
| Continuous Internal Evaluation | 30 Marks |
| Credits | 3 |

**Course Objectives:**

Students will:

1. Analyze the components of cloud computing and its business perspective.
2. Evaluate the various cloud development tools.
3. Collaborate with real time cloud services.
4. Analyze the case studies to derive the best practice model to apply when developing and deploying cloud based applications.
5. Understand large data processing in the cloud.
6. Utilize the resource management in the cloud.

**Course Outcomes:**

After completion of the course, the student would be able to:

1. Identify the components of cloud computing for service perspective.
2. Apply the Cloud Computing developing tools.
3. Imply the Cloud Computing models for developing best applications.
4. Give services in Real time requirements.
5. Apply large data processing methods in Clouds.
6. Use the maximum Cloud Computing resources properly.

**UNIT-I**

Fundamental Cloud Computing-Understanding Cloud Computing, Origins influences, Basic Concepts and Terminology, Goals, Benefits, risks, Challenges, Rolls and boundaries, Cloud characteristics, Cloud Delivery models, Cloud deployment models.

**UNIT-II**

Cloud enabling technology-Broadband Networks and Internet architecture, Data center technology, Visualization technology, Cloud Security-basic terms and concepts, Threat agents, Cloud security threats,

**UNIT-III**

Cloud Infrastructure Mechanisms-Logical network perimeter, Virtual server, Cloud Storage device, cloud usage monitor, Resource replication, special cloud mechanisms, cloud management mechanisms, cloud security mechanisms,

**UNIT-IV**

Cloud Computing Architecture-Fundamental Architecture, Work load distribution architecture, Resource pooling architecture, Dynamic scalability architecture, service load balancing architecture, Cloud bursting architecture, redundant storage architecture, Hyper clustering architecture, load balanced virtual server instances architecture, non-disruptive service architecture, zero down time architecture, cloud balancing architecture, Resource reservation architecture, rapid provision architecture.

**UNIT-V**

Working with clouds-(Cloud Provider Perspective) Building IaaS Environments, Equipping PaaS Environment, optimizing SaaS Environments. (Cloud consumer perspective)- Working with IaaS Environments, working with PaaS Environment, working with SaaS Environments.

**Text Book:**

1. Thomas Erl, Ricardo Puttini "Cloud Computing: Concepts, Technology & Architecture", Prentice, Hall, 1st Edn. 2015

**Suggested Reading:**


1. Rajkumar Buyya, James Broberge and Anddrzej, M Gosciniski "Cloud Computing Principles and Paradims". Wiley publishing 2011.
2. John W Rittinghouse,james F.Ransome. "Cloud Computing Implementation, Management and Security" CRC Press 2009.
3. Kai Hwang. Geoffrey C.Fox,Jack J. Dongarra, "Distributed and Cloud Computing from parallel Processing to the Internet of things".

**16MCE107 SOFTWARE PROJECT MANAGEMENT (ELECTIVE-II)**

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|---|---|
| Instruction | 3 Hours per week |
| Duration of Semester End Examination | 3 Hours |
| Semester End Examination | 70 Marks |
| Continuous Internal Evaluation | 30 Marks |
| Credits | 3 |

**Course Objectives:**

Students will:

1. Introduce software project management and to describe its distinctive characteristics.
2. Discuss project planning and the planning process.
3. Show how graphical schedule representations are used by project management.
4. Discuss the notion of risks and the risk management process.
5. Managing the people in software industry.
6. Understand the quality of a project.

**Course Outcomes:** After completion of the course, the students would be able to:

1. Gain basic knowledge of software project management principles
2. Come up with a project schedule and assign resources
3. Choose an appropriate project development model.
4. Identify project risks, monitor and track project deadlines.
5. Work in a team environment and be aware of different modes of communications.
6. Understand the various levels of quality metrics and measurements.

**UNIT-I**

**Software Project Management**: Introduction, Importance, Software Projects Vs Other types of Projects, Contract Management, Technical Project Management, Activities covered by SPM, Plans, Methods and Methodologies. Setting Objectives, Project Success and Failures, Management and Control.

**Project Evaluation and Programme Management:** Project port polio management, Evaluation of Individual projects, Cost Benefit Evaluation Techniques, Risk Evaluation, Program Management, Managing the Resource with in the Program, Strategic Program Management, Aids to Program Management, **Overview of Project Planning.**

**UNIT-II**

**Selection of an Appropriate Project Approach**: Choosing the methodologies and technologies, Software process and process models.

**Software Effort Estimation**: Problems with Over and Underestimates, Software Effort Estimation Techniques. Function Point Analysis. A Parametric Productive Model – COCOMO-2

**Activity Planning**: Objectives of Activity Planning, Schedules, Activities, Sequencing, Network Planning Models.

**UNIT-III**

**Risk Management** : Categories of Risk, A Frame work with Dealing with Risk, Evaluating Risk with the Schedule.

**Resource Allocation**: Nature of Resource, Identify Resource Requirements, Scheduling, Creating Critical path, Cost Schedules, Scheduling Sequence.

**Monitoring & Control**: Creating Framework, Collecting Data, Project Termination Review, Visualizing Progress, Cost Monitoring, Prioritizing Monitoring, Change Control, Software Configuration Management.

**UNIT-IV**

**Managing Contracts**: Types of Contracts, Stages in Contract Placement, Typical Terms of Contracts, Contract Management Acceptance.

**Managing People in Software Environments**: Organizational behavior, selecting the Right person for the Job, Instruction in the best methods, Motivations, the Oldham-hackman Job characteristics model, Stress, Health and Safety, Some Ethical and Professional concerns.

**Working in Teams**: Becoming a Team, Decision making, Organization and Team Structures, Coordination of dependencies, Communication genres, Communication plans, Leadership.

**UNIT –V**

**Software Quality** : The Place of Software Quality in Project planning, Quality Management Systems, Process Capability models, Software Reliability Quality plans,

**ISO** : ISO – 9126, Product and Process Metrics

An Overview of PRINCE 2 : Components of Prince 2.

**Text Book:**

1. Bob Hughes and Mike Cotterell "Software Project Management", 5th Edition, Tata McGraw Hill, 2010.

**Suggested Reading:**

1. Walker Rayce "Software Project Management: A Unified Framework", Addison Wesley, 1998.
2. Watts S. Humphrey "Managing Software Process", Addison – Wesley Pearson Education, 1998.

**16MCE108 PATTERN RECOGNITION (ELECTIVE-II)**

| | |
|---|---|
| Instruction | 3 Hours per week |
| Duration of Semester End Examination | 3 Hours |
| Semester End Examination | 70 Marks |
| Continuous Internal Evaluation | 30 Marks |
| Credits | 3 |

**Course Objectives:**

Students will:

1. Learn the fundamental algorithms for pattern recognition.
2. Understand important pattern recognition techniques.
3. Gain important pattern recognition techniques.
4. Apply the pattern recognition theories to applications of interest.
5. Construct the entropy minimization, clustering transformation and feature ordering.
6. Originate the various structural pattern recognition and feature extraction techniques.

**Course Outcomes:**

After completion of the course, the students would be able to:

1. Facilitate the Pattern Recognition Techniques and their applications.
2. Understand various algorithms for pattern recognition
3. Apply algorithms for pattern recognition.
4. Understand the clustering concepts and algorithms
5. Bring out structural pattern recognition and feature extraction techniques.
6. Identify, Analyze and Formulate various application domains.

**UNIT- I**

**Introduction** –What is Pattern Recognition, Data sets for Pattern Recognition, Different paradigms for Pattern Recognition,

Representation – Data Sets for Pattern Representation, Representation of Clusters, Proximity Measures, Size of Patterns, Abstractions of the Data Set, Feature Abstractions of the Data Set, Feature Extraction, Feature Selection, Evaluation of Classifiers, Evaluation of Clustering.

**UNIT – II**

**Nearest Neighbor Based Classifiers**: Nearest Neighbor Algorithms, Variants of Nearest Neighbor Algorithms, Use of Nearest Neighbor Algorithm Transaction Databases, Efficient Algorithms, Data Reduction, Prototype Selection,

Bayes Classifiers- Bayes Theorem, Minimum Error Rate Classifier, Estimation of Probabilities, Comparison with Naive Bayes Classifier, Naive Bayes Classifier, Bayesian Belief Network.

**UNIT – III**

**Hidden Markov Model**: Markov Model for Classification, HMM, Classification using HMM's.

Decision Trees – Introduction, Decision Tree for Pattern Classification, Construction of Decision Tree, Splitting at the Nodes, Over fitting and Pruning, Example of DT Induction.

**UNIT – IV**

**Support Vector Machines** – Introduction, Learning the Linear Discriminant Function, Neural Networks, SUM of Classification.

**Combination of Classifiers** – Introduction, Methods for Constructing Ensembles of Classifiers, Methods for Combining Classifiers.

**UNIT – V**

**Clustering**- Hierarchical Algorithms, Partitional Clustering, Clustering Large Data Sets.

**An Application** – Hand Written Digit Recognition, Description of Digit Data, Preprocessing of Data, Classification Algorithms, Selection of Representative Patterns, Results, Biometric, Facial Recognition, IRIS Scan, Finger Prints etc.

**Text Books:**


1. V. Susheela Devi & M. Narasimha Murthy "Pattern Recognition – An Introduction", 2013.
2. Rajjan Shingal "Pattern Recognition" Oxford University press., 2012.


**Suggested Reading:**


1. Richard Duda, Hart and David strok "Pattern Classification", John Wiley publishers.,
2. Gose. Johnsonbaugh. Jost "Pattern recognition and Image Analysis", PHI
3. Tou. Rafael. Gonzalez "Pattern Recognition Principle", Pearson Education

**16MCC123 COMPUTER NETWORKS LAB**

| | |
|---|---|
| Instruction | 3 Hours per week |
| Duration of Semester End Examination | 3 Hours |
| Semester End Examination | 50 Marks |
| Continuous Internal Evaluation | 25 Marks |
| Credits | 2 |

**Course Objectives:**

Students will:

1. Learn Networking commands.
2. Understand connection oriented and connection less iterative programs
3. Learn connection oriented and connection less concurrent programs.
4. Acquire the knowledge of Pre fork Server program.
5. Obtain the concept of Remote command execution.
6. Gain the knowledge of Advanced Socket System Calls.

**Course Outcomes:**

After completion of the course, the students would be able to:

1. Use Networking commands.
2. Implement connection oriented and connection less iterative programs.
3. Execute connection oriented and connection less concurrent programs.
4. Implement the Pre fork Server program.
5. Run the program on Remote command execution.
6. Execute programs on Advanced Socket System Calls.

**List of Programs:**

1. Using and understanding following Commands. Ifconfig, net stat, ping, arp, telnet, ftp, finger.
2. a) Connection oriented Iterative Echo Server
   b) Connectionless Iterative Echo server
3. a) Connection oriented Concurrent Echo Server
   b) Connectionless Concurrent Echo server
4. a) Connection oriented Iterative Time Server
   b) Connectionless Iterative Time Server
5. a) Connection oriented Concurrent Time Server
   b) Connectionless Concurrent Time Server
6. Remote command execution.
7. Program to pass file descriptors.
8. To demonstrate the usage of Advanced Socket System Calls like Getsockopt(), Setsockopt(), Select(), Readv(), getpeernamet(), Getsockname().
9. To demonstrate the Non-Blocking (Asynchronous) Input-Output.
10. To demonstrate the implementation of Pre forked Server.

**Suggested Reading:**


1. W. Richard Stevens, "Unix Network Programming", Pearson Education Inc, PHI Learning 1990.
2. Behroz A Forouzan, "Data Communications and Networking", 4th Edition, Tata McGraw – Hill, 2009.

**16MCC124 DATA WAREHOUSING AND DATA MINING LAB**

| | |
|---|---|
| Instruction | 3 Hours per week |
| Duration of Semester End Examination | 3 Hours |
| Semester End Examination | 50 Marks |
| Continuous Internal Evaluation | 25 Marks |
| Credits | 2 |

**Course Objectives:**

Students will:

1. Understand the need of Data Warehouses over Databases, and the difference between usage of operational and historical data repositories.
2. Understand loading the data from different sources and preprocessing of different types of the data.
3. Build different types of data models from various datasets which are useful to model the data
4. Experience row and column operations of different datasets.
5. Get a clear idea of various classes of Data Mining techniques, their need, scenarios (situations) and scope of their applicability.
6. Learn the algorithms used for various types of Data Mining Problems.

**Course Outcomes:**

After completion of the course, the students would be able to:

1. Understand the need of Data Warehouses over Databases.
2. Load the data from different sources and preprocess of different types of the data.
3. Build variety of data models useful in modeling data.
4. Use data mining functionalities in different Scenarios.
5. Prepare graphs using data mining tools for patterns presentation.
6. Execute variety of algorithms.

**List of Programs:**

1. Connect and load data from Databases, User input, Excel files
2. Select the records from data sets using "Select" operation.
3. Extract samples from different data sets using "Selection" operation.
4. Demonstrate of record operation "balance" on different datasets.
5. Aggregate the records using Aggregate operation on different datasets
6. Manage the records of different datasets using "Sort" operation.
7. Merge the records from different datasets.
8. Separate the top most records using "Distinct" operation.
9. Demonstration of record operation "Distinct" on different datasets
10. Filter the fields from different datasets.
11. Derive a new field using existing fields from different datasets using "Derive" operation.
12. Demonstration of field operation "Derive" on different data sets
13. Group the data into different bins using binning.
14. Partition the data using field operation portioning.
15. Interchange the rows and columns of dataset using transpose operation.
16. Draw the graph of "Plot" Graph building on variety of data
17. Draw the graph of "Distribution" Graph building on variety of data
18. Construct histogram on variety of data.
19. Construct collection graph on variety of data.
20. Draw the graph of "Multi plot" Graph building on variety of data
21. Create "Web" Graph on variety of dat.
22. Build Apiori association model on transactional data.
23. Build C4.5 classifier.
24. Train and Test CRT classifier on categorical data.
25. Train and Test CHAID classifier.
26. Construct and Test QUEST classifier.
27. Design, Model and test Neural Network classifier.
28. Construct Binary classifier for binary class data.
29. Construct and Test K-Means clustering model.
30. Model COHENON unsupervised data.

31. Construct GRI classifier.
32. Construct different REGRESSION equations.
33. Design and Test Logistic modeling.
34. Demonstration of output operations
    a) Stats b) Analysis, c) Matrix, d) Table, e) Transform

**16MCC125** **MINI PROJECTS**

| | |
|---|---|
| Instruction | 3 Hours per week |
| Duration of Semester End Examination | 3 Hours |
| Semester End Examination | 50 Marks |
| Continuous Internal Evaluation | 25 Marks |
| Credits | 2 |

**Course Objectives:**
Students will:

1. Handle small scale projects in the lab.
2. Learn the basic concepts of Front End, Middleware and Back End technologies.
3. Learn the implementation of Mini Project which shall lead into the implementation of Major Project.

**Course Outcomes:**
After completion of the Mini Project, the students would be able to:

1. Implement the basic level technologies pertaining to Front End, Middleware and Back End.
2. Implement the Major Project successfully.

Fourth Semester of the MCA course contains the Mini Project has to be carried out by each student individually in a period of 15 weeks of duration. Students should submit a synopsis at the end of 2$^{nd}$ week in consultation with the Project Guide. The synopsis should consist of definition of the problem, scope of the problem and plan of action. Before completion of the fourth semester the students are required to present their work before the internal committee of the MCA department, in which each student will be awarded with marks.

At the end of the semester the students are required to present their project work before the External Committee for Vive-Voce examination, in which each student will be awarded with marks.