ANNA UNIVERSITY, CHENNAI
AFFILIATED INSTITUTIONS

REGULATIONS – 2013
CURRICULUM I TO VI SEMESTERS (FULL TIME)
MASTER OF COMPUTER APPLICATION

SEMESTER I

THEORY

Course Code	Course Title	L	T	P	C
MA7151	Mathematical Foundation for Computer Applications	3	1	0	4
MC7101	Computer Organization	3	0	0	3
MC7102	Problem Solving and Programming	3	0	0	3
MC7103	Database Management Systems	3	0	0	3
MC7104	Data structures and Algorithms	3	1	0	4

PRACTICAL

Course Code	Course Title	L	T	P	C
MC7111	DBMS Laboratory	0	0	3	2
MC7112	Data Structures and Algorithms Laboratory	0	0	3	2
MC7113	Communication Skill Laboratory	1	0	2	2
	Total	16	2	8	23

SEMESTER II

THEORY

Course Code	Course Title	L	T	P	C
MC7201	Object Oriented Programming	3	0	0	3
MC7202	Web Programming Essentials	3	0	0	3
MC7203	System Software	3	0	0	3
MC7204	Operating Systems	3	0	0	3
MC7205	Computer Graphics and Multimedia	3	0	0	3

PRACTICAL

Course Code	Course Title	L	T	P	C
MC7211	Object Oriented Programming Laboratory	0	0	3	2
MC7212	Web Programming Laboratory	0	0	3	2
MC7213	Graphics and Multimedia Laboratory	0	0	3	2
	Total	15	0	9	21

SEMESTER III

THEORY

Course Code	Course Title	L	T	P	C
MC7301	Computer Networks	3	0	0	3
MC7302	Embedded Systems	3	0	0	3
MC7303	Software Engineering	3	0	0	3
MC7304	Professional Ethics	3	0	0	3
MC7305	Internet Programming	3	0	0	3

PRACTICAL

Course Code	Course Title	L	T	P	C
MC7311	Embedded Systems Laboratory	0	0	3	2
MC7312	Internet Programming Laboratory	0	0	3	2
MC7313	Visual Programming Laboratory	1	0	3	2
	Total	16	0	9	21

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SEMESTER IV

THEORY

Course Code	Course Title	L	T	P	C
MC7401	Resource Management Techniques	3	0	0	3
MC7402	Object Oriented Analysis and Design	3	0	0	3
MC7403	Data Warehousing and Data Mining	3	0	0	3
MC7404	Network Programming	3	0	0	3
	Elective I	3	0	0	3

PRACTICAL

Course Code	Course Title	L	T	P	C
MC7411	Software Development- Case Tools Laboratory	0	0	3	2
MC7412	Network Programming Laboratory	0	0	3	2
MC7413	Technical Seminar and Report Writing	0	0	3	2
	Total	**15**	**0**	**9**	**21**

SEMESTER V

THEORY

Course Code	Course Title	L	T	P	C
MC7501	Web Application Development	3	0	0	3
MC7502	Service Oriented Architecture	3	0	0	3
MC7503	Mobile computing	3	0	0	3
	Elective II	3	0	0	3
	Elective III	3	0	0	3

PRACTICAL

Course Code	Course Title	L	T	P	C
MC7511	Advanced Internet Programming Laboratory	0	0	3	2
MC7512	XML and Web Services Laboratory	0	0	3	2
MC7513	Mini Project (Socially Relevant)	0	0	3	2
	Total	**15**	**0**	**9**	**21**

SEMESTER VI

PRACTICAL

Course Code	Course Title	L	T	P	C
MC7611	Project Work	0	0	24	12
	Total	**0**	**0**	**24**	**12**

TOTAL NO OF CREDITS 119

ELECTIVES

ELECTIVE I

Course Code	Course Title	L	T	P	C
MC7001	Game Programming	3	0	0	3
MC7002	Soft Computing	3	0	0	3
MC7003	Accounting and Financial Management	3	0	0	3
MC7004	Energy Aware Computing	3	0	0	3
MC7005	Security in Computing	3	0	0	3
MA7071	Numerical and Statistical Methods	3	0	0	3

ELECTIVE II

Course Code	Course Title	L	T	P	C
MC7006	M-commerce	3	0	0	3
MC7007	Health Care Management	3	0	0	3
MC7008	Geological Information Systems	3	0	0	3
MC7009	Human Resource Management	3	0	0	3
MC7010	Enterprise Application Integration	3	0	0	3
MC7011	Big Data Analytics	3	0	0	3

ELECTIVE III

Course Code	Course Title	L	T	P	C
MC7012	Ad hoc and Sensor Networks	3	0	0	3
MC7013	Semantic web	3	0	0	3
MC7014	Software Testing and Quality Assurance	3	0	0	3
MC7015	Software Project Management	3	0	0	3
MC7016	Cloud Computing	3	0	0	3
MC7017	Network Protocols	3	0	0	3

ANNA UNIVERSITY, CHENNAI
AFFILIATED INSTITUTIONS

REGULATIONS - 2013

CURRICULUM AND SYLLABUS I TO VI SEMESTERS (FULL TIME)
MASTER OF COMPUTER APPLICATION

PROGRAMME EDUCATIONAL OBJECTIVES

I.   To excel in problem solving and programming skills in the various computing fields of IT industries
II. To develop the ability to plan, analyze, design, code, test, implement & maintain a software product for real time system
III. To promote students capability to set up their own enterprise in various sectors of Computer applications
IV. To experience the students in finding solutions and developing system based applications for real time problems in various domains involving technical, managerial, economical & social constraints
V.   To prepare the students to pursue higher studies in computing or related disciplines and to work in the fields of teaching and research.

PROGRAMME OBJECTIVES

a) Understand and Apply mathematical foundation, computing and domain knowledge for the conceptualization of computing model of problems.
b) Identify, Analyze the computing requirements of a problem and Solve them using computing principles.
c) Design and Evaluate a computer based system, components and process to meet the specific needs of applications.
d) Use current techniques and tools necessary for complex computing practices.
e) Use suitable architecture or platform on design and implementation with respect to performance
f) Develop and integrate effectively system based components into user environment.
g) Understand and commit to Cyber regulations and responsibilities in Professional computing practices.
h) Recognize the need for and develop the ability to engage in continuous learning as a Computing professional.
i) Apply the understanding of management principles with computing knowledge to manage the projects in multidisciplinary environments.
j) Communicate effectively with the computing community as well as society by being able to comprehend effective documentations and presentations.
k) Understand societal, environmental, health, legal, ethical issues within local and global contexts and the consequential responsibilities relevant to professional practice.
l) Function effectively in a team environment to accomplish a common goal.
m) Identify opportunities and use innovative ideas to create value and wealth for the betterment of the individual and society.
n) Use knowledge to analyze, interpret the data and synthesis the information to derive valid conclusions using research methods.
o) Expertise in developing application with required domain knowledge.

MA7151   MATHEMATICAL FOUNDATIONS FOR COMPUTER APPLICATIONS   L T P C
**   3 1 0 4**

COURSE OBJECTIVES:
- To understand the concepts and operations of matrix algebra needed for computing graphics modeling
- To understand and apply the class of functions which transform a finite set into another finite set which relates to input output functions in computer science.
- To impart discrete knowledge in computer engineering through finite automata and Context free grammars

UNIT I   MATRIX ALGEBRA   9
Matrices, Rank of Matrix, Solving System of Equations-Eigen Values and Eigen Vectors-Inverse of a Matrix - Cayley Hamilton Theorem

UNIT II   BASIC SET THEORY   9
Basic Definitions - Venn Diagrams and set operations - Laws of set theory - Principle of inclusion and exclusion - partitions- Permutation and Combination - Relations- Properties of relations - Matrices of relations - Closure operations on relations - Functions - injective, subjective and objective functions.

UNIT III   MATHEMATICAL LOGIC   9
Propositions and logical operators - Truth table - Propositions generated by a set, Equivalence and implication - Basic laws- Some more connectives - Functionally complete set of connectives- Normal forms - Proofs in Propositional calculus - Predicate calculus.

UNIT IV   FORMAL LANGUAGES   9
Languages and Grammars-Phrase Structure Grammar-Classification of Grammars-Pumping Lemma For Regular Languages-Context Free Languages.

UNIT V   FINITE STATE AUTOMATA   9
Finite State Automata-Deterministic Finite State Automata(DFA), Non Deterministic Finite State Automata (NFA)-Equivalence of DFA and NFA-Equivalence of NFA and Regular Languages

**   TOTAL: 45+15= 60 PERIODS**

COURSE OUTCOMES:
- Acquire the basic knowledge of matrix, set theory, functions and relations concepts needed for designing and solving problems
- Acquire the knowledge of logical operations and predicate calculus needed for computing skill
- Able to design and solve Boolean functions for defined problems
- Apply the acquired knowledge of formal languages to the engineering areas like Compiler Design
- Apply the acquired knowledge of finite automata theory and design discrete problems to solve by computers.

REFERENCES:
1. Kenneth H.Rosen, " Discrete Mathematics and Its Applications", Tata McGraw Hill, Fourth Edition, 2002 (Unit 1,2 & 3).
2. Hopcroft and Ullman, "Introduction to Automata Theory, Languages and Computation", Narosa Publishing House, Delhi, 2002. (Unit 4,5)
3. A.Tamilarasi & A.M.Natarajan, "Discrete Mathematics and its Application", Khanna Publishers, 2nd Edition 2005.
4. M.K.Venkataraman "Engineering Mathematics", Volume II, National Publishing ompany, 2nd Edition,1989.
5. Juraj Hromkovic, "Theoretical Computer Science", Springer Indian Reprint, 2010.
6. David Makinson, "Sets, Logic and Maths for Computing", Springer Indian Reprint, 2011.

MC7101   **COMPUTER ORGANIZATION**   **L T P C**
                                                                           3 0 0 3

COURSE OBJECTIVES :
- To impart the knowledge in the field of digital electronics
- To impart knowledge about the various components of a computer and its internals.
- To design and realize the functionality of the computer hardware with basic gates and other components using combinational and sequential logic.
- To understand the importance of the hardware-software interface

UNIT I   DIGITAL FUNDAMENTALS   8
Number Systems and Conversions – Boolean Algebra and Simplification – Minimization of Boolean Functions – Karnaugh Map, Logic Gates – NAND – NOR Implementation

UNIT II   COMBINATIONAL AND SEQUENTIAL CIRCUITS   10
Design of Combinational Circuits – Adder / Subtracter – Encoder – Decoder – MUX / DEMUX – Comparators, Flip Flops – Triggering **–** Master – Slave Flip Flop – State Diagram and Minimization **–** Counters – Registers.

UNIT III   BASIC STRUCTURE OF COMPUTERS & PARALLEL PROCESSING   9
Functional units – Basic operational concepts – Bus structures – Performance and Metrics – Instruction and instruction sequencing – Addressing modes – ALU design – Fixed point and Floating point operation .

UNIT IV   PROCESSOR DESIGN   9
Processor basics – CPU Organization – Data path design – Control design – Basic concepts – Hard wired control – Micro programmed control – Pipeline control – Hazards – Super scalar operation.

UNIT V   MEMORY, I/O SYSTEM AND PARALLEL PROCESSING   9
Memory technology – Memory systems – Virtual memory – Caches – Design methods – Associative memories – Input/Output system – Programmed I/O – DMA and Interrupts – I/O Devices and Interfaces - Multiprocessor Organization – Symmetric multiprocessors – Cache Coherence – Clusters: Non Uniform Memory Access- Vector Computation.

                                                                    TOTAL: 45 PERIODS
COURSE OUTCOMES:
- Able to design digital circuits by simplifying the Boolean functions
- Able to Understand the organization and working principle of computer hardware components
- Able to understand mapping between virtual and physical memory
- Acquire knowledge about multiprocessor organization and parallel processing
- Able to trace the execution sequence of an instruction through the processor

REFERENCES:
1. Morris Mano, "Digital Design", Prentice Hall of India, Fourth Edition 2007
2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky and Naraig Manjikian, "Computer organization and Embedded Systems", Sixth Edition, Tata McGraw Hill, 2012.
3. William Stallings, "Computer Organization & Architecture – Designing for Performance" 9th Edition 2012.
4. Charles H. Roth, Jr., "Fundamentals of Logic Design", Jaico Publishing House, Mumbai, Fourth Edition, 1992.
5. David A. Patterson and John L. Hennessy, "Computer Organization and Design: The Hardware/Software Interface", Fourth Edition, Morgan Kaufmann / Elsevier,2009.
6. John P. Hayes, "Computer Architecture and Organization", Third Edition, Tata McGraw Hill, 1998.
7. Svetlana N.Yanushkevich, Vlad P.Shmerko, "Introduction to Logic Design", CRC Press, 2012.

MC7102   **PROBLEM SOLVING AND PROGRAMMING**   **L T P C**
                                                                          3 0 0 3

COURSE OBJECTIVES:
- To understand the basic concepts of problem solving approaches and develop optimal program structure using conditional and iterative control structures and functions.
- To design, implement, test, and apply the basic C programming concepts.
- Apply the techniques of structured (functional) decomposition to break a program into smaller pieces and describe the mechanics of parameter passing.

UNIT I   INTRODUCTION TO COMPUTER PROBLEM SOLVING   8
Introduction – The Problem Solving aspect – Top down design – Implementation of algorithm – Program Verification – The efficiency of algorithm – The analysis of algorithm.

UNIT II   PROGRAMMING, ALGORITHMS AND FLOWCHARTS   9
Programs and Programming – building blocks for simple programs -Programming life cycle phases – pseudo code representation – flow charts - Algorithm - Programming Languages - compiler – Interpreter, Loader and Linker - Program execution – Classification of Programming Language - Structured Programming Concept.

UNIT III   BASICS OF 'C', INPUT / OUTPUT & CONTROL STATEMENTS   9
Introduction- Identifier – Keywords - Variables – Constants – I/O Statements - Operators - Initialization –Expressions – Expression Evaluation – Lvalues and Rvalues – Type Conversion in C – Formatted input and output functions - Specifying Test Condition for Selection and Iteration- Conditional Execution - and Selection – Iteration and Repetitive Execution- go to Statement – Nested Loops- Continue and break statements.

UNIT IV   ARRAYS, STRINGS, FUNCTIONS AND POINTERS   10
Array – One dimensional Character Arrays- Multidimensional Arrays- Arrays of Strings - Two dimensional character array – functions - parameter passing mechanism scope – storage classes – recursion - comparing iteration and recursion- pointers – pointer operators - uses of pointers- arrays and pointers – pointers and strings - pointer indirection- pointers to functions - Dynamic memory allocation.

UNIT V   USER-DEFINED DATATYPES & FILES   9
Structures – initialization - nested structures – structures and arrays – structures and pointers - union – typedef and enumeration types - bit fields - File Management in C – Files and Streams – File handling functions – Sequential access file- Random access file – Command line arguments.

                                                  TOTAL:45 PERIODS

COURSE OUTCOMES:
- Able to design a computational solution for a given problem.
- Able to break a problem into logical modules that can be solved (programmed).
- Able to transform a problem solution into programs involving programming constructs
- To write programs using structures, strings, arrays, pointesr and files for solving complex computational problem.
- Able to introduce modularity using functions and pointers which permit ad hoc run-time polymorphism

REFERNCES:
1. How to solve it by computer , R.G.Dromey, Pearson education , fifth edition, 2007.
2. Pradip Dey, Manas Ghosh, "Fundamentals of Computing and Programming in C", First Edition, Oxford University Press, 2009
3. Kamthane, A.N., "Programming with ANSI and Turbo C", Pearson Education, Delhi,2006
4. Deitel and Deitel, "C How to Program", Pearson Education. 2010 6 th edition
5. Brian W. Kernighan and Dennis M. Ritchie, "The C programming Language",2006, Prentice-Hall
6. Yashavant Kanetkar, "Understanding Pointers In C", 4th Revised & Updated Edition, 2008, Bpb Publications
7. Cormen,Leiserson, Rivest, Stein, " Introduction to Algorithms", McGraw Hill , Publishers, 2002
8. Peter Norton, "Introduction to Computers", Sixth Edition, Tata McGraw Hill Publications, 2007.
9. Reema Thareja, "Programming in C", Oxford University Press, 2011.

MC7103   **DATABASE MANAGEMENT SYSTEMS**   **L T P C**
                                                                                                         3 0 0 3

COURSE OBJECTIVES
- To understand the fundamentals of data models and conceptualize and depict a database system using ER diagram
- To make a study of SQL and relational database design.
- To know about data storage techniques an query processing.
- To impart knowledge in transaction processing, concurrency control techniques and recovery procedures.

UNIT I   INTRODUCTION   9
File systems versus Database systems – Data Models – DBMS Architecture – Data Independence – Data Modeling using Entity – Relationship Model – Enhanced E-R Modeling.

UNIT II   RELATIONAL MODEL AND QUERY EVALUATION   9
Relational Model Concepts – Relational Algebra – SQL – Basic Queries – Complex SQL Queries – Views – Constraints – Relational Calculus – Tuple Relational Calculus – Domain Relational Calculus – overview of commercial RDBMSs – Database Design – Functional Dependencies – Normal Forms – 1NF – 2NF-3NF-BCNF – 4NF-5NF - Algorithms for Executing Query Operations –– Cost Estimation

UNIT III   TRANSACTION PROCESSING   9
Transaction Processing – Properties of Transactions - Serializability – Transaction support in SQL - Locking Techniques – Time Stamp ordering – Validation Techniques – Granularity of Data Items – Recovery concepts – Shadow paging – Log Based Recovery – Database Security Issues – Access control – Statistical Database Security.

UNIT IV   FILES AND INDEXING   9
 File operations – Hashing Techniques – Indexing – Single level and Multi-level Indexes – B+ tree – Static Hashing - Indexes on Multiple Keys.

UNIT V   SPECIAL PURPOSE DATABASES   9
OODBMS- - Object-Based Databases - OO Data Model - OO Languages – Persistence – Object Relational Databases - XML – Structure of XML - Temporal Databases – Mobile Databases – Spatial Databases – Case Study for Design and Manage the Database for any Project
                                                                              TOTAL : 45 PERIODS

COURSE OUTCOMES:
- Understand the basic concepts of the database and data models.
- design a database using ER diagrams and map ER into Relations and normalize the relations
- Acquire the knowledge of query evaluation to monitor the performance of the DBMS.
- Develop a simple database applications using normalization.
- Acquire the knowledge about different special purpose databases and to critique how they differ from traditional database systems.

REFERENCES:
1. Abraham Silberschatz, Henry F.Korth and S.Sundarshan "Database System Concepts", Sixth Edition, McGraw Hill, 2010.
2. C.J. Date, "An Introduction to Database Systems", Eight Edition, Pearson Education Delhi, 2003.
3. Ramez Elamassri and Shankant B-Navathe, "Fundamentals of Database Systems", Sixth Edition, Pearson Education Delhi, 2010.
4. Raghu Ramakrishnan, Johannes Gehrke ,' Database management systems" McGraw Hill, 2003.
5. Peter Rob, Carlos Coronel, "Database System Concepts", Cengage Learning, 2008.
6. Frank. P. Coyle, "XML, Web Services And The Data Revolution", Pearson Education, 2012.
7. Lee Chao, "Database Development and Management", Auerbach Publications, 2010.
8. Peter Rob, Carlos coronel , "Data base system concepts" , Ceange Learning 2008

MC7104	DATA STRUCTURES AND ALGORITHMS	L T P C
		3 1 0 4

COURSE OBJECTIVES
- To understand the linear and non linear data structures available in solving problems
- To know about the sorting and searching techniques and its efficiencies
- To get a clear idea about the various algorithm design techniques
- Using the data structures and algorithms in real time applications
- Able to analyze the efficiency of algorithm

UNIT I   LINEAR DATA STRUCTURES   9+3
Introduction - Abstract Data Types (ADT) – Arrays and its representation –Structures – Stack – Queue – Circular Queue - Applications of stack – Infix to postfix conversion – evaluation of expression – Applications of Queue - Linked Lists – Doubly Linked lists – Applications of linked list – Polynomial Addition

UNIT II   TREE STRUCTURES   9+3
Need for non-linear structures – Trees and its representation – Binary Tree – expression trees – Binary tree traversals – left child right sibling data structures for general trees – applications of trees – Huffman Algorithm - Binary search tree.

UNIT III   BALANCED SEARCH TREES, SORTING AND INDEXING   9+3
AVL trees –B-Trees - Sorting – Bubble sort - Quick Sort - Insertion Sort – Heap sort – Hashing - Hashing functions - Collision Resolution Techniques - Separate chaining - Open addressing - Multiple hashing.

UNIT IV   GRAPHS   9+3
Definitions – Representation of graph - Graph Traversals - Depth-first traversal – breadth-first traversal - applications of graphs - Topological sort – shortest-path algorithms – minimum spanning tree – Prim's and Kruskal's algorithms – biconnectivity – Euler circuits.

UNIT V   ALGORITHM DESIGN AND ANALYSIS   9+3
Algorithm Analysis – Asymptotic Notations -   Divide and Conquer – Merge Sort – Binary Search - Greedy Algorithms – Knapsack Problem – Dynamic Programming – Warshall's Algorithm for Finding Transitive Closure   – Backtracking – Sum of Subset Problem – Branch and Bound – Travelling Salesman Problem.

TOTAL 45+15: 60 PERIODS

COURSE OUTCOMES:
- Able to select and apply the data structure to suit any given problem.
- Able to design their own data structure according to the application need.
- Able to apply the algorithm design techniques to any of the real world problem.
- Able to develop any new application with the help of data structures and algorithms.
- Able to write efficient algorithm for a given problem and able to analyze its time complexity.

REFERENCES:
1. M. A. Weiss, "Data Structures and Algorithm Analysis in C++", Pearson Education Asia, 2013.
2. Tanaenbaum A.S.,Langram   Y. Augestein M.J " Data Structures using C" Pearson Education , 2004
3. Anany Levitin "Introduction to the Design and Analysis of Algorithms" Pearson Education 2003.
4. E. Horowitz, S.Sahni and Dinesh Mehta, "Fundamentals of Data structures in C++", University Press, 2007.
5. E. Horowitz, S. Sahni and S. Rajasekaran, "Computer Algorithms/C++", Second Edition, University Press, 2007.
6. Reema Thareja, "Data Structures using C", Oxford Press, 2012.
7. V. Aho, J. E. Hopcroft, and J. D. Ullman, "Data Structures and Algorithms", Pearson Education, 1983.
8. T. H. Cormen, C. E. Leiserson, R. L. Rivest, and C. Stein, "Introduction to algorithms", Second Edition

MC7111	**DBMS LABORATORY**	**L T P C**
		0 0 3 2

1. Creation of base tables and views.
2. Data Manipulation INSERT, DELETE and UPDATE in Tables. SELECT, Sub Queries and JOIN
3. Data Control Commands
4. High level language extensions – PL/SQL. Or Transact SQL – Packages
5. Use of Cursors, Procedures and Functions
6. Embedded SQL or Database Connectivity.
7. Oracle or SQL Server Triggers – Block Level – Form Level Triggers
8. Working with Forms, Menus and Report Writers for a application project in any domain
9. Front-end tools – Visual Basic/Developer 2000.

TOTAL: 45 PERIODS

MC7112   **DATA STRUCTURES AND ALGORITHMS LABORATORY**   **L T P C**
                                                                          0 0 3 2

1. Polynomial Addition using array
2. Array implementation of stack
3. Array implementation of Queue
4. Infix to postfix conversion
5. Singly Linked List operations
6. Binary tree traversals
7. Quick sort
8. Dictionary application using any of the data structure
9. Find the Shortest Path using Dijkstra's Algorithm – Greedy method
10. Warshall's Algorithm for finding transitive closure using Dynamic programming
11. Sum of subset problem using backtracking

TOTAL: 45 PERIODS

MC7113   **COMMUNICATION SKILL LABORATORY**   **L T P C**
                                                                      1 0 2 2

I. PC based session (Weightage 40%) 21 periods

A. English Language Lab (15 Periods)

1. Listening Comprehension: (5)
Listening and typing – Listening and sequencing of sentences – Filling in the blanks - Listening and answering questions.

2. Reading Comprehension: (5)
Filling in the blanks - Close exercises – Vocabulary building - Reading and answering questions.

3. Speaking: (5)
Phonetics: Intonation – Ear training - Correct Pronunciation – Sound recognition exercises – Common Errors in English. Conversations: Face to Face Conversation – Telephone conversation – Role play activities (Students take on roles and engage in conversation)

B. Discussion of audio-visual materials (6 periods) (Samples to learn and practice)

1. Resume / Report Preparation / Letter Writing   (1)
Structuring the resume / report - Letter writing / Email Communication - Samples.

2. Presentation skills: (1)
Elements of effective presentation – Structure of presentation - Presentation tools – Voice Modulation – Audience analysis - Body language – Video samples

3. Soft Skills: (2)
Time management – Articulateness – Assertiveness – Psychometrics – Innovation and Creativity - Stress Management & Poise - Video Samples

4. Group Discussion: (1)
Why is GD part of selection process ? - Structure of GD – Moderator – led and other GDs - Strategies in GD – Team work - Body Language - Mock GD –Video samples

5. Interview Skills: (1)
   Kinds of interviews – Required Key Skills – Corporate culture – Mock interviews- Video samples.

II. Practice Session (Weightage – 60%) 24 periods

1. Resume / Report Preparation / Letter writing: Students prepare their own resume and report. (2)

2. Presentation Skills: Students make presentations on given topics. (8)
3. Group Discussion: Students participate in group discussions. (6)
4. Interview Skills: Students participate in Mock Interviews (8)

REFERENCES:
1. Anderson, P.V, **Technical Communication**, Thomson Wadsworth , Sixth Edition, New Delhi, 2007.
2. Prakash, P, **Verbal and Non-Verbal Reasoning**, Macmillan India Ltd. Second Edition, New Delhi, 2004.
3. John Seely, **The Oxford Guide to Writing and Speaking**, Oxford University Press, New Delhi, 2004.
4. Evans, D, **Decisionmaker**, Cambridge University Press, 1997.
5. Thorpe, E, and Thorpe, S, **Objective English**, Pearson Education, Second Edition, New Delhi, 2007.
6. Turton, N.D and Heaton, J.B, **Dictionary of Common Errors**, Addision Wesley Longman Ltd., Indian reprint 1998.

LAB REQUIREMENTS:
1. Teacher console and systems for students.
2. English Language Lab Software
3. Career Lab Software

Guidelines for the course
1. A batch of 60 students is divided into two groups – one group for the PC- based session and the other group for the Class room session.
2. The English Lab (2 Periods) and the Career Lab (2 Periods) may be handled by any competent teacher
3. **Record Notebook:** At the end of each session of English Lab, review exercises are given for the students to answer and the computer evaluated sheets are to be compiled as record notebook. Similar exercises for the career lab are to be compiled in the record notebook.
4. **Internal Assessment:** The 15 marks (the other 5 marks for attendance) allotted for the internal assessment will be based on the record notebook compiled by the candidate. 10 marks may be allotted for English Lab component and 5 marks for the Career Lab component.
5. **End semester Examination:** The end-semester examination carries 40% weightage for English Lab and 60% weightage for Career Lab.

TOTAL :45 PERIODS

MC7201   **OBJECT ORIENTED PROGRAMMING**   **L T P C**
                                                                           3 0 0 3

COURSE OBJECTIVES:
- To learn how C++ supports Object Oriented principles such as abstraction, polymorphism etc
- To understand and apply the principles hiding, localization and modularity in software development.
- Use the generic programming features of C++ including the STL
- Design and implement reliable and maintainable object-oriented applications of moderate complexity composed of several classes

UNIT I   FUNDAMENTALS OF OBJECT ORIENTED PROGRAMMING   9
Object–Oriented Programming concepts – Encapsulation – Programming Elements – Program Structure – Enumeration Types –– Functions and Pointers – Function Invocation – Overloading Functions – Scope and Storage Class – Pointer Types – Arrays and Pointers – Call–by–Reference – Assertions – Standard template library.

UNIT II   IMPLEMENTING ADTS AND ENCAPSULATION   9
Aggregate Type struct – Structure Pointer Operators – Unions – Bit Fields – Data Handling and Member Functions – Classes – Constructors and Destructors – Static Member – this Pointer – reference semantics – implementation of simple ADTs.

UNIT III   POLYMORPHISM   9
ADT Conversions – Overloading – Overloading Operators – Unary Operator Overloading – Binary Operator Overloading – Function Selection – Pointer Operators – Visitation – Iterators – containers – Sequence Containers -   List – List Iterators – Associative Containers.

UNIT IV   TEMPLATESAND FILE HANDLING   9
Template Class – Function Templates – RTTI Templates - Class Templates – Parameterizing – STL – Algorithms – Function Adaptors – Streams and Formatted I/O – I/O Manipulations -File handling – Random Access

UNIT V   INHERITANCE   9
Derived Class – Typing Conversions and Visibility – Code Reuse – Virtual Functions – Templates and Inheritance – Run–Time Type Identifications – Exceptions – Handlers – Standard Exceptions.

                                                                   TOTAL: 45 PERIODS

COURSE OUTCOMES:
- Able to understand and design the solution to a problem using object-oriented programming concepts.
- Able to use proper class protection mechanism to provide security.
- Able to demonstrate the use of virtual functions to implement polymorphism.
- Understand and implement the features of C++ including templates, exceptions and file handling for providing programmed solutions to complex problems
- Able to reuse the code with extensible Class types, User-defined operators and function overloading

REFERENCES:
1. Bhushan Trivedi, "Programming with ANSI C++", Oxford Press, Second Edition, 2012.
2. HM Deitel and PJ Deitel "C++ How to Program", Seventh Edition, 2010, Prentice Hall
3. Ira Pohl, "Object–Oriented Programming Using C++", Pearson Education, 2 Edition, 2003.
4. E Balagurusamy, "Object oriented Programming with C++", 3 edition, 2006, Tata McGraw Hill
5. Stanley B.Lippman, Josee Lajoie, "C++ Primer", Pearson Education, Third Edition, 2005.
6. Kamthane," Object Oriented Programming with ANSI and Turbo C++", Person Education, 2003.
7. Bhave , " Object Oriented Programming With C++", Pearson Education , 2004.
8. S.B Lippman, Josee, Josee Lajoie, Barbara, " C++ Premier" 4 Edition, Pearson , 2012
9. Ray Lischner, "Exploring C++ : The programmer's introduction to C++" , apress, 2010.

MC7202	WEB PROGRAMMING ESSENTIALS	L T P C
		3 0 0 3

COURSE OBJECTIVES:
- To understand the concepts and architecture of the World Wide Web.
- To understand and practice mark up languages
- To understand and practice embedded dynamic scripting on client side Internet Programming
- To understand and practice web development techniques on client-side

UNIT I   INTRODUCTION TO WWW   9
Internet Standards – Introduction to WWW – WWW Architecture – SMTP – POP3 – File Transfer Protocol - Overview of HTTP, HTTP request – response —— Generation of dynamic web pages.

UNIT II   UI DESIGN   9

Markup Language (HTML): Introduction to HTML and HTML5 - Formatting and Fonts -Commenting Code – Anchors – Backgrounds – Images – Hyperlinks – Lists – Tables – Frames - HTML Forms.

Cascading Style Sheet (CSS): The need for CSS, Introduction to CSS – Basic syntax and structure - Inline Styles – Embedding Style Sheets - Linking External Style Sheets – Backgrounds - Manipulating text - Margins and Padding - Positioning using CSS.

UNIT III   INTRODUCTION TO JAVASCRIPT   9
Introduction - Core features - Data types and Variables - Operators, Expressions, and Statements - Functions - Objects - Array, Date and Math related Objects - Document Object Model - Event Handling - Controlling Windows & Frames and Documents - Form handling and validations.

UNIT IV   ADVANCED JAVASCRIPT   9
Browser Management and Media Management – Classes – Constructors – Object-Oriented Techniques in JavaScript – Object constructor and Prototyping - Sub classes and Super classes – JSON - jQuery and AJAX.

UNIT V   PHP   9
Introduction - How web works - Setting up the environment (LAMP server) - Programming basics - Print/echo - Variables and constants – Strings and Arrays – Operators, Control structures and looping structures – Functions – Reading Data in Web Pages - Embedding PHP within HTML - Establishing connectivity with MySQL database.

COURSE OUTCOMES:
- ➢ Acquire knowledge about functionalities of world wide web
- ➢ Explore markup languages features and create interactive web pages using them
- ➢ Learn and design Client side validation using scripting languages
- ➢ Acquire knowledge about Open source JavaScript libraries
- ➢ Able to design front end web page and connect to the back end databases.

REFERENCE BOOKS:
1. Harvey & Paul Deitel & Associates, Harvey Deitel and Abbey Deitel, "Internet and World Wide Web - How To Program", Fifth Edition, Pearson Education, 2011.
2. Achyut S Godbole and Atul Kahate, "Web Technologies", Second Edition, Tata McGraw Hill, 2012.
3. Thomas A Powell, Fritz Schneider, "JavaScript: The Complete Reference", Third Edition, Tata McGraw Hill, 2013.
4. David Flanagan, "JavaScript: The Definitive Guide, Sixth Edition", O'Reilly Media, 2011
5. Steven Holzner, "The Complete Reference - PHP", Tata McGraw Hill, 2008
6. Mike Mcgrath, "PHP & MySQL in easy Steps", Tata McGraw Hill, 2012.
7. http://php.net/manual/

MC7203   **SYSTEM SOFTWARE**   **L T P C**
                                                                                         3 0 0 3

COURSE OBJECTIVES:
- • To understand the relationship between system software and machine architecture, design and implementation of assemblers, linkers and loaders.
- • To understand the design, function and implementation of assemblers, linkers and loaders
- • To have an understanding of macro processors and system software tools

UNIT I   BASICS OF SYSTEM SOFTWARE AND ASSEMBLER   9
Introduction – System software and SIC/XE machine architecture - Basic assembler functions – Assembler algorithms and data structures – Machine dependent assembler features, Instruction formats and addressing modes – Program relocation – Machine independent assembler features – Literals – Symbol-defining statements – Expressions – Program Blocks – Control Sections and Program Linking-Implementation examples MASM assembler.

UNIT II   COMPILER- LEXICAL ANALYSIS, SYNTAX ANALYSIS   9
Phases of compiler-Lexical Analysis: Role of a Lexical analyzer, input buffering, specification and recognition of tokens, Finite Automata, Designing a lexical analyzer generator, Pattern matching based on NFA's. Syntax Analysis: Role of Parser, Top-down parsing, recursive descent and predictive parsers (LL), Bottom-Up parsing, Operator precedence parsing, LR, SLR and LALR parsers.

UNIT III   COMPILER- CODE GENERATION, OPTIMIZATION   9
Intermediate languages: graphical representations, DAGs, Three address code, types of three address statements, syntax directed translation into three address code, implementation of three address statements-Code Optimization: Machine dependent and machine independent code generation: Sources of optimization-Code Generation-Semantic stacks, evaluation of expressions, control structures, and procedure calls.

UNIT IV   LOADERS AND LINKERS   9
Basic loader functions: Design of an Absolute Loader – A Simple Bootstrap Loader Machine dependent loader features Relocation – Program Linking – Algorithm and Data Structures for Linking Loader. Machine-independent loader features – Automatic Library Search – Loader Options Loader design options – Linkage Editors – Dynamic Linking – Bootstrap Loaders. Implementation examples: MSDOS linker.

UNIT V   MACRO PROCESSORS & OTHER SYSTEM SOFTWARE   9
Basic macro processor functions – Macro Definition and Expansion – Macro Processor Algorithm and data structures – Implementation examples: MASM Macro Processor- Text editors – Overview of Editing Process - User Interface – Editor Structure – Interactive Debugging Systems – Debugging functions and capabilities –Relationships with Other parts of the system – User Interface Criteria. **-** Virtual Machines

TOTAL: 45 PERIODS .

COURSE OUTCOMES:
- Able to trace the path of a source code to object code and the to executable file
- To design the front end of the compiler-scanner, parser
- Understand and identify the relationship between system software and machine architecture
- Analyze the functions of assembler, compiler, linker, and loaders
- Know the design and implementation of loaders and linkers

REFERENCES:
1. Leland Beck - "System Software – An Introduction to Systems Programming", Third Edition, Pearson Education, Inc., 2008
2. A.V. Aho, R. Shethi and Ulman; Compilers - Principles, Techniques and Tools, Second Edition, Pearson Education, 2002.
3. D. M. Dhamdhere, "Systems Programming and Operating Systems", Tata McGraw Hill Company, Second Edition, 2009.
4. John J. Donovan, "Systems Programming", Tata McGraw Hill Company, Second Edition, 2000.
5. V. Raghavan, "Principles of Compiler Design", Tata McGrawHill Education Publishers, 2010.
6. Srimanta Pal, " Systems Programming " , Oxford University Press, 2011.

MC7204   OPERATING SYSTEMS   L T P C
3 0 0 3

COURSE OBJECTIVES:
- To be aware of the evolution and fundamental principles of operating system, processes and their communication
- To understand the various operating system components like process management, memory management and
- To know about file management and the distributed file system concepts in operating systems
- To be aware of components of operating system with relevant case study

UNIT I   INTRODUCTION   9
Introduction -Types of operating systems-operating systems structures-Systems components-operating systems services-System calls-Systems programs-Processes-process concept- process scheduling-operation on processes-co-operating processes-Inter process communications-CPU Scheduling-Scheduling criteria-Scheduling algorithms-Multiple-processor Scheduling

UNIT II   PROCESS SYNCHRONIZATION   9
Process Synchronization –Critical Section problem – Semaphores-Classical problems of synchronization-critical regions-Monitors-Deadlock Characterization-Deadlock handling-Deadlock Prevention-Deadlock avoidance-Deadlock Detection-Deadlock Recovery –Threads-Multithreading Models

UNIT III   MEMORY MANAGEMENT   9
Memory Management-Swapping-Contiguous Memory allocation-Paging-Segmentation-Virtual Memory-Demand paging-Page Replacement-Thrashing

UNIT IV   DISK SCHEDULING AND DISTRIBUTED SYSTEMS   9
Disk Structures-Disk Scheduling-File Systems Interface-File concepts-Access methods-Directory Structures-File System Implementation-File Systems structures-Directory Implementation-Allocation Methods-Free Space management-Distributed File systems-Naming and Transparency-Remote File Accesses- Stateful Versus Stateless Service-File replication

UNIT V   CASE STUDIES   9
Linux System-design Principles- process management-File Systems-Windows Vista-Systems Structures-Process management-memory management-Android OS-Virtual machine OS

COURSE OUTCOMES:
- Able to understand the operating system components and its services
- Implement the algorithms in process management and solving the issues of IPC
- Able to demonstrate the mapping between the physical memory and virtual memory
- Able to understand file handling concepts in OS perspective
- Able to understand the operating system components and services with the recent OS

TOTAL : 45 PERIODS

REFERENCES:
1. Abraham Silberschalz Peter B Galvin, G.Gagne, "Operating Systems Concepts", Seventh Edition, Addision Wesley Publishing Co.,2010
2. Andrew S.Tanenbaum, "Modern operating Systems", Third Edition, PHI Learning Pvt.Ltd., 2008
3. William Stallings, "Operating Systems: Internals and Design Principles",Seventh Edition, Prentice Hall, 2011.
4. H M Deital, P J Deital and D R Choffnes, "Operating Systems" ,3rd edition, Pearson Education, 2011.
5. D M Dhamdhere, " Operating Systems: A Concept-based Approach", Second Edition, Tata McGraw-Hill Education, 2007.

MC7205   COMPUTER GRAPHICS AND MULTIMEDIA   L T P C
                                                                          3 0 0 3
COURSE OBJECTIVES:
- To understand computational development of graphics with mathematics
- To provide in-depth knowledge of display systems, image synthesis, shape modeling of 3D application.
- To Understand basic concepts related to Multimedia including data standards, algorithms and software
- To Experience development of multimedia software by utilizing existing libraries and descriptions of algorithms

UNIT I   BASIC CONCEPTS   9
2D Transformations – Clipping – Window – View Prot Mapping – Graphical User Interfaces and Interactive Input Methods – Picture Construction Techniques – Virtual Reality Environment.

UNIT II   3D GRAPHICS   9
3D Transformation – 3D Viewing – Visible Surface Detection – Back Face Detection – Depth Buffer Method – Scan Line Method.

UNIT III   MULTIMEDIA BASICS   9
Introduction to Multimedia – Components – Hypermedia – Authoring – Authoring tools – File formats – Color models – Digital Audio representation – Transmission – Audio signal processing – Digital music making – MIDI – Digital video – Video compression techniques – Video performance measurements – Multimedia Databases – Animation – Key frames and tweening techniques – Principles of animation – Virtual reality – Multimedia for portable devices

UNIT IV   MULTIMEDIA COMMUNICATION   9
Stream characteristics for Continuous media – Temporal Relationship – Object Stream Interactions - Media Synchronization – Models for Temporal Specifications – Streaming of Audio and Video – Recovering from packet loss – RTSP –– Multimedia Communication Standards –RTP/RTCP – SIP and H.263- Real time streaming and On-demand streaming

UNIT V   MULTIMEDIA APPLICATION DEVELOPMENT   9
Design, Development and evaluation of multimedia a system - The development of user interface design - Design Process - MultiMedia & the Internet - Multimedia conferencing - Multimedia file sharing – Multimedia broadcasting - Multimedia Development Issues - Multimedia project - Structured Multimedia development - Multimedia project timing - Sample project

TOTAL: 45 PERIODS

COURSE OUTCOMES:
- Gain proficiency in 3D computer graphics API programming
- Enhance the perspective of modern computer system with modeling, analysis and interpretation of 2D and 3D visual information.
- Able to understand different realizations of multimedia tools
- Able to develop interactive animations using multimedia tools
- Gain the knowledge of different media streams in multimedia transmission

REFERENCES:
1. Donald Hearn and M. Pauline Baker, "Computer Graphics in C Version", Second Edition, Pearson Education
2. Tom McReynolds – David Blythe " Advanced Graphics Programming Using OpenGL" , Elsevier, 2010
3. Parag Havaldar and Gerard Medioni, "Multimedia Systems-Algorithms, Standards and   Industry Practices",
    Course Technology, Cengage Learning, 2010.
4. John F. Koegel Bufend , "Multimedia systems", Pearson Education, Delhi, 2002
5. Ralf Steinmetz and Klara "Multimedia Computing, Communications and Applications", Pearson Education,2004.
6. Kurose and Ross, 'Computer Networks : A top down Approach', Pearson Education, 2002
7. Mohammad Dastbaz, Desgning Interactive Multimedia Systems
8. Multimedia – Technology and applications David Hillman Galgotia Publications, Delhi
9. Ralf Steinmetz and Klara Nahrstedt "Multimedia Applications", Springer, 2007.

MC7211   **OBJECT ORIENTED PROGRAMMING LABORATORY**   **L T P C**
                                                               0 0 3 2

1. Write a C++ Program to illustrate Enumeration and Function Overloading
2. Write a C++ Program to illustrate Scope and Storage class
3. Implementation of ADT such as Stack and Queues
4. Write a C++ Program to illustrate the use of Constructors and Destructors and Constructor Overloading
5. Write a Program to illustrate Static member and methods
6. Write a Program to illustrate Bit fields
7. Write a Program to overload as binary operator, friend and member function
8. Write a Program to overload unary operator in Postfix and Prefix form as member and friend function
9. Write a Program to illustrate Iterators and Containers
10. Write a C++ Program to illustrate function templates
11. Write a C++ Program to illustrate template class
12. Write C++ Programs and incorporating various forms of Inheritance
13. Write a C++ Program to illustrate Virtual functions
14. Exception Handling
15. File Handling – Read, Write, Update

                                                          TOTAL: 45 PERIODS

MC7212   **WEB PROGRAMMING LABORATORY**   **L T P C**
                                                  0 0 3 2

1. Create a web page with the following using HTML5
        (i) To embed an image map in a web page
        (ii) To fix the hot spots
        (iii) Show all the related information when the hot spots are clicked.
2. Create a web page with all types of Cascading style sheets.
3. Implement Client Side Scripts for Validating Web Form Controls using JavaScript.
4. Designing Quiz Application Personal Information System/ Using JavaScript
5. Write a JavaScript for Loan Calculation.
6. Develop and demonstrate a HTML file that includes JavaScript that uses functions for the following problems:
        a) Parameter: A string
           Output: The position in the string of the left-most vowel
        b) Parameter: A number
           Output: The number with its digits in the reverse order
7. Develop PHP program using Arrays, control structures, looping structures and Form Handling
8. Using PHP and MySQL, develop a program to accept book information viz. Accession number, title, authors, edition and publisher from a web page and store the information in a database and to search for a book with the title specified by the user and to display the search results with proper headings.
9. Write an AJAX program for parsing a JSON file and formatting the output.
10. Develop a web application for Airline Reservation System using PHP & AJAX.

                                                          TOTAL: 45 PERIODS

MC7213   **GRAPHICS AND MULTIMEDIA LAB**   **L T P C**
                                                                        0 0 3 2

UNIT I   TWO DIMENSIONAL TRANSFORMATIONS   9
Creation of two dimensional objects and applying simple transformations like Translation, Scaling, Rotation and applying Composite transformations.

UNIT II   CLIPPING AND WINDOWING   9
Clipping and windowing of a part of the created two dimensional object using any one of the clipping algorithmgg

UNIT III   THREE DIMENSIONAL TRANSFORMATIONS   9
Creation of simple three dimensional objects like cube, cone and cylinder and applying simple transformations like Translation, Scaling, Rotation, Composite transformations, projections –Parallel, Perspective.

UNIT IV   VISIBLE SURFACE DETECTION   9
Finding out visible surfaces and removal of hidden surfaces in simple objects using object space and image space algorithms.

UNIT V   IMAGE EDITING   9
Image enhancement, Image transformation from color to gray scale and vice versa, Image manipulation and Image optimization for web - Usage of editing tools, layers, filters, special effects and color modes. Creation of simple Gif animated images with textual illustrations, Image Compression.

Software:
1. C/C++/Java
2. OpenGL 3.7 (precompiled GLUT libraries 3.7 – Open source)
3. Any open source software like 'GIMP 2.6'/ Flash 8.0 /Photoshop

                                                        TOTAL: 45 PERIODS

MC7301   **COMPUTER NETWORKS**   **L T P C**
                                                                        3 0 0 3

COURSE OBJECTIVES:
* To understand networking concepts and basic communication model
* To understand network architectures and components required for data communication.
* To analyze the function and design strategy of physical, data link, network layer and transport layer
* To Acquire knowledge of various application protocol standard developed for internet

UNIT I   NETWORK FUNDAMENTALS   9
Uses of Networks – Categories of Networks -Communication model –Data transmission concepts and terminology – Protocol architecture – Protocols – OSI – TCP/IP – LAN Topology - Transmission media

UNIT II   DATA LINK LAYER   9
Data link control - Flow Control – Error Detection and Error Correction - MAC – Ethernet, Token ring, Wireless LAN MAC – Blue Tooth - Bridges.

UNIT III   NETWORK LAYER   9
Network layer – Switching concepts – Circuit switching – Packet switching –IP –– Datagrams – IP addresses- IPV6– ICMP – Routing Protocols – Distance Vector – Link State- BGP.

UNIT IV   TRANSPORT LAYER   9
Transport layer –service –Connection establishment – Flow control – Transmission control protocol – Congestion control and avoidance – User datagram protocol. -Transport for Real Time Applications (RTP).

UNIT V   APPLICATIONS   9
Applications - DNS- SMTP – WWW –SNMP- Security –threats and services - DES- RSA- web security -SSL

TOTAL : 45 PERIODS

COURSE OUTCOMES:
- Able to trace the flow of information from one node to another node in the network
- Able to Identify the components required to build different types of networks
- Able to understand the functionalities needed for data communication into layers
- Able to choose the required functionality at each layer for given application
- Able to understand the working principles of various application protocols
- Acquire knowledge about security issues and services available

REFERENCES:
1. Larry L. Peterson & Bruce S. Davie, "Computer Networks – A systems Approach", Fourth Edition, Harcourt Asia / Morgan Kaufmann, 2007.
2. William Stallings, "Data and Computer Communications", Nineth Edition, Prentice Hall , 2011.
3. Forouzan, " Data Communication and Networking", Fifth Edition , TMH 2012
4. Andrew S.Tannenbaum David J. Wetherall, "Computer Networks" Fifth Edition , Pearson Education 2011
5. James F. Kurose, Keith W. Ross, "Computer Networking: A Top-down Approach, Pearson Education, Limited, sixth edition,2012
6. John Cowley, "Communications and Networking : An Introduction", Springer Indian Reprint, 2010.
7. Achyut S Godbole,Atul Hahate, " Data Communications and Networks"second edition 2011
8. Wayne Tomasi, " Introduction to Data communications and Networking" , Pearson 2011

**MC7302   EMBEDDED SYSTEMS   L T P C
                                                                              3 0 0 3**

COURSE OBJECTIVES:
- To understand the architecture and functions of 8085 processor
- To Learn Assembly language programming
- To understand the Basic concepts of Embedded systems and 8051 microcontroller
- To gain knowledge about how the I/O devices are interfaced with 8051 microcontroller
- To understand the basics of RTOS and to learn the method of designing a real time systems

UNIT I   INTRODUCTION TO MICROPROCESSORS   9
Evolution Of Microprocessors - 8-Bit Processor - 8085 Architecture – Register Organization - Instruction Set – Timing Diagram- Addressing Modes – Interrupts- Interrupt Service Routines- Assembly Language Programming Using 8085

UNIT II   INTRODUCTION TO EMBEDDED SYSTEMS   9
Embedded Systems- Processor Embedded Into A System-Embedded Hardware And Software Units-Applications-Design Process – Intel 8051 Architecture- Processor And Memory Organization-Interrupts Of 8051 - Assembly Language Programming Using 8051

UNIT III   INTERFACING WITH 8051   9
Input-Output Interfacing – Bus Standards – PCI – ISA – Timing And Control – Input Output Devices – Serial And Parallel Communication – Motor Control-Programming Display Devices – ARM Architecture

UNIT IV   REAL – TIME OPERATING SYSTEM   9
Inter Process Communication – Signal Functions – Socket Programming – Mailbox - Pipes – RTOS – OS Services – Process Management - Timer Function –Event Function – Memory Management – Device, Files And I/O Subsystem – Basic Design Of RTOS.

UNIT V   RTOS PROGRAMMING   9
Basic Functions – Types Of RTOS – RTOS μCOS – RTLinux – Real Time Linux Functions-Programming With RTLinux – Case Study

TOTAL : 45 PERIODS

COURSE OUTCOMES:
- Able to understand the functionality of 8085 microprocessor
- Able to design and control real time control systems
- Able incorporate enhanced features in the embedded systems through software
- Able to rectify minor problems by troubleshooting
- Acquire the knowledge of real time operating system and implement real time functions

REFERENCE BOOKS:
1. Rajkamal, "Embedded System: Architecture, Programming And Design" Tata Mcgraw-Hill Education, Second Edition, 2008.
2. B.Kanth Rao, "Embedded Systems" PHI Learning Private Limited, 2011.
3. Marilyn Wolf, "Computers As A Components" Third Edition, Morgan Kaufmann Series 2012.
4. A.P.Godse & A.O.Mulani "Embedded Systems" Third Edition, Technical publications 2009.
5. Mohamed Rafiquzzaman, "Microprocessors and Micro computer-based system design", CRC Press, Second Edition, 2013.

**MC7303   SOFTWARE ENGINEERING   L T P C
                                                                       3 0 0 3**
COURSE OBJECTIVES:
- to provide an insight into the processes of software development
- To understand and practice the various fields such as analysis, design, development, testing of Software Engg .
- To develop skills to construct software of high quality with high reliability
- To apply metrics and testing techniques to evaluate the software

UNIT I   INTRODUCTION   9
Software Engineering paradigms – Waterfall Life cycle model –   Spiral Model – Prototype Model – fourth Generation Techniques – Planning – Software Project Scheduling, – Risk analysis and management – Requirements and Specification – Case Study for Project Plan and SRS

UNIT II   SOFTWARE DESIGN   9

Abstraction – Modularity – Software Architecture – Cohesion – Coupling – Various Design Concepts and notations – Real time and Distributed System Design – Documentation – Dataflow Oriented design – Jackson System development – Designing for reuse – Programming standards – Case Study for Design of any Application Project.

UNIT III   SOFTWARE TESTING AND MAINTENANCE   9

Software Testing Fundamentals – Software testing strategies – Black Box Testing – White Box Testing – System Testing – Object Orientation Testing – State based Testing - Testing Tools – Test Case Management – Software Maintenance Organization – Maintenance Report – Types of Maintenance – Case Study for Testing Techniques

UNIT IV   SOFTWARE METRICS   9

Scope – Classification of metrics – Measuring Process and Product attributes – Direct and Indirect measures – Cost Estimation - Reliability – Software Quality Assurance – Standards – Case Study for COCOMO model

UNIT V   SCM & WEB ENGINEERING   9

Need for SCM – Version Control – SCM process – Software Configuration Items – Taxonomy – CASE Repository – Features – Web Engineering

TOTAL: 45 PERIODS

COURSE OUTCOMES:

- Get an insight into the processes of software development
- Able to understand the problem domain for developing SRS and various models of software engineering
- Able to Model software projects into high level design using DFD,UML diagrams
- Able to Measure the product and process performance using various metrics
- Able to Evaluate the system with various testing techniques and strategies

REFERENCE BOOKS:

1. Roger S. Pressman, "Software Engineering: A Practitioner Approach", Seventh edition, McGrawHill, 2010.
2. Richard Fairley, " Software Engineering Concepts", Tata McGraw Hill Edition, 2008
3. Ali Behforroz, Frederick J.Hudson, "Software Engineering Fundamentals", Oxford Indian Reprint, 2012
4. Sommerville, "Software Engineering", Sixth Edition, Addison Wesley-Longman, 2004.
5. Kassem A. Saleh, "Software Engineering", First Edition, J.Ross Publishing, 2009.
6. Pankaj Jalote, "An Integrated approach to Software Engineering", Third Edition, Springer Verlag, 2005.
7. Roger S. Pressman, David Lowe, "Web Engineering: A Practitioner's Approach", Special Indian edition, McGrawHill, 2008.
8. Jibitesh Mishra, Ashok Mohanty, "Software Engineering", Pearson Education, First Edition, 2012

MC7304   **PROFESSIONAL ETHICS**   **L T P C**
                                                                                    3 0 0 3

COURSE OBJECTIVES
* To understand the concepts of computer ethics in work environment.
* To understand the threats in computing environment
* To understand the intricacies of accessibility issues
* To ensure safe exits when designing the software projects

UNIT I   **COMPUTER ETHICS INTRODCUTION AND COMPUTER HACKING**   **9**
A general Introduction – Computer ethics: an overview – Identifying an ethical issue – Ethics and law – Ethical theories - Professional Code of conduct – An ethical dilemma – A framework for ethical decision making - Computer hacking – Introduction – definition of hacking – Destructive programs – hacker ethics -   Professional constraints – BCS code of conduct – To hack or not to hack? – Ethical positions on hacking

UNIT II   **ASPECTS OF COMPUTER CRIME AND INTELLECTUAL PROPERTY**
                      RIGHTS   **9**
Aspects of computer crime - Introduction - What is computer crime – computer security measures – Professional duties and obligations - Intellectual Property Rights – The nature of Intellectual property – Intellectual Property – Patents, Trademarks, Trade Secrets, Software Issues, Copyright - The extent and nature of software piracy – Ethical and professional issues – free software and open source code

UNIT III   **REGULATING INTERNET CONTENT, TECHNOLOGY AND SAFETY**   **9**
Introduction – In defence of freedom expression – censorship – laws upholding free speech – Free speech and the Internet - Ethical and professional issues - Internet technologies and privacy – Safety and risk – assessment of safety and risk – risk benefit analysis – reducing risk

UNIT IV   **COMPUTER TECHNOLOGIES ACCESSIBILITY ISSUES**   **9**
Introduction – Principle of equal access – Obstacles to access for individuals – professional responsibility - Empowering computers in the workplace – Introduction – computers and employment – computers and the quality of work – computerized monitoring in the work place – telecommuting – social, legal and professional issues - Use of Software, Computers and Internet-based Tools - Liability for Software errors - Documentation Authentication and Control – Software engineering code of ethics and practices – IEEE-CS – ACM Joint task force

UNIT V   **SOFTWARE DEVELOPMENT AND SOCIAL NETWORKING**   **9**
Software Development – strategies for engineering quality standards – Quality management standards – Social Networking – Company owned social network web site – the use of social networks in the hiring process – Social Networking ethical issues – Cyber bullying – cyber stalking – Online virtual world – Crime in virtual world - digital rights management - Online defamation – Piracy – Fraud

                                                            TOTAL: 45 PERIODS

COURSE OUTCOMES:
* Helps to examine situations and to internalize the need for applying ethical principles, values to tackle with various situations.
* Develop a responsible attitude towards the use of computer as well as the technology.
* Able to envision the societal impact on the products/ projects they develop in their career
* Understanding the code of ethics and standards of computer professionals.
* Analyze the professional responsibility and empowering access to information in the work place.

REFERENCES:
1. Penny Duquenoy, Simon Jones and Barry G Blundell, "Ethical , legal and professional issues in computing", Middlesex University Press, 2008
2. George Reynolds, "Ethics in Information Technology", Cengage Learning, 2011
3. Caroline Whitback," Ethics in Engineering Practice and Research ", Cambridge University Press, 2011
4. Richard Spinello, "Case Studies in Information and Computer Ethics", Prentice Hall, 1997.
5. John Weckert and Douglas Adeney, Computer and Information Ethics, Greenwood Press, 1997.
6. Sara Baase, "A Gift of Fire: Social, Legal, and Ethical Issues for Computing and the Internet",3rd Edition,Prentice Hall, 2008
7. http://www.infosectoday.com/Articles/Intro_Computer_Ethics.htm

MC 7305	INTERNET PROGRAMMING	L T P C
		3 0 0 3

COURSE OBJECTIVES:
- To provide an overview of working principles of internet, web related functionalities
- To understand and apply the fundamentals core java, packages, database connectivity for computing
- To enhance the knowledge to server side programming
- To provide knowledge on advanced features like Swing, JavaBeans, Sockets.

UNIT I   INTERNET APPLICATIONS   9
Domain Name System - Exchanging E-mail – Sending and Receiving Files - Fighting Spam, Sorting Mail and avoiding e-mail viruses – Chatting and Conferencing on the Internet – Online Chatting - Messaging – Usenet Newsgroup – Voice and Video Conferencing – Web Security, Privacy, and site-blocking – FTP.

UNIT II   JAVA FUNDAMENTAL   9
Java features – Java Platform – Java Fundamentals – Expressions, Operators, and Control Structures – Classes, Packages and Interfaces – Exception Handling.

UNIT III   PACKAGES   9
AWT package – Layouts – Containers – Event Package – Event Model – Painting – Garbage Collection - Multithreading
– Language Packages.

UNIT IV   ADVANCED JAVA PROGRAMMING   9
Utility Packages – Input Output Packages – Inner Classes – Java Database Connectivity - Servlets - RMI – Swing Fundamentals - Swing Classes.

UNIT V   JAVA BEANS AND NETWORKING   9
Java Beans – Application Builder Tools - Using the Bean Developer Kit-Jar Files-Introspection- BDK-Using BeanInfo Interface – Persistence- Java Beans API – Using Bean Builder - Networking Basics - Java and the Net – InetAddress – TCP/IP Client Sockets – URL –URL Connection – TCP/IP Server Sockets – A Caching Proxy HTTP Server – Datagrams.

TOTAL: 45 PERIODS

COURSE OUTCOMES:
- Able to understand the internet standards and recent web technologies like Conferencing, newsgroup etc.
- Able to implement, compile, test and run Java program,
- Able to make use of hierarchy of Java classes to provide a solution to a given set of requirements found in the Java API
- Able to understand the components and patterns that constitute a suitable architecture for a web application using java servlets
- Able to demonstrate systematic knowledge of backend and front end by developing an appropriate application.

REFERENCES:
1. Margaret Levine Young, "Internet and WWW", 2nd Edition, Tata McGraw Hill, 2002.
2. Paul J. Deitel, Harvey M. Deitel, "Internet & World Wide Web: How to Program", Pearson Education International, 2009
3. Herbert Schildt, The Complete Reference – Java 2, 4th Edition, Tata McGraw Hill, 2001
4. Joyce Farrell, "Java Programming", Cengage Learning, Sixth Edition, 2011
5. C. Xavier, "Java Programming: A Practical Approach", Tata McGraw Hill, 2011
6. Keyur shah, "Gateway to Java Programmer Sun Certification", Tata Mc Graw Hill 2002
7. Poornachandra Sarang, "Java Programming", McGraw Hill Professional, 2012
8. Herbert Schildt, Dale Skrien, "Java Fundamentals – A Comprehensive Introduction", Tata Mc Graw Hill, 2013
9. John Dean, Raymond Dean, " Introduction to Programming with JAVA – A Problem Solving Approach", Tata Mc Graw Hill, 2012
10. Ralph Bravaco, Shai Simonson, "Java Programming : From the Ground Up", Tata McGraw Hill Edition, 2012
11. D.S.Malik, "Java Programming", Cengage Learning, 2009
12. Rashmi Kanta Das, "Core Java for Beginners" , Vikas Publishing House Pvt. Ltd., 2011

MC7311   **EMBEDDED SYSTEMS LABORATORY**   **L T P C**
                                                                          0 0 3 2

1. Assembly Language Programs Using 8085 – 3 Experiments

2. 8051 Microcontroller Based Simple ALP Experiments – 2 Experiments

3. 8051 Microcontroller Based I/O Interfacing - 2 Experiments

4. Real Time Systems Program Using RTOS – 2 Experiments

5. Case Study Using RTLinux

TOTAL : 45 PERIODS

MC7312   **INTERNET PROGRAMMING LABORATORY**   **L T P C**
                                                                                 0 0 3 2

1. Basics - Sending and receiving mails from one or more email clients, Video Conferencing demonstration.
2. Writing Java programs by making use of class, interface, package, etc for the following
   - # Different types of inheritance study
   - # Uses of 'this' keyword
   - # Polymorphism
   - # Creation of user specific packages
   - # Creation of jar files and using them
   - # User specific exception handling
3. Writing window based GUI applications using frames and applets such as Calculator application, Fahrenheit to Centigrade conversion etc
4. Application of threads examples
5. Reading and writing text files
6. Writing an RMI application to access a remote method
7. Writing a Servlet program with database connectivity for a web based application such as students result status checking, PNR number enquiry etc
8. Creation and usage of Java bean
9. Create a Personal Information System using Swing
10. Event Handling in Swing
11. FTP Using Sockets.

TOTAL : 45 PERIODS

MC7313   **VISUAL   PROGRAMMING LABORATORY**   **L T P C**
                                                                                 1 0 3 2

VB
1. Database applications using data control.

VC++
1. SDK type programs code for GDI objects.
2. Implementation of Process management using PWCT
3. Implementation of advanced dynamic Slider & Image control applications
4. Programming for reading and writing into documents.
5. Creating DLLs and using them.
6. Data access through ODBC – Cdatabase, Crecordset.
7. Creating status bar application, static and dynamic splitter windows
8. create an application that will load the bit map dynamically with and with out wizard
9. Creating Active-x controls using .Net

TOTAL : 45 PERIODS

RESOURCE MANAGEMENT TECHNIQUES L T P C
3 0 0 3

COURSE OBJECTIVES:
- To provide the concept and an understanding of basic concepts in Operations Research Techniques for Analysis and Modeling in Computer Applications.
- To understand , develop and solve mathematical model of linear programming problems
- To understand , develop and solve mathematical model of Transport and assignment problems
- To Understand network modeling for planning and scheduling the project activities

UNIT I   LINEAR PROGRAMMING MODELS   9
Mathematical Formulation - Graphical Solution of linear programming models – Simplex method – Artificial variable Techniques- Variants of Simplex method

UNIT II   TRANSPORTATION AND ASSIGNMENT MODELS   9
Mathematical formulation of transportation problem- Methods for finding initial basic feasible solution – optimum solution - degeneracy – Mathematical formulation of assignment models – Hungarian Algorithm – Variants of the Assignment problem

UNIT III   INTEGER PROGRAMMING MODELS   9
Formulation – Gomory's IPP method – Gomory's mixed integer method – Branch   and bound technique.

UNIT IV   SCHEDULING BY PERT AND CPM   9
Network Construction – Critical Path Method – Project Evaluation and Review Technique – Resource Analysis in Network Scheduling

UNIT V   QUEUEING MODELS   9
Characteristics of Queuing Models – Poisson Queues - (M / M / 1) : (FIFO / ∞ /∞),   (M / M / 1) : (FIFO / N / ∞), (M / M / C) : (FIFO / ∞ / ∞), (M / M / C) : (FIFO / N / ∞) models.

TOTAL : 45 PERIODS

COURSE OUTCOMES:
- Understand and apply linear, integer programming to solve operational problem with   constraints
- Apply transportation and assignment models to find optimal solution in warehousing and Travelling,
- To prepare project scheduling using PERT and CPM
- Identify and analyze appropriate queuing model to reduce the waiting time in queue.
- Able to use optimization concepts in real world problems

REFERENCES:
1. Taha H.A., "Operations Research : An Introduction " 8th Edition, Pearson Education, 2008.
2. A.M.Natarajan, P.Balasubramani, A.Tamilarasi, "Operations Research", Pearson Education, Asia, 2005.
3. Prem Kumar Gupta, D.S. Hira, "Operations Research", S.Chand & Company Ltd, New Delhi, 3rd Edition , 2008.
4. John W. Chinneck "Feasibility and Infeasibility in Optimization Algorithms and Computational Methods' Springer, 2008
5. Ravindran, Phillips, Solberg,"Operations Research: Principles And Practice", 2ND ED, John Wiley & Sons, 01-Jul-2007
6. Ibe, O.C. "Fundamentals of Applied Probability and Random Processes", Elsevier, U.P., 1st Indian Reprint, 2007.
7. Gross, D. and Harris, C.M., "Fundamentals of Queueing Theory", Wiley Student, 3rd Edition, New Jersy, 2004.

MC7402   **OBJECT ORIENTED ANALYSIS AND DESIGN**   **L T P C**
                                                                        3 0 0 3

COURSE OBJECTIVES:
- To provide a brief, hands-on overview of object-oriented analysis in software process
- To discuss Case studies based project specifications to develop object-oriented models and identify implementation strategies.
- To demonstrate and apply basic object oriented techniques to create and modify object oriented analysis and design models.
- To understand and apply testing techniques for object oriented software

UNIT I   INTRODUCTION   9
An overview – Object basics – Object state and properties – Behavior – Methods – Messages – Information hiding – Class hierarchy – Relationships – Associations – Aggregations- Identity – Dynamic binding – Persistence – Metaclasses – Object oriented system development life cycle.

UNIT II   METHODOLOGY AND UML   9
Introduction – Survey – Rumbugh, Booch, Jacobson methods – Patterns – Creational - Abstract Factory – Factory Method – Behavioral – Momento – Mediator - Structural – Decorator - Facade - Concurrency Patterns –Lock – Reactor – Scheduler - Frameworks – Unified approach – Unified modeling language – Static and Dynamic models – UML diagrams – Class diagram – Usecase diagrams – Dynamic modeling – Model organization – Extensibility.

UNIT III   OBJECT ORIENTED ANALYSIS   9
Identifying Usecase – Business object analysis – Usecase driven object oriented analysis – Usecase model – Documentation – Classification – Identifying object, relationships, attributes, methods – Super-sub class – A part of relationships Identifying attributes and methods – Object responsibility

UNIT IV   OBJECT ORIENTED DESIGN   9
Design process and benchmarking – Axioms – Corollaries – Designing classes – Class visibility – Refining attributes – Methods and protocols – Object storage and object interoperability – Databases – Object relational systems – Designing interface objects – Macro and Micro level processes – The purpose of a view layer interface-OOUI - MVC Architectural Pattern and Design – Designing the system.

UNIT V   QUALITY AND TESTING   9
Quality assurance – Testing strategies – Test cases – Automated Testing Tools – Case Study - Cryptanalysis – Health Care Systems- Inventory Control System - Rational Rose Suite.

                                                                TOTAL : 45 PERIODS

COURSE OUTCOMES:
- Understand the basic concepts to identify state & behavior of real world objects
- Able to learn the various object oriented methodologies and choose the appropriate one for solving the problem with the help of various case studies
- Understand the concept of analysis, design & testing to develop a document for the project
- Able to implement analysis, design & testing phases in developing a software project
- Able to understand the testing strategies and know about automated testing tools

REFERENCES :
1. Ali Bahrami, "Object Oriented System Development", McGraw Hill International Edition, 2008.
2. Craig Larman, Applying UML and Patterns, 2nd Edition, Pearson, 2002.
3. Brahma Dathan, Sarnath Ramnath, "Object-Oriented Analysis, Design and Implementation", Universities Press, 2010.
4. Grady Booch, James Rumbaugh, Ivar Jacobson, "The Unified Modeling Language User Guide", Addison Wesley Long man, 1999.
5. Bernd Bruegge, Allen H. Dutoit, Object Oriented Software Engineering using UML, Patterns and Java, Pearson 2004
6. Martin Fowler, "UML Distilled A Brief Guide to Standard Object Modeling Language", 3rd Edition, Addison Wesley, 2003
7. Russ Miles, Kim Hamilton, "Learning UML 2.0", O'Reilly, 2008.

MC7403　　　　　　　**DATA WAREHOUSING AND DATA MINING**　　　　**L T P C**
　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　3　0　0　3

COURSE OBJECTIVES:
- To expose the students to the concepts of Data warehousing Architecture and Implementation
- To Understand Data mining principles and techniques and Introduce DM as a cutting edge business intelligence
- To learn to use association rule mining for handling large data
- To understand the concept of classification for the retrieval purposes
- To know the clustering techniques in details for better organization and retrieval of data
- To identify Business applications and Trends of Data mining

UNIT I　　　DATA WAREHOUSE　　　　　　　　　　　　　　　　　　　　　　　　8
Data Warehousing - Operational Database Systems vs. Data Warehouses - Multidimensional Data Model - Schemas for Multidimensional Databases – OLAP Operations – Data Warehouse Architecture – Indexing – OLAP queries & Tools.

UNIT II　　　DATA MINING & DATA PREPROCESSING　　　　　　　　　　　　　9
Introduction to KDD process – Knowledge Discovery from Databases - Need for Data Preprocessing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation.

UNIT III　　　ASSOCIATION RULE MINING　　　　　　　　　　　　　　　　　　8
Introduction - Data Mining Functionalities - Association Rule Mining - Mining Frequent Itemsets with and without Candidate Generation - Mining Various Kinds of Association Rules - Constraint-Based Association Mining.

UNIT IV　　　CLASSIFICATION & PREDICTION　　　　　　　　　　　　　　　　10
Classification vs. Prediction – Data preparation for Classification and Prediction – Classification by Decision Tree Introduction – Bayesian Classification – Rule Based Classification – Classification by Back Propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction – Accuracy and Error Measures – Evaluating the Accuracy of a Classifier or Predictor – Ensemble Methods – Model Section.

UNIT V   CLUSTERING   10
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.

TOTAL : 45 PERIODS

COURSE OUTCOMES:
Upon Completion of the course, the students will be able to
- Store voluminous data for online processing
- Preprocess the data for mining applications
- Apply the association rules for mining the data
- Design and deploy appropriate classification techniques
- Cluster the high dimensional data for better organization of the data
- Discover the knowledge imbibed in the high dimensional system
- Evolve Multidimensional Intelligent model from typical system
- Evaluate various mining techniques on complex data objects

REFERENCES:
1. Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques" Second Edition, Elsevier, Reprinted 2008.
2. K.P. Soman, Shyam Diwakar and V. Ajay, "Insight into Data mining Theory and Practice", Easter Economy Edition, Prentice Hall of India, 2006.
3. G. K. Gupta, "Introduction to Data Mining with Case Studies", Easter Economy Edition, Prentice Hall of India, 2006.
4. BERSON, ALEX & SMITH, STEPHEN J, Data Warehousing, Data Mining, and OLAP, TMH Pub. Co. Ltd, New Delhi, 2012
5. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, "Introduction to Data Mining", Pearson Education, 2007
6. PRABHU Data Warehousing, PHI Learning Private Limited, New Delhi, 2012, ,
7. PONNIAH, PAULRAJ, Data Warehousing Fundamentals, John Wiley & Sons, New Delhi, 2011
8. MARAKAS, GEORGE M, Modern Data Warehousing, Mining, and Visualiza Visualization, Pearson Education, 2011

MC7404   NETWORK PROGRAMMING   L T P C
**   3 0 0 3**

COURSE OBJECTIVES :
   1. To understand interprocess and inter-system communication
   2. To understand socket programming in its entirety
   3. To understand usage of TCP/UDP / Raw sockets
   4. To understand how to build network applications

UNIT I   INTRODUCTION   9
Overview of UNIX OS - Environment of a UNIX process - Process control – Process relationships Signals – Interprocess Communication- overview of TCP/IP protocols

UNIT II   ELEMENTARY TCP SOCKETS   9
Introduction to Socket Programming –Introduction to Sockets – Socket address Structures – Byte ordering functions – address conversion functions – Elementary TCP Sockets – socket, connect, bind, listen, accept, read, write , close functions – Iterative Server – Concurrent Server.

UNIT III   APPLICATION DEVELOPMENT   9

 TCP Echo Server – TCP Echo Client – Posix Signal handling – Server with multiple clients – boundary conditions: Server process Crashes, Server host Crashes, Server Crashes and reboots, Server Shutdown – I/O multiplexing – I/O Models – select function – shutdown function – TCP echo Server (with multiplexing) – poll function – TCP echo Client (with Multiplexing)

UNIT IV   SOCKET OPTIONS, ELEMENTARY UDP SOCKETS   9

Socket options – getsocket and setsocket functions – generic socket options – IP socketoptions – ICMP socket options – TCP socket options – Elementary UDP sockets – UDP echo Server – UDP echo Client – Multiplexing TCP and UDP sockets – Domain name system – gethostbyname function – Ipv6 support in DNS – gethostbyadr function –getservbyname and getservbyport functions.

UNIT V   ADVANCED SOCKETS   9

Ipv4 and Ipv6 interoperability – threaded servers – thread creation and termination – TCP echo server using threads – Mutexes – condition variables – raw sockets – raw socket creation – raw socket output – raw socket input – ping program – trace route program.

TOTAL: 45 PERIODS

COURSE OUTCOMES:
1. To write socket API based programs
2. To design and implement client-server applications using TCP and UDP sockets
3. To analyze network programs

REFERENCES:

1. W. Richard Stevens, B. Fenner, A.M. Rudoff, "Unix Network Programming – The Sockets Networking API", 3rd edition, Pearson, 2004.
2. W. Richard Stevens, S.A Rago, "Programming in the Unix environment", 2nd edition, Pearson, 2005.

| MC7411 | SOFTWARE DEVELOPMENT – CASE TOOLS LABORATORY | L T P C |
| | | 0 0 3 2 |

1. Practicing the different types of case tools such as Rational Rose / other Open
        Source be used for all the phases of Software development life cycle.
2. Data modeling
3. Source code generators
4. Apply the following to typical application problems:
        1. Project Planning
        2. Software Requirement Analysis
        3. Software Design
        4. Data Modeling & Implementation
        5. Software Estimation
        6. Software Testing

A possible set of applications may be the following:
        a. Library System
        b. Student Marks Analyzing System
        c. Text Editor.
        d. Create a dictionary.
        e. Telephone directory.
        f. Inventory System.

TOTAL: 45 PERIODS

MC7412 **NETWORK PROGRAMMING LABORATORY** **L T P C**
0 0 3 2

1. Implementation of File System Calls
2. Implementation of ICP Techniques – Pipe, Message Queue, Shared Memory
3. Socket Programming
   a) TCP Sockets
   b) UDP Sockets
   c) Applications using Sockets
4. Simulation of Sliding Window Protocol
5. Simulation of Routing Protocols
6. RPC
7. Development of applications such as DNS / HTTP / E-mail / Multi-user chat

TOTAL : 45 PERIODS

MC7413 **TECHNICAL SEMIANR AND REPORT WRITING** **L T P C**
0 0 3 2

The goal of this course is to train the students to critically evaluate a well-defined set of research subjects and to summarize the findings concisely in a paper of scientific quality. The paper will be evaluated based on the ability to understand a topic, communicate it and identify the issues. Results from this term paper will be presented to fellow students and a committee of faculty members.

1. Every student selects a topic related to current trends and the same should be approved by the respective committee. This selection should have at least 5 distinct primary sources.

2. Every student must write a short review of the topic and present it to fellow students and faculty (discuss the topic – expose the flaws – analyze the issues) every week.

3. The faculty should evaluate the short review and award marks with respect to the following.

   a. Has the student analyzed – not merely quoted – the most significant portions of the primary sources employed?

   b. Has the student offered original and convincing insights?

   c. Plagiarism to be checked.

4. Every student should re-submit and present the review article including issues/ comments/ conclusions which had arisen during the previous discussion.

5. Every student should submit a final paper as per project specifications along with all short review reports (at least 4 internal reviews) and corresponding evaluation comments.

6. Every student should appear for a final external review exam to defend themselves.

TOTAL: 45 PERIODS

MC7501   **WEB APPLICATION DEVELOPMENT**   **L T P C**
                                                                                                     3 0 0 3

COURSE OBJECTIVES:
*   To acquire knowledge on the usage of recent platforms in developing web applications
*   To understand architecture of J2EE and design applications using J2EE, Straut and hypernet
*   To understand framework of .NET and design applications using .NET, C#, Silverlite
*   To Design and develop interactive, client-side, server-side executable web applications LAMP Stack.

UNIT I   J2EE Platform   9
Introduction -Enterprise Architecture Styles - J2EE Architecture - Containers - J2EE Technologies - Developing J2EE Applications - Naming and directory services - Using JNDI - JNDI Service providers - Java and LDAP - LDAP operations - Searching an LDAP server - Storing and retrieving java objects in LDAP - Application Servers - Implementing the J2EE Specifications - J2EE packaging and Deployment - J2EE packaging overview - Configuring J2EE packages

UNIT II   STRUTS AND HIBERNATE   9
Struts Architecture - Struts classes - Action Forward, Action Form, Action Servlet, Action classes - Understanding struts - config.xml, Understanding Action Mappings, Struts flow with an example application, Struts Tiles Framework, Struts Validation Framework – Hibernate - Architecture of Hibernate - Downloading Hibernate - Exploring HQL - Understanding Hibernate O/R Mapping.

UNIT III   LAMP STACK   9
Overview of Lamp Stack - Features of Lamp Stack –Understanding Python Understanding LAMP and Its Effect on Web Development

UNIT IV   .Net, C#   9
Introduction - .Net revolution - .Net framework and its architecture – CLR – What is Assembly – Components of Assembly – DLL hell and Assembly Versioning. Overview to C# - C # Compilation and Execution Process – C# Fundamentals (Data types, Operators, Programming constructs) – Inheritance –Sealed Classes – Interface - Overloading – OverRiding – Method Hiding – C# Property – Exception Handling

UNIT V   ASP.NET AND SILVERLIGHT   9
ASP.Net- IIS - ASP.Net Page Life Cycle – ASP Vs ASP.Net - HTML Controls Vs Server side Controls – Validation Controls – Data binding in ASP.Net – Caching – Configuration in ASP.Net (web.config) – Session management – View State in ASP.Net – ASP.Net. Introduction - RIA – Silverlight – XAML – App.Xaml – XAP – How Silverlight application executes in a web browser

                                                                                      TOTAL : 45 PERIODS

COURSE OUTCOMES:
*   Knows how to design and implement Internet systems for enhancing education and engineering design,
*   Able to understand functionality of Internet system
*   Able to design a system according to customer needs using the available Internet technologies
*   Able to Design and develop interactive, client-side, server-side executable web applications.
*   Explore the features of various platforms and frameworks used in web applications development

REFERENCES:
1. James Holmes "Struts: The Complete Reference, " 2nd Edition 2007 McGraw Hill Professional
2. Patrick Peak And Nick Heudecker, Patrick Peak, Nick Heudecker Hibernate Quickly, " 2007Dreamtech
3. Subrahmanyam Allamaraju and Cedric Buest , "Professional Java Server Programming(J2EE 1.3 Edition), ", Shroff Publishers & Distributors Pvt Ltd
4. Jesse Liberty , 'Programming C#, " , 4th Edition, O'Reilly Media
5. Mario Szpuszta, Matthew MacDonald , "Pro ASP.NET 4 in C# 2010: Includes Silverlight 2, "Apress, Third Edition
6. Jason Beres, Bill Evjen, Devin Rader , 'Professional Silverlight 4 Print", December 2012 www.free-ebooks-library.com
7. James Lee, Brent Ware , "Open Source Development with LAMP: Using Linux, Apache, MySQL, Perl, and PHP" Addison Wesley, Pearson 2009
8. Vern Ceder ,"The Quick Python Book," Second Edition, Manning Publications Company,2010

MC7502   **SERVICE ORIENTED ARCHITECTURE**   **L T P C**
                                                                         3 0 0 3

COURSE OBJECTIVES:
- To provide fundamental concepts of Service Oriented Architecture..
- To gain knowledge about SOAP, UDDI and XML to create web services.
- To know about the Cloud Computing architecture and services.

UNIT I   SOA BASICS   9
Roots of SOA – Characteristics of SOA - Comparing SOA to client-server and distributed internet architectures – Anatomy of SOA- How components in an SOA interrelate - Principles of service orientation – Service Layers.

UNIT II   XML AND WEB SERVICES   9
XML structure – Elements – Creating Well-formed XML - Name Spaces – Schema Elements, Types, Attributes – XSL Transformations – Parser – Web Services Overview – Architecture.

UNIT III   WSDL, SOAP and UDDI   9
WSDL - Overview Of SOAP – HTTP – XML-RPC – SOAP: Protocol – Message Structure – Intermediaries – Actors – Design Patterns And Faults – SOAP With Attachments – UDDI.

UNIT IV   SOA in J2EE and .NET   9
SOA platform basics – SOA support in J2EE – Java API for XML-based web services (JAX-WS) - Java architecture for XML binding (JAXB) – Java API for XML Registries (JAXR) - Java API for XML based RPC (JAX-RPC) – JAX-RS SOA support in .NET – ASP.NET web services.

UNIT V   CLOUD COMPUTING   9
Vision of Cloud computing – Cloud Definition – Characteristics and Benefits – Virtualization – Cloud computing Architecture – Cloud Reference Model, Types of Clouds – Cloud Platforms in Industry.

TOTAL : 45 PERIODS

COURSE OUTCOMES:
- Known about the basic principles of service oriented architecture , its components and techniques
- Understand the architecture of web services
- Able to design and develop web services using protocol
- Understand technology underlying the service design
- Acquire the fundamental knowledge of cloud computing

REFERENCES:
1. Thomas Erl, "Service-Oriented Architecture: Concepts, Technology, and Design", Pearson Education, 2006.
2. Heather Williamson, "XML, The Complete Reference", McGraw Hill Education, 2012.
3. Frank. P. Coyle, "XML, Web Services And The Data Revolution", Pearson Education, 2002.
4. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services. An Architect's Guide", Pearson Education, 2005.
5. Newcomer, Lomow, "Understanding SOA with Web Services", Pearson Education, 2005.
6. Dan woods and Thomas Mattern, "Enterprise SOA designing IT for Business Innovation", O'REILLY, First Edition, 2006.
7. Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi, "Mastering Cloud Computing", McGraw Hill Education, 2013.

MC7503   **MOBILE COMPUTING**   **L T P C**
                                                                       3 0 0 3

COURSE OBJECTIVES:
- To learn the basic concepts, aware of the GSM, SMS, GPRS Architecture.
- To have an exposure about wireless protocols -WLN, Bluetooth, WAP, ZigBee **issues**.
- To Know the Network, Transport Functionalities of Mobile communication
- To understand the concepts of Adhoc and wireless sensor networks.
- To impart knowledge about Mobile Application Development

UNIT I   **WIRELESS COMMUNICATION FUNDAMENTALS, ARCHITECTURE**   **9**
Frequencies Spectrum- Multiplexing- Spread spectrum-GSM vs CDMA - 2G Mobile Wireless Services -Comparison of 2G and 3 G - GSM Architecture-Entities-Call Routing-PLMN-Address and identifiers-Network Aspects-Mobility Management-Frequency Allocation-Authentication and Security-SMS Architecture-Value Added Service through SMS-GPRS-GPRS and Packet Data Network-Architecture-Network Operations-Data Service-Application .

UNIT II   **MOBILE WIRELESS SHORT RANGE NETWORKS**   **9**
Introduction-WLAN Equipment-WLAN Topologies-WLAN Technologies-IEEE 802.11 Architecture-WLAN MAC-Security of WLAN, Power Management-Standards- WAP Architecture-WAP 2.0-Bluetooth enabled Devices Network-Layers in Bluetooth Protocol-Security in Bluetooth- IrDA- ZigBee

UNIT III   **MOBILE IP NETWORK LAYER, TRANSPORT LAYER**   **9**
IP and Mobile IP Network Layer- Packet delivery and Handover Management-Location Management-Registration- Tunneling and Encapsulation-Route Optimization- Dynamic Host Configuration Protocol–VoIP -IPsec -Mobile Transport Layer-Conventional TCP/IP Transport Layer Protocol-Indirect, Snooping, Mobile TCP

UNIT IV   MOBILE AD-HOC, SENSOR NETWORKS   9
Introduction to Mobile Ad hoc Network- MANET-Routing and Routing Algorithm-Security – Wireless Sensor Networks-Applications- Distributed Network and Characteristics-Communication Coverage-Sensing Coverage-Localization- Routing -Function Computation- Scheduling

UNIT V   MOBILE APPLICATION DEVELOPMENT   9
Mobile Applications Development -Application Development Overflow-Techniques for Composing Applications - Understanding the Android Software Stack – Android Application Architecture – Developing for Android – The Android Application Life Cycle – The Activity Life Cycle – Creating Your First Android Activity – Creating Applications and Activities – Creating User Interfaces – Intents – Broadcast Receivers – Adapters – Data Storage, Retrieval, and Sharing.-Geo services- creating mobile applications like game, Clock, calendar, Convertor, phone book, Text Editor

TOTAL: 45 PERIODS

COURSE OUTCOMES:
- Gain the knowledge about various types of Wireless Data Networks and Wireless Voice Networks.
- understand the architectures, the challenges and the Solutions of Wireless Communication those are in use.
- realize the role of Wireless Protocols in shaping the future Internet.
- know about different types of Wireless Communication Networks and their functionalities.
- Able to develop simple Mobile Application Using Android

REFERENCES
1. Asoke K Talukder, Hasan Ahmed,Roopa R Yavagal "Mobile Computing", Tata McGraw Hill Pub ,Aug – 2010
2. Raj Kamal "Mobile Computing" Oxford Higher Education, Second Edition, 2012
3. Pei Zheng, Larry L. Peterson, Bruce S. Davie, Adrian Farrell "Wireless Networking   Complete" Morgan Kaufmann Series in Networking , 2009(introduction, WLAN MAC)
4. Vijay K Garg "Wireless Communications & Networking" Morgan Kaufmann Series, 2010
5. Jochen Schillar "Mobile Communications" Pearson Education second Edition
6. Donn Felker ,'Android Application Development For Dummies, Wiley, 2010
7. Reto Meier,Professional Android 2 Application Development, Wrox's Programmer to Programmer series
8. Ed Burnette,'Hello, Android: Introducing Google's Mobile Development Platform' third edition' Pragmatic Programmers,2012
9. Jerome(J.F) DiMarzio "Android A programmer's Guide" Tata McGraw-Hill 2010 Edition

MC7511   **ADVANCED INTERNET PROGRAMMING LABORATORY**   **L T P C**
                                                                                          0 0 3 2

1. Develop a car showroom inventory web application with 2-tier architecture. Use JSP and JDBC
2. Develop a real estate web application with n-tier architecture. Use JSP, Servlets and JDBC. The application should be able to add and search all properties such as rental/own, individual/apartment and duplex/semi-duplex
3. Develop any web application which authenticates using LDAP
4. Develop a standalone java application or a web application to add, modify and delete the LDAP attributes of the given input
5. Design a student identity management web application using struts framework. The application should be able to provide an identity such as student id, access to department assets with department id, access to lab assets with lab id.
6. Create an online bookstore that includes all validation controls available in ASP.NET
7. Create a component that receives two numbers from the user through a Web Form, and based on the user's selection add or subtract the two numbers and returns the result to the Web Form. The result should be displayed in the Web Form using ASP.NET
8. Create a Silverlight Application for the SharePoint Client Object Model
9. Create a graph using the SharePoint Object Model and Silverlight Graphing controls

TOTAL : 45 PERIODS

MC7512   **XML AND WEB SERVICES LABORATORY**   **L T P C**
                                                                                          0 0 3 2

1. XML document creation.
2. Importing and Exporting XML document in database.
3. XSL Transformation
4. Internal and External DTD creation
5. XML Schema creation
6. Parsing XML document using DOM/SAX parser.
7. Web Service creation using JAX-WS
8. Web Service creation using JAX-RS
9. Web Service creation using .NET
10. JAXB Marshaling and Unmarshaling

A possible set of applications may be the following:

      a. Currency Conversion
      b. Temperature Conversion
      c. Ticket Booking
      d. Dictionary

TOTAL: 45 PERIODS

MC7513   **MINI PROJECT (SOCIALLY RELEVANT)**   **L T P C**
                                                                        0 0 3 2

- Team Project with a maximum of four in a team
- Students shall select a domain and develop an application with social relevance
- Documentation is to be based on the standards
- Evaluation pattern is like Lab examination
- Need to submit a report, presentation with demo.
- User Based Testing and feedback from the benefited society required

TOTAL: 45 PERIODS.

MC7001   **GAME PROGRAMMING**   **L T P C**
                                                                        3 0 0 3

COURSE OBJECTIVES:
- To understand of game design and development
- To understand the processes, mechanics, issues in game design, game engine development
- To understand modeling, techniques, handling situations, and logic.

UNIT I   3D GRAPHICS FOR GAME PROGRAMMING   9
Coordinate Systems, Ray Tracing, Modeling in Game Production, Vertex Processing, Rasterization, Fragment Processing and Output Merging, Illumination and Shaders, Parametric Curves and Surfaces, Shader Models, Image Texturing, Bump Mapping,Advanced Texturing, Character Animation, Physics-based Simulation

UNIT II   GAME DESIGN PRINCIPLES   9
Character development, Story Telling, Narration, Game Balancing, Core mechanics, Principles of level design, Genres of Games, Collision Detection, Game Logic, Game AI, Path Finding

UNIT III   GAMING ENGINE DESIGN   9
Renderers, Software Rendering, Hardware Rendering, and Controller based animation, Spatial Sorting, Level of detail, collision detection, standard objects, and physics

UNIT IV   GAMING PLATFORMS AND FRAMEWORKS   9
Flash, DirectX, OpenGL, Java, Python, XNA with Visual Studio, Mobile Gaming for the Android, iOS, Game engines - Adventure Game Studio, DXStudio, Unity

UNIT V   GAME DEVELOPMENT   9
Developing 2D and 3D interactive games using OpenGL, DirectX – Isometric and Tile Based Games, Puzzle games, Single Player games, Multi Player games.
TOTAL: 45 PERIODS
 COURSE OUTCOMES:
- Able to understand and apply 3 D concepts in Game programming.
- Gain knowledge about principles and levels of design in various game development
- Gain knowledge about gaming engine design for controlling
- Explore into various platforms and frameworks available for game development
- Able to design and develop interactive games

REFERENCE BOOKS:
1. David H. Eberly, "3D Game Engine Design, Second Edition: A Practical Approach to Real-Time Computer Graphics" Morgan Kaufmann, 2 Edition, 2006.
2. JungHyun Han, "3D Graphics for Game Programming", Chapman and Hall/CRC,1st edition, 2011.
3. Mike McShaffrfy, "Game Coding Complete", Third Edition, Charles River Media, 2009.
4. Jonathan S. Harbour, "Beginning Game Programming", Course Technology PTR, 3 edition, 2009.
5. Ernest Adams and Andrew Rollings, "Fundamentals of Game Design", Prentice Hall 1st edition, 2006.
6. Roger E. Pedersen, "Game Design Foundations", Edition 2, Jones & Bartlett Learning, 2009.
7. Scott Rogers, "Level Up!: The Guide to Great Video Game Design", Wiley, 1st edition, 2010.
8. Jason Gregory, "Game Engine Architecture", A K Peters, 2009.
9. Jeannie Novak, "Game Development Essentials", 3rd Edition, Delmar Cengage Learning, 2011.
10. Andy Harris, "Beginning Flash Game Programming For Dummies", For Dummies; Updated edition, 2005.
11. John Hattan, "Beginning Game Programming: A GameDev.net Collection",Course Technology PTR, 1 edition, 2009.
12. 8. Eric Lengyel, "Mathematics for 3D Game Programming and Computer Graphics", Third Edition, Course Technology PTR, 3rd edition, 2011.
13. Dino Dini, **"**Essential 3D Game Programming", Morgan Kaufmann, 1st edition 2012.
14. Jim Thompson, Barnaby Berbank-Green, and Nic Cusworth, "Game Design: Principles, Practice, and Techniques - The Ultimate Guide for the Aspiring Game Designer", 1st edition, Wiley, 2007.

MC7002   **SOFT COMPUTING**   **L T P C**
                                                                             3 0 0 3

COURSE OBJECTIVES
- To learn the key aspects of Soft computing
- To know about the components and building block hypothesis of Genetic algorithm.
- To understand the features of neural network and its applications
- To study the fuzzy logic components
- To gain insight onto Neuro Fuzzy modeling and control.
- To gain knowledge in machine learning through Support vector machines.

UNIT I   **INTRODUCTION TO SOFT COMPUTING**   **9**
Evolution of Computing - Soft Computing Constituents – From Conventional AI to Computational Intelligence - Machine Learning Basics

UNIT II   **GENETIC ALGORITHMS**   **9**
Introduction, Building block hypothesis, working principle, Basic operators and Terminologies like individual, gene, encoding, fitness function and reproduction, Genetic modeling: Significance of Genetic operators, Inheritance operator, cross over, inversion & deletion, mutation operator, Bitwise operator, GA optimization problems, JSPP (Job Shop Scheduling Problem), TSP (Travelling Salesman Problem),Differences & similarities between GA & other traditional methods, Applications of GA.

UNIT III   NEURAL NETWORKS   9
Machine Learning using Neural Network, Adaptive Networks – Feed Forward Networks – Supervised Learning Neural Networks – Radial Basis Function Networks - Reinforcement Learning – Unsupervised Learning Neural Networks – Adaptive Resonance Architectures – Advances in Neural Networks.

UNIT IV   FUZZY LOGIC   9
Fuzzy Sets – Operations on Fuzzy Sets – Fuzzy Relations – Membership Functions-Fuzzy Rules and Fuzzy Reasoning – Fuzzy Inference Systems – Fuzzy Expert Systems – Fuzzy Decision Making

UNIT V   NEURO-FUZZY MODELING   9
Adaptive Neuro-Fuzzy Inference Systems – Coactive Neuro-Fuzzy Modeling – Classification and Regression Trees – Data Clustering Algorithms – Rule base Structure Identification – Neuro-Fuzzy Control – Case Studies.

TOTAL: 45 PERIODS

COURSE OUTCOMES:
- Implement machine learning through neural networks.
- Gain Knowledge to develop Genetic Algorithm and Support vector machine based machine learning system
- Write Genetic Algorithm to solve the optimization problem
- Understand fuzzy concepts and develop a Fuzzy expert system to derive decisions.
- Able to Model Neuro Fuzzy system for data clustering and classification.

REFERENCES:
1. Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, "Neuro-Fuzzy and Soft Computing", Prentice-Hall of India, 2003
2. Kwang H.Lee, "First course on Fuzzy Theory and Applications", Springer–Verlag Berlin Heidelberg, 2005.
3. George J. Klir and Bo Yuan, "Fuzzy Sets and Fuzzy Logic-Theory and Applications", Prentice Hall, 1995.
4. James A. Freeman and David M. Skapura, "Neural Networks Algorithms, Applications, and Programming Techniques", Pearson Edn., 2003.
5. David E. Goldberg, "Genetic Algorithms in Search, Optimization and Machine Learning", Addison Wesley, 2007.
6. Mitsuo Gen and Runwei Cheng,"Genetic Algorithms and Engineering Optimization", Wiley Publishers 2000.
7. Mitchell Melanie, "An Introduction to Genetic Algorithm", Prentice Hall, 1998.
8. S.N.Sivanandam, S.N.Deepa, "Introduction to Genetic Algorithms", Springer, 2007.
9. A.E. Eiben and J.E. Smith "Introduction to Evolutionary Computing" Springer, 2003
10. E. Sanchez, T. Shibata, and L. A. Zadeh, Eds., "Genetic Algorithms and Fuzzy Logic Systems: Soft Computing Perspectives, Advances in Fuzzy Systems - Applications and Theory", Vol. 7, River Edge, World Scientific, 1997.
11. ROSS TIMOTHY J, Fuzzy Logic with Engineering Applications, Wiley India Pvt Ltd, New Delhi, 2010

MC7003   **ACCOUNTING AND FINANCIAL MANAGEMENT**   **L T P C**

                                                                              3 0 0 3
COURSE OBJECTIVES
- To understand the basic principles of Double entry system and preparation of balance sheet.
- To understand the process of estimating the cost of a particular product.
- To Prepare the estimate for various business activities such as purchase, sale, production and cash budgets
- To ensure decision making process of an organization.
-

UNIT I   FINANCIAL ACCOUNTING   9
Meaning and Scope of Accounting-Principles-Concepts-Conventions-Accounting Standards-Final Accounts-Trail Balance-Trading Account-Profit and Loss Account-Balance Sheet-Accounting Ratio Analysis-Funds Flow Analysis-Cash Flow Analysis

UNIT II   ACCOUNTING   9
Meaning-Objectives-Elements of Cost-Cost Sheet-Marginal Costing and Cost Volume Profit Analysis-Break Even Analysis-Applications-Limitations-Standard Costing and Variance Analysis-Material-Labor-Overhead-Sales-Profit Variances

UNIT III   BUDGETS AND BUDGETING CONTROL   9
Budgets and Budgetary Control-Meaning-Types-Sales Budget-Production Budget-Cost of Production Budget-Flexible Budgeting-Cash Budget-Master Budget-Zero Base Budgeting-Computerized Accounting

UNIT IV   INVESTMENT DECISION AND COST OF CAPITAL   9
Objectives and Functions of Financial Management-Risk-Return Relationship-Time Value of Money Concepts-Capital Budgeting-Methods of Appraisal-Cost of Capital Factors Affecting Cost of Capital-Computation for Each Source of Finance and Weighted Average Cost of Capital

UNIT V   FINANCING DECISION AND WORKING CAPITAL MANAGEMENT   9
Capital Structure-Factors Affecting Capital Structure-Dividend Policy-Types of Dividend Policy-Concepts of Working Capital-Working Capital Policies-Factors affecting Working Capital-Estimation of Working Capital Requirements

COURSE OUTCOMES
- Able to understand the balance sheet preparation and do analysis
- Able to understand the budget preparation and control of a company
- Helps to decide about the state of affairs of a particular firm / company.
- Ensures the preparation of fiscal policies of the organization.
- Ensures the factors to be considered in investment policies.

REFERENCES:
1. S.N.Maheswari, "Financial and Management Accounting", Sultan Chand & Sons, 5 edition,2010
2. I.M.Pandey, "Financial Management", Vikas Publishing House Pvt. Ltd., 9th Edition, 2009.
3. M.Y.Khan and P.K.Jain, "Financial Management, Text, Problems and Cases", Tata McGraw Hill, 5th Edition, 2008.
4. Aswat Damodaran, "Corporate Finance Thoery and Practice", John Wiley & Sons, 2008.
5. I.M.Pandey, "Management Accounting", Vikas Publishing House Pvt. Ltd., 3rd Edition, 2009
6. Brigham, Ehrhardt, "Financial Management Theory and Practice" 11th Edition, Cengage Learning, 2008
7. Srivatsava, Mishra, "Financial Management", Oxford University

MC7004   **ENERGY AWARE COMPUTING**   **L T P C**
                                                                              3 0 0 3

COURSE OBJECTIVES:
- To examines the design of power efficient architecture, power and performance tradeoffs, restructuring of software and applications and standards for energy aware Hardware and Software.
- To know the fundamental principles energy efficient devices
- To study the concepts of Energy efficient storage
- To introduce energy efficient algorithms
- Enable the students to know energy efficient techniques involved to support real-time systems.
- To study Energy aware applications.

UNIT I   INTRODUCTION   9
 Energy efficient network on chip architecture for multi core system-Energy efficient MIPS CPU core with fine grained run time power gating – Low power design of Emerging memory technologies.

UNIT II   ENERGY EFFICIENT STORAGE   9
Disk Energy Management-Power efficient strategies for storage system-Dynamic thermal management for high performance storage systems-Energy saving technique for Disk storage systems

UNIT III   ENERGY EFFICIENT ALGORITHMS   9
Scheduling of Parallel Tasks – Task level Dynamic voltage scaling – Speed Scaling – Processor optimization- Memetic Algorithms – Online job scheduling Algorithms.

UNIT IV   REAL TIME SYSTEMS   9
Multi processor system – Real Time tasks- Energy Minimization – Energy aware scheduling- Dynamic Reconfiguration- Adaptive power management-Energy Harvesting Embedded system..

UNIT V   ENERGY AWARE APPLICATIONS   9
On chip network – Video codec Design – Surveillance camera- Low power mobile storage.
                                                                    TOTAL: 45 PERIODS
COURSE OUTCOMES:
- To Design Power efficient architecture Hardware and Software.
- To analyze power and performance trade off between various energy aware storage devices.
- To implement various energy aware algorithms.
- To restructure the software and Hardware for Energy aware applications.
- To know the Energy aware applications

REFERENCE BOOKS:
1. Handbook of Energy Aware and Green computing, Ishfaq Ah mad, Sanjay Ranka, Chapman and Hall/CRC ,2012
2. Energy Aware system design Algorithms and Architecture, Chong-Min Kyung, Sungioo yoo, Springer,2011.
3. Energy Aware computing, Bob steiger wald ,Chris:Luero,Intel Press,2012.

MC7005   **SECURITY IN COMPUTING**   **L T P C**
                                                                          3 0 0 3

COURSE OBJECTIVES:
- To understand the basics of cryptography
- learn to find the vulnerabilities in programs and to overcome them,
- know the different kinds of security threats in networks and its solution
- know the different kinds of security threats in databases and solutions available
- learn about the models and standards for security.

UNIT I   ELEMENTARY CRYPTOGRAPHY   9
Terminology and Background – Substitution Ciphers – Transpositions – Making Good Encryption Algorithms- Data Encryption Standard- AES Encryption Algorithm – Public Key Encryption – Cryptographic Hash Functions – Key Exchange – Digital Signatures – Certificates

UNIT II   PROGRAM SECURITY   9
Secure programs – Non-malicious Program Errors – Viruses – Targeted Malicious code – Controls Against Program Threat – Control of Access to General Objects – User Authentication – Good Coding Practices – Open Web Application Security Project Flaws – Common Weakness Enumeration Most Dangerous Software Errors

UNIT III   SECURITY IN NETWORKS   9
Threats in networks – Encryption – Virtual Private Networks – PKI – SSH – SSL – IPSec – Content Integrity – Access Controls – Wireless Security – Honeypots – Traffic Flow Security – Firewalls – Intrusion Detection Systems – Secure e-mail.

UNIT IV   SECURITY IN DATABASES   9
Security requirements of database systems – Reliability and Integrity in databases –Redundancy – Recovery – Concurrency/ Consistency – Monitors – Sensitive Data – Types of disclosures – Inference-finding and confirming sql injection

UNIT V   SECURITY MODELS AND STANDARDS   9
Secure SDLC – Secure Application Testing – Security architecture models – Trusted Computing Base – Bell-LaPadula Confidentiality Model – Biba Integrity Model – Graham-Denning Access Control Model – Harrison-Ruzzo-Ulman Model – Secure Frameworks – COSO – CobiT – Compliances – PCI DSS – Security Standards - ISO 27000 family of standards – NIST.

                                                          TOTAL: 45 PERIODS
COURSE OUTCOMES:
- Apply cryptographic algorithms for encrypting and decryption for secure data transmission
- Understand the importance of Digital signature for secure e-documents exchange
- Understand the program threats and apply good programming practice
- Get the knowledge about the security services available for internet and web applications
- Understand data vulnerability and sql injection
- Gain the knowledge of security models and published standards

REFERENCES:
1. Charles P. Pfleeger, Shari Lawrence Pfleeger, "Security in Computing", Fourth Edition, Pearson Education, 2007.
2. Michael Whitman, Herbert J. Mattord, "Management of Information Security", Third Edition, Course Technology, 2010.
3. William Stallings, "Cryptography and Network Security : Principles and Practices", Fifth Edition, Prentice Hall, 2010.

4. Michael Howard, David LeBlanc, John Viega, "24 Deadly Sins of Software Security: Programming Flaws and How to Fix Them", First Edition, Mc GrawHill Osborne Media, 2009.
5. Matt Bishop, "Computer Security: Art and Science", First Edition, Addison-
6. Wesley, 2002.
7. https://www.owasp.org/index.php/Top_10_2010
8. https://www.pcisecuritystandards.org/security_standards/pci_dss.shtml
9. http://cwe.mitre.org/top25/index.html
10. Justin Clarke "SQL injection Attacks and defense" Elsevier ,2012

MA7071　　　　　　　　**NUMERICAL AND STATISTICAL METHODS**　　　　**L T P C**
　　　3 0 0 3

COURSE OBJECTIVES:
- To understand and apply numerical methods for solving systems of linear equations
- To understand and apply numerical integration and differentiation
- To solving initial value problems of ordinary differential equations numerically
- To provide an understanding of the statistical methods and probabilistic concepts   by which real-life problems are analyzed
   (Focus on problems- No derivations)

UNIT I　　　　LINEAR SYSTEM OF EQUATIONS　　　　　　　　　　　　　　　9
Solution of Systems of equations – Solution of Simultaneous linear equations – Gauss elimination methods – Gauss Jordan methods, Jacobi and Gauss Seidal iterative methods

UNIT II　　　　NUMERICAL DIFFERENTIATION AND INTEGRATION　　　　　9
Interpolation, Differentiation and integration – difference table – Newton's forward and backward interpolation –Lagrangian interpolation –Differentiation formulae– Trapezoidal and Simpson rule Gaussian – Quadrature

UNIT III　　　DIFFERENTIAL EQUATIONS　　　　　　　　　　　　　　　　9
Ordinary Differential equations–Taylor Series and Euler methods, Runge– Kutta methods – Predictor-corrector method – Milne and Adam – Bashforth methods – Error Analysis

UNIT IV　　　PROBABILITY DISTRIBUTIONS　　　　　　　　　　　　　　9
Probability axioms- Bayes Theorem- One dimensional Discrete random variables and Continuous random variables – Density and Distribution functions – Binomial and normal distribution

UNIT V　　　SAMPLING DISTRIBUTIONS　　　　　　　　　　　　　　　　9
Small sample, t-test, F-test, χ^2 –test, ANOVA one way classification and two way classification
　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　TOTAL: 45 PERIODS

COURSE OUTCOMES:
- Develop a good understanding of the various methods used for the numerical solution of scientific problems
- Able to solve system of linear equations and   initial value problems of ordinary differential equations numerically
- Help to understand the value of probability and Statistics in acquiring knowledge and making decisions
- Develop an ability to apply statistical tests in experiments, as well as to analyze and interpret data

REFERENCES:
1. Baghel Singh Grewal, "Numerical Methods in Engineering and Science,Khanna Publisher 2011
2. John.E..Freund, Irwin Miller, Marylees Miller "Mathematical Statistics with   Applications ", Seventh Edition, Prentice Hall of India, 2011.
3. T.Veerarajan , "Probability, statistics and random process" third edition Tata Mcgrawhill publications,2009
4. Steven C. Chapra, Raymond P. Canale, " Numerical methods for Engineers", McGraw-Hill Higher Education, 01-Aug-2010
5. A.M.Natarajan & A.Tamilarasi, "Probability Random Processes and Queuing theory", New Age International Publishers, 2nd Edition, 2005.
6. C. Woodford, "*Numerical Methods* with Worked Examples: Matlab Edition Springer,2012.

MC7006	M - COMMERCE	L T P C
		3 0 0 3

COURSE OBJECTIVES:
- To understand the E – commerce strategies and value chains
- To understand the M-commerce services
- To understand M – commerce infrastructure and applications.
- To know the availability of latest technology and applications of M- commerce in various domains.
- To apply mobile commerce in business-to-business application.

UNIT I   ELECTRONIC COMMERCE   9

Introduction -The e-commerce environment - The e-commerce marketplace -Focus on portals, Location of trading in the marketplace - Commercial arrangement for transactions - Focus on auctions - Business models for e-commerce - Revenue models - Focus on internet start-up companies - the dot-com - E-commerce versus E-business.

UNIT II   MOBILE COMMERCE   9

Introduction – Infrastructure Of M– Commerce – Types Of Mobile Commerce Services – Technologies Of Wireless Business – Benefits And Limitations, Support, Mobile Marketing & Advertisement, Non– Internet Applications In M– Commerce – Wireless/Wired Commerce Comparisons

UNIT III   MOBILE COMMERCE: TECHNOLOGY   9

A Framework For The Study Of Mobile Commerce – NTT Docomo's I– Mode – Wireless Devices For Mobile Commerce – Towards A Classification Framework For Mobile Location Based Services – Wireless Personal And Local Area Networks –The Impact Of Technology Advances On Strategy Formulation In Mobile Communications Networks

UNIT IV   MOBILE COMMERCE: THEORY AND APPLICATIONS   9

The Ecology Of Mobile Commerce – The Wireless Application Protocol – Mobile Business Services – Mobile Portal – Factors Influencing The Adoption Of Mobile Gaming Services – Mobile Data Technologies And Small Business Adoption And Diffusion – M–Commerce In The Automotive Industry – Location– Based Services: Criteria For Adoption And Solution Deployment – The Role Of Mobile Advertising In Building A Brand – M– Commerce Business Models

UNIT V   BUSINESS– TO– BUSINESS MOBILE E-COMMERCE   9

Enterprise Enablement – Email And Messaging – Field Force Automation (Insurance,Real Estate, Maintenance, Healthcare) – Field Sales Support (Content Access, Inventory) – Asset Tracking And Maintenance/Management – Remote IT Support –Customer Retention (B2C Services, Financial, Special Deals) – Warehouse Automation – Security.

TOTAL : 45 PERIODS

COURSE OUTCOMES:
- Able to apply E – commerce principles in market place.
- Able to apply M – commerce principles to various business domains
- Understand the theory and applications of M-commerce in business domain
- Get an exposure to current technological advancements in M-commerce.
- Able to build M – commerce business models.

REFERENCE BOOKS:

1. Dave Chaffey, "E-Business and E-Commerce Management", Third Edition, 2009, Pearson Education
2. Brian E. Mennecke, Troy J. Strader, "Mobile Commerce: Technology, Theory and Applications", Idea Group Inc., IRM press, 2003.
3. P. J. Louis, " M-Commerce Crash Course", McGraw- Hill Companies February 2001.
4. Paul May, "Mobile Commerce: Opportunities, Applications, and Technologies of Wireless Business" Cambridge University Press March 2001.
5. Michael P. Papazoglou, Peter M.A. Ribbers, 'e-business organizational and Technical foundation ',Wiley India 2009
6. Dr.Pandey , Saurabh Shukla E-commerce and Mobile commerce Technologies , Sultan chand ,2011

MC7007	**HEALTH CARE MANAGEMENT**	**L T P C**
		3 0 0 3

COURSE OBJECTIVES:
- To understand the basic concepts of health care system.
- To know about creating and maintaining health care information systems
- To ensure access of clinical information system on the fly
- To understand IT governance and assessment of health care information system

UNIT I   INTRODUCTION   9
Introduction to health care information – Health care data quality – Health care information regulations, laws and standards.

UNIT II   HEALTH CARE INFORMATION SYSTEMS   9
History and evolution of health care information systems – Current and emerging use of clinical information systems – system acquisition – System implementation and support.

UNIT III   INFORMATION TECHNOLOGY   9
Information architecture and technologies that support health care information systems – Health care information system standards – Security of health care information systems.

UNIT IV   MANAGEMENT OF IT CHALLENGES   9
Organizing information technology services – IT alignment and strategic planning – IT governance and management.

UNIT V   IT INITIATIVES   9
Management's role in major IT initiatives – Assessing and achieving value in health care information systems. Case study

TOTAL : 45 PERIODS

COURSE OUTCOMES:
- Develop an understanding of basic research skills applicable to the design, evaluation and implementation of appropriate Healthcare Information Systems (HIS) ;
- Define and analyse the impact, strengths and weaknesses of various HIS in any healthcare settings
- Write reports on the roles of HIS and their impact on facilitating superior healthcare delivery
- Design a suitable HIS architecture
- Use research methods and analysis together to plan the successful implementation of an appropriate HIS solution

REFERENCE BOOKS:
1. Karen A Wager, Frances Wickham Lee, John P Glaser, " Managing Health Care Information Systems: A Practical Approach for Health Care Executives", John Wiley, 2 nd edition 2009.
2. Marion J. Ball, Charlotte Weaver, Joan Kiel ,"Healthcare Information Management Systems: Cases, Strategies, and Solutions", Springer, 2010, 3 rd edition
3. Rudi Van De Velde and Patrice Degoulet, "Clinical Information Sytems: A Componenet based approach", Springer 2005.
4. Kevin Beaver,Healthcare Information Systems, Second edition Best Practices, CRC Press, 2002
5. Marion J. BallHealthcare Information Management Systems: A Practical Guide Springer-Verlag GmbH, 1995

MC7008   **GEOLOGICAL INFORMATION SYSTEMS**   **L T P C**
                                                                    3 0 0 3

COURSE OBJECTIVES:
- Understand the basic concepts of Geological information systems.
- To provide an exposure to spatial database structures and their utility in GIS.
- Understand the process of scanning, digitizing and georeferencing.
- To introduce the raster and vector geoprocessing capabilities of GIS.

UNIT I   SPATIAL DATA REPRESENTAION   9
GIS – Definition and related terminology- Components of GIS: Data,Technology,Application– digital representation of geospatial data – raster – vector – object oriented – geo database model-analysis .

UNIT II   DATA DIGITIZATION AND PREPARATION   9
Characteristics of raster data processing—raster File format-Acquiring and handling raster Data – Georeferencing-Preproceesing-mosaicking– Linking digital databases: ODBC – GPS data integration Characteristics of Vector Geoprocessing -Vector Data Input – Digitizer: Principles, Co-ordinate transformation – Graphical data editing – Scanner: Principles, On Screen Digitization-post scanning-importing- data editing

UNIT IV   RASTER DATA ANALYSIS   9
Raster Geospatial Data Analysis-Local operations: Reclassification, Logical and Arithmetic overlay operations – Neighbourhood operations: Aggregation, Filtering, Slope and Aspect map – Extended neighbourhood operations: - Statistical Analysis, Proximity, Connectivity operations, Buffering, Viewshed analysis – Regional operations: Area, Perimeter, Shape, Identification of region and Classification-output functions of Raster geoprocessing

UNIT III   VECTOR DATA PROCESSING   9
Non-topological analysis: Attribute database query, SQL, Summary statistics-statistical computation-calculation-quantification- Address geocoding, -Topological analysis Feature based topological functions-overlay-buffering- Layer based topological function-Reclassification, Aggregation, Overlay analysis- Point-in-polygon, Line-in-polygon, Polygon-on-polygon: Clip, Erase, Identity, Union, Intersection – Network based Geoprocessing –Output functions

UNIT V   GIS MODELLING AND APPLICATIONS   9
Spatial modelling – External, Conceptual, Logical, Internal –GIS Modeling with case study- spatial data mining-DEM- introduction and applications

COURSE OUTCOMES:
- Understand GIS concepts and spatial data representation
- Able to design spatial data input in raster form as well as vector form
- Understand vector data analysis and output functions
- Understand raster data geo processing
- Able to design a GIS model for real world problem

REFERENCES:
1. Lo, C.P. and Yeung, Albert K.W., Concepts and Techniques of Geographic Information Systems, Prentice Hall, 2/E,2009.
2. Peter A. Burrough, Rachael A. McDonnell, Principles of GIS, Oxford University Press, 2000
3. Kang-Tsung Chang ,Introduction to Geographic Information Systems, McGraw-Hill Higher Education, 2006
4. Robert Laurini and Derek Thompson, Fundamentals of Spatial Information Systems, Academic Press, 1996
5. Paul A. Longley, Mike Goodchild, David J. Maguire, Geographic Information Systems and Science, John Wiley & Sons Inc ,2011.

MC7009   HUMAN RESOURCE MANAGEMENT   L T P C
                                                                                3   0 0 3

COURSE OBJECTIVES:
- To understand the importance of human resources.
- To describe the steps involved in the human resource planning process
- To understand the stages of employee socialization and training needs.
- To know about the purposes of performance management systems and appraisal.
- To know the list of occupational safety and health administration enforcement priorities.

UNIT I   FUNDAMENTALS OF HRM   9
Introduction- importance of HRM – functions- qualities of HR manager – evolution and growth of HRM – trends and opportunities - HRM in global environment – legal and ethical context – laws for discriminatory practices – equal opportunity employment.

UNIT II   STAFFING, RECRUITMENT AND SELECTION   9
HR polices - need, type and scope – human resource planning – job analysis – recruiting goals – recruiting sources – global perspective – selection process – pre-employment testing – interviews – job offers – hiring mistakes - key element for successful predictors.

UNIT III   TRAINING AND DEVELOPMENT   9
Socialization – new employee orientation, training, development – organizational development – methods – evaluating training – international training and development issues – career development - value for organization and individual – mentoring and coaching – traditional career stages

UNIT IV   PERFORMANCE EVALUATION, REWARDS AND BENEFITS   9
Appraisal process – methods – factors distort appraisal – team appraisal – international appraisal –- rewards – Theories of motivation - compensation administration – job evaluation and pay structure – special cases of compensation – executive compensation programs – employee benefits.

UNIT V   SAFE AND HEALTHY WORK ENVIRONMENT   9
Occupational safety and health act - issues – stress – assistance program – labor management - employee unions – labor legislation. Promotion, demotion, transfer and separation – employee grievances - redressal methods.

TOTAL: 45 PERIODS

OUTCOMES
- Identify the primary external influences affecting HRM.
- Outline the components and the goals of staffing, training and development.
- Understand the selection procedure in various organizations.
- Understand the practices used to retain the employees and able to evaluate their performance.
- Able to identify the stress and the cause of burn out.

REFERENCES:
1. Decenzo and Robbins, Human Resource Management, Wilsey, 10th edition, 2012.
2. Mamoria C.B. and Mamoria. S., Personnel Management, Himalaya Publishing Company, 1997.
3. Mirza S. Saiyadain Human Resource Management , Tata McGraw Hill , 4th edition 2009
4. Eugence Mckenna and Nic Beach Human Resource Management, , Pearson Education Limited, 2002.
5. Dessler, Human Resource Management, Pearson Education Limited, 2002.
6. Decenzo and Robbins, Human Resource Management, Wilsey, 6th edition, 2001.
7. Wayne Cascio, Managing Human Resource, McGraw Hill, 1998.
8. Ivancevich, Human Resource Management, McGraw Hill 2002.
9. Biswajeet Pattanayak, Human Resource Management, Prentice Hall of India, 3rd edition 2005.

MC7010   **ENTERPRISE APPLICATION INTEGRATION**   **L T P C**
                                                                    3 0 0 3

COURSE OBJECTIVES:
- Describe approaches to enterprise application integration
- Understand the integration middleware
- Evaluate the integration approaches suitable for a given problem

UNIT I   INTRODUCTION   6
Requirements for EAI - Challenges in EAI – Integration with legacy systems – Integration with partners - Heterogeneous environment – Implementation approaches – Web services, messaging, ETL, direct data integration – Middleware requirements – Approaches to integration – services oriented and messaging.

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UNIT II   INTEGRATION PATTERNS   6
Introduction to integration patterns – Architecture for application integration – Integration patterns – Point to point, broker, message bus, publish/subscribe, Challenges in performance, security, reliability - Case studies

UNIT III   SERVICE ORIENTED INTEGRATION   12
Business process integration - Composite applications-services – Web services – Service choreography and orchestration - Business process modeling - BPMN, Business process execution - BPEL – Middleware infrastructure - Case studies

UNIT IV   MESSAGING BASED INTEGRATION   9
Messaging – Synchronous and asynchronous – Message structure – Message oriented middleware – Reliability mechanisms – Challenges – Messaging infrastructure – Java Messaging Services – Case studies

UNIT V   ENTERPRISE SERVICE BUS   12
Enterprise Service Bus – routing, scalable connectivity, protocol and message transformations, data enrichment, distribution, correlation, monitoring – Deployment configurations – Global ESB, Directly connected, Federated, brokered ESBs – Application server based – Messaging system based – Hardware based ESBs – Support to SOA, message based and event based integrations - Case studies.

TOTAL: 45 PERIODS

COURSE OUTCOMES:
Upon Completion of the course, the students will be able to
- Describe different approaches to integration enterprise applications
- Analyze specifications and identify appropriate integration approaches
- Develop a suitable integration design for a given problem
- Identify appropriate integration middleware for a given problem
- Evaluate the integration approaches against specified requirements

REFERENCES
1. George Mentzas and Andreas Frezen (Eds), "Semantic Enterprise Application Integration for Business Processes: Service-oriented Frameworks", Business Science Reference, 2009
2. Waseem Roshen, "SOA Based Enterprise Integration", Tata McGrawHill, 2009.
3. G Hohpe and B Woolf, "Enterprise Integration Patterns: Designing, Building, and Deploying Messaging Solutions", Addison-Wesley Professional, 2003
4. D Linthicum, "Next Generation Application Integration: From Simple Information to Web Services", Addison-Wesley, 2003
5. Martin Fowler, "Patterns of Enterprise Application Architecture", Addison- Wesley, 2003
6. Kapil Pant and Matiaz Juric, "Business Process Driven SOA using BPMN and BPEL: From Business Process Modeling to Orchestration and Service Oriented Architecture", Packt Publishing, 2008

MC7011   **BIG DATA ANALYTICS**   **L T P C**
                                                                                           3 0 0 3

COURSE OBJECTIVES:
- To explore the fundamental concepts of big data analytics
- To learn to analyze the big data using intelligent techniques.
- To understand the various search methods and visualization techniques.
- To learn to use various techniques for mining data stream.
- To understand the applications using Map Reduce Concepts.

UNIT I   INTRODUCTION TO BIG DATA   8
Introduction to BigData Platform – Challenges of Conventional Systems - Intelligent data analysis –
Nature of Data - Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools -
Statistical Concepts: Sampling Distributions - Re-Sampling - Statistical Inference - Prediction Error.

UNIT II   MINING DATA STREAMS   9
Introduction To Streams Concepts – Stream Data Model and Architecture - Stream Computing -
Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Estimating
Moments – Counting Oneness in a Window – Decaying Window - Real time Analytics Platform(RTAP)
Applications - Case Studies - Real Time Sentiment Analysis, Stock Market Predictions.

UNIT III   HADOOP   10
History of Hadoop- The Hadoop Distributed File System – Components of Hadoop- Analyzing the
Data with Hadoop- Scaling Out- Hadoop Streaming- Design of HDFS-Java interfaces to HDFS-
Basics-Developing a Map Reduce Application-How Map Reduce Works-Anatomy of a Map Reduce
Job run-Failures-Job Scheduling-Shuffle and Sort – Task execution - Map Reduce Types and
Formats- Map Reduce Features

UNIT IV   HADOOP ENVIRONMENT   9
Setting up a Hadoop Cluster - Cluster specification - Cluster Setup and Installation - Hadoop
Configuration-Security in Hadoop - Administering Hadoop – HDFS - Monitoring-Maintenance-Hadoop
benchmarks- Hadoop in the cloud

UNIT V   FRAMEWORKS   9
Applications on Big Data Using Pig and Hive – Data processing operators in Pig – Hive services –
HiveQL – Querying Data in Hive - fundamentals of HBase and ZooKeeper - IBM InfoSphere
BigInsights and Streams. Visualizations - Visual data analysis techniques, interaction techniques;
Systems and applications

TOTAL : 45 PERIODS

COURSE OUTCOMES:
The students will be able to:
- Work with big data platform
- Analyze the big data analytic techniques for useful business applications.
- Design efficient algorithms for mining the data from large volumes.
- Analyze the HADOOP and Map Reduce technologies associated with big data analytics
- Explore on Big Data applications Using Pig and Hive
- Understand the fundamentals of various bigdata analysiss techniques

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3. Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos, "Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data", McGrawHill Publishing, 2012
4. Anand Rajaraman and Jeffrey David Ullman, "Mining of Massive Datasets", Cambridge University Press, 2012.
5. Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", John Wiley & sons, 2012.
6. Glenn J. Myatt, "Making Sense of Data", John Wiley & Sons, 2007
7. Pete Warden, "Big Data Glossary", O'Reilly, 2011.
8. Jiawei Han, Micheline Kamber "Data Mining Concepts and Techniques", Second Edition, Elsevier, Reprinted 2008.
9. Da Ruan,Guoquing Chen, Etienne E.Kerre, Geert Wets, Intelligent Data Mining, Springer,2007
10. Paul Zikopoulos ,Dirk deRoos , Krishnan Parasuraman , Thomas Deutsch , James Giles , David Corrigan , Harness the Power of Big Data The IBM Big Data Platform, Tata McGraw Hill Publications, 2012
11. Michael Minelli (Author), Michele Chambers (Author), Ambiga Dhiraj (Author) , Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses,Wiley Publications,2013
12. Zikopoulos, Paul, Chris Eaton, Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data, Tata McGraw Hill Publications, 2011

MC7012   **AD-HOC AND SENSOR NETWORKS**   **L T P C**
3 0 0 3

COURSE OBJECTIVES:
- To understand the basics of Ad-hoc & Sensor Networks
- To learn various fundamental and emerging protocols of all layers in ad-hoc network
- To study about the issues pertaining to major obstacles in establishment and efficient management of ad-hoc and sensor networks
- To understand the nature and applications of ad-hoc and sensor networks
- To understand various security practices and protocols of Ad-hoc and Sensor Networks

UNIT I   ADHOC NETWORKS FUNDAMENTALS AND MAC PROTOCOLS   9
Fundamentals Of WLans – IEEE 802.11 Architecture - Self Configuration And Auto Configuration-Issues In Ad-Hoc Wireless Networks – MAC Protocols For Ad-Hoc Wireless Networks – Contention Based Protocols - TCP Over Ad-Hoc Networks-TCP Protocol Overview - TCP And MANETs – Solutions For TCP Over Ad-Hoc Networks

UNIT II   ADHOC NETWORK ROUTING AND MANAGEMENT   9
Routing in Ad-Hoc Networks- Introduction -Topology based versus Position based Approaches - Proactive, Reactive, Hybrid Routing Approach - Principles and issues – Location services - DREAM – Quorums based Location Service – Grid – Forwarding Strategies – Greedy Packet Forwarding – Restricted Directional Flooding- Hierarchical Routing- Other Routing Protocols.

UNIT III   SENSOR NETWORK COMMUNICATION PROTOCOLS   9

Introduction – Architecture - Single Node Architecture – Sensor Network Design Considerations – Energy Efficient Design Principles for WSN's – Protocols for WSN – Physical Layer - Transceiver Design Considerations – MAC Layer Protocols – IEEE 802.15.4 Zigbee – Link Layer and Error Control Issues - Routing Protocols – Mobile Nodes and Mobile Robots - Data Centric & Contention Based Networking – Transport Protocols & QoS – Congestion Control Issues – Application Layer Support.

UNIT IV   SENSOR NETWORK MANAGEMENT AND PROGRAMMING   9

Sensor Management - Topology Control Protocols and Sensing Mode Selection Protocols - Time Synchronization - Localization and Positioning – Operating Systems and Sensor Network Programming – Sensor Network Simulators.

UNIT V   ADHOC AND SENSOR NETWORK SECURITY   9

Security in Ad-Hoc and Sensor Networks – Key Distribution and Management – Software based Anti-tamper Techniques – Water Marking techniques – Defense against Routing Attacks - Secure Adhoc Routing Protocols – Broadcast Authentication WSN Protocols – TESLA – Biba – Sensor Network Security Protocols - SPINS

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the course the students will be able to:

- Work with existing Ad-hoc and sensor network protocols and standards.
- Create a Sensor network environment for different type of applications
- Design ad-hoc and sensor network architectures using QoS and Congestion control mechanisms
- Interpret the various control fields of the protocol in each layer
- Select appropriate routing algorithms for different network environments
- Program ad-hoc and sensor network for various applications
- Deploy security mechanisms in the wireless ad-hoc and sensor networks

REFERENCES:

1. Carlos De Morais Cordeiro, Dharma Prakash Agrawal, "Ad Hoc and Sensor Networks: Theory and Applications", Second Edition, World Scientific Publishing, 2011.
2. Holger Karl, Andreas willig, "Protocols and Architectures for Wireless Sensor Networks", John Wiley & Sons, Inc .2005.
3. C.Siva Ram Murthy and B.S.Manoj, "Ad Hoc Wireless Networks – Architectures and Protocols", Pearson Education, 2004.
4. C.K.Toh, "Ad Hoc Mobile Wireless Networks", Pearson Education, 2002.
5. Erdal Çayırcı , Chunming Rong, "Security in Wireless Ad Hoc and Sensor Networks", John Wiley and Sons, 2009
6. Waltenegus Dargie, Christian Poellabauer, "Fundamentals of Wireless Sensor Networks Theory and Practice", John Wiley and Sons, 2010
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8. Kazem Sohraby, Daniel Minoli, Taieb Znati , Wireless Sensor Networks: Technology, Protocols and Applications, Wiley Interscience A John Wiley & sons, Inc., Publication .
9. Feng Zhao, Leonidas Guibas, " Wireless Sensor Networks : An information processing Approach " , Elsevier 2004 .
10. Amiya Nayak, Ivan Stojmenovic, : Wireless Sensor and Actuator Networks : Algorithm and Protocols for Scalable Coordination and Data communication John Wiley & Sons 2010 .
11. Feng Zhao and Leonidas Guibas, "Wireless Sensor Networks", Morgan Kaufman Publishers, 2004.

MC7013   **SEMANTIC WEB**   **L T P C**
                                                                               3 0 0 3

COURSE OBJECTIVES:
- To understand the need of semantic web in web services
- To know the methods to discover, classify and build ontology for more reasonable results in searching
- To build and implement a small ontology that is semantically descriptive of chosen problem domain
- To implement applications that can access, use and manipulate the ontology

UNIT I   INTRODUCTION   9
Introduction to the Syntactic web and Semantic Web – Evolution of the Web – The visual and syntactic web – Levels of Semantics – Metadata for web information - The semantic web architecture and technologies –Contrasting Semantic with Conventional Technologies –Semantic Modeling - Potential of semantic web solutions and challenges of adoption

UNIT II   ONTOLOGICAL ENGINEERING   9
Ontologies – Taxonomies –Topic Maps – Classifying Ontologies – Terminological aspects: concepts, terms, relations between them – Complex Objects –Subclasses and Sub-properties definitions – Upper Ontologies – Quality – Uses - Types of terminological resources for ontology building – Methods and methodologies for building ontologies – Multilingual Ontologies -Ontology Development process and Life cycle – Methods for Ontology Learning – Ontology Evolution – Versioning

UNIT III   STRUCTURING AND DESCRIBING WEB RESOURCES   9
Structured Web Documents - XML – Structuring – Namespaces – Addressing – Querying – Processing - RDF – RDF Data Model – Serialization Formats- RDF Vocabulary –Inferencing - RDFS – basic Idea – Classes – Properties- Utility Properties – RDFS Modeling for Combinations and Patterns- Transitivity

UNIT IV   WEB ONTOLOGY LANGUAGE   9
OWL – Sub-Languages – Basic Notions -Classes- Defining and Using Properties – Domain and Range – Describing Properties - Data Types – Counting and Sets- Negative Property Assertions – Advanced Class Description – Equivalence – Owl Logic.

UNIT V   SEMANTIC WEB TOOLS AND APPLICATIONS   9
Development Tools for Semantic Web – Jena Framework – SPARL –Querying semantic web - Semantic Wikis - Semantic Web Services – Modeling and aggregating social network data - Ontological representation of social relationships, Aggregating and reasoning with social network data

                                                                  TOTAL: 45 PERIODS

COURSE OUTCOMES:
- Understand semantic web basics, architecture and technologies
- Able to represent data from a chosen problem in XML with appropriate semantic tags obtained or derived from the ontology
- Able to understand the semantic relationships among these data elements using Resource Description Framework (RDF)
- Able to design and implement a web services application that "discovers" the data and/or other web services via the semantic web
- Able to discover the capabilities and limitations of semantic web technology for social networks

REFERENCES:
1. Liyang Yu, "A Developer's Guide to the Semantic Web", Springer, First Edition, 2011
2. John Hebeler, Matthew Fisher, Ryan Blace and Andrew Perez-Lopez, "Semantic Web Programming", Wiley, First Edition, 2009.
3. Grigoris Antoniou, Frank van Harmelen, "A Semantic Web Primer", Second Edition (Cooperative Information Systems) (Hardcover), MIT Press, 2008
4. Robert M. Colomb, "Ontology and the Semantic Web", Volume 156 Frontiers in Artificial Intelligence and Applications (Frontier in Artificial Intelligence and Applications), IOS Press, 2007.
5. Dean Allemang and James Hendler, "Semantic Web for the Working Ontologist: Effective Modeling in RDFS and OWL, Morgan Kaufmann", Second Edition, 2011.
6. Michael C. Daconta, Leo J. Obrst and Kevin T. Smith, "The Semantic Web: A Guide to the Future of XML, Web Services, and Knowledge Management", Wiley, First Edition 2003
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9. Peter Mika, "Social networks and the Semantic Web", Springer, 1st edition 2007.

MC7014   **SOFTWARE TESTING AND QUALITY ASSURANCE**   **L T P C**
3 0 0 3

COURSE OBJECTIVES:
- To know the behavior of the testing techniques to detect the errors in the software
- To understand standard principles to check the occurrence of defects and its removal.
- To learn the functionality of automated testing tools
- To understand the models of software reliability.

UNIT I   TESTIING ENVIRONMENT AND TEST PROCESSES   9
World-Class Software Testing Model – Building a Software Testing Environment - Overview of Software Testing Process – Organizing for Testing – Developing the Test Plan – Verification Testing – Analyzing and Reporting Test Results – Acceptance Testing – Operational Testing – Post Implementation Analysis

UNIT II   TESTING TECHNIQUES AND LEVELS OFTESTING   9
Using White Box Approach to Test design - Static Testing Vs. Structural Testing – Code Functional Testing – Coverage and Control Flow Graphs –Using Black Box Approaches to Test Case Design – Random Testing – Requirements based testing –Decision tables –State-based testing – Cause-effect graphing – Error guessing – Compatibility testing – Levels of Testing - Unit Testing - Integration Testing - Defect Bash Elimination. System Testing - Usability and Accessibility Testing – Configuration Testing - Compatibility Testing - Case study for White box testing and Black box testing techniques.

UNIT III   INCORPORATING SPECIALIZED TESTING RESPONSIBILITIES   9
Testing Client/Server Systems – Rapid Application Development Testing – Testing in a Multiplatform Environment – Testing Software System Security - Testing Object-Oriented Software – Object Oriented Testing – Testing Web based systems – Web based system – Web Technology Evolution – Traditional Software and Web based Software – Challenges in Testing for Web-based Software – Testing a Data Warehouse - Case Study for Web Application Testing.

UNIT IV   TEST AUTOMATION   9
Selecting and Installing Software Testing Tools - Software Test Automation – Skills needed for Automation – Scope of Automation – Design and Architecture for Automation – Requirements for a Test Tool – Challenges in Automation – Tracking the Bug – Debugging – Case study using Bug Tracking Tool.

UNIT V   SOFTWARE TESTING AND QUALITY METRICS   9
Testing Software System Security - Six-Sigma – TQM - Complexity Metrics and Models – Quality Management Metrics - Availability Metrics - Defect Removal Effectiveness - FMEA - Quality Function Deployment – Taguchi Quality Loss Function – Cost of Quality. Case Study for Complexity and Object Oriented Metrics.

COURSE   OUTCOMES:
- Test the software by applying testing techniques to deliver a product free from bugs
- Evaluate the web applications using bug tracking tools.
- Investigate the scenario and the able to select   the proper testing technique
- Explore the test automation concepts and tools
- Deliver quality product to the clients by way of applying standards such as TQM, Six Sigma
- Evaluate the estimation of cost, schedule based on standard metrics

REFERENCES:
1. William Perry, "Effective Methods of Software Testing", Third Edition, Wiley Publishing 2007
2. Srinivasan Desikan and Gopalaswamy Ramesh, "Software Testing – Principles and Practices", Pearson Education, 2007.
3. Naresh Chauhan , "Software Testing Principles and Practices " Oxford University Press , New Delhi , 2010.
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MC7015   SOFTWARE PROJECT MANAGEMENT   L T P C
**   3 0 0 3**

COURSE OBJECTIVES:
- To know of how to do project planning for the software process.
- To learn the cost estimation techniques during the analysis of the project.
- To understand the quality concepts for ensuring the functionality of the software

UNIT I   SOFTWARE PROJECT MANAGEMENT CONCEPTS   9
Introduction to Software Project Management: An Overview of Project Planning: Select Project, Identifying Project scope and objectives, infrastructure, project products and Characteristics. Estimate efforts, Identify activity risks, and Allocate resources.

UNIT II   SOFTWARE EVALUATION AND COSTING   9
Project Evaluation: Strategic Assessment, Technical Assessment, cost-benefit analysis, Cash flow forecasting, cost-benefit evaluation techniques, Risk Evaluation. Selection of Appropriate Project approach: Choosing technologies, choice of process models, Structured methods.

UNIT III   SOFTWARE ESTIMATION TECHNIQUES   9
Software Effort Estimation: Problems with over and under estimations, Basis of software Estimation, Software estimation techniques, expert Judgment, Estimating by analogy. Activity Planning: Project schedules, projects and activities, sequencing and scheduling Activities, networks planning models, formulating a network model.

UNIT IV   RISK MANAGEMENT   9
Risk Management: Nature of Risk, Managing Risk, Risk Identification and Analysis, Reducing the Risk. Resource Allocation: Scheduling resources, Critical Paths, Cost scheduling, Monitoring and Control: Creating Framework, cost monitoring, prioritizing monitoring.

UNIT V   SOFTWARE QUALITY MANAGEMENT   9
TQM, Six Sigma, Software Quality: defining software quality, ISO9126, External Standards, Comparison of project management software's: dot Project, Launch pad, openProj. Case study: PRINCE2

                                                                                TOTAL ; 45 PERIODS

COURSE OUTCOMES:
- Understand the activities during the project scheduling of any software application.
- Learn the risk management activities and the resource allocation for the projects.
- Can apply the software estimation and recent quality standards for evaluation of the software projects
- Acquire knowledge and skills needed for the construction of highly reliable software project
- Able to create reliable, replicable cost estimation that links to the requirements of project planning and managing

REFERENCES:
1. Bob Hughes & Mike Cotterell, "Software Project Management", Tata McGraw- Hill Publications, Fifth Edition 2012.
2. S. A. Kelkar," Software Project Management" PHI, New Delhi, Third Edition ,2013.
3. Richard H.Thayer "Software Engineering Project Management,": IEEE Computer Society
4. Futrell , "Quality Software Project Management", Pearson Education India, 2008
5. http://en.wikipedia.org/wiki/Comparison_of_project_management_software
6. http://www.ogc.gov.uk/methods_prince_2.asp

MC7016   **CLOUD COMPUTING**   **L T P C**
                                                                                          3 0 0 3

COURSE OBJECTIVES:
- To introduce the broad perceptive of cloud architecture and model
- To understand the concept of Virtualization and design of cloud Services
- To be familiar with the lead players in cloud.
- To understand the features of cloud simulator
- To apply different cloud programming model as per need.
- To learn to design the trusted cloud Computing system

UNIT I   CLOUD ARCHITECTURE AND MODEL   9
Technologies for Network-Based System – System Models for Distributed and Cloud Computing – NIST Cloud Computing Reference Architecture.
Cloud Models:- Characteristics – Cloud Services – Cloud models (IaaS, PaaS, SaaS) – Public vs Private Cloud –Cloud Solutions - Cloud ecosystem – Service management – Computing on demand.

UNIT II   VIRTUALIZATION   9
Basics of Virtualization - Types of Virtualization - Implementation Levels of Virtualization - Virtualization Structures - Tools and Mechanisms - Virtualization of CPU, Memory, I/O Devices - Virtual Clusters and Resource management – Virtualization for Data-center Automation.

UNIT III   CLOUD INFRASTRUCTURE   9
Architectural Design of Compute and Storage Clouds – Layered Cloud Architecture Development – Design Challenges - Inter Cloud Resource Management – Resource Provisioning and Platform Deployment – Global Exchange of Cloud Resources.

UNIT IV   PROGRAMMING MODEL   9
Parallel and Distributed Programming Paradigms – MapReduce , Twister and Iterative MapReduce – Hadoop Library from Apache – Mapping Applications - Programming Support - Google App Engine, Amazon AWS -   Cloud Software Environments -Eucalyptus, Open Nebula, OpenStack, Aneka, CloudSim

UNIT V   SECURITY IN THE CLOUD   9
Security Overview – Cloud Security Challenges and Risks – Software-as-a-Service Security – Security Governance – Risk Management – Security Monitoring – Security Architecture Design – Data Security – Application Security – Virtual Machine Security - Identity Management and Access Control – Autonomic Security.

TOTAL:45 PERIODS

COURSE OUTCOMES:
- Compare the strengths and limitations of cloud computing
- Identify the architecture, infrastructure and delivery models of cloud computing
- Apply suitable virtualization concept.
- Choose the appropriate cloud player , Programming Models and approach.
- Address the core issues of cloud computing such as security, privacy and interoperability
- Design Cloud Services and Set a private cloud

REFERENCES:
1. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.
2. John W.Rittinghouse and James F.Ransome, "Cloud Computing: Implementation, Management, and Security", CRC Press, 2010.
3. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing, A Practical Approach", TMH, 2009.
4. Kumar Saurabh, "Cloud Computing – insights into New-Era Infrastructure", Wiley India,2011.
5. George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud" O'Reilly
6. James E. Smith, Ravi Nair, "Virtual Machines: Versatile Platforms for Systems and Processes", Elsevier/Morgan Kaufmann, 2005.
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10. Gautam Shroff,Enterprise Cloud Computing,Cambridge University Press,2011
11. Michael Miller, Cloud Computing,Que Publishing,2008
12. Nick Antonopoulos, Cloud computing,Springer Publications,2010

MC7017   **NETWORK PROTOCOLS**   **L T P C**
                                                                                      3 0 0 3

OBJECTIVES:
- To understand the existing network architecture models and analyze the their performance
- To understand the high speed network protocols and design issues.
- To learn Network Security Technologies and Protocols
- To study various protocols in wireless LAN, MAN.

UNIT I   FUNDAMENTALS OF NETWORKING STANDARDS AND PROTOCOLS   9
Network Communication Architecture and Protocols - OSI Network Architecture seven Layers Model - Definition and Overview of TCP/IP Protocols -TCP/IP Four Layers Architecture Model - Other Network Architecture Models: IBM SNA.

UNIT II   ROUTED AND ROUTING PROTOCOLS   9
Application Layer Protocols-Presentation Layer Protocols- Session Layer Protocols - Transport Layer Protocols - Network Layer Protocols - Data Link Layer Protocols - Routing Protocols - Multicasting Protocols - MPLS.

UNIT III   ISDN AND NETWORK MANAGEMENT PROTOCOLS   9
Overview of ISDN − Channels − User access – Protocols Network management requirements − Network monitoring − Network control − SNMP V_1, V_2 and V_3 − Concepts, MIBs − Implementation issues-RMON.

UNIT IV   SECURITY AND TELEPHONY PROTOCOLS   9
Network Security Technologies and Protocols - AAA Protocols - Tunneling Protocols - Security Protocols- Private key encryption − Data encryption system, public key encryption − RSA − Elliptic curve cryptography − Authentication mechanisms− Web security -Secured Routing Protocols - IP telephony -Voice over IP and VOIP Protocols –Signaling Protocols- Media/CODEC.

UNIT V   NETWORK ENVIRONMENTS AND PROTOCOLS   9
Wide Area Network and WAN Protocols - Frame relay - ATM - Broadband Access Protocols -PPP Protocols - Local Area Network and LAN Protocols - Ethernet Protocols - Virtual LAN Protocols - Wireless LAN Protocols - Metropolitan Area Network and MAN Protocol - Storage Area Network and SAN Protocols.

TOTAL:45 PERIODS

OUTCOME:

- Ability to study, analyze and design seven layers of protocols of wired and wireless networks**.**

REFERENCES:
1. Javvin, "Network Protocols" , Javvin Technologies Inc , second edition, 2005
2. William Stallings, "Cryptography and Network Security", PHI, 2000.
3. Mani Subramanian, "Network Management−Principles and Practices", Addison Wesley, 2000.
4. William Stallings, "SNMP, SNMPV2, SNMPV3 and RMON1 and 2", 3rd Edition, Addison Wesley, 1999.
5. William Stallings, "Data and Computer Communications" 5th Edition, PHI, 1997.