Dr.M.G.R.
EDUCATIONAL AND RESEARCH INSTITUTE
UNIVERSITY
(Decl. U/S 3 of the UGC Act 1956)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

M.Tech – Computer Science Engineering (Full Time)
Curriculum and Syllabus
2013 Regulation

I SEMESTER						
S.No	**Sub.Code**	**Title of Subject**	**L**	**T**	**P**	**C**
1	MMA130008	Applied Mathematics for Computer Engineers	3	1	0	4
2	MCS13C001	Advanced Data Structures and Algorithms	3	0	0	3
3	MCS13C002	Object Oriented Software Engineering	3	0	0	3
4	MCS13C003	Computer Network Management	3	0	0	3
5	MCS13C004	Computer Architecture & Design	3	1	0	4
6	MCS13C005	Multimedia Systems	3	0	0	3
7	MCS13CL01	Advanced Data Structures Lab	0	0	3	1
8	MCS13CL02	Computer Network Management Lab	0	0	3	1
		Total	**18**	**2**	**6**	**22**

II SEMESTER						
S.No	**Sub.Code**	**Title of Subject**	**L**	**T**	**P**	**C**
1	MCS13C006	Compiler Design and Optimization	3	1	0	4
2	MCS13C007	Advanced Database Technology	3	0	0	3
3	MCS13C008	Service Oriented Architecture	3	0	0	3
4	MCS13C009	Advanced Web Technology	3	0	0	3
5	MCS13CEXX	Elective I	3	0	0	3
6	MCS13CL03	Term Paper & Seminar	0	0	3	1
7	MCS13CL04	Service Computing Lab	0	0	3	1
8	MCS13CL05	Complier & Database Lab	0	0	3	1
		Total	**15**	**1**	**9**	**19**

III SEMESTER						
S.No	**Sub.Code**	**Title of Subject**	**L**	**T**	**P**	**C**
1	MCS13C010	High Speed Networks & Security	3	1	0	4
2	MCS13CEXX	Elective II	3	0	0	3
3	MCS13CEXX	Elective III	3	0	0	3
4	MCS13CEXX	Elective IV	3	0	0	3
5	MCS13CL06	Project Work Phase-I	0	0	6	6
		Total	**12**	**1**	**6**	**19**

IV SEMESTER						
S.No	**Sub.Code**	**Title of Subject**	**L**	**T**	**P**	**C**
1	MCS13CL07	Project Work Phase-II	0	0	24	15
		Total	**0**	**0**	**24**	**15**

Summary of Credits:

1st Semester Credits	**22**
2nd Semester Credits	**19**
3rd Semester Credits	**19**
4th Semester Credits	**15**
Total	**75**

Elective I						
S.No	**Sub.Code**	**Title of Subject**	**L**	**T**	**P**	**C**
1	MCS13CE01	Multi-Core Programming	3	0	0	3
2	MCS13CE02	Embedded Systems	3	0	0	3
3	MCS13CE03	Mobile Communication	3	0	0	3
4	MCS13CE04	Software Project Management	3	0	0	3

Elective II						
S.No	**Sub.Code**	**Title of Subject**	**L**	**T**	**P**	**C**
1	MCS13CE05	Agent Based Systems	3	0	0	3
2	MCS13CE06	Natural Language Processing	3	0	0	3
3	MCS13CE07	Soft Computing	3	0	0	3
4	MCS13CE08	Ethical Hacking and Digital Forensics	3	0	0	3

Elective III						
S.No	**Sub.Code**	**Title of Subject**	**L**	**T**	**P**	**C**
1	MCS13CE09	Pattern Recognition	3	0	0	3
2	MCS13CE10	Game Theory	3	0	0	3
3	MCS13NE13	Advanced 3G Networks	3	0	0	3
4	MCS13CE11	Genetic Algorithms & Machine Learning	3	0	0	3

Elective IV						
S.No	**Sub.Code**	**Title of Subject**	**L**	**T**	**P**	**C**
1	MCS13CE12	Cloud Computing	3	0	0	3
2	MCS13CE13	Data Analytics	3	0	0	3
3	MCS13CE14	Ad-hoc and Wireless Sensor Networks	3	0	0	3
4	MCS13CE15	Software Metrics and Quality Assurance	3	0	0	3

MMA130008	**APPLIED MATHEMATICS FOR COMPUTER ENGINEERS**	**L T P C** **3 1 0 4**

OBJECTIVES:

- Students will be able to understand and solve problems on the mathematical concepts of algebraic structures, formal languages, automata theory, interpolation.
- Numerical differentiation and Integration.

UNIT I ALGEBRAIC STURCTURES 12 Hrs

Groups (Definition and Examples) – Subgroups – Permutation groups – Homomorphism – Kernel – Cosets – Lagrange's theorem – Rings – Fields (Definition and Examples).

UNIT II FORMAL LANGUAGES 12 Hrs

Regular expressions– Grammars – Context sensitive grammar – Context free grammar – Derivation trees – Finite state machine.

UNIT III AUTOMATA THEORY 12 Hrs

Finite State Automata (FSA) – Deterministic FSA – Non-Deterministic FSA – Push Down Automata – Turing machine.

UNIT IV INTERPOLATION 12 Hrs

Newton forward and backward differences – Central differences – Stirling's and Bessel's formulae – Interpolation with Newton's divided differences – Lagrange's method.

UNIT V NUMERICAL DIFFERENTIATION AND INTEGRATION 12 Hrs

Numerical differentiation with interpolation polynomials – Numerical integration by Trapezoidal and Simpson's (both 1/3 rd & 3/8 th) rules – Two and three point Gaussian Quadrature formulae – Double integrals using Trapezoidal and Simpson's rules.

Total no. of hrs: 60

REFERENCES:

1. Tremblay J.P., Manohar R., (2004) *Discrete Mathematical structures with applications to Computer science*, Tata McGraw Hill Publishing Co.
2. Kenneth Rosen (2007) *Discrete Mathematics and its applications (SIE)*, Tata McGraw Hill Publishing Co.
3. John C. Martin (2003), *Introduction to languages and the theory of computation (3rd ed.)*, Mcgraw Hill
4. Hopcroft J.E., Ullman J.D. (2002) *Introduction to Automata theory, Languages and Computation*, Narosa Publishing house
5. Veerarajan T. (2005) *Numerical Methods*, Tata McGraw Hill Publishing Co.
6. Sastry S.S. (2003) *Introductory Methods of Numerical Analysis*, Prentice Hall of India

		L	T	P	C
MCS13C001	**ADVANCED DATA STRUCTURES AND ALGORITHMS**	**3**	**0**	**0**	**3**

OBJECTIVES:

- To extend the Students' knowledge of algorithms and data structures.
- To enhance their expertise in algorithmic analysis and algorithm design techniques.
- To learn a variety of useful algorithms and techniques and extrapolate from them in order to then apply those algorithms and techniques to solve problems.

UNIT I: LINEAR AND NON-LINEAR DATA STRUCTURES **9 Hrs**

Stacks, Queues & Lists Implementation and Applications – Cursor implementation of Linked Lists – Trees – Binary Trees – Binary Search Tree – Tree Traversals – AVL Trees – Splay Trees.

UNIT II: SEARCHING AND SORTING **9 Hrs**

Sequential search – Binary search – sorting techniques: Bubble sort, selection sort, insertion sort, heap sort, merge sort, quick sort and radix sort.

UNIT III: ALGORITHMS **9 Hrs**

Greedy Algorithms – Dynamic Programming – Back patching – Branch and Bound – Divide and Conquer – Lower Bound Theory**.**

UNIT IV: GRAPH AND PARALLEL ALGORITHMS **9 Hrs**

Graphs – representations – traversals: BFS, DFS – minimum spanning tree – shortest path – bi-connected and strongly components – parallel algorithms – sorting – matrix multiplication

UNIT V: SELECTED TOPICS **9 Hrs**

NP completeness – approximation algorithms – NP hard problems – magic square.

Total no.of Hours:45

REFERENCES:

1. E. Horowitz, S. Sahani & Mehta (1999) *Fundamentals of Data Structures in C++*, Galgotia
2. Langsman, Augestein & Tanenbaum (2002) *Data Structures Using C & C++*, (2nd ed.), PHI
3. T.H. Cormen, C.E. Leiserson, R.L. Rivest (1994) *Introduction to Algorithms*, McGraw Hill
4. Weiss (2003) *Data Structures and Algorithm Analysis in C++* (2nd ed.) Pearson Education
5. M.J. Quinn (1998), Designing Efficient Algorithms for Parallel Computers, McGraw Hill
6. Kenneth A. Berman & Jerome L. Paul (2003) *Fundamentals of Sequential and Parallel Algorithms*, Thomson Learning

		L	T	P	C
MCS13C002	**OBJECT ORIENTED SOFTWARE ENGINEERING**	**3**	**0**	**0**	**3**

OBJECTIVES:

- To understand the importance of object oriented software engineering.
- To study the various lifecycle models for developing softwares.
- To analyze and design software using tools.
- To develop efficient software, deploy and maintain after production.

UNIT I: **INTRODUCTION TO CLASSICAL SOFTWARE ENGINEERING**: **9 Hrs**

Historical, Economic and Maintenance aspects. Introduction to OO Paradigm. Different phases in structured paradigm and OO Paradigm. Software Process and different life cycle models and corresponding strengths and weaknesses.

UNIT II: PLANNING, ESTIMATION & TOOLS FOR STEP WISED REFINEMENT: 9 Hrs

Estimation of Duration and Cost – COCOMO components of software. Project Management plan, Cost - Benefit analysis, Introduction to software metrics and CASE tools. Taxonomy and scope of CASE tools.

UNIT III: MODULES TO OBJECTS: 9 Hrs

Cohesion and Coupling, Data Encapsulation and Information hiding aspects of Objects. Inheritance, polymorphism and Dynamic Binding aspects. Cohesion and coupling of objects. Reusability, Portability and Interoperability aspects.

UNIT IV: REQUIREMENT & ANALYSIS PHASES: 9 Hrs

Rapid Prototyping method, Specification phase, Specification Document, Formal methods of developing specification document, Use case Modeling, Class Modeling, Dynamic Modeling, Testing during OO Analysis.

UNIT V: DESIGN PHASE & IIM PHASES: 9 Hrs

Data oriented design, Object Oriented design, and Formal techniques for detailed design. Challenges in design phase. Implementation, Integration and maintenance phases, OOSE aspects in these phases.

Total no.of Hours:45

REFERENCES:

1. Stephen R. Schach, *Object oriented and Classical Software Engineering*, (7th ed.), , TMH
2. Timothy Lethbridge, Robert Laganiere *Object oriented and classical software Engineering*,TMH
3. Ivica Crnkovic (CBSE 2004) *Component-based software engineering*, 7th international symposium, Springer

		L	T	P	C
MCS13C003	**COMPUTER NETWORK MANAGEMENT**	**3**	**1**	**0**	**4**

OBJECTIVES:

- To ensure a comprehensive understanding of computer network communication architectures.
- To study mathematical models related to network performance analysis.
- To focus on current and emerging networking technologies.

UNIT-I: NETWORK ARCHITECTURE: 12 Hrs

Layering & Protocols - OSI & Internet Architecture - Network Topology Link& Medium access Protocols - IEEE 802 Standards-Performance Issues-Network Adapters.

UNIT-II: LAYERS: 12 Hrs

Switching concepts - Internetworking - Routing Protocols. Transport Layer- UDP - TCP - Congestion Control-Applications: Telnet - FTP -E-mail- DNS- Multimedia Applications-Security.

UNIT-III: SNMP MANAGEMENT: 12 Hrs

Monitoring & control - SNMPv1 –organization and information models, SNMP V2, V3,

UNIT-IV: NETWORK MONITORING: 12 Hrs

RMON 1, RMON 2, Broadband Network Management- ATM, Access Networks.

UNIT-V: NETWORK MANAGEMENT APPLICATIONS: 12 Hrs

Network Management Tools and Systems, Network Management, Web based management.

Total No.of Hours: 60

REFERENCES

1. Mani Subramanian (2000) *Network Management Principles and Practice* Pearson education
2. William Stallings (1999), *SNMP, SNMPV2, SNMPV3*, RMON(1st , 2nd & 3rd ed.), Addison Wesley
3. Douglas E. Comer and David L. Stevens (1998), *Internetworking with TCP/IP*, Vol2. PHI
4. Peterson Davie (2000) *Computer Networks - A System Approach* (2nd ed.), Morgan Kauffman Harcourt,
5. Andrew S. Tananbaum, " Computer Networks " , 3 rd Edition, PHI.

		L	T	P	C
MCS13C004	**COMPUTER ARCHITECTURE & DESIGN**	**3**	**1**	**0**	**4**

OBJECTIVES:

- To ensure a comprehensive understanding the design of advanced Computer Architectures.
- To focus on current and emerging design technologies in computer architecture.

UNIT-I: INTRODUCTION **12 Hrs**

Overview of CPU, Memory, I/O Design – Introduction to Register transfer notation – abstract and concrete RTN - Performance evaluation.

UNIT-II: CPU ARCHITECTURE **12 Hrs**

Instruction sets of different machines – CISC and RISC Processors – Simple RISC Computer (SRC) design - Pipelining Issues – Super Scalar Architectures.

UNIT-III: MEMORY DESIGN **12 Hrs**

Virtual Memory – Cache Design for different architectures and multiprocessor environments – evaluating memory performance.

UNIT-IV: I/O DESIGN **12 Hrs**

Speed Limits – Interfacing to different types of I/O Devices – Performance measures.

UNIT-V: PARALLEL ARCHITECTURES **12 Hrs**

Data Flow – Vector Processors – Multi Processor Architecture: SIMD, MIMD – Multi Computer Architecture – Interconnection Networks.

Total no.of Hours: 60

REFERENCES

1. Vincent P. Heuring, Harry F. Jordan (2003), *Computer Systems Design and Architecture*, Pearson Education
2. Stallings, *Computer Organization and Architecture: Designing for Performance* (6th ed.), PHI
3. John P. Hayes (2003) *Computer Organization and Architecture*, Tata McGraw Hill
4. D. A. Patterson & J. L. Hennessy (1996), *Computer Architecture – A Quantitative Approach*, (2nd ed.), Morgan Kaufmann Publishers.

		L	T	P	C
MCS13C005	**MULTIMEDIA SYSTEMS**	**3**	**0**	**0**	**3**

OBJECTIVES:

- To understand the basic concepts of graphics designs.
- To familiarize the student with the transformation and projection techniques and color models.
- To appreciate the use of multimedia authoring tools and multimedia compression techniques.

UNIT-I: INTRODUCTION **9 Hrs**

Multimedia applications - System architecture - Objects of Multimedia Systems -Multimedia databases.

UNIT-II: COMPRESSION AND FILE FORMATS **9 Hrs**

Types of compression - Image compression - CCITT - JPEG - Video image compression - MPEG-DVI Technology - Audio compression - RTF format - TIFF file format - RIFF file format - MIDI - JPEG DIB - TWAIN.

UNIT-III: INPUT/OUTPUT TECHNOLOGIES **9 Hrs**

Traditional devices - Pen input - Video display systems - Scanners - Digital audio - Video images and animation.

UNIT-IV: STORAGE AND RETRIEVAL **9 Hrs**

Magnetic Media - RAID - Optical media - CD-ROM - WORM - Juke box - Cache management – DVD.

UNIT-IV: APPLICATION DESIGN **9 Hrs**

Application classes - Types of systems - Virtual reality design - Components - Databases - Authoring Systems - Hyper media - User interface design - Display/Playback issues - Hypermedia linking and embedding.

Total no.of Hours: 45

REFERENCES

1. Andleigh PK and Thakrar K (2003) *Multimedia Systems Design*, Pearson Education
2. Vaughan T (1999) Multimedia, Tata McGraw Hill
3. Koegel Buford JFK (1999) *Multimedia Systems,* Addison Wesley Longman
4. Steinmetz (1996), *Multimedia: Computing, Communication and Application*, Pearson Education
5. Rao, Bojkovic & Milovanovic (2003) *Multimedia Communication Systems: Techniques standards & Networks*, PHI

		L T P C
MCS13L01	**ADVANCED DATA STRUCTURE LAB**	**0 0 3 1**

OBJECTIVE:

- To implement the following list of programs

LIST OF EXPERIMENTS

1. Implementation of stack and queue operations using linked list and array.
2. Implementation of linked lists operations
3. Implementation of sorting techniques
   a. Quick sort b. Merge sort c. Bubble sort
   d. Selection sort e. Insertion sort f. Shell and heap sort
4. Implementation of Searching techniques
   a. Linear search b. Binary search
5. Expression evaluation of Infix to Postfix
6. Binary tree representation and traversal techniques
7. Depth first search
8. Breadth first search
9. Single source shortest path algorithm
10. Single search shortest path

MCS13L02 COMPUTER NETWORK MANAGEMENT LAB 0 0 3 1

OBJECTIVE:

- To implement the following list of programs

LIST OF EXPERIMENTS

1. Client server Chat Program Using TCP
2. Client-Server Chat Using UDP
3. Printing the Client Address at the Server end
4. Date-Time Server
5. File Transfer Using TCP
6. Simulation of Sliding Window Protocol
7. Domain Name System
8. Simulation of Routing Protocols
9. Uniform Resource Locator (URL)
10. Multiclient-Server Chat
11. Simulation of Simple Network Management Protocol
12. Invoke a remote method.

		L	T	P	C
MCS13C006	**COMPILER DESIGN AND OPTIMIZATION**	**3**	**1**	**0**	**4**

OBJECTIVES:

- To understand the various optimization techniques about compiler's instruction selection and scheduling techniques.
- To explore how parallelism is handled by compilers and understand how compilers deal with pipelining architecture to just-in-time compilations

UNIT-I: INTRODUCTION **12 Hrs**

Compilers-Grammars-Languages-Phases of compiler-compiler writing tools-Errors-Lexical phase errors, syntactic phase errors, semantic phase errors

UNIT-II: LEXICAL ANALYZER **12 Hrs**

Role of lexical analyzer-input Buffering –Specification and Recognition of tokens –Language for specifying Lexical analyzer-Finite Automata-Regular expression to NFA-Optimization of DFA based pattern matches – Design of a Lexical Analyzer Generator

UNIT-III: SYNTAX ANALYZER **12 Hrs**

Parsers-CFG-derivations and parse trees-capabilities of CFG- Top own parsing-Bottom Up parsing - LR parsing- SLR parsing -LALR parsing – CLR parsing – Operator Precedence – Predictive Parsing.

UNIT-IV: INTERMEDIATE CODE GENERATION **12 Hrs**

Syntax Directed Translation scheme-Implementation of Syntax Directed Translators-Intermediate code- postfix notation, parse trees and syntax trees-Trees three address code –Quadruples, Triples –Translation of Assignment statements –Boolean expressions-Declaration –Flow control statements –Back patching.

UNIT-V: CODE OPTIMIZATION **12 Hrs**

Principal source of optimization-Issues in the design of a code generator-Run-Time storage management –Basic blocks and flow graphs Next use information-Simple code generator –DAG representation of basic blocks-Peephole optimization – Code Generation

Total no.of Hours:60

REFERENCES:

1. A.V.Aho, Ravi Sethi,J. D.ullman (1988), *Compilers –principles ,Techniques and tools*, Addison Wesley publishing company
2. Allen I.Holub (1993) *Compiler Design in C*, Prentice Hall of India
3. Kenneth C. Louden (2003) *Compiler Construction: Principles & Practice*, Thomson Learning
4. Muchnick, *Advanced Compiler Design: Implementation*, Acadamic Press
5. Rajini Jindal (2002) , *Compilers Construction & Design* , Umesh Publications , Delhi
6. Ronald Mak (1996) *Writing Compilers and Interpreters*, (2nd ed.) , John Miler &Sons

		L	T	P	C
MCS13C007	**ADVANCED DATABASE TECHNOLOGY**	**3**	**0**	**0**	**3**

OBJECTIVES:

- Students would be able to Design and implement relational database solutions for general applications.
- Develop database scripts for data manipulation and database administration.Understand and perform common database administration tasks, such as database monitoring, performance tuning, data transfer, and security.
- To balance the different types of competing resources in the database environment so that the most important applications have priority access to the resources

UNIT-I: INTRODUCTION TO DATABASE **9 Hrs**

Database Environment – Data Models – Relational Model – Relational algebra and Calculus – SQL: Data Definition, Data Manipulation, Query by Example – Commercial Databases: PL/SQL – Stored Procedure.

UNIT-II: DATABASE PLANNING **9 Hrs**

Design and Administration – Fact Finding Techniques – ER Modeling – Enhanced ER Modeling – Normalization

UNIT-III: SECURITY **9 Hrs**

Transaction Management – Query Processing – Programmatic SQL – Distributed DBMS: Introduction, Architecture, Design and Advanced Concepts – Query Processing – Updating Distributed Data – Distributed Transaction Management, Concurrency Control – Recovery.

UNIT-IV: INTRODUCTION TO OBJECT DBMS **9 Hrs**

Concepts – Design – Standards and Systems – Object relational DBMS – OODBMS.

UNIT-V: DBMS IN WEB APPLICATIONS **9 Hrs**

Structured and Semi Structured Data: XML and DBMS – Overview: of Data Warehousing– OLAP – Data Mining.

Total no.of Hours:45

REFERENCES

1. Thomas M Connolly, Carolyn E Begg, Database Systems *A Practical Approach to Design Implementation and Management*, (3rd ed.),Addison Wesley.
2. Bipin C. Desai (2001), *An Introduction to Database Systems*, Galgotia Publications
3. C. J. Date, *An Introduction to Database Systems*, (7th ed.), Pearson Education.
4. Abraham Silberschatz, Henry F Korth, S.Sudershan *Database System Concepts* (4th ed.)
5. Prabhu (2002), *Object Oriented Database Systems: Approaches and Architecture*, PHI
6. Morrison (2003) *Database Driven Websites*, Thomson Learning.

		L	T	P	C
MCS13C008	**SERVICE ORIENTED ARCHITECTURE**	**3**	**0**	**0**	**3**

OBJECTIVES:

- To understand various architecture for application development.
- To learn the importance of SOA in application integration and web service and SOA related tools.

UNIT I : SOA AND WEB SERVICES FUNDAMENTALS **9 Hrs**

Fundamentals of SOA-Common characteristics of contemporary SOA-common tangible benefits of SOA-Evolution of SOA-Evolution of SOA-web services and contemporary SOA-activity management and composition

UNIT II: SOA AND SERVICE ORIENTATION **9 Hrs**

Principles of Service Orientation-Service orientation and the enterprise-anatomy of a service oriented architecture-common principles of service orientation-how service orientation principles inter relate-Service Layers

UNIT III: SOA PALNNING AND ANALYSIS **9 Hrs**

SOA Delivery Strategies-Introduction to service oriented analysis-benefits of business centric SOA-Deriving Business services-service modeling –service modeling guidelines-classifying service model logic

UNIT IV: SOA DESIGN **9 Hrs**

Introduction to service oriented design- WSDL language basics-SOAP language basics-service interface design tools-SOA composition guidelines-service design-Business process design

UNIT V: SOA PLATFORMS AND SOA SECURITY. **9 Hrs**

SOA Platform basics-SOA support in J2EE-SOA support in .NET-SOA Security-SOA Governance

Total no. of hrs: 45

REFERENCE BOOKS:

1. Shankar Kambhampaly (2008) *Service –Oriented Architecture for Enterprise Applications*, Wiley India
2. Eric Newcomer, Greg Lomow, *Understanding SOA with Web Services*, Pearson Education.
3. Mark O' Neill, et al. (2003), *Web Services Security*, Tata McGraw-Hill Edition
4. Thomas Erl (2005) *Service-Oriented Architecture: Concepts, Technology and Design*, Prentice Hall
5. Michael Rosen, Boris Lublinsky, (2008) *Applied SOA Service Oriented Architecture and Design Strategies*,Wiely India Edition

		L	T	P	C
MCS13C009	**ADVANCED WEB TECHNOLOGY**	**3**	**0**	**0**	**3**

OBJECTIVES:

- To understand the issues in the design of web application development and concepts of client side and server side technologies.
- To learn the concept of three tier application using MVC.To understand and learn the importance of Java based security solutions.
- To learn the concepts of software components using EJB.To learn the concept of other framework.

UNIT I: FUNDAMENTALS **9 Hrs**

Introduction to the web - Web- enabling Technologies - Web service Protocol - Web Design concepts - Examining good and bad web design - Page Design Resources.

UNIT II: SIMPLE DESIGN ISSUES **9 Hrs**

Page Design - HTML - Web page style considerations - Page composition - Type faces - Tag parameters - Color and graphics for web pages - WYSIWYG web page editor - Dreamweaver.

UNIT III: ADVANCE DESIGN ISSUED **9 Hrs**

Advanced Page design - tables and frames - preparing graphics and animations forms - cascading style sheets - user interface design - page grid - page templates - usability testing.

UNIT IV: SCRIPTING IN DESIGN **9 Hrs**

Typography and Graphic design for the web - Creating transparent GIF - Lean graphics - Image maps – Palette map - Web programming - Web site Garage - W3C HTML validation services - Net mechanic - DHTML - XML.

UNIT V: TOOLS AND APPLICATIONS **9 Hrs**

Online Applications - Developing an on-line shopping application - Data Base design issues - connecting Data Base with tools such as Java, ASP.

Total no.of Hours: 45

REFERENCES:

1. Deitel and Deitel (2000), *Internet and World Wide Web how to program*, Prentice Hall
2. Bob Breed Love (1996), *Web Programming* Unleashed, Sams net Publications
3. (2000) *DHTML* `O' Reiley Publications
4. Goldfarb (2000), *The XML handbook* , (2nd ed.), Pearson Education
5. Hall (1998), Core *Web Programming* (1st ed.), Pearson Education
6. Walther, *Active Server Pages 2.0 Unleashed*, Techmedia.

MCS13CL04 SERVICE COMPUTING LAB 0 0 3 1

OBJECTIVE:

- To implement the following list of programs

LIST OF EXPERIMENTS

1. Creation of An Addition Web Service
2. Creation of Web Service Client
3. Creation of A Web Service With Database Connectivity
4. Creation of A SOA Project With BPEL Module to Compose A Web Service
5. Generation of WSDL
6. Creation of RPC Style Web Service
7. Creation of Document Style Web Service

MCS13CL05 COMPILER & DATABASE LAB 0 0 3 1

OBJECTIVE:

- To implement the following list of programs

LIST OF EXPERIMENTS

COMPILER LAB

1. Implementation of Lexical Analyzer
2. Creation of Symbol Table
3. Implementation of Assembler
4. DFA From Regular Expression
5. Implementation of Top Down Parser
6. Implementation of Operator Precedence Parser

DATABASE LAB

1. Finding Rank Holders Using Cursors
2. Creation of Trigger
3. PL/SQL Procedure to Insert A Row
4. Student Information System
    a. Queries On Student marks
    b. Queries on Student Details
5. Employee payroll System
6. Finding total & average using functions

		L	T	P	C
MCS13C010	**HIGH SPEED NETWORKS & SECURITY**	**3**	**0**	**0**	**3**

OBJECTIVES:

- To learn about the different internet routing protocols and different aspects routing in.
- To understand the issues in ATM networks and the protocols used for th working of ATM networks and how TCP play the role in Network Congestion.
- To understand the mathematical model for security and different aspects of encryption techniques and the role played by authentication in security.

UNIT I: INTRODUCTION **9 Hrs**

Networking history – Need for speed and quality of services – Advanced TCP and ATM networks – Need for the protocol architecture – TCP/IP protocol architecture – OSI model – Internetworking – Transmission control protocol – User datagram protocol – Internet protocol – IPv6.

UNIT II: ADVANCED NETWORKS **9 Hrs**

Packet switching networks – Frame relay networks – ATM protocol architecture – ATM logical connections – ATM cell – ATM service categories – ATM adoption layer – The emergency of high speed LANs-Ethernet – Fiber channel – Wireless LANs.

UNIT III: CONGESTION AND TRAFFIC MANAGEMENT **9 Hrs**

Effect of congestion – Congestion and control – Traffic management – Congestion control in packet switching networks – Frame relay congestion control – Need for Flow and error control - Link control mechanisms – ARQ performance – TCP flow control – TCP congestion control – Performance of TCP over ATM – Requirement for ATM traffic and congestion control – ATM traffic Related attributes – Traffic management framework – Traffic control – ABR traffic management – GFR traffic management.

UNIT IV: PUBLIC KEY ENCRYPTION **9 Hrs**

Attacks - Services - Mechanisms - Conventional Encryption - Classical and Modern Techniques – Encryption Algorithms – Confidentiality - RSA - Elliptic Curve Cryptography - Number Theory Concepts

UNIT V: MESSAGE AUTHENTICATION **9 Hrs**

Hash Functions - Digest Functions - Digital Signatures - Authentication protocols.

Total no.of Hours: 45

REFERENCE:

1. William Stallings (2002), "*High speed Networks and Internets*", (2nd ed.), Pearson Education
2. Halsall, "*Data Communications Computer Networks and Open Systems*", Pearson Education
3. Wolf Gary Effelsberg, Otto Spaniol, Andre D. (1996), "*High Speed Networking for Multimedia applications*", Kluwer Academic publishers
4. Andrew S.Tanenbaum (1996), "*Computer Networks*", (3rd ed.), Prentice Hall
5. Stallings (1999), *Cyptography & Network Security - Principles & Practice*, Pearson Education
6. Bruce, Schneier (1996), *Applied Cryptography* (2nd ed.), Toha Wiley & Sons

		L	T	P	C
MCS13CE01	**MULTI-CORE PROGRAMMING**	**3**	**0**	**0**	**3**

OBJECTIVES:

- To understand the recent trends in the field of Computer Architecture and identify performance related parameters.
- To appreciate the need for parallel processing and problems related to multiprocessing.
- To understand the different types of multicore architectures and design of the memory hierarchy.
- To expose the students to multicore programming.

UNIT I: **9 Hrs**

INTRODUCTION TO MULTIPROCESSORS AND SCALABILITY ISSUES

Parallel computer models –- Symmetric and distributed shared memory architectures – Performance Issues. Multi-core Architectures - Software and hardware multithreading – SMT and CMP architectures – Design issues – Case studies – Intel Multi-core architecture – SUN CMP architecture – IBM cell processor.

UNIT II: **9 Hrs**

PARALLEL PROGRAMMING

Fundamental concepts – Designing for threads. Threading and parallel programming constructs – Synchronization – Critical sections – Deadlock. Threading APIs.

UNIT III: **9 Hrs**

OPENMP PROGRAMMING

OpenMP – Threading a loop – Thread overheads – Performance issues – Library functions. Solutions to parallel programming problems – Data races, deadlocks and livelocks – Non-blocking algorithms – Memory and cache related issues.

UNIT IV: **9 Hrs**

MPI PROGRAMMING

MPI Model – collective communication – data decomposition – communicators and topologies – point-to-point communication – MPI Library.

UNIT V: **9 Hrs**

MULTITHREADED APPLICATION DEVELOPMENT

Algorithms, program development and performance tuning.

Total no.of Hours:45

REFERENCES

1. Michael J Quinn (2003), ―*Parallel programming in C with MPI and OpenMP‖* , Tata McGraw Hill
2. Shameem Akhter and Jason Roberts (2006), ―*Multi-core Programming‖* , Intel Press
3. John L. Hennessey and David A. Patterson (2007), *Computer architecture – A quantitative approach*, (4th ed.), Morgan Kaufmann/Elsevier Publishers
4. David E. Culler, Jaswinder Pal Singh (2004), ―*Parallel computing architecture : A hardware/ software approach‖* , Morgan Kaufmann/Elsevier Publishers
5. Wesley Petersen and Peter Arbenz (2004), ―*Introduction to Parallel Computing‖* , Oxford University Press

		L	T	P	C
MCS13CE02	**EMBEDDED SYSTEMS**	**3**	**0**	**0**	**3**

OBJECTIVES:

- To understand the architecture of embedded processor, microcontroller and peripheral devices with embedded systems and how to work in embedded network environment.
- To understand challenges in Real time operating system analyze and design applications on embedded systems.

UNIT I: OVERVIEW **9 Hrs**

Overview of embedded systems, Design challenge, Processor technology, IC technology, Design technology-Custom-Single purpose processors: Custom single purpose processor design, optimizing custom single processors, Basic architecture, operation, programmers view, development environment, Application specific instruction set processors, selecting a microprocessor

UNIT II: STANDARD SINGLE-PURPOSE PROCESSORS **9 Hrs**

peripherals Timers, counters, watchdog timers, UART ,Pulse width modulator, LCD controller, Keypad controller, ADC, Real time clocks

UNIT III: MEMORY **9 Hrs**

Memory write ability and storage performance, Common memory types, composing memories, memory hierarchy and cache, advanced RAM: DRAM, FPM DRAM, EDO DRAM, SDRAM, RDRAM, Memory management Unit

UNIT IV: INTERFACING **9 Hrs**

Arbitration, Muti-level bus architectures, Serial protocols: I2C bus, CAN bus, Fire Wire bus, USAB, Parallel protocols: PCI and ARM bus, Wireless Protocols: IrdA, Bluetooth,IEEE802.11

UNIT V: CASE STUDIES **9 Hrs**

Digital Camera: Case study of embedded system - Brief study State Machine and Concurrent Process Models - Control systems: Open loop and closed loop systems, General control systems and PID controllers, Fuzzy control, Practical issues related to computer based control, Benefits of computer based control implementations

Total no.of Hours: 45

REFERENCES

1. Frank Vahid and Tony Givargis (2001) *Embedded System Design: A Unified Hardware and Software Introduction*, Wiley
2. Mazidi (2003), *The 8051 Microcontrollers & Embedded Systems*, Pearson Education
3. Janathan W. Valvano (2003), Embedded *Microcomputer Systems: Real-time Interfacing*, Thomson Learning

		L	T	P	C
MCS13CE03	**MOBILE COMMUNICATION**	**3**	**0**	**0**	**3**

OBJECTIVES :

- To understand the basics of Mobile computing and wireless networks in Mobile Computing.
- To understand the architectures of mobile applications and familiar with mobile computing platforms.

UNIT I: INTRODUCTION **9 Hrs**

Medium access control – Telecommunication systems - Satellite systems - Broadcast systems.

UNIT II: STANDARDS **9 Hrs**

Wireless LAN - IEEE 802.11 - HIPERLAN - Bluetooth.

UNIT III: ADHOC NETWORKS **9 Hrs**

Characteristics - Performance issues - Routing in mobile hosts.

UNIT IV: NETWORK ISSUES **9 Hrs**

Mobile IP - DHCP - Mobile transport layer - Indirect TCP - Snooping TCP - Mobile TCP - Transmission / time-out freezing - Selective retransmission - Transaction oriented TCP.

UNIT V: APPLICATION ISSUES **9 Hrs**

Wireless application protocol - Dynamic DNS - File systems - Synchronization protocol - Context-aware applications - Security - Analysis of existing wireless network .

Total no.of Hours: 45

REFERENCES:

1. J. Schiller (2000), *Mobile Communications*, Addison Wesley
2. William C.Y.Lee (1993), Mobile *Communication Design Fundamentals*, John Wiley

		L	T	P	C
MCS13CE04	**SOFTWARE PROJECT MANAGEMENT**	**3**	**0**	**0**	**3**

OBJECTIVES:

- Student understand the basic knowledge about software project management that form the background in developing complex, evolving (software-intensive) systems.
- To plan a software management process that account for quality issues and non-functional requirements.
- To employ a selection of concepts and techniques to complete a small-scale analysis and design in software projects.
- To impart knowledge and to translate requirement specifications into a design, and then realize that design practically, all using an appropriate software engineering methodology.

UNIT I: INTRODUCTION **9 Hrs**

Conventional Software Management – Evolution of Software Economics – Improving Software Economics – Conventional versus Modern Software Project Management

UNIT II: SOFTWARE MANAGEMENT PROCESS FRAMEWORK **9 Hrs**

Lifecycle Phases – Artifacts of the Process – Model Based Software Architectures – Workflows of the Process – Checkpoints of the Process

UNIT III: SOFTWARE MANAGEMENT DISCIPLINES **9 Hrs**

Iterative Process Planning - Organisation and Responsibilities – Process Automation – Process Control and Process Instrumentation – Tailoring the Process

UNIT IV: MANAGED AND OPTIMIZED PROCESS **9 Hrs**

Data Gathering and Analysis: Principles of Data Gathering, Data Gathering Process, Software Measures, Data Analysis - Managing Software Quality – Defect Prevention

UNIT V: CASE STUDIES **9 Hrs**

COCOMO Cost Estimation Model – Change Metrics – CCPDS-R

Total No of periods: 45

REFERENCES:

1. Walker Royce (2004) "*Software Project Management – A Unified Framework* ", Pearson Education, (Unit I, II, III & V)
2. Humphrey, Watts (1989) *Managing the software process* ", Addison Wesley,. (Unit IV)
3. Ramesh Gopalaswamy (2001), "*Managing Global Projects*", Tata McGraw Hill
4. Bob Hughes, Mikecotterell, (2004) "*Software Project Management*",(3rd ed.), Tata McGraw Hill

		L	T	P	C
MCS13CE05	**AGENT BASED SYSTEMS**	**3**	**0**	**0**	**3**

OBJECTIVE:

- To study the concepts of agent based systems such as knowledge based agents, planning agents, higher level agents and have knowledge about how the agents will act under uncertainty.

UNIT I: INTRODUCTION **9 Hrs**

Definitions - History - Intelligent Agents - Structure-Environment - Basic Problem Solving Agents-Formulating - Search Strategies - Intelligent search - Game playing as search.

UNIT II: KNOWLEDGE BASED AGENTS **9 Hrs**

Representation - Logic-First order logic - Reflex Agent - Building a knowledge Base - General Ontology - Inference - Logical Recovery

UNIT III: PLANNING AGENTS **9 Hrs**

Situational Calculus - Representation of Planning - Partial order Planning- Practical Planners – Conditional Planning - Replanning Agents

UNIT IV: AGENTS AND UNCERTAINITY **9 Hrs**

Acting under uncertainty - Probability Bayes Rule and use - Belief Networks - Utility Theory – Decision-Network - Value of Information - Decision Theoretic Agent Design.

UNIT V: HIGHER LEVEL AGENTS **9 Hrs**

Learning agents - General Model - Inductive Learning - Learning Decision Trees-Reinforcement Learning - Knowledge in Learning - Communicative agents -Types of communicating agents - Future of AI

Total no.of Hours: 45

REFERENCES

1. Stuart Russell and Peter Norvig (2003), *Artificial Intelligence - A Modern Approach*, Pearson Education
2. Patrick Henry Winston (1999), *Artificial Intelligence*, (3rd ed.) , AW
3. Nils.J.Nilsson (1992), *Principles of Artificial Intelligence*, Narosa Publishing House

		L	T	P	C
MCS13CE06	**NATURAL LANGUAGE PROCESSING**	**3**	**0**	**0**	**3**

OBJECTIVES:

- To understand the representation and processing of Morphology and Part-of Speech Taggers.
- To appreciate various techniques used for speech synthesis and recognition and understand different aspects of natural language syntax and the various methods used for processing syntax.
- To understand different methods of disambiguating word sensesand various representations of semantics, discourse and applications of natural language processing

UNIT I: INTRODUCTION AND LINGUISTIC BACK GROUND 9 Hrs

Introduction to Natural Language Understanding – The Different levels of Language Analysis – Representation and Understanding – the Organization of Natural Language Understanding Systems . Linguistic Back ground: The elements of Simple Sentences – Adjective Phrases and Adverbial Phrases.

UNIT II: PARSING 9 Hrs

Top – Down Parser – A Bottom – Up Chart Parser – Transition Networks Grammars. Features and Augmented Grammars: Some basic Feature systems for English - Parsing with features -Efficient Parsing: Shift Reduce Parser – Deterministic Parser.

UNIT III SEMANTICS 9 Hrs

Semantic and Logical Form – Encoding Ambiguity in the logical form – Thematic Roles.Semantic Interpretation and Compositionality – Lexicalized Semantic Interpretation and Semantic roles - semantic Interpretation Using Feature Unification .

UNIT IV KNOWLEDGE REPRESENTATION 9 Hrs

A Representation Based on FOPC – Handling Natural Language Quantification . Local Discourse Context and Discourse Entities – Ellipses – Surface Anaphora – Establishing Coherence – Reference and Matching Expectations – Using Hierarchical Plans.

UNIT V DISCOURSE STRUCTURE AND CASE STUDIES 9 Hrs

Need – Segmentation and Cue Phrases – Tense and aspect – Managing the Attentional Stack – an Example. Case Study : Logic and Model – Theoretic Semantics – A Semantics for FOPC – Symbolic Computation : Data structures – Matching , Search algorithms - The Unification Algorithm.

Total no.of Hours: 45

REFERENCE BOOKS

1. Ronald Hausser (1999) " *Foundations of Computational Linguistics*", Springer- Verlog,
2. Winograd , " *Language as a cognitive process- syntax*" , Addison Wesley
3. Popov (1986) , " *Talking with computer in Natural language*" springer verlog
4. Akshar Bharathi, Vineet Chaitanya, Rajeev Sangal (2000), "*Natural Language Processing* – A Paninian Perspective", PHI
5. James Allen (2004)– "*Natural Language Understanding* ", Pearson Education

		L	T	P	C
MCS13CE07	**SOFT COMPUTING**	**3**	**0**	**0**	**3**

OBJECTIVES:

- To learn the key aspects of Soft computing , Neural networks and fuzzy logic components.
- To gain insight onto Neuro Fuzzy modeling and control.
- To know about the components and building block hypothesis of Genetic algorithm and knowledge in machine learning through Support Vector Machines.

UNIT I: ARTIFICIAL NEURAL NETWORKS **9 Hrs**

Basic concepts - Single layer perception - Multilayer Perception - Supervised and Unsupervised learning -Back propagation networks - Kohnen's self organizing networks - Hopfield network**..**

UNIT II: FUZZY SYSTEMS **9 Hrs**

Fuzzy sets and Fuzzy reasoning - Fuzzy matrices - Fuzzy functions - Decomposition - Fuzzy automata and languages - Fuzzy control methods - Fuzzy decision making**.**

UNIT III: NEURO - FUZZY MODELING **9 Hrs**

Adaptive networks based Fuzzy interface systems - Classification a nd Regression Trees - Data clustering algorithms - Rule based structure identification - Neuro-Fuzzy controls - Simulated annealing – Evolutionary computation.

UNIT IV: GENETIC ALGORITHMS **9 Hrs**

Survival of the Fittest - Fitness Computations - Cross over - Mutation -Reproduction - Rank method - Rank space method

UNIT V: SOFTCOMPUTING AND CONVENTIONAL AI **9 Hrs**

AI search algorithm - Predicate calculus - Rules of interference – Semantic networks - Frames - Objects - Hybrid models - Applications.

Total no.of Hours: 45

REFERENCES

1. Jang J.S.R., Sun C.T. and Mizutani E (2003), "*Neuro-Fuzzy and Soft computing*", Pearson Education
2. Timothy J.Ross (1997), "*Fuzzy Logic with Engineering Applications*", McGraw Hill
3. Laurene Fausett (2003), "*Fundamentals of Neural Networks*", Pearson Education
4. George J. Klir and Bo Yuan (1995), "*Fuzzy sets and Fuzzy Logic*", Prentice Hall, USA
5. Nih J.Nelsson (1998), "*Artificial Intelligence - A New Synthesis*", Harcourt Asia Ltd.
6. D.E . Goldberg (1989), "*Genetic Algorithms: Search, Optimization and Machine Learning*", Addison Wesley,

		L	T	P	C
MCS13CE08	**ETHICAL HACKING AND DIGITAL FORENSICS**	**3**	**0**	**0**	**3**

OBJECTIVES:

- To learn various hacking techniques and attacks and data assets against attacks from the Internet.
- To assess and measure threats to information assets and benefits of strategic planning process.
- To evaluate where information networks are most vulnerable and penetration tests into secure networks for evaluation purposes.
- To enable students to understand issues associated with the nature of forensics

UNIT I: **9 Hrs**

Hacking windows – Network hacking – Web hacking – Password hacking. A study on various attacks – Input validation attacks – SQL injection attacks – Buffer overflow attacks - Privacy attacks.

UNIT II: **9 Hrs**

TCP / IP – Checksums – IP Spoofing port scanning, DNS Spoofing. Dos attacks – SYN attacks, Smurf attacks, UDP flooding, DDOS – Models. Firewalls – Packet filter firewalls, Packet Inspection firewalls – Application Proxy Firewalls. Batch File Programming.

Unit III: **9 Hrs**

Fundamentals of Computer Fraud – Threat concepts – Framework for predicting inside attacks – Managing the threat – Strategic Planning Process.

UNIT IV **9 Hrs**

Architecture strategies for computer fraud prevention – Protection of Web sites – Intrusion detection system – NIDS, HIDS – Penetrating testing process – Web Services – Reducing transaction risks.

UNIT V: **9 Hrs**

Key Fraud Indicator selection process customized taxonomies – Key fraud signature selection process – Accounting Forensics – Computer Forensics – Journaling and it requirements – Standardized logging criteria – Journal risk and control matrix – Neural networks – Misuse detection and Novelty detection.

Total no.of Hours: 45

REFERENCES

1. Kenneth C.Brancik (2008) "*Insider Computer Fraud*" Auerbach Publications Taylor & Francis Group
2. Ankit Fadia (2006) " *Ethical Hacking*" second edition Macmillan India Ltd

		L	T	P	C
MCS13CE09	**PATTERN RECOGNITION**	**3**	**0**	**0**	**3**

OBJECTIVES:

- To understand the concepts of Pattern recognition and machine learning.
- To appreciate supervised and unsupervised learning and their applications.
- To understand the theoretical and practical aspects of Probabilistic Graphical Models and concepts and algorithms of reinforcement learning and learn aspects of computational learning theory.

UNIT I: PATTERN RECOGNITION **9 Hrs**

Overview of pattern recognition - Discriminant functions - Supervised learning - Parametric estimation - Maximum likelihood estimation - Bayesian parameter estimation - Perceptron algorithm - LMSE algorithm - Problems with Bayes approach - Pattern classification by distance functions - Minimum distance pattern classifier.

UNIT II: UNSUPERVISED CLASSIFICATION **9 Hrs**

Clustering for unsupervised learning and classification - Clustering concept - C-means algorithm - Hierarchical clustering procedures - Graph theoretic approach to pattern clustering - Validity of clustering solutions.

UNIT III: STRUCTURAL PATTERN RECOGNITION **9 Hrs**

Elements of formal grammars - String generation as pattern description - Recognition of syntactic description - Parsing - Stochastic grammars and applications - Graph based structural representation.

UNIT IV: FEATURE EXTRACTION AND SELECTION **9 Hrs**

Entropy minimization - Karhunen - Loeve transformation - Feature selection through functions approximation - Binary feature selection.

UNIT V: RECENT ADVANCES **9 Hrs**

Neural network structures for Pattern Recognition - Neural network based Pattern associates – Unsupervised learning in neural Pattern Recognition - Self organizing networks - Fuzzy logic - Fuzzy pattern classifiers - Pattern classification using Genetic Algorithms.

Total no.of Hours: 45

REFERENCES

1. Robert J.Schalkoff (1992), *Pattern Recognition : Statistical, Structural and Neural Approaches*, John Wiley & Sons Inc., New York
2. Tou and Gonzales (1974), *Pattern Recognition Principles*, Wesley Publication Company, London
3. Duda R.O., and Hart.P.E (1973)., *Pattern Classification and Scene Analysis*, Wiley, New York
4. Morton Nadier and Eric Smith P. (1993) *Pattern Recognition Engineering*, John Wiley & Sons,

		L	T	P	C
MCS13CE10	**GAME THEORY**	**3**	**0**	**0**	**3**

OBJECTIVES:

- To introduce the student to the notion of a game, its solutions concepts, and other basic notions and tools of game theory, and the main applications for which they are appropriate, including electronic trading markets.
- To formalize the notion of strategic thinking and rational choice by using the tools of game theory, and to provide insights into using game theory in modeling applications.
- To draw the connections between game theory, computer science, and economics, especially emphasizing the computational issues.
- To introduce contemporary topics in the intersection of game theory, computer science, and economics;

UNIT I: FUNDAMENTALS **9 Hrs**

Conflict, Strategy and Games, Game theory, The Prisoner's Dilemma, Scientific metaphor, Business case, Games in normal and extensive forms – Representation, Examination, Examples.

UNIT II: NON COOPERATIVE EQUILIBRIA IN NORMAL GAMES **9 Hrs**

Dominant Strategies and Social Dilemmas, Nash Equilibrium, Classical Cases in Game theory, Three person games, Introduction to Probability and Game theory, N-Person games.

UNIT III: COOPERATIVE SOLUTIONS **9 Hrs**

Elements of Cooperative Games- Credible commitment, A Real Estate Development, Solution Set, Some Political Coalitions, Applications of the Core to Economics –The Market Game, The Core of a Two Person Exchange Game, The Core with More than Two Pairs of Traders, The core of Public Goods Contribution Game, Monopoly and Regulation.

UNIT IV: SEQUENTIAL GAMES **9 Hrs**

Strategic Investment to Deter Entry, The Spanish Rebellion, Again, Imbedded Games – Planning Doctoral Study, Centipede Solved, Repeated play- Campers Dilemma, Pressing the shirts, Indefinitely Repeated Play – A Repeated Effort Dilemma, The Discount Factor.

UNIT V: APPLICATIONS **9 Hrs**

Voting Games, Games and Experiments, Auctions, Evolution and Boundary Rational Learning.

Total no.of Hours: 45

REFERENCES

1. Roger A. McCain (2005), "*Game Theory – A Non-Technical Introduction to the Analysis of Strategy*", Thomson South-Western
2. Tirole, (2005) "*Game Theory*", Mit press
3. Osborne (2006), "*An Introduction to Game Theory*", Oxford Press
4. E. N. Barron (2009), "*Game Theory: An Introduction*", Wiley India Pvt Ltd .

		L	T	P	C
MCS13NE13	**ADVANCED 3G NETWORKS**	**3**	**0**	**0**	**3**

OBJECTIVES:

- To learn various generations of wireless and cellular networks and fundamentals of 3G Services, its protocols and applications.
- To study about evolution of 4G Networks, its architecture and applications.
- To study about Wi MAX networks, protocol stack and standards.

UNIT I: MOBILE NETWORK **9 Hrs**

Introduction, Motivation, Scope, Nomenclature, GSM, GPRS and UMTS, Need of new architecture, Radio interfaces, Requirements for new architecture, Evolution of mobile network standardization

UNIT II: 3GPP ARCHITECTURE **9 Hrs**

Overall Architecture, Radio Access Network, EPC, Internetworking with EPC, 3GPP CS System, CDMA 2000, I-WLAN Architecture, Network Discovery and Selection, Home Cell Deployment,

UNIT III: MAIN CONCEPTS **9 Hrs**

E-UTRA- Physical, Radio Link Layer, RAN, MME Load Balancing, Tracking Concepts, IP packet Bearers, AAA, Security, EPS Mobility,QoS,Non-3GPP Access

UNIT IV: FUNCTIONS AND PROCEDURES OF 3GPP SYSTEM **9 Hrs**

Access control, Node selection, IP Address allocation, Initial attachment, Connectivity and Detachment, S1 connection management, Intra, Inter -System Mobility, session Handling Procedure.

UNIT V: PROTOCOLS **9 Hrs**

GPT, PMIPv6, EAP, MOBIKE, SCTP, S1, X2, NAS protocols.

Total no.of hrs: 45

REFERENCES:

1. Gottfried Punz (2010),” *Evolution of 3G Networks: The Concept, Architecture and Realization of Mobile Networks beyond UMTS*” ,Springer link
2. Clint Smith.P.E,Daniel Collins (2007),” *3G Wireless Networks*” TMH,Second Edition
3. Mooi Choo Chuah, Qinqing Zhang (2008),”*Design and Performance of 3G Wireless Networks and Wireless LANs*”,Springer
4. Vijay .k. Garg (2002) ,”*Wireless Network Evolution: 2G To 3G*”,pearson Education

		L	T	P	C
MCS13CE11	**GENETIC ALGORITHMS & MACHINE LEARNING**	**3**	**0**	**0**	**3**

OBJECTIVES:

- To understand the algorithms, programming and applications of Evolutionary and genetic algorithms and neural and fuzzy systems.
- To get an understanding of machine learning techniques for text classification and clustering.

UNIT I: INTRODUCTION TO GENETIC ALGORITHM 9 Hrs

Introduction to Genetic Algorithm – Robustness of Traditional Optimization and Search methods – Goals of optimization-GA versus Traditional methods – Simple GA – GA at work –Similarity templates (Schemata) – Learning the lingo - **Mathematical foundations:** The fundamental theorem - Schema processing at work. – The 2-armed & k-armed Bandit problem. –The building Block Hypothesis. – Minimal deceptive problem.

UNIT II: GA OPERATORS 9 Hrs

Data structures – Reproduction- Roulette-wheel Selection – Boltzman Selection – Tournament Selection-Rank Selection – Steady –state selection –Crossover mutation – A time to reproduce, a time to cross. – Get with the Main program. – How well does it work. – Mapping objective functions to fitness forum. – Fitness scaling. Coding – A Multi parameter, Mapped, Fixed – point coding – Discretization – constraints.

UNIT III: APPLICATIONS OF GA 9 Hrs

The rise of GA – GA application of Historical Interaction. – Dejung & Function optimization – Current applications of GA - **Advanced operators & techniques in genetic search :**Dominance, Diploidy & abeyance – Inversion & other reordering operators. – other mine-operators – Niche & Speciation – Multi objective optimization – Knowledge-Based Techniques. – GA & parallel processes – Real life problem

UNIT IV: INTRODUCTION TO GENETICS-BASED MACHINE LEARNING 9 Hrs

Genetics – Based Machine learning – Classifier system – Rule & Message system – Apportionment of credit: The bucket brigade – Genetic Algorithm – A simple classifier system in Pascal. – Results using the simple classifier system.

UNIT V: APPLICATIONS OF GENETICS-BASED MACHINE LEARNING 9 Hrs

The Rise of GBMC – Development of CS-1, the first classifier system. – Smitch's Poker player. – Other Early GBMC efforts. –Current Applications.

Total No. of Hrs: 45

REFERENCE BOOKS

1. David E. Gold Berg (2001), "*Genetic Algorithms in Search, Optimization & Machine Learning*", Pearson
2. S.Rajasekaran, G.A.Vijayalakshmi Pai (2003), " *Neural Networks, Fuzzy Logic and Genetic Algorithms* ", PHI , (Chapters 8 and 9)
3.Kalyanmoy Deb (1995), "*Optimization for Engineering Design, algorithms and examples*", PHI

		L	T	P	C
MCS13CE12	**CLOUD COMPUTING**	**3**	**0**	**0**	**3**

OBJECTIVES:

- To understand the concept of cloud and utility computing and various issues in cloud computing.
- To familiarize themselves with the state of the art in cloud.
- To appreciate the emergence of cloud as the next generation computing paradigm and set up a private cloud.

UNIT I: INTRODUCTION 9 hours

Introduction - Essentials - Benefits - Business and IT Perspective - Cloud and Virtualization -Cloud Services Requirements – Cloud and Dynamic Infrastructure - Cloud Computing Characteristics - Cloud Adoption. Cloud Models - Cloud Characteristics - Measured Service - Cloud Models - Security in a Public Cloud - Public versus Private Clouds - Cloud Infrastructure
Self Service.

UNIT II: CLOUD SERVICES AND SOLUTIONS 9 hours

Gamut of Cloud Solutions - Principal Technologies - Cloud Strategy – Cloud Design and Implementation using SOA - Conceptual Cloud Model - Cloud Service Defined. Cloud Solutions - Introduction - Cloud Ecosystem - Cloud Business Process Management - Cloud Service Management - Cloud Stack - Computing on Demand (CoD) – Cloudsourcing.

UNIT III: CLOUD OFFERINGS AND CLOUD MANAGEMENT 9 hours

Cloud Offerings - Information Storage, Retrieval, Archive and Protection - Cloud Analytics - Testing under Cloud - Information Security - Virtual Desktop Infrastructure - Storage Cloud. Cloud Management - Resiliency - Provisioning - Asset Management - Cloud Governance - High Availability and Disaster Recovery - Charging Models, Usage Reporting, Billing and Metering

UNIT IV: CLOUD VIRTUALIZATION TECHNOLOGY 9 hours

Virtualization Defined - Virtualization Benefits - Server Virtualization – Virtualization for x86 Architecture - Hypervisor Management Software - Logical Partitioning (LPAR) - VIO Server - Virtual Infrastructure Requirements - Storage virtualization - Storage Area Networks - Network-Attached storage - Cloud Server Virtualization - Virtualized Data Center

UNIT V: CLOUD, SOA AND INFRASTRUCTURE BENCHMARKING 9 hours

SOA and Cloud - SOA Defined - SOA and IaaS - SOA-based Cloud Infrastructure Steps - SOA Business and IT Services. OLTP Benchmark - Business Intelligence Benchmark - e-Business Benchmark - ISV Benchmarks Cloud Performance Data Collection and Performance Monitoring Commands Benchmark Tools.

Total No. of Hrs: 45

REFERENCES

1. Kumar Saurabh, “Cloud Computing: Insights into New-Era Infrastructure”, Wiley India, 2011.
2. John Rhoton, “Cloud Computing Explained: Implementation Handbook for Enterprises”, Recursive Press, 2013.
3. George Reese, “Cloud Application Architectures: Building Applications and Infrastructure in the Cloud (Theory in Practice)”, O’Reilly, 2009.

		L	T	P	C
MCS13CE13	**DATA ANALYTICS**	**3**	**0**	**0**	**3**

OBJECTIVES:

- To understand big data analytics as the next wave for businesses looking for competitive advantage and financial value of big data analytics.
- To explore tools and practices for working with big data and how big data analytics can leverage into a key component.
- To understand how to mine the data and learn about stream computing.
- To know about the research that requires the integration of large amounts of data

UNIT –I: INTRODUCTION **09 Hrs**

Data science articulated, history and context, technology landscape - Examples

UNIT –II: DATABASES **09 Hrs**

Databases and the relational algebra ,Parallel databases, parallel query processing, in-database analytics ,MapReduce, Hadoop, relationship to databases, algorithms, extensions, languages , Key-value stores and NoSQL; tradeoffs of SQL and NoSQL, Entity resolution, record linkage, data cleaning

UNIT-III : ANALYSIS **09 Hrs**

Basic statistical modeling, experiment design, introduction to machine learning, overfitting, Supervised learning: overview, simple nearest neighbor, decision trees/forests, Unsupervised learning: k-means, multi-dimensional scaling, Graph Analytics: PageRank, community detection, recursive queries, iterative processing, Text Analytics: latent semantic analysis, Collaborative Filtering: slope-one

UNIT-IV: DATA SCIENCE CONCEPTS **09 Hrs**

Introduction - data and relations –preprocessing- visualization-Correlation

UNIT-V: MODELS **09 Hrs**

Regression-Forecasting – classification – Clustering- Optimization Methods.

Total no.of Hrs: 45

REFERENCE BOOKS:

1) Data Analytics,Models and Algorithms for Intelligent Data Analysis,Runkler, Thomas A., Springer,2012.[ISBN 978-3-8348-2589-6]
2) Mining of Massive Datasets, Anand Rajaraman, Jeffrey David Ullman Cambridge University Press, 2011.

		L	T	P	C
MCS13CE14	**AD-HOC AND WIRELESS SENSOR NETWORK**	**3**	**0**	**0**	**3**

OBJECTIVES:

- To learn about the issues in the design of wireless ad hoc networks and working of protocols in different layers of mobile ad hoc and sensor networks.
- To expose the students to different aspects in sensor networks.
- To understand various security issues in ad hoc and sensor networks and solutions to the issues

UNIT I: AD HOC NETWORKS: **9 Hrs**

Introduction and Definitions, Ad hoc Network Applications, Design Challenges. Collision Avoidance Protocols.

UNIT II: **9 Hrs**

Routing in Mobile Ad hoc Networks -Multicasting -Transport layer Protocols

UNIT-III: **9 Hrs**

Energy Conservation-Use of Smart Antennas-QoS Issues-Security

UNIT-IV: WIRELESS SENSOR NETWORKS: **9 Hrs**

Introduction-Applications- Medium Access Control Protocols

UNIT-V: WIRELESS SENSOR NETWORKS: **9 Hrs**

Routing Protocols - Transport Control Protocols- Network Management

Total no. of hrs: 45

REFERENCE BOOKS:

1. Prasant Mohapatra and Srihanamurthy, "*Ad Hoc Networks Technologies and Protocols*", Springer, Springer International Edition, 2009.

2. Kazem Sohraby, Daniel Minoli, Taieb Znati, (2007) "*Wireless Sensor Networks*", A John Wiley & Sons, Inc., Pub!ication

3. Carlos De Morais Cordeiro, Dharma Prakash Agrawal (2011),"*Ad Hoc and Sensor Networks: Theory and Applications*", (2nd ed.) World Scientific

4. Houda Labiod (2010),"*Wireless Ad Hoc and Sensor Networks*", John Wiley & Sons

		L	T	P	C
MCS13CE15	**SOFTWARE METRICS AND QUALITY ASSURANCE**	**3**	**0**	**0**	**3**

OBJECTIVES:

- To study the fundamentals of Software Quality Assurance, managing the Software Quality.
- To study about the metrics for Software Quality and Software Quality Program Concepts.

Unit I: FUNDAMENTALS OF SOFTWARE QUALITY ASSURANCE 9 Hrs

The Role of SQA – SQA Plan – SQA considerations – SQA people – Quality Management – Software Configuration Management

UNIT II: MANAGING SOFTWARE QUALITY 9 Hrs

Managing Software Organizations – Managing Software Quality – Defect Prevention – Software Quality Assurance Management

UNIT III: SOFTWARE QUALITY ASSURANCE METRICS 9 Hrs

Software Quality – Total Quality Management (TQM) – Quality Metrics – Software Quality Metrics Analysis

UNIT IV: SOFTWARE QUALITY PROGRAM 9 Hrs

Software Quality Program Concepts – Establishment of a Software Quality Program Software Quality Assurance Planning – An Overview – Purpose & Scope.

UNIT V: SOFTWARE QUALITY ASSURANCE MODELS 9 Hrs

Software Quality Assurance; Statistical Quality Assurance - Software Reliability, Models for Quality Assurance-ISO-9000 - Series, CMM, SPICE, Malcolm Baldrige Award.

Total no. of hrs: 45

REFERENCES:

1. Gordon G Schulmeyer (2007), "*Handbook of Software Quality Assurance*", (3rd ed.), Artech House Publishers
2. Nina S Godbole (2004),*Software Quality Assurance: Principles and Practice*, Alpha Science International,
3. Mordechai Ben-Menachem / Garry S Marliss,*Software Quality*, Vikas Publishing House, Pvt, Ltd.
4. Watts S Humphrey, " *Managing the Software Process*", Pearson Education Inc
5. Roger Pressman (1999), " *Software Engineering* ", 5th edition McGraw Hill