S.R.M. UNIVERSITY

FACULTY OF ENGINERING AND TECHNOLOGY

SCHOOL OF COMPUTING

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

S.R.M. UNIVERSITY – FACULTY OF ENGINEERING AND TECHNOLOGY

PROGRAMME: M.TECH (CSE) – PART TIME

CURRICULUM AND SYLLABUS

SCHOOL OF COMPUTING

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

M.Tech. (CSE) – PART TIME

CURRICULUM

I SEMESTER

COURSE CODE	COURSE NAME	L	T	P	C
Theory					
MA533	Mathematical Foundations of Computer Science	3	1	0	4
CS513	Parallel Computer Architecture	3	1	0	4
CS517	Object Oriented Software Engineering	3	1	0	4
Total		**9**	**3**	**0**	**12**

II SEMESTER

COURSE CODE	COURSE NAME	L	T	P	C
Theory					
CS502	Database Technology	3	1	0	4
CS505	Data structures & Algorithms	3	1	0	4
	Elective – I	3	0	0	3
Practical					
CS509	Software Development Lab	0	0	3	2
Total		**9**	**2**	**3**	**13**

III SEMESTER

COURSE CODE	COURSE NAME	L	T	P	C
Theory					
CS504	Computer Communication	3	1	0	4
CS516	Distributed Operating Systems	3	1	0	4
CS518	Internet Programming and Tools	3	1	0	4
Total		**9**	**3**	**0**	**12**

IV SEMESTER

COURSE CODE	COURSE NAME	L	T	P	C
Theory					
CS601	Wireless Communication & Networks	3	1	0	4
CS603	TCP / IP Technology	3	1	0	4
	Elective – II	3	0	0	3
Practical					
CS510	Internet Programming Lab	0	0	3	2
Total		**9**	**2**	**3**	**13**

V SEMESTER

COURSE CODE	COURSE NAME	L	T	P	C
Theory					
	Elective – III	3	0	0	3
	Elective – IV	3	0	0	3
	Elective – V	3	0	0	3
Total		**9**	**0**	**0**	**9**

VI SEMESTER

COURSE CODE	COURSE NAME	L	T	P	C
CS612	Project Work	0	0	24	12
Total		**0**	**0**	**24**	**12**

TOTAL CREDITS TO BE EARNED FOR THE AWARD OF THE DEGREE   : 71

ELECTIVES FOR SECOND SEMESTER

COURSE CODE	COURSE NAME	L	T	P	C
MA553	Discrete Mathematics	3	0	0	3
CS551	System Programming	3	0	0	3
CS553	Genetic Algorithms & Machine Learning	3	0	0	3
CS623	Component Based System Design	3	0	0	3
CS651	Neural Networks Programming Techniques	3	0	0	3
CS685	Multimedia Systems	3	0	0	3

ELECTIVES FOR FOURTH SEMESTER

COURSE CODE	COURSE NAME	L	T	P	C
CS560	Fuzzy Logic	3	0	0	3
CS562	Digital Image Processing	3	0	0	3
CS564	Virtual Reality Technology	3	0	0	3
CS578	Human Interface System Design	3	0	0	3
CS621	Software Quality Management	3	0	0	3

ELECTIVES FOR FIFTH SEMESTER

COURSE CODE	COURSE NAME	L	T	P	C
CS530	Software Reliability	3	0	0	3
CS650	Pattern Recognition Techniques	3	0	0	3
CS655	Data Warehousing	3	0	0	3
CS667	Real Time Systems	3	0	0	3
CS669	Network Security	3	0	0	3
CS689	Embedded Technology	3	0	0	3
CS691	Fault Tolerant Systems	3	0	0	3
CS693	Grid Computing	3	0	0	3
CS695	Intelligent Systems	3	0	0	3
CS696	Natural Language Understanding	3	0	0	3

SCHEME OF EXAMINATION

Course	Duration In Hours	Internal Marks	External Marks	Total	Passing Minimum	
					External	Aggregate
All Theory And Practical Courses	3 hrs.	30	70	100	35	50
Project Work		150	450	600	--	300

MA533   **MATHEMATICAL FOUNDATIONS OF**   **L   T   P   C**
COMPUTER SCIENCE
(Common for M.Tech (CSE, IT) & MCA)   **3   1   0   4**

UNIT I – LOGIC   9
Statements – Connectives – Truth tables – Normal forms – Predicate calculus – Inference Theory for Statement calculus and predicate calculus.

UNIT II–COMBINATORICS   9
Mathematical Induction – Pigeonhole principle – Principle of inclusion and exclusion.

UNIT III - RECURSIVE FUNCTIONS   9
Recurrence relation – Solution of recurrence relation using characteristic polynomial and using generating function – Recursive functions – Primitive recursive functions, Computable and non computable functions.

UNIT IV – ALGEBRAIC STRUCTURES   9
Groups – Definition and examples only – Cyclic groups – Permutation group (S_n and D_n) – Subgroups – Homomorphism and Isomorphism – Cosets –   Lagrange's Theorem – Normal subgroups – Cayley's representation theorem.

UNIT V –LATTICES   9
Partial order relations, poset – Lattices, Hasse diagram – Boolean algebra.

TUTORIAL 15
TOTAL 60

TEXT BOOKS
1. Tremblay J.P. and Manohar R., "Discrete Mathematical Structures with applications to Computer Science", McGraw Hill International Edition, 1987. (Unit I – Chapter 1 : All sections excluding 1-2.5, 1-2.12, 1-2.13, 1-2.15, 1-3.6, 1-4.4)
2. Kenneth H. Rosen, Discrete Mathematics and Its Applications, 4th Edition, Tata McGraw Hill, 2002. (Unit II – Chapter 3: Sections 3.1, 3.2, Chapter 4 : Section 4.2)
3. Venkataraman M.K. etal., "Discrete Mathematics", National Publishing Co.,2000, (Unit III Ch.5.1-5.7)
4. Prof. V. Sundaresan, K.S. Ganapathy Subramanian and K. Ganesan, Discrete Mathematics, New Revised Edition, 2001. (Unit IV – Chapter 4: Section 4.3.)
5. Alan Doerr and Kenneth Levasseur, "Applied Discrete Structures for Computer Science", Galgotia Publications (P) Ltd.,1992.(Unit- V ch:13.1,13.2,13.3)

REFERENCE BOOKS
1. C.L. Liu, Elements of Discrete Mathematics, 2nd Edition, McGraw Hill Publications, 1985.
2. Gersting. J.L. Mathematical Structures for Computer Science, 3rd Edition, W.H. Freeman and Co., 1993.
3. Lidl and Pitz, Applied abstract Algebra, Springer – Verlag, New York, 1984.

CS513   **PARALLEL COMPUTER ARCHITECTURE**   **L   T   P   C**

                           (Same as IT503)   **3   1   0   4**

PURPOSE

To learn the advanced concepts of Computer Architecture

INSTRUCTIONAL OBJECTIVES
- To learn the parallel models and processors
- Pipelining and scalable architectures
- To learn the multithreaded and data flow architecture

UNIT I   PARALLEL MODELS   **9**

Parallel computer models: Multiprocessors and Multicomputer – Multivector and SIMD computer PRAM & VLSI models, conditions of parallelism. System interconnect architectures performance. Metrics and Measures.

UNIT II   PROCESSORS AND MEMORY HIERARCHY   **9**

Advanced processor technology – Super scalar and vector processors – Memory hierarchy technology, virtual memory technology – cache memory organization – shared – memory organization.

UNIT – III   PIPELINING AND SUPERSCALAR TECHNIQUES   **9**

Linear pipeline processors – Nonlinear pipeline processors – Instruction pipeline design Arithmetic pipeline design – Superscalar pipeline design

UNIT – IV   PARALLEL AND SCALABLE ARCHITECTURE   **9**

Multiprocessor system interconnects – Cache coherence, Vector processing principle Compound Vector processing, SIMD computer organization, multiprocessor operating system, multiprocessor examples

UNIT – V   SCALABLE, MULTITHREADED & DATA FLOW ARCHITECTURE   **9**

Latency – Hiding techniques – Principles of Multithreading , Scalable and Multithreaded architectures. Dataflow computer, static data flow computer , Dynamic data flow compiler, VLSI computing structure

                                                   Tutorial   15
                                                   Total   60

TEXT BOOK

1. Kai Hwang, "Advanced Computer Architecture", Parallelism, Scalability, Programmability, McGraw Hill, 1993

REFERENCE BOOKS
1. Hwang Briggs, "Computer Architecture and parallel processing", McGraw hill
2. William Stallings, "Computer Organization and Architecture- Designing for Performance", PHI,2000

CS517   OBJECT ORIENTED SOFTWARE ENGINEERING   L   T   P   C

(Same as IT505)   3   1   0   4

PURPOSE
        To learn the advanced software enginnering principles and methodologies for effective software development

INSTRUCTIONAL OBJECTIVES
- To learn about software prototyping, analysis and design
- To learn UML and its usage
- Case studies to apply the principles

UNIT I INTRODUCTION   8
Software Engineering Paradigms - Software Development process models - Project & Process - Project management – Process & Project metrics - Object Oriented concepts & Principles.

UNIT II PLANNING & SCHEDULING   9
Software prototyping - Software project planning – Scope – Resources - Software Estimation - Empirical Estimation Models-Planning-Risk Management - Software Project Scheduling – Object Oriented Estimation & Scheduling.

UNIT III ANALYSIS & DESIGN   12
        Analysis Modeling - Data Modeling - Functional Modeling & Information Flow-Behavioral Modeling-Structured Analysis - Object Oriented Analysis - Domain Analysis-Object oriented Analysis process - Object Relationship Model - Object Behaviour Model.
        Design Concepts & Principles - Design Process - Design Concepts - Modular Design – Design Effective Modularity - Introduction to Software Architecture - Data Design – Transform Mapping – Transaction Mapping – OOD - Design System design process- Object design process - Design Patterns.

UNIT IV   IMPLEMENTATION & TESTING   8
Top-Down , Bottom-Up , object oriented product Implemention & Integration. Software Testing methods-White Box, Basis Path-Control Structure –Black Box-Unit Testing-Integration testing-Validation & System testing.Testing OOA & OOD models-Object oriented testing strategies.

UNIT V   MAINTENANCE   8
Maintenance process-System documentation-program evolution dynamics-Maintenance costs-Maintainability measurement – Case Studies

                                              Tutorial 15
                                              Total   60

TEXT BOOKS

1. Roger S. Pressman, " Software Engineering A Practitioner's Approach" , Fifth Edition,Tata McGraw Hill
2. Grady Booch,James Rumbaugh,Ivar Jacobson –"the Unified Modeling Language User Guide" – Addison Wesley,1999. (Unit III)

REFERENCE BOOKS

1. Ian Sommerville, "Software Engineering", V Edition Addison- Wesley 1996
2. Pankaj Jalote "An Integrated Approach to Software Engineering" Narosa Publishing House 1991
3. Carlo Ghezzi Mehdi Jazayer, Dino Mandrioli "Fudamentals of Software Engineering"Prentice Hall of India 2002.
4. Fairley, "Software Engineering Concepts", Mc.Graw Hill 1985

CS502	DATABASE TECHNOLOGY	L	T	P	C
	Common for CSE S/W & IT	**3**	**1**	**0**	**4**
	(Same as IT502)				

PURPOSE
This course will provide a comprehensive study of Relational , Distributed and Advanced Database technologies

INSTRUCTIONAL OBJECTIVES
- To learn about ER diagrams, their representation in RDBMS
- To learn the various storage structures for Database
- To study Distributed and Parallel databases
- To learn about Object Oriented databases and Web DB's

UNIT – I DATABASE CONCEPTS   9
Introduction- Overview of file systems and database systems-Software architecture of a typical DBMS-Data Models ,Schemas and Instances- ER and EER diagrams and Data Flow Diagrams. Database administration and control

UNIT – II   RELATIONAL CONCEPTS   9
Introduction to Relational Model, Relational Algebra, Commercial query languages-Case studies-Normalization Techniques.

UNIT – III   DATABASE STORAGE AND SYSTEM DESIGN   9
Storage Structures, Indexing and multi dimensional indexes, Query Processing Algorithms, External Sorting, Query Optimization- Heuristic based optimization- cost based optimization, Buffer Management, Concurrency Control, Recovery.

UNIT – IV DISTRUBUTED DATABASES   9
Distributed Databases: Query processing, semi-joins, query optimization, distributed and client/server architecture-distributed transactions – Locking and commit protocols-Concurrency control, transaction and recovery Heterogeneity issues

Parallel databases - Parallel Architectures, performance measures, shared nothing/shared disk/shared memory based architectures

UNIT – V ADVANCED DATABASE SYSTEMS   9
Semi-structured and Web databases - The World Wide Web- HTML- Architecture -XML, XML/QL - Database Connectivity
OODBMS - ORDBMS- Deductive databases- data mining and warehousing-temporal and spatial databases-mobile databases.

                                                              Tutorial 15
                                                              Total   : 60

TEXT BOOK
1. Abraham Silberschtz, Henry. F. Korth, S.Sudharsan, "Database System Concepts", 4th Edition, Tata McGraw Hill, 2002

REFERENCE BOOKS

1. Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", 3rd Edition, Addison Wesley,2000
2. Thomas Conolly, Carolyn Begg, " Database Systems", 3rd edition, Pearson Education, 2003
3. Jim Gray and Andreas Reuter, "Transaction Processing : Concepts and Techniques", Moragan Kauffman Publishers, 1993.
4. W. Kim., "Introduction to Object Oriented Databases ", MIT Press, 1992.
5. Stefano Ceri & Giuesppe Pelagatti, "Distributed Databases - Principles and Systems", McGraw Hill Book Company, 1987.

CS505	**DATA STRUCTURES AND ALGORITHMS**	**L**	**T**	**P**	**C**
		3	**1**	**0**	**4**

PURPOSE
To study advanced representations in Data structures and algorithms

INSTRUCTIONAL OBJECTIVES
- To learn about Linear and Non linear data structures
- To learn the representations and notations used in data structures
- To learn the various analysis of algorithms
- Study of memory management schemes

UNIT – I INTRODUCTION   8
Abstract Data Types - Time and Space Analysis of Algorithms - Big Oh and Theta Notations - Average, best and worst case analysis - Simple recurrence relations and use in algorithms – Mappings

UNIT – II LINEAR DATA STRUCTURES   9
Arrays, Lists, Stacks, Queues
Array and Linked Structure Implementation of Lists, Stacks and Queues - Applications - Array of Nodes and Dynamic Pointer Implementation of Linked Structures - Cursors – Sets, Applications of linear data structures.

UNIT – III NON-LINEAR DATA STRUCTURES   9
Trees - Binary trees - Search trees - Balanced trees - Advanced tree structures - B trees - AVL trees, 2-3 trees, Splay trees – applications of trees - Graphs - Directed - Shortest path - Undirected graph - Minimal spanning tree - Tree traversals - Articulation points and biconnected components - Advanced Data Structures - Priority Queues - Hashing – Dictionary - Applications of Graphs.

UNIT – IV ANALYSIS AND DESIGN OF ALGORITHMS   9
Algorithms Analysis - Sorting - Searching - Design Techniques - Greedy Methods - Dynamic Programming - Divide and Conquor - Back Tracking -Aplications

UNIT V ADVANCED ALGORITHMS   10
Parallel Algorithms:- Basic Techniques- Work & Efficiency - Distributed Computation - Heuristic & Approximation Approaches.

TEXT BOOK
1. Alfred .V. Aho, John .E. Hopcroft, Jeffrey .D. Ullman, "Data Structures and Algorithms", Addison-Wesley Publications.,1985

REFERENCE BOOKS
1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Second Edition, Pearson Education, Asia.1994
2. Jean-Paul Tremblay, Paul .G. Sorenson, "An Introduction to Data Structures with Applications", Tata Mc Graw Hill second edition , 1991.
3. Thomas .H. Cormen, Charles .E. Leiserson, Ronald .L. Rivest, "Introduction to Algorithms", PHI 1998.

Ellis Horowitz, Sartaj Sahni, Songuthevan Rajasekaran, "FUNDAMENTALS of Computer algorithms", Galgotial Publications Pvt. Ltd, 1999.

ELECTIVE – I	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

One Elective paper should be chosen from the list of subject codes given below

MA553 , CS551 , CS553 , CS623 , CS651 and CS685

CS509	**SOFTWARE DEVELOPMENT LAB**	**L**	**T**	**P**	**C**
	(Common for CSE and S/W Engg.)	**0**	**0**	**3**	**2**

PURPOSE
This laboratory course gives a complete understanding of the practical application od Software Engineering principles and methods

Develop the following software using Software Engineering Methodology:

1. Student Course Registration .
2. Payroll Processing Application.
3. Banking Process.
4. Library Management System.
5. Railway Reservation System.
6. Trading System.
7. Cellular Phone.

Total : 45

CS504 **COMPUTER COMMUNICATION** **L T P C**

Common for CSE S/W & IT **3 1 0 4**
(Same as IT504)

PURPOSE
This course provides an understanding of the various principles , protocols and design aspects of Computer Networking

INSTRUCTIONAL OBJECTIVES
- To study the various Architectures, Data transmission techniques
- To learn the Wide Area and Local Area Networks
- To learn the various communication protocols and applications

UNIT – I FUNDAMENTALS **6**
Introduction to Data Communications and Networking overview – Protocol Architecture - ISO-OSI Model – Layers and functionalities

UNIT – II DATA COMMUNICATIONS **12**
Data Communications – Data Transmission – guided and Wireless transmission- Signal Encoding techniques – Digital Data Communication techniques – Data Link control – Multiplexing – spread spectrum.

UNIT – III   WIDE AREA NETWORKS **9**
WAN – Circuit switching and Packet switching – Asynchronous Transfer Mode – Routing in Switched Networks – Congestion control in switched Data Networks – Cellular Wireless Networks

UNIT – IV LOCAL AREA NETWORKS **9**
LAN- Local Area Network overview – High- speed LAN's – Wireless LAN's

UNIT – V COMMUNICATION ARCHITECTURE & PROTOCOLS **9**
Communication Architecture and Protocols – Internetwork Protocols – Internetwork Operations – Transport Protocols – Network Security – Distributed Applications
Tutorial 15
Total 60

TEXT BOOK
  1. William Stallings, "Data & Computer Communication" , 7th Edition PHI 2004

REFERENCE BOOKS
  1. Andrew Tanenbaum, "Computer Networks", 4th edition , PHI,2001
  2. Douglas E. Comer,"InterNetworking with TCP/IP Vol I & II " , PHI, 2003
  3. Richard Stevens, "UNIX Network Programming Volume 1.2002
  4. Kurose Rose ,"Computer Networking: A Top-down Approach toward the
       Internet",2001

CS516   **DISTRIBUTED OPERATING SYSTEMS**   **L   T   P   C**

Common for CSE S/W & IT   **3   1   0   4**
(Same as IT500)

PURPOSE
This course provides and in-depth knowledge of Advanced Operating System concepts

INSTRUCTIONAL OBJECTIVES
- Basic introduction to Operating System principles
- Distributed Computing techniques , Synchronous and Processes
- Shared Data access, Files , Case study

UNIT I   OVERVIEW OF OPERATING SYSTEMS   **6**
Introduction – overview of operating system concepts – Process management and Scheduling , Memory management : partitioning, paging, segmentation, virtual memory, Device and File management.

UNIT II   DISTRIBUTED COMPUTING   **11**
Introduction - Distributed Systems – Hardware and Software concepts – Design issues; Communication in Distributed systems : Layered protocols - ATM networks - Client Server model – Remote Procedure Calls.

UNIT III   SYNCHRONIZATION AND PROCESSES   **11**
Synchronization : Clock synchronization – Mutual exclusion – Election algorithms, - Atomic transactions – Deadlocks; Processes : Threads – System models – processor allocation – Scheduling – Fault tolerance – Real time distributed systems.

UNIT IV   SHARED MEMORY AND FILE SYSTEMS   **11**
Shared memory : Consistency models – Page based distributed shared memory – Shared variables – Object based distributed shared memory; Distributed File Systems : Design and Implementation.

UNIT V   CASE STUDY – AMOEBA   **6**
Introduction to Amoeba – Object and Capabilities – memory management – Communication – Amoeba Servers.

                                   Tutorial   15
                                   Total   60

TEXT BOOK
1. Andrew S Tanenbaum , " Distributed Operating Systems " , Pearson Education India, 2001.

REFERENCE BOOKS
1. Mukesh Singhal, Niranjan G Shivratri , " Advanced Concepts in Operating Systems", McGraw Hill International, 1994.
2. Pradeep K Sinha , " Distributed Operating Systems Concepts and Design ", PHI, 2002.

CS518   **INTERNET PROGRAMMING AND TOOLS**   **L T P C**

                    (Common for CSE and S/W Engg)   **3 1 0 4**

PURPOSE
> To learn the Internet Technologies.

INSTRUCTIONAL OBJECTIVES
- To learn about Java, HTML , DHTML concepts.
- To know about server side programming
- Knowledge of XML and its applications

UNIT—I   BASIC INTERNET CONCEPTS   8
History of internet-Internet addressing-TCP/IP-DNS and directory services-Interne Applications-Electronic mail, New groups UUCP, FTP, Telnet, Finger.

UNIT—II   WORLD WIDE WEB   9
Overview – Hyper text markup language- Uniform Resource Locators-Protocols-M Browsers-Plug-Ins-Net meeting and Chat-Search engines.

UNIT—III   SCRIPTING LANGUAGES   9
Java Script Programming-Dynamic HTML-Cascading style sheets-Object model and Event model- Filters and Transitions-Active X Controls-Multimedia-Client side scri.

UNIT IV SERVER SIDE PROGRAMMING   10
Introduction to Java Servelets – overview and architecture – Handling HTTP get & post request – session Tracking – Multi-tier application - Implicit objects – Scripting – Standard actions – Directives – Custom Tag libraries.

UNIT V WEB DATABASES   9
Connecting to Databases – JDBC principles – Database access – XML – Introduction – Structuring Data – XML Namespaces – XML vocabularies – Web server

                                           Tutorial   15
                                           Total   60

TEXT BOOKS
1. Deital and Deital, Goldberg, "Internet & World Wide Web, How To Program", third edition, Pearson Education, 2004.

REFERENCE BOOKS
1. Jame Jaworski, "Java unleased", SAMS Techmedia Publications, 1999
2. Naughton , Herbert Schildt , "Java2, Complete Reference", 4th edition, TMH,2000
3. Deital & Deital, "Java How to program", Prentice hall 2000.
4. Gary Cornell, Cay S.Horstmann, Core Java Vol.1 and Vol.2, Sun Microsystems.
5. Ted coombs, Jason coombs , Brewer, " Active X source book", John wiley

CS601   **WIRELESS COMMUNICATION AND NETWORKS**   **L T P C**

                                                                3 1 0 4

PURPOSE
To learn the standards and issues in Wireless and Mobile Computing

INSTRUCTIONAL OBJECTIVES
- To study the standards of Wireless LAN , Sensor and ADHOC networks
- To learn about Mobile nodes and IP
- To study the latest protocols and applications of wireless and Mobile standards

UNIT – I WIRELESS TRANSMISSION FUNDAMENTALS   **9**
Introduction to wireless transmission –signal propagation –Multiplexing-Modulation-Spread Spectrum-Fading-Coding and Error control.

UNIT – II MAC, TELE COMMUNICATION AND SATELLITE SYSTEMS   **9**
Medium access Control Techniques- SDMA-TDMA-FDMA- CDMA- Comparison.
Tele communication systems- GSM-DECT and TETRA.
Satellite Systems- Routing, Localization and hand over.

UNIT – III WIRELESS LANS   **9**
Wireless LAN Technology-IEEE 802.11 Standards-HIPER LAN and Bluetooth-Role of Wireless local loops..

UNIT – IV WIRELESS ATM AND MOBILE NETWORK LAYER   **9**
WATM Services-Reference Model-Handover-Location Management- Mobile QOS-Access Point Control Protocol., Mobile IP-DHCP- Adhoc Networks.

UNIT – V MOBILE TRANSPORT LAYER AND SUPPORT FOR MOBILITY   **9**
Mobile transport layer – Traditional TCP-Indirect Snooping-Mobile TCP **-**Support for Mobility-WWW-Wireless Application Protocol.

                                                                    Tutorial :15
                                                                    Total : 60

TEXT BOOK
1. J.Schiller, "Mobile Communications", Addition Wesley, 2000

REFERENCE BOOKS
1. Williams Stallings, "Wireless Communication and Networks", Pearson Education.
2. Raj Pandya," Mobile and Personal Communication Systems and Services", Prentice Hall of India, 2001.
3. Uwe Hansmann, Lother Merk, Martin Nicklous, Thomas Stober, " Principles of Mobile Computing" , Springer International Edition, 2nd edition , 2003

CS603   **TCP/IP TECHNOLOGY**   **L   T   P   C**

(Same as IT603)   **3   1   0   4**

PURPOSE
This course gives a complete understanding of TCP / IP Technology

INSTRUCTIONAL OBJECTIVES
- To study the standards of TCP / IP protocol and addressing
- Study of various protocols like ARP , RARP ,UDP, ICMP, TGMP
- Multicasting protocols, sockets

UNIT – 1   INTRODUCTION   9
Protocols and standards – OSI model – TCP / IP protocol suite – addressing – versions – underlying technologies.

UNIT – II   IP ADDRESSES, ROUTING, ARP AND RARP   9
Classful addressing – other issues – subnetting – supernetting – classless addressing – routing methods – delivery – table and modules – CIDR – ARP package – RARP

UNIT – III   IP, ICMP, TGMP AND UDP   9
Datagram – fragmentation – options – checksum – IP package – ICMP – messages, formats – error reporting – query – checksum – ICMP package – IGMP – messages, operation – encapsulation – IGMP package – UDP – datagram – checksum – operation – uses – UDP package.

UNIT – IV TCP, UNICAST AND MULTICAST ROUTING PROTOCOLS   9
Services – flow, congestion and error control – TCP package and operation – state transition diagram – unicast routing protocols – RIP – OSPF – BGP – multicast routing – trees – protocols – MOSPF – CBT – PIM

UNIT – V   APPLICATION LAYER, SOCKETS   9
Client server model – concurrency – processes – sockets – byte ordering – socket system calls – TCP and UDP client-server programs – BOOTP -DHCP – DNS – name space, resolution – types of records – concept – mode of operation – Rlogin.

                                                  Tutorial :15

                                                  Total : 60

TEXT BOOK
Behrouz Forouzan, "TCP/IP protocol suite ", 2nd edition, Tata McGrawhill

REFERENCE BOOK
Douglas Comer, "Internetworking with TCP / IP" ,Vol – 1, PHI, 2000

ELECTIVE – II   **L   T   P   C**

3 0 0 3

One Elective paper should be chosen from the list of subject codes given below

CS560, CS562, CS564, CS578 and CS621

CS510	INTERNET PROGRAMMING LAB	L	T	P	C
	(Common for CSE and S/W Engg)	0	0	3	2

PURPOSE

This laboratory course gives a complete understanding of the internet programming concepts using Java application, applets, HTML, XML and JSP.

INSTRUCTIONAL OBJECTIVES
- Implementing Java components
- Practicing RMI, JDBC, JSP
- Multithreading and animation concepts

LIST OF EXPERIMENTS

1. Exercises on creating HTML pages
2. Implementation of Package Bio-Data
3. Shapes Class Hierarchy
4. Animation using Java Applets
5. Multi Threaded implementation of Producer Consumer Problem
6. Implementation of simple TCP/IP Client and server
7. Operations on Employee table using JDBC
8. Bubble sort implementation using RMI
9. Constructing a simple database using XML
10. An interactive Web application in JSP
11. Using cookies to track users in browsers from the web servers
12. Constructing a secured FTP client – server application

Total : 45

ELECTIVE – III   **L T P C**

3 0 0 3

ELECTIVE – IV **L   T   P   C**
                      3   0   0   3

ELECTIVE – V   **L   T   P   C**
                      3   0   0   3

Electives   should be chosen from the list of subject codes given below

CS530, CS650, CS655, CS667, CS669, CS689, CS691, CS693, CS695 & CS696

CS612   **PROJECT WORK**   **L   T   P   C**
                                          0   0   24   12

MA553	DISCRETE MATHEMATICS	L	T	P	C
	(Same as MA321)	3	0	0	3

PURPOSE
To impart to the students of Engineering, the rudiments of Mathematics so as to enable them to apply the same for their own branch.

INSTRUCTIONAL OBJECTIVES
To equip the students of Engineering, the knowledge of Mathematics and its applications so as to enable them to apply them for the branch in which they are admitted.

UNIT I   MATHEMATICAL LOGIC   9
Propositions and Logical operators – Truth tables and propositions generated by a set – Equivalence and Implication – Tautologies – Laws of logic – Proofs in Propositional calculus – Direct proofs – Conditional conclusions – Indirect proofs – Propositions over a universe – Mathematical Induction – The existential and universal quantifiers – Predicate calculus including theory of inference.

UNIT II   SET THEORY   9
Laws of Set theory – Partition of a set – Minsets – The duality principle – Relations – Graphs of relations – Hasse diagram – Matrices of relations – Closure operations on relations – Warshall's algorithm – Functions – Combinatorics.

UNIT III   RECURRENCE RELATION & ALGEBRAIC SYSTEMS   9
Recurrence relations – Solving a recurrence relation – Recurrence relations obtained from solutions – Generating functions – Solution of a recurrence relation using generating functions – Closed form expression for generating function.
Groups – Cyclic groups and subgroups – Normal subgroups – Coding theory – Group codes.

UNIT IV   GRAPH THEORY   9
Basic concepts – Data structures for graphs – Connectivity – Traversals graph optimization – The traveling salesman problem and networks and the maximum flow problem – Trees – Spanning Trees – Rooted trees – Binary Trees – Kruskal's algorithm – Traversals of Binary trees.

UNIT V   BOOLEAN ALGEBRA & FORMAL LANGUAGES   9
Boolean algebra – Posets – Lattices – Application of Boolean Algebra to switching theory. Languages – Recognition and generation - Phase structure grammars and languages – Finite state Machine – Recognition in regular languages .

                                        Total   45

TEXT BOOK
1. Alan Doerr and Kenneth Levasseur, "Applied Discrete Structures for Computer Science", Galgotia Publications (P) Ltd.(**Unit I** – Chapter 3 Section 3.1 – 3.8, **Unit II** – Chapter 2, Chapter 4 Section 4.2 – 4.5, Chapter 6 Section 6.1, 6.2, 6.4, 6.5, Chapter 7, **Unit III** –

Chapter 8 Section 8.3, 8.4 Chapter 11 Section 11.25 Chapter 15 Section 15.1, 15.2, 15.4 15.5, **UnitIV** – Chapter 9, Section 9.1 – 9.5, Chapter 10 Section 10.1 – 10.5, **Unit V** – Chapter 13 Section 13.1–13.3, 13.7, Chapter 14 Section 14.2, 14.3)

REFERENCE BOOKS

1. Tremblay J.P. and Manohar R., "Discrete Mathematical Structures with applications to Computer Science", Tata Mc Graw Hill Publishing Co.,2000
2. Venkataraman M.K., etal. "Discrete Mathematics", National Publishing Co.
3. Seymour Lipschutz, Marc Lars Lipson, "Discrete Mathematics", Mc Graw Hill Inc., 1992
4. Kolman and Busby, "Discrete Mathematical Structures for Computer Science", 1987.
5. Iyengar N.Ch.S.N. etal," Discrete Mathematics", Vikas Publishing Ltd.
6. Sundaresan V. etal. "Discrete Mathematics", A.R. Publications.
7. Solairaju etal. "Discrete Mathematics", Anuradha Publications.

CS551	SYSTEM PROGRAMMING	L	T	P	C
	(same as IT552)	3	0	0	3

PURPOSE
This course enables to understand the concepts of various System Software

INSTRUCTIONAL OBJECTIVES
- Assemblers , Macros , Loaders and Linkers
- Compiler design principles and techniques

UNIT – I   INTRODUCTION AND ASSEMBLERS   9
Introduction: Language Processor Fundamentals, Data Structures Language Processing, Search data structures, Data Structures, Scanning, Parsing, Assemblers – Elements of assembly language programming, Simple assembly scheme, Pass structure of assemblers, Design of a two pass assembler, single pass assembler for IBM PC.

UNIT –II   LOADERS AND LINKERS   9
Macro and Linkers: Macro definition and call, Macro expansion, Nested macro calls, Advanced macro facilities, Design of preprocessor, Relocation and linking concepts, Design of a linker, Self relocating program, Linker for MS-DOS, Linking for overlays, Loaders.

UNIT – III   COMPILERS – GRAMMERS AND FINITE AUTOMATA   9
Compilers : Structure of compilers, Lexical Analysis, Syntax Analysis, Intermediate Code Generation , Optimization, Code Generation, Book-keeping, Error handling, Compiler-writing tools, Programming Languages, Role of Lexical Analyzer, Design of Lexical Analyzer, Regular Expressions, Finite Automata, Regular expression to finite automata, Minimizing DFA, Implementation to lexical analyzer, Context free grammars, derivations and Parse trees, Capabilities of context-free Grammars.

UNIT- IV   PARSING AND SYNTAX DIRECTED TRANSLATION   9
Parsing : Parsers, Shift-reduce parsing Operator precedence parsing, Top down parsing, Predictive parsing, 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 statement, Boolean expressions, Errors, Lexical phase errors, Semantic-phase errors, Semantic errors.

UNIT- V CODE OPTIMIZATION TECHNIQUES   9
Optimization Techniques : Principal Sources of Optimization, Loop Optimization, DAG Representation of Basic Blocks, Value Numbers and Algebric laws, Global data-flow analysis, Dominators, Reducible flow graphs, Depth-first search, Loop-invariant computations, Induction variable Elimination, Other loop optimization.

Total : 45

TEXT BOOK
1. Dhamdhere, "System Programming " , 2nd Edition, Tata McGraw Hill, 2000.

REFERENCE BOOK
1. Alfred V.Aho Jeffery D.Ullman, "Principles of Compiler Design " , Narosa Publishing House, Fifteenth Reprint 1996.

CS553	GENETIC ALGORITHMS & MACHINE LEARNING	L	T	P	C
	(Same as IT557)	3	0	0	3

PURPOSE
This course gives a complete understanding of the concepts of Genetic algorithm

INSTRUCTIONAL OBJECTIVES
- Mathematical foundations for Genetic algorithm, operators
- Applications of Genetic Algorithms
- Genetic based machine learning and its applications

UNIT- I INTRODUCTION TO GENETIC ALGORITHM   9
 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   11
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   11
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 7

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 7

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

Total   45

TEXT BOOKS
1. David E. Gold Berg, "Genetic Algorithms in Search, Optimization & Machine Learning", Pearson Education, 2001
2. S.Rajasekaran, G.A.Vijayalakshmi Pai, " Neural Networks, Fuzzy Logic and Genetic Algorithms ", PHI , 2003   (Chapters 8 and 9)

REFERENCE BOOK
1. Kalyanmoy Deb, "Optimization for Engineering Design, algorithms and examples", PHI 1995

CS623	COMPONENT BASED SYSTEM DESIGN	L	T	P	C
	(Common for CSE and S/W Engg.)	**3**	**0**	**0**	**3**

PURPOSE
This course enable us to understand the concept of Component and its representation in languages and packages

INSTRUCTIONAL OBJECTIVES
- Fundamentals of Component Based Development
- Design of software components and management
- CORBA ,COM , EJB technologies

UNIT—I   BASIC CONCEPTS   9
Software Components—Component models and Component Services—myths in Component Based Technology—Risk Factors—Success Factors ,Component Based Software Development.

UNIT – II COMPONENTS ,ARCHITECTURE AND PROCESS   9
Component Architecture, Component Frameworks, Component Development, Component distribution and acquisition , Component assembly , markets and components

UNIT—III   DESIGN OF SOFTWARE COMPONENT   9
Software Components and the UML Component Infrastructures—Business Components— Components and Connectors—Designing Models of Modularity & Integration.

**UNIT—IV   MANAGEMENT OF COMPONENT BASED SOFTWARE
SYSTEMS   9**

Measurement and Metrics for Software Components—Selecting the right Components—Software Component Project Management—Trouble with Testing Components—Configuration Management and Component Libraries—Evolution Maintenance of Management of Component based Systems.

UNIT—V   COMPONENT TECHNOLOGIES   9

Overview of the Following Component Models: CORBA, COM+,
Enterprise Java Beans, Software Agents.

Total : 45

TEXT BOOKS
1. GeorgeT.Heinemen, William T. Councill," Component Based Software Engineering".

REFERENCE BOOKS
1. Clemens Szyperski, "Component Software – Beyond object oriented programming", Pearson Education , 2nd edition, 2004.
2. Thomas J..Mowbray, William A.Ruh, "Inside CORBA Distributed Object Standards and Applications", Addison – Wesley, 2001. (UNIT – IV)
3. Dale Rojerson, "Inside COM", Microsoft Press, 2001. (UNIT- V)
4. Andreas Vogel, Keith Duddy "Java Programming with CORBA" John Wiley & Sons. 1998.
5. Kuth Short, "Component Based Development and Object Modeling", Sterling Software, 1997.

CS651   NEURAL NETWORKS PROGRAMMING TECHNIQUES   L   T   P   C
                                                            3   0   0   3

PURPOSE
To study the Artificial Neural Networks and its applications in computer field

INSTRUCTIONAL OBJECTIVES
- To learn the basics of ANN and comparing with Human brain
- To learn the various architectures of building an ANN and its applications
- To learn the pattern classification techniques , advanced methods of representing information in ANN
-

UNIT—I   INTRODUCTIONTO ANS TECHNOLOGY   9
Elementary Neurophysiology—From Neuron to ANS—ANS Simulation Adaline and Madaline - review of Signal Processing - Adaline and Adaptive Linear Combiner—Applications of Adaptive Signal Processing—The Madaline—Simulating the Adaline.

UNIT—II   BACK PROPAGATION   9
Back Propagation Network—The Generalized Delta Rule—Practical Considerations—Applications—The Back Propagation Simulator— BAM and Hopfield Memory—simulating the BAM.

UNIT—III   SIMULATED ANNEALING   9
Information Theory and Statistical Mechanics—The Boltzmann Machine –Simulation using Boltzmann Simulator - The Counter Propagation Network: CPN Building Blocks—CPN Data Processing—The CPN simulator—An Image Classification Example.

UNIT—IV   SELF—ORGANIZING MAP   9
SOM Data Processing—Applications of Self—Organizing Maps—Simulating the SOM. Adaptive Resonance Theory : ART Network Description—ART1—ART2 - ART1 and ART2 Simulator.

UNIT—V   SPATIOTEMPORAL PATTERN CLASSIFICATION   9
Formal Avalanche—Architecture of   Spatiotemporal Networks—STN Simulation & Applications of STNS. The Neocognitron: Neocognitron Architecture—Neocognitron in Data Processing—Performance—Addition of Lateral Inhibition -- Feed Back to Neocognitron.
                                                        Total : 45

TEXT BOOK
1. James. A.Freeman and David.M.Skapura, "Neural Networks Algorithms, Applications and Programming Techniques " ,Pearson Education , 2002.

REFERENCE BOOKS
1. B.Yegnanarayana, "Artificial Neural Networks",Prentice - Hall, of India, 2001.
2. J.M.Zurada, " Introduction to Artificial Neural Networks ", Jaico Publishing House.,1997
3. M.H.Hassoun, "Fundamentals of Artificial Neural Networks",Prentice-Hall of India.,1998

4. Simon Haykin, "Neural Networks - A Comprehensive Foundation',Pearson Education - 2001

CS685	MULTIMEDIA SYSTEMS	L	T	P	C
	(Common for CSE and S/W Engg.)	3	0	0	3

PURPOSE

To study the tools and applications of Multimedia Systems

INSTRUCTIONAL OBJECTIVES

- To learn the devices and tools for generating and representing multimedia
- To study the text and images in multimedia
- Learning how to organize the Multimedia Project and building intelligent systems

UNIT I INTRODUCTION 9

Introduction - Multimedia applications – architecture and issues for distributed multimedia systems – multimedia skills – digital audio representations and processing – video technology.

UNIT II MULTIMEDIA HARDWARE AND SOFTWARE 9

Connections – memory and storage devices – I/P devices – O/P hardware – communication devices – basic software tools – making instant multimedia – authoring tools.

UNIT – III AUDIO, DIGITAL VIDEO AND IMAGE COMPRESSION 9

MIDI Vs digital audio – audio file formats - video compression techniques – standardization of algorithms – JPEG image compression – MPEG – DVI technology.

UNIT IV MULTIMEDIA BUILDING BLOCKS 9

Text – Sound – Images – animation - video – project delivering – planning and costing – designing and producing – delivery.

UNIT – V MULTIMEDIA INFORMATION SYSTEM 9

Operating system support for continous media applications – middleware system service architecture – multimedia device, presentation services and user interface – multimedia file systems and information model.

Total : 45

TEXT BOOK
1. Tay Vaughan, "Multimedia - Making it work", Tata Mc Graw Hill Edition, 5th edition.
REFERENCE BOOKS
1. Andleigh PK and Thakrar K . "Multimedia Systems Design", Prentice Hall.,1995
2. Walter Worth John .A, "Multimedia Technology and Applications", Ellis Horowood Ltd, 1991
3. Nigel Chapman and Jenny Chapman, "Digital Multimedia", John Wiley & Sons Ltd.,2000
4. John .F. Koegel Buford, "Multimedia Systems", Pearson education.

CS560	FUZZY LOGIC	L	T	P	C
		3	0	0	3

PURPOSE
This course presents a detailed knowledge of Fuzzy logic principles, systems and its applications.

INSTRUCTIONAL OBJECTIVIES
- Fuzzy sets and representations
- Fuzzy Relation and Logic
- Fuzzy systems and Application

UNIT-I   INTRODUCTION   9
Uncertainty and imprecision-statistics and random processes-uncertainty in information-fuzzy sets and membership-classical sets-operations on classical sets –properties of classical sets-fuzzy set operations-properties of fuzzy sets.

UNIT -II   FUZZY RELATIONS AND MEMBERSHIP FUNCTIONS   9

Brief about Crisp relations- fuzzy relations –fuzzy tolerance and equivalence relations-value assignments-membership functions-features-standandard forms and boundaries-fuzzification –membership value assignments –inference-rank ordering-neural networks-genetic algorithms –inductive reasoning.

UNIT -III   FUZZIFICZTION AND FUZZY ARITHMETIC   9

Lambda-cuts for fuzzy sets-lambda cutsfor fuzzy relations- defuzzification methods-Extension principle-functions of fuzzy sets- fuzzy transform-fuzzy numbers-approximate methods of extension-vertex method-DSW algorithm

UNIT -IV   FUZZY LOGIC AND FUZZY RULE BASED SYSTEMS   9
Fuzzy logic –approximate reasoning-fuzzy tautologies-contradictions-equivalence-and logical proofs-other forms of implication operation and composition operation-linguistic hedges-rule based systems-fuzzy associative memories-multiobjective decision making – fuzzy bayesian decision method.

UNIT -V APPLICATIONS   9
Single sample identification-multifeature pattern recognition-image processing-simple fuzzy logic controllers-General fuzzy logic controllers-Industrial applications-Fuzzy tool box in Matlab.

Total 45

TEXT BOOK
Timothy J.Ross, ''Fuzzy Logic with Engineering applications'',McGraw Hill Inc.

REFERENCE BOOKS
1.George j.Klir & Tina A.Folger, "Fuzzy sets Uncertainty & Information",PHI,2001
2.J.S.R.Jang C.T.Sun,E.Mizutani,"Neuro fuzzy and Soft Computing",PHI,2003

CS562	DIGITAL IMAGE PROCESSING	L	T	P	C
		3	0	0	3

PURPOSE
This course provides a complete understanding of the various image processing techniques

INSTRUCTIONAL OBJECTIVES
- Image fundamentals and techniques
- Image transforms, enhancement , restoration and compression
- Image reconstruction operations

UNIT -I   DIGITAL IMAGE FUNDAMENTALS   9
Introduction – Origin – steps in Digital Image Processing – Components; Elements of Visual Perception – Image sensing and Acquisition – Image Sampling & Quantization – Lloyd Maz Quantizer – Dither – Color images- Matrix theory – Relationships between pixels

UNIT- II   IMAGE ENHANCEMENT   9
Spatial Domain : Gray level transformations – Histogram processing – using Arithmetic / Logic operations.
Frequency Domain : Introduction to Fourier Transform – Smoothing and Sharpening frequency domain filters. – Implementations.

UNIT-III   IMAGE RESTORATION   9
Noise models – mean filters – order – statistics – Adaptive filters – Band reject – Band pass – Notch – Optimum notch filtering – Wiener filtering

UNIT-IV   IMAGE COMPRESSION   9
Fundamentals – Compression models – Information theory – error free compression – Lossy compression – Compression standards.

UNIT-V   IMAGE SEGMENTATION AND REPRESENTATION   9
Point detection – Line detection – Edge detection – Boundary detection – Thresholding – Region-based segmentation; Representation – Boundary descriptors – Regional descriptors
                                                    Total : 45

TEXT BOOK
1. Gonzales Rafael , Richard E.woods, "Digital Image Processing", 2nd edition , Pearson Education 2004

REFERENCE BOOKS
1. Anil Jain K. "Fundamentals of Digital Image Processing", PHI, 1999.
2. William Pratt , "Digital Image Processing", Wiley Interscience, 2nd edition 1991

CS564   **VIRTUAL REALITY TECHNOLOGY**   L   T   P   C

                                                                              3   0   0   3

PURPOSE
This course provides a detailed understanding of the concepts of Virtual Reality and its
application

INSTRUCTIONAL OBJECTIVES
- Geometric modeling and Virtual environment
- Virtual Hardware and Software
- Virtual Reality applications

UNIT – I   INTRODUCTION   9
Virtual Reality & Virtual Environment : Introduction – Computer graphics – Real time
computer graphics – Flight Simulation – Virtual environments –Requirement for virtuality –
benefits of virtual reality- **Historical development of VR :** Introduction – Scientific
Landmark -**3D Computer Graphics :** Introduction – The Virtual world space – positioning
the virtual of server – the perspective projection – human vision – stereo perspective
projection – 3D clipping – Colour theory – Simple 3D modeling – Illumination models –
Reflection models – Shading algorithms – Radiosity – Hidden-Surface removal – Realism –
Stereographic usages

UNIT – II   GEOMETRIC MODELING   9
Geometric Modeling : Introduction – From 2D to 3D – 3D space curves – 3D boundary
representation – Other modeling strategies-**Geometrical Transformations:** Introduction –
Frames of reference – Modeling transformations – Instances – Picking – Flying – Scaling the
VE – Collision detection - **A Generic VR system :** Introduction – The virtual environment –
the Computer environment – VR Technology – Model of interaction – VR System

UNIT – III VIRTUAL ENVIRONMENT   9
Animating the Virtual Environment: Introduction – The dynamics of numbers – the
animation of objects –shape & object in between – free-form deformation – particle system-
Physical Simulation : Introduction – Objects falling in a graphical field – Rotating wheels –
Elastic collisions – projectiles – simple pendulum – spings – Flight dynamics of an aircraft.

UNIT – IV VR HARDWARES & SOFTWARES   9
Human factors : Introduction – the age- the ear- the semantic senses – equilibrium –
conclusions - **VR Hardware :** Introduction – sensor hardware – Head-coupled displays –
Aquatic hardware – Integrated VR systems-**VR Software:** Introduction – Modeling virtual
world –Physical simulation- VR Polkits

UNIT – V   VR APPLICATION   9
Introduction – Engineering – Entertainment – Science – Training – **The Future :**
Introduction – Virtual Equipments – modes of interaction – conclusion.

                                                                    Total   45

TEXT BOOK
1. John Vince, "Virtual Reality Systems ", Pearson Education Asia, 2001

REFERENCE BOOKS
1. Adams, "Visualizations of Virtual Reality",Tata McGraw Hill, 2000.
2. Grigore C. Burdea, Philippe Coiffet , "Virtual Reality Technology" , Wiley-Interscience,1 Edition,1994.
3. William R. Sherman, Alan B. Craig, "Understanding Virtual Reality: Interface, Application, and Design",Morgan Kaufmann, 1st Edition,2002.

CS578	HUMAN INTERFACE SYSTEM DESIGN	L	T	P	C
	(Common for CSE and S/W Engg.)	3	0	0	3

PURPOSE

This course on user Interface Design provides a basic understanding of interface design and principles

INSTRUCTIONAL OBJECTIVES
- Design process management
- Interaction devices and windows strategies
- Managing virtual environments

UNIT I INTRODUCTION 9

Goals of System Engineering – Goals of User Interface Design – Motivations of Human factors in Design – High Level Theories –Object-Action Interface Design - Three Principles – Guidelines for Data Display and Data Entry

UNIT II MANAGING DESIGN PROCESS 9

Introduction- Organizational Design to Support Usability – The Three Pillars of Design- Development Methodologies- Ethnographic Observation – Participating Design- Scenario Development- Social Impact Statement for Early Design – Legal Issues- Reviews – Usability Testing and laboratories- Surveys- Acceptance tests – Evaluation during Active use- Specification Methods- Interface – Building Tools- Evaluation and Critiquing tools

UNIT III MANIPULATION AND VIRTUAL ENVIRONMENTS 9

Introduction-Examples of Direct Manipulation Systems –Explanation of Direct Manipulation-Visual Thinking and Icons – Direct manipulation Programming – Home Automation- Remote Direct Manipulation- Virtual Environments- Task-Related Organization – Item Presentation Sequence- Response Time and Display Rate – Fast Movement Through Menus- Menu Layouts- Form Fillin – Dialog Box – Functionality to Support User's Tasks – Command Organization Strategies – Benefits of Structure- Naming and Abbreviations – Command Menus- Natural Language in Computing.

UNIT IV INTERACTION DEVICES 9

Introduction – Keyboards and Functions – Pointing Devices- Speech recognition ,Digitization and Generation – Image and Video Displays – Printers –Theoretical Foundations –Expectations and Attitudes – User Productivity – Variability – Error messages – Nonanthropomorphic Design –Display Design – color-Reading from Paper versus from Displays- Preparation of Printed Manuals- Preparation of Online Facilities.

UNIT V   WINDOWS STRATEGIES AND INFORMATION SEARCH   9

Introduction- Individual Widow Design- Multiple Window Design- Coordination by Tightly –Coupled Widow- Image Browsing- Personal Role Management and Elastic Windows – Goals of Cooperation – Asynchronous Interaction – Synchronous Distributed – Face to Face- Applying Computer Supported Cooperative Work to Education – Database query and phrase search in Textual documents – Multimedia Documents Searches – Information Visualization – Advance Filtering Hypertext and Hypermedia – World Wide Web- Genres and Goals and Designers – Users and their tasks – Object Action Interface Model for Web site Design

Total : 45

TEXT BOOK

1.   Ben Shneiderman , " Designing the User Interface", 3rd Edition, Addison-Wesley, 2001

REFERENCE BOOKS

1.   Barfied , Lon ,   "The User Interface : Concepts and Design", Addison – Wesley
2.   Wilbert O. Galiz , "The Essential guide to User Interface Design", Wiley Dreamtech, 2002
3.   Jacob Nielsen, " Usability Engineering ", Academic Press, 1993.
4.   Alan Dix et al, " Human - Computer Interaction ", Prentice Hall, 1993.

CS621   **SOFTWARE QUALITY MANAGEMENT**   L   T   P   C

                (Common for CSE and S/W Engg)   3   0   0   3

PURPOSE

    This course deals with improving the quality of software and managing them

INSTRUCTIONAL OBJECTIVES

- Principles of Software quality and concepts
- Quality Assurance models
- Total Quality Management

UNIT I INTRODUCTION   9

Concepts of Quality Control, Quality Assurance, Quality Management - Total Quality Management; Cost of Quality; QC tools - 7 QC Tools and Modern Tools; Other related topics - Business Process Re-engineering - Zero Defect, Six Sigma, Quality Function Deployment, Benchmarking, Statistical process control.

UNIT II SOFTWARE ENGINEERING PRINCIPLES   9

Software Engineering Principles, Software Project Management, Software Process, Project and Product Metrics, Risk Management

UNIT III   SOFTWARE QUALITY ASSURANCE MODELS   9

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

UNIT IV SOFTWARE PROCESSES & TESTING   9

Software Process - Definition and implementation; internal Auditing and Assessments; Software testing - Concepts, Tools, Reviews, Inspections & Walkthroughs; P-CMM.

UNIT V TQM   9

Total Quality Management – Introduction, Software reuse for TQM , Software testing method for TQM, Defect Prevention and Total Quality Management, Zero Defect Software Development, Clean room Engineering.

                                                      Total   45

TEXT BOOKS

1. Watt.S. Humphery, " Managing Software Process ", Addison - Wesley, 1998.
2. Allan Gillies ,"Software quality Theory & Management ", Thomson international Press 1997. (Unit I & II)

REFERENCE BOOKS

1. Roger Pressman, " Software Engineering ", 5th edition McGraw Hill, 1999.
2. G.Gordan Schulmeyer , James , "Total Quality Management for Software", International Thomson Computer Press, 1998
3. Philip B Crosby, " Quality is Free: The Art of Making Quality Certain ", 1992.
4. Brian hambling ,"Managing Software Quality" , Mc Graw Hill

ELECTIVES FOR THIRD SEMESTER

CS530	SOFTWARE RELIABILITY	L	T	P	C
	(Common for CSE and S/W Engg.)	3	0	0	3

PURPOSE
This course gives a thorough knowledge of providing software reliability.

INSTRUCTIONAL OBJECTIVES
- Software Reliability.
- Reliability approaches
- Reliability models

UNIT—I INTRODUCTION TO RELIABILITY ENGINEERING 9
Reliability — Repairable and Non Repairable systems — Maintainability and Availability — Designing for higher reliability — Redundancy — MTBF — MTTF MDT - MTTR— k out of in systems

UNIT—II SOFTWARE RELIABLITY 9
Software reliability - Software reliability Vs Hardware reliability – Failures and Faults - Classification of Failures – Counting – System Configuration – Components and Operational Models – Concurrent Systems – Sequential Systems – Standby Redundant systems

UNIT—III SOFTWARE RELIABILITY APPROACHES 9
Fault Avoidance — Passive Fault detection — Active Fault Detection — Fault Tolerance - Fault Recovery - Fault Treatment

UNIT—IV SOFTWARE RELIABILITY MODELING 9
Introduction to Software Reliability Modeling – Parameter Determination and Estimation - Model Selection – Markovian Models – Finite and Infinite failure category Models – Comparison of Models – Calendar Time Modeling

UNIT—V SPECIAL TOPICS IN SOFTWARE RELIABLITY 9
Management Techniques for reliability - Organization and Staffing — Programming Languages and Reliability — Computer Architecture and Reliability — Proving Program correctness & Reliability Design - Reliability Testing – Reliability Economics

Total:45

TEXT BOOKS
1. John D. Musa, " Software Reliability", McGraHill, 1985
2. Glenford J. Myers, "Software Reliability ", Wiley Interscience Publication, 1976

REFERENCE BOOKS
1. Patric D. T.O connor," Practical Reliability Engineering" , 4th Edition, John Wesley & sons , 2003.
2. Anderson and PA Lee : " Fault tolerance principles and Practice ", PHI ,1981
3. Pradhan D K (Ed.): " Fault tolerant computing – Theory and Techniques", Vol1 and Vol 2 , Prentice hall, 1986.

4. E.Balagurusamy ," Reliability Engineering", Tata McGrawHill, 1994

CS650	PATTERN RECOGNITION TECHNIQUES	L	T	P	C
		3	0	0	3

PURPOSE
To study the Pattern Recognition techniques and its applications

INSTRUCTIONAL OBJECTIVES
- To learn the basics of Pattern Classifier
- To learn Feature extraction , Classification and Recognition techniques
- To learn recent advances in pattern classification

UNIT—I   PATTERN RECOGNITION OVERVIEW   7
Pattern recognition, Classification and Description—Patterns and feature Extraction with Examples—Training and Learning in PR systems—Pattern recognition Approaches—Other Approaches to PR.

UNIT—II   STATISTICAL PATTERN RECOGNITION   11
Introduction to statistical Pattern Recognition—supervised Learning using Parametric and Non Parametric Approaches.

UNIT—III   LINEAR DISCRIMINANT FUNCTIONS AND UNSUPERVISED LEARNING AND CLUSTERING   9
Introduction—Discrete and binary Classification problems—Techniques to directly Obtain linear Classifiers -- Formulation of Unsupervised Learning Problems—Clustering for unsupervised learning and classification.

UNIT—IV   SYNTACTIC PATTERN RECOGNITION   9
Overview of Syntactic Pattern Recognition—Syntactic recognition via parsing and other grammars–Graphical Approaches to syntactic pattern recognition—Learning via grammatical inference.

UNIT—V   NEURAL PATTERN RECOGNITION   9
Introduction to Neural networks—Feedforward Networks and training by Back Propagation—Content Addressable Memory Approaches and Unsupervised Learning in Neural PR.

Total:45

TEXT BOOK
1. Robert Schalkoff, "pattern Recognition: statistical , structural and neural approaches, John wiley & sons , Inc,1992.

REFERENCE BOOKS
1. Earl Gose, Richard johnsonbaugh, Steve Jost, Pattern Recognition and Image Analysis, Prentice Hall of India,.Pvt Ltd, new Delhi.
2. R.O.Duda, P.E.Hart & D.G Stork, Pattern Classification 2nd Edition, J.Wiley Inc 2001.

3. R.O.Duda & P.E.Hart, Pattern Classification and Scene Analysis, J.wiley Inc, 1973.(Statistical PR)
4. K.S.Fu, Syntactic Pattern Recognition, Academic press Inc,1974.
5. C.M.Bishop, Neural Networks for Pattern Recognition, Oxford University Press, 1995.

CS655	DATA WAREHOUSING	L	T	P	C
		3	0	0	3

PURPOSE
This course enable us to understand the concepts of Data Warehousing and Data Mining
And its applications

INSTRUCTIONAL OBJECTIVES
- OLTP and Developing a Data Warehouse
- Data mining techniques and algorithms
- Data Mining environments and applications

UNIT-I INTRODUCTION 9
Introduction – Data warehouse delivery method – system process – typical process flow within a data ware house – query management process – process architecture – meta data data marting.

UNIT-II DESIGN ASPECTS 9
Design aspects – Designing dimension tables – Designing starflake scheme – Multi dimensional scheme – partitioning strategy aggregations – Data marting- Meta data – System Data warehouse process manager.

UNIT-III HARDWARE 9
Hardware and operational design – server hardware, network hardware – parallel technology – security input on design of Hardware – backup and recovery – Service level agreement – Operating the data warehouse.

UNIT-IV PLANNING AND DEVELOPMENT 9
Capacity planning – Estimating the load – Tuning the data warehouse – Assessing performance – Tuning the data load and queries – Testing data warehouse – Development of test plan – Testing the data base and operational environment.

UNIT-V MINING ENVIRONMENT 9
Data Mining Environment: Case studies in building business environment, Application of data ware housing and Data mining in Government, National Data ware houses and case studies.

Total :45

TEXT BOOK

1. Sam Anabory & Dennis Murray , "Data Warehousing in the real world", Addison Wesley, 1997.

2. C.S.R. Prabhu , "Data Ware housing: Concepts, Techniques, Products and Applications", Prentice Hall of India, 2001. (Unit V)

REFERENCE BOOKS

1. J.Han, M.Kamber , "Data Mining: Concepts and Techniques", Academic Press, Morgan Kanf man Publishers, 2001.

2. Pieter Adrians, Dolf Zantinge, "Data Mining", Addison Wesley,2000.
3. Seidman,, "Data Mining with Microsoft SQL Server", Prentice Hall of India,2001.

4. Berry and Lin off , "Mastering Data Mining: The Art and Science of Customer Relationship Management", John Wiley and Sons, 2001

5. David Hand, Heikki Mannila, Padhraic Smyth, "Principles of Data Mining", PHI, 2004

CS656	NATURAL LANGUAGE UNDERSTANDING	L	T	P	C
		3	0	0	3

PURPOSE
This course on Natural language Processing gives a better understanding of the machine translation of natural languages

INSTRUCTIONAL OBJECTIVES
- Understanding of NLP with respect to English language syntax and semantics
- Context and world knowledge
- Approaches to machine translation

UNIT – I INTRODUCTION AND LINGUISTIC BACK GROUND   9
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
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
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
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

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: 45

TEXT BOOK
1. James Allen – "Natural Language Understanding ", Pearson Education, 2004.

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

CS667	REAL TIME SYSTEMS	L	T	P	C
	(Common for CSE and S/W Engg.)	3	0	0	3

PURPOSE
This course enables us to understand the concepts of Real time systems and its applications
-
INSTRUCTIONAL OBJECTIVES
- Basics of Real time systems
- Real time programming tools and Databases
- Fault tolerance , Reliability and Synchronization

UNIT – I   Introduction   6

Architecture of Real time Systems / Embedded Systems – Operating Systems issues – Performance Measures – Estimating Program runtimes.

UNIT – II   Task Assignment and Scheduling   10

Uniprocessor Scheduling – IRIS Tasks – Tasks Assignment Mode charges – Fault tolerant scheduling.

UNIT- III   Programming Languages and Tools   6

Desired characteristics based on ADA – Data typing – Control Structures – Packages – Exception Handling – Overloading – Multitasking – Timing specification – Task Scheduling – Just-in-time Compilation – Runtime support.

UNIT- IV   REAL TIME DATABASES   12

Basic Networking principles – Real time databases – Transaction processing – Concurrency control – Disk scheduling algorithms – Serialization and Consistency.

UNIT- V   Fault Tolerance, Reliability and Synchronization

11

Fault types – Fault detection and containment – Redundancy – Data diversity – Reversal checks – Obtaining parameter values – Reliability models for hardware redundancy – Software error models – Clocks – Fault tolerant synchronization – Synchronization in software.

Total: 45

TEXT BOOK
1. C.M. Krishna, Kang G.Shin, "Real Time Systems", McGraw-Hill, 1997.

REFERENCES
1. Raymond J.A. Buhr, Donald L. Bailey, "An Introduction To Real Time Systems", Prentice Hall International, 1999.
2. K.V.K.K.Prasad, "Embedded, Real-Time Systems, concepts, Design and Programming" , DreamTeach, 2003
3. Jane S Liu, "Real Time Systems", Pearson Education, 2004.

CS669	NETWORK SECURITY	L	T	P	C
	(Common for CSE ,S/W Engg.)	**3**	**0**	**0**	**3**

PURPOSE
This course provides a way to understand the various security techniques in networks

INSTRUCTIONAL OBJECTIVES
- Encryption techniques and key generation techniques
- Authentication and security measures
- Intrusion and filtering analysis

UNIT – I   CONVENTIONAL AND MODERN ENCRYPTION   9
Services – Attacks – Steganography – Classical Encryption Techniques – SDES – DES – Differential and Linear Cryptanalysis – Modes of operation – Encryption Algorithms—Triple DES – Blowfish – CAST128 – RC5 – Traffic Confidentiality

UNIT – II   PUBLIC KEY ENCRYPTION   9
Uniqueness – Number Theory concepts – Primality – Modular Arithmetic – Fermet & Euler Theorem – Euclid Algorithm – RSA – Elliptic Curve Cryptography – Diffie Hellman Key Exchange

UNIT – III   AUTHENTICATION   9
Digests – Requirements – MAC – Hash function – Security of Hash and MAC – Birthday Attack – MD5 – SHA – RIPEMD – Digital Signature Standard – Proof of DSS

UNIT – IV   SECURITY PRACTICE   9
Authentication applications – Kerberos – Kerberos Encryption Techniques – PGP – Radix64 – IP Security Architecture – Payload – Key management – Web security requirements – SSL – TLS – SET

UNIT – V   SYSTEM SECURITY   9
Resources – Intruders and Intrusion – Viruses and Worms – OS Security – Firewalls – Design Principles – Packet Filtering – Application gateways – Trusted systems – Counter Measures

Total: 45

TEXT BOOK
1. William Stallings , "Cryptography & Network Security" , Pearson Education, 3rd Edition 2003

REFERENCE BOOKS
1. Charlie Kaufman, Radia Perlman, Mike Speciner, " Network Security,
    Private communication in a public world", PHI, 2nd edition, 2002
2. Douglas R.Stinson, "Cryptography – Theory and Practice " , CRC Press , 1995
3. Bruce Schneier , Niels Ferguson , "Practical Cryptography", Wiley Dreamtech India Pvt Ltd, 2003

CS689   **EMBEDDED TECHNOLOGY**   **L   T   P   C**

                                                                     3   0   0   3

PURPOSE

To study the architecture of microcontrollers and embedded microcomputer systems.

INSTRUCTIONAL OBJECTIVES
- To understand the architecture of PIC microcontroller
- To understand the architectures and applications of embedded microprocessor based systems.
- To know cross compilers and debugging strategies
- To understand the basic design issues of real time OS

UNIT I   REVIEW OF EMBEDDED HARD WARE   **9**

Gates – Timing Diagram – Memory – Microprocessor – Buses – Direct Memory Access – Interrupts – Built ins on the Microprocessor – Convention Used on Schematic – Schematic – Interrupts Microprocessor Architecture – Interrupt Basics – Shared Data Problem – Interrupt Latency.

UNIT II   MICROCHIP PIC MICRO CONTROLLER   **9**

Introduction – CPU Architecture – Registers – Instruction Sets – Addressing Modes – Loop Timing – Timers – Interrupts Timing – I/O Exception – I2 C Bus Operation – Serial EEPROM – Analog to Digital Converter – UART – Baud Rate – Data Handling – Initialization – Special features – Serial Programming – Parallel Slave Port .

UNIT III EMBEDDED MICROCOMPUTER SYSTEM   **9**

Motorola MC68H11 Family Architecture – Registers – Addressing Modes Programs – Interfacing Methods – Parallel I/O Interface – Parallel Port Interface – Memory Interfacing – High Speed I/O Interfacing - Interrupts– Interrupt Service Routine – Features of Interrupts – Interrupt Vector – Priority – Timing Generation & Measurement – Input capture – Output Compare – Frequency measurement – Serial I/O Devices – RS 232, RS485 – Analog Interfacing – Applications.

UNIT IV SOFTWARE DEVELOPMENT   **9**

Round Robin – Round Robin with Interrupts – Function – Queue Scheduling Architecture & Algorithms – Introduction to – Assemblers, Compliers, Cross Compliers, Integrated Development environment(IDE) – Object Oriented Interfacing – Recursion – Debugging Strategies – Simulators.

UNIT V   REAL TIME OPERATING SYSTEM   **9**

Task & Task States – Tasks & Data – Semaphores & Shared Data – Operating System Services – Message Queues – Timer Functions – Event Memory Management – Interrupt Routines & RTOS Environment – Basic design Using RTOS.

                                                     TOTAL   45

TEXT BOOKS
1. David E. Simon , "An Embedded Software Primer",Pearson Education,2004.
2. John B Peatman , "Design with PIC Microcontroller",Pearson Education Asia, 1998. (Unit II)
3. Jonartthan W. Valvano, "Embedded Micro Computer System:Real Time Interfacing",Thomson Learning, 2001. (Unit III)

REFERENCE BOOKS
1. Burns, Alan & Wellings , "Real Time Systems & Programming Languages",2nd Edition,1997.
2. Grehan Moore & Cyliax , "Real Time Programming: A Guide to 32 bit Embedded Development" ,Addison Wesley, 1998.
3. Heath Steve, "Embedded System Design", Newnes ,1997.

CS691	FAULT TOLERANT SYSTEMS	L	T	P	C
		3	0	0	3

PURPOSE

To study the Fault tolerance systems architecture and its techniques

INSTRUCTIONAL OBJECTIVES
- To understand the error model and its operation
- Fault tolerance and architecture
- Fault tolerant software

UNIT - I   INTRODUCTION   9
Fault Prevention -Fault tolerance – anticipated and unanticipated Faults- Test generation for digital systems- Combinational logic. Network Boolean difference method test generation for sequential circuits- fault simulation.

UNIT- II   ERROR MODEL   9
General coding scheme – Parity checking code- arithmetic code – code for computer memories –checking errors in logical operation – communication coding.

UNIT- III   FAULT TOLERANCE   9
Coding technique-fault tolerant self checking and fail safe circuits-fault tolerant in combinatorial and sequential circuits- synchronous and asynchronous fail safe circuits.

UNIT- IV   ARCHITECTURE   9
Fault tolerant computers - general purpose commercial systems-fault tolerant multiprocessor and VLSI based communication architecture.

UNIT- V   FAULT TOLERANT SOFTWARE   9
Design-N-version programming recovery block - acceptance tests-fault trees- validation of fault tolerant systems.

TEXT BOOKS
1. K.K.Pradhan, "Fault Tolerant computing theory and techniques" volume III. Prentice Hall, 1989
2. Anderson and Lee, "Fault Tolerant principles and practice" ,PHI 1989.

REFERENCE BOOKS
1. Parag K. Lala, "Fault Tolerant and Fault Testable, Hardware design" PHI 1985.
2. LALA, " Digital systems design using PLD's ",PHI 1990.
3. N. N. Biswas, "Logic Design theory", PHI 1990.
4. Shem , toy Levei , Ashok K.Agarwala , "Fault Tolerant System design", Tata McGraw Hill, 1994

CS693	GRID COMPUTING	L	T	P	C
		3	0	0	3

PURPOSE
This course provides a way to understand the emerging Grid computing technology and its applications

INSTRUCTIONAL OBJECTIVES
- Types of Grids and its architecture
- Open Grid Service Architecture and management
- Parallel computing environment, Grid services and applications

UNIT- I INTRODUCTION 9
Grid Computing values and risks – History of Grid computing – Grid computing model and protocols – overview of types of Grids

UNIT- II TYPES OF GRIDS 9
Desktop Grids : Background – Definition – Challenges – Technology – Suitability – Grid server and practical uses; Clusters and Cluster Grids; HPC Grids; Scientific in sight – application and Architecture – HPC application development environment and HPC Grids; Data Grids; Alternatives to Data Grid – Data Grid architecture

UNIT – III ARCHITECTURE AND MANAGEMENT 9
The open Grid services Architecture – Analogy – Evolution – Overview – Building on the OGSA platform – implementing OGSA based Grids – Creating and Managing services – Services and the Grid – Service Discovery – Tools and Toolkits – Universal Description Discovery and Integration (UDDI)

UNIT – IV NATIVE PROGRAMMING AND SOFTWARE APPLICATIONS 9
Desktop supercomputing – parallel computing – parallel programming paradigms – problems of current parallel programming paradigms – Desktop supercomputing programming paradigms – parallelizing existing applications – Grid enabling software applications – Needs

of the Grid users – methods of Grid deployment – Requirements for Grid enabling software – Grid enabling software applications

UNIT – V APPLICATIONS , SERVICES AND ENVIRONMENTS   9
Application integration – application classification – Grid requirements – Integrating applications with Middleware platforms – Grid enabling Network services – managing Grid environments – Managing Grids – Management reporting – Monitoring – Data catalogs and replica management – portals – Different application areas of Grid computing

Total   45

TEXT BOOK
1. Ahmar Abbas, " Grid Computing , A Practical Guide to Technology and Applications", Firewall media , 2004

REFERENCE BOOKS
1. Joshy Joseph , Craig Fellenstein , "Grid Computing", Pearson Education , 2004
2. Foster , "Grid Blue print foe new computing"

CS695	INTELLIGENT SYSTEMS	L	T	P	C
		3	0	0	3

PURPOSE
This course provides a way to understand the concepts of Artificial Intelligence , ANN , Genetic Algorithms and Fuzzy systems and its applications

INSTRUCTIONAL OBJECTIVES
*   Basics of AI and ANN
*   Neuro fuzzy systems and its applications
*   Genetics algorithms and its applications

UNIT-I ARTIFICIAL INTELLIGENCE   9
Some Applications of AI-Production Systems and AI-Different types of Production Systems-Search Strategies for AI-Backtracking-Graph-search, Ununiformed and Heuristic Graph-Search Procedures-Related Algorithms-Applications.

UNIT-II   INTRODUCTION TO NEURAL COMPUTING   9
Differences between Human Brain and ANN - Knowledge Based Information Processing-Neural Information Processing - Hybrid Intelligence - Basic Concepts of Neural Networks - Inference and Learning - Classification, Association, Optimization and Self-Organization Models-Learning-Supervised And Unsupervised.

UNIT-III   FUZZY SYSTEMS   9
Crisp sets and Fuzzy sets-Notion of Fuzzy Sets - Basic Concepts - Operations on Fuzzy sets-Uncertainty and Information – Types of Uncertainty –Principles of Uncertainty and Information -Applications

UNIT-IV   NEURO-FUZZY SYSTEMS   9

Introduction to Neuro - Fuzzy Systems -Fuzzy System Design Procedures – Fuzzy Sets and Logic Background - Fuzzy / ANN Design and Implementation

UNIT-V   GENETIC ALGORITHMS   9
 Introduction-Robustness of Traditional Optimization and Search Techniques-The goals of optimization-Computer Implementation-Applications

Total:45

TEXT BOOKS
1. Limin Fu , "Neural Network in computer intelligence", McGraw-Hill International Editions,1994.
2. Timoothy J. Ross , "Fuzzy Logic with Engineering Applications", McGraw-Hill International Editions,1997 (Unit III & IV)

REFERENCE BOOKS
1. -Nils J.Nilsson ,"Principles of Artificial Intelligence", Narosa Publishing House.,1980
2. Elaine Rich and Kelvin knight, "Artificial Intelligence", McGraw-Hill Edition.1991
3. David E. Goldberg , "Genetic Algorithms-In Search, optimization and Machine Learning", Pearson Education.
4. George.J.Klin / Bo Yuan , "Fuzzy Systems & Fuzzy Logic – Theory and Applications" , Prentice, Hall of India,1995.