Item No : 16.20

B.Tech. (CSE) SCHEME & SYLLABUS FOR 2006 & 2007 BATCHES
(7th Semester)

SEMESTER VII:

Subject Code	Subject Title	Period of Instruction			Credits
		L	T	P	
BCSCCS 701	Soft Computing Techniques	3	1	0	4
BCSCCS 702	Parallel Computing and Algorithms	4	1	0	5
BCSCCS 703	Visual Programming	4	1	0	5
BCSCCS 704	Distributed Systems	3	1	0	4
BCSDCS XXX	DE 8	3	1	0	4
BCSDCS XXX	DE 9	3	1	0	4
BCSCCS 705	Parallel Computing & Algorithms lab	0	0	3	2
BCSCCS 706	Distributed Systems Lab	0	0	3	2
	TOTAL	**20**	**6**	**6**	**30**

DEPARTMENTAL ELECTIVES:

BCSDCS 701	Real Time Systems	3	1	0	4
BCSDCS 702	Grid Computing	3	1	0	4
BCSDCS 703	Embedded Systems	3	1	0	4
BCSDCS 704	Protocol and network management	3	1	0	4
BCSDCS 705	Software Testing	3	1	0	4

BCSCCS701 SOFT COMPUTING TECHNIQUES

(Common for CSE, IT and ICT)

L	T	P	CREDITS
3	1	0	4

UNIT-I **(15 Periods)**

Fuzzy Logic: Introduction to fuzzy sets – Fuzzy Relations – properties - Fuzzy rules and fuzzy reasoning and inference – Standard Forms and Boundaries - Fuzzification and De-fuzzification methods - Extension Principles – Functions of Fuzzy Sets – Fuzzy Transform (Mapping) - Practical Considerations – Fuzzy numbers – Interval Analysis in Arithmetic – Approximate methods of Extension – Vertex Method – DSW Algorithm – Restricted DSW Algorithm.

UNIT-II **(15 Periods)**

ANS and BPN: Network inputs and outputs - feed back inter connections and network stability - feed forward networks - adaptive networks - supervised and unsupervised learning - Back Propagation Network – Approach – Operation – Generalized Delta Rule – Update of output – Layer weights – Updates of hidden layer weights – Training data – Network sizing – Weights and Learning Parameters – BPN Applications – Data compression.

UNIT-III **(15 Periods)**

BAM and CPN: Associative Memory definitions – Hamming Distance – Linear Associator – BAM Architecture – BAM Processing – BAM Mathematics – BAM Energy Function – Discrete Hopfield Memory –Counter Propagation Network – CPN Building Blocks – Input Layer – Instar – Competitive Networks – Outstar – CPN data processing

UNIT-IV **(15 Periods)**

Genetic Algorithm: Introduction to Genetic Algorithms - Mathematical foundations – Computer implementation of GA: data structures – reproduction, crossover and mutation – a time to reproduce, a time to cross – mapping objective functions to fitness form – fitness scaling-crossover schema theorem – codings – a multiparameter, mapped, fixed-point coding - discretization – constraints

Text Books:

1. Timothy J. Ross, “Fuzzy Logic with Engineering Applications”, McGraw Hill, 2002. [Unit I]
2. James A Freeman, David M Skapura, “Neural Networks”, Addison Wesley 1991. [Units II & III]
3. David E. Goldberg, “Genetic Algorithms in Search, Optimization, and Machine Learning”, Addison Wesley, 2001. [Unit IV]

References:

1. Jyh-shing Roger Jang, Chnesy-Tsai Sur & Eiji Miziltazi, "Neuro Fuzzy and Soft computing: A Computational approach to learning and machine intelligence”, Pearson Education, 2004.
2. Melanie Mitchell, “Introduction to Genetic Algorithms”, Prentice Hall of India, 2004.

BCSCCS702 PARALLEL COMPUTING AND ALGORITHMS
(Common for CSE, IT and ICT)

L	T	P	CREDITS
4	1	0	5

UNIT - I **(19 Periods)**

Parallel Processing: Parallel processing terminology – pipelining, data and control parallelism, scalability – PRAM model of parallel computation - PRAM algorithms – Reducing the number of processors

UNIT - II **(19 Periods)**

Parallel algorithms: Matrix multiplication algorithms for processor arrays, multiprocessors and multicomputers

Sorting: Enumeration sort – Odd-Even transposition - Bitonic Merge – Quick sort based algorithms

Graph algorithm: Single source shortest path – multiprocessor algorithm

UNIT - III **(19 Periods)**

MPI: Introduction – Point to point communication – blocking send and receive operations – non-blocking communications - user defined data types and packing – collective communications – Broadcast – Scatter – Gather - Graph topology functions

UNIT - IV **(18 Periods)**

Multi Core Programming: Multi Core architecture – System view of threads – Concepts of Parallel Programming - Threading and parallel programming constructs – Threading APIs – OpenMP – A portable solution for threading

Text Books:

1. Michael J. Quinn, "Parallel computer theory and practice", McGraw Hill, Second Edition, 1994. [Units I & II]
2. Marc Snir, Steve Otto, Steven Huss-Lederman, David Walker, Jack Dongarra, "MPI – The Complete Reference Volume I : The MPI Core", MIT Press, Second Edition, 1998. [Unit III]
3. Shameem Akhter and Jason Roberts, "Multi-Core Programming – Increasing Performance through Software Multi-threading", Intel Press, 2006. [Unit IV]

References:

1. Kai Hwang, "Advanced Computer Architecture – Parallelism scalability Programmability", McGraw Hill, 1993.
2. Michael J. Quinn, "Parallel Programming in C with MPI and OpenMP", McGraw Hill, First Edition, 2003.
3. Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar, "Introduction to Parallel Computing", Pearson Education, Second Edition, 2003.

BCSCCS703 VISUAL PROGRAMMING

L	T	P	CREDITS
4	1	0	5

UNIT – I **(19 Periods)**

Introduction to VB.NET: Introduction -Visual Basic.Net, the. Net framework, events, procedures, properties and controls- Programming building blocks- variables and data types, assignment and arithmetic operators, comparison and logical operators.

UNIT – II **(19 Periods)**

Control Structures, Overloading, User Interface, Error handling: Controlling the flow of the program- control structures, loops and arrays, procedures, subroutines, functions, function arguments, procedure overloading, The User Interface-helper forms, message boxes, dialog boxes, owned forms, menus and toolbars- Error handling and prevention- structured exception handling and debugging.

UNIT – III **(19 Periods)**

Introduction VC++ .Net: Introduction to Visual C++. Net programming, control structures - functions, Arrays, object based programming, inheritance, polymorphism, exception handling.

UNIT – IV **(18 Periods)**

GUI, Multithreading, Files: GUI concepts- windows forms, event handling models, control properties and layouts, labels, text boxes, buttons, checkboxes, radio buttons, picture boxes, mouse event handling, keyboard event handling, link labels, list boxes and checked list boxes- Multithreading, Files and streams.

Text Books:

1. Jeffrey Kent, “VisualBasic .Net A Beginner’s Guide”, Tata McGraw Hill, 2002. [Units I & II]
2. Deitel, “Visual C++ .Net How to program”, Pearson Education, 2004. [Units III & IV]

References:

1. Shapiro, Jeremy, **“**Visual Basic .NET: The Complete Reference”, Tata McGraw Hill, 2002.
2. Kimmel, P, “Visual Basic .Net Unleashed”, Techmedia, 2002.

BCSCCS704 DISTRIBUTED SYSTEMS
(Common for CSE, IT and ICT)

L	T	P	CREDITS
3	1	0	4

UNIT - I **(12 Periods)**

Introduction: Goals – Hardware concepts – Bus based Multiprocessors – Switched multiprocessors – Bus Based multi computers – Switched multi computers – Software concepts – Network OS and NFS – True distributed systems – multiprocessor time sharing systems – Design issues.

UNIT - II **(18 Periods)**

Communication: Client/server model – Addressing – Blocking versus non – Blocking primitives – Buffered versus unbuffered primitives – reliable versus unreliable primitives – Implementation – Remote procedure call: Basic RPC Operation – Parameter passing – Dynamic binding – RPC Semantics in the presence of failures – Implementation issues.

Remote object invocation – Distributed objects – Binding a Client to an object – Static versus dynamic – Parameter passing – Message oriented communication – Stream oriented communication - Group communication: Introduction – design issues – ISIS.

UNIT - III **(15 Periods)**

Synchronization: Clock synchronization: logical & physical clocks – Algorithms – Use of synchronized clocks – Mutual exclusion: Centralized algorithm – Distributed algorithm – Token ring algorithm – Comparison – Election algorithms: Bully algorithm – Ring algorithm.

Atomic Transactions: Introduction – Transaction model – Implementation – Concurrency control – Deadlock: detection and prevention

UNIT - IV **(15 Periods)**

Consistency: Introduction – Data Centric consistency models – Client centric consistency models – Fault tolerance – process resilience – Distributed commit – Recovery – Distributed file systems – Sun network file system – Coda file system

Text Books:

1. Andrew. S Tanenbaum, “Distributed Operating Systems”, Prentice Hall of India, 2006. [Units I, II & III]
2. Andrew S Tanenbaum & Maarten Van Steen, “Distributed systems – Principles & Paradigms”, Addison Wesley, Second Edition, 2006. [Units II & IV]

References:

1. Andrew. S Tanenbaum, “Modern Operating system”, Prentice Hall of India, 2000.
2. Pradeep K Sinha , “Distributed operating systems – Concepts and Design”, Prentice Hall of India, 1998.

BCSDCS701 REAL TIME SYSTEMS
(Common for CSE, IT and ICT)

L	T	P	CREDITS
3	1	0	4

UNIT – I **(15 Periods)**

Introduction: Issues in Real–Time computing – structure of a Real–time system – task classes – Characterization of Real–Time systems and tasks: Performance measures – Estimating Program Run Times – Classical Uniprocessor scheduling Algorithms.

UNIT – II **(15 Periods)**

Task Assignment – Mode Changes – Fault Tolerant Scheduling.

Programming Languages and Tools: Desired language characteristics, Data typing, control structures, Hierarchical decomposition, packages, Run–Time error handling, overloading and generics Multitasking, task scheduling Timing specification, Run–time support.

UNIT – III **(15 Periods)**

Real Time Databases: Basic definitions – Real Time vs General Purpose Database – Main memory Databases – Transaction Priorities and Aborts – Concurrency control Issues, Disk Scheduling Algorithms, Two–phase approach to improve predictability, serialization consistency, Databases for Hard Real – Time systems.

Real–Time Communication: Network topologies – Protocols

UNIT – IV **(15 Periods)**

Fault–tolerance techniques: Causes of failures – Fault types – fault detection – fault and error containment – Redundancy – Data diversity – Reversal checks – Integrated failure handling – Reliability evaluation techniques

Reliability: Obtaining parameter values – Reliability models for hardware redundancy – software error models – Taking time into account.

Text Book:

1. C. M. Krishna and K. G. Shin, “Real Time Systems”, McGraw Hill, 1997.

References:

1. Philip A. Laplante, “Real Time system Design and Analysis - An Engineer’s Handbook”, IEEE Press Ltd., Second Edition, 2002.
2. Alan Burns, Andy Wellings, “Real Time systems and their programming languages”, Addison Wesley, Second Edition, 1996.

BCSDCS702 GRID COMPUTING
(Common for CSE and IT)

L	T	P	CREDITS
3	1	0	4

UNIT – I (**15 Periods**)

Grid Computing: Introduction: Overview – Grid applications – Grid Infrastructure - Grid Computing Organizations and their roles: organizations developing grid standards and best practice Guidelines– organizations developing grid computing Toolkits and Framework – organizations Building and using grid-based solution to solve Computing - Grid Computing anatomy – Grid Computing road map.

UNIT – II (**15 Periods)**

Grid Computing Applications: Merging the Grid services Architecture with the Web services Architecture: services Oriented Architecture - Web services Architecture – XML - Service message description mechanisms – Relationship between web service and Grid Service – web Service Interoperability - OGSA –Introduction – Goals – CDC – NFS – Online Media and Entertainment.

UNIT – III **(15 Periods**)

Technologies: OGSA platform components – OGSA Hosting Environment – Core Networking Services Transport and Security– OGSA Infrastructure – OGSI -OGSA Basic Services.

UNIT – IV (**15 Periods**)

Grid Computing Tool Kits: Globus GT 3 Toolkit Architecture – GT3 Software architecture Model - GT3 Tool Kit Service Programming model, GT3 Tool Kit High level services.

Text Book:

1. Joshy Joseph & Craig Fellenstein, “Grid Computing”, Pearson Education, First Edition, 2004.

Reference:

1. Ahmar Abbas, “Grid Computing: A Practical Guide to technology and Applications”, Charles River media, 2003.

BCSDCS703 EMBEDDED SYSTEMS
(Common for CSE, IT and ICT)

L	T	P	CREDITS
3	1	0	4

UNIT - I **(15 Periods)**

Introduction to Embedded systems: Embedding systems - Classification of embedded systems - Characteristics of embedded computing applications - Challenges in embedded computing system design process - Processor in embedded systems - Other hardware Unit - Software embedded into a system - Exemplary Embedded systems - Embedded system on-chip and VLSI circuit

UNIT - II **(15 Periods)**

Embedded software development process: Software development life cycle and its models - Software analysis, design, Implementation - Testing, validating and debugging - Real time programming issues during development process - Software project management - Software maintenance - Issues in embedded system design

UNIT - III **(15 Periods)**

Real time Operating Systems: Real-time and Embedded system OS - interrupt routines in RTOS environment - RTOS task scheduling models - performance metric in scheduling models - list of basic actions in a preemptive schedules and expected times taken at a processor - Fifteen point strategy for synchronization.

Co-design and tools: Embedded system design and co-design issues in system development process - Use of target system and its emulator and ICE - Use of software tools for development of an embedded system - Use of scopes and logic analyser for system hardware tests

UNIT – IV **(15 Periods)**

Distributed embedded systems: Distributed embedded architectures - Networks for embedded systems - Network based design - Internet enabled systems.

Applications: Telephone PBX - Ink Jet printer - Personal Digital Assistants - Set Top Boxes - Real time alarm clock

Text Books:

1. Wayne Wolf, “Computers as components – Principles of embedded computing system design”, Elsevier, Second Edition, 2008. [Units I & IV]
2. Raj Kamal, “Embedded systems – Architecture, Programming and design”, Tata McGraw Hill, First reprint, 2003. [Units II & III]

Reference:

1. Steve Heath, “Embedded systems Design”, Newnes publications, Second Edition, 2003.

BCSDCS704 PROTOCOLS AND NETWORK MANAGEMENT

L	T	P	CREDITS
3	1	0	4

UNIT - I (15 Periods)

Introduction: Need for simple Network Management- Features of the Management Frame work. A brief overview of TCP/IP. Overview of Simple Network Management: The nature of Management information – MIBs- The internet standard Management model- Network Management applications- Bringing in the LAN monitors- MIB variable, The first MIB-MIB-I- Tuning the MIB to get MIB II- Technology extensions- Simple Network Management Protocol- Structure and Identification of Management information- Advantages of a Modular approach.

UNIT - II (15 Periods)

Network Monitoring: Network Management requirements-Network Management Systems- Network monitoring architecture-Performance Monitoring-Fault Monitoring – Accounting - monitoring - Network Control: Configuration control- Security control.

UNIT - III (15 Periods)

SNMP network management concepts: Back ground, Basic Concepts. SNMP management Information: Structure of Management Information - Practical Issues.

Standard MIBs: MIB-II - Ethernet interface MIB. Simple Network Management Protocol: Basic concepts, Protocol specification - Transport-level support - SNMP Group practical Issues.

UNIT - IV (15 Periods)

Remote network monitoring: Statistics collection,-Basic concepts – Statistics groups – History group – Host group – Matrix group – Token ring extension to RMON – RMON alarms and filter alarms – Filter, Packet capture and event group – Practical issues – RMON2 protocol directory – Protocol distribution – Address map groups – RMON2 host groups, Matrix groups, Extension to RMON1 for RMON2 device.

Text Books:

1. Dr.Sordnie Feit, "SNMP – A Guide to Network Management", McGraw Hill, 1995. [Unit I]
2. William Stallings, "SNMP, SNMPv2, SNMPv3 and RMON1 and 2", Pearson Education, Third Edition, 2003. [Units II, III & IV]

References:

1. A. S. Tanenbaum, "Computer Networks", Prentice Hall of India, Third Edition, 1999.
2. Camel Terplan, "Network Management", CRC Press, 1999.
3. Mani Subramaniam, "Network Management Principles & Practice", PTR, First Edition, 2000.

BCSDCS705 SOFTWARE TESTING

(Common for CSE and IT)

L	T	P	CREDITS
3	1	0	4

UNIT – I **(15 Periods)**

Introduction : Purpose of Testing-Some dichotomies- model for testing- consequences of bugs- taxonomy for bugs- flow graph for path testing-Path testing basics- predicates, path predicates and achievable paths- path sensitizing- path instrumentation-implementation and application of path testing- testability tips

UNIT – II **(15 Periods)**

Transaction Flow, Data Flow And Domain Testing : Transaction flows- testing techniques-implementation; data flow testing basics- strategy, applications, tools and effectiveness; domain testing- domains and paths- nice domains and ugly domains- domain testing- domains and interface testing- domains and testability

UNIT – III **(15 Periods)**

Syntax and Logic Based Testing - Syntax testing- A grammar for format- Test Case generation-Implementation and Application- Motivational Overview of logic based testing- decision table-path expressions- KV Charts- Specifications

UNIT – IV **(15 Periods)**

Testing Specialized Systems and Test Documentation Testing Client server systems, Testing rapid application development- test web based systems- testing security- testing a data warehouse-building test documentation

Text Books:

1. Boris Beizer, “Software Testing Techniques”, Dream Tech Press, 2003. [Units I, II & III]
2. William E Perry, “Effective Methods for Software Testing”, John Wiley & Sons, Second Edition, 2000. [Unit IV]

Reference:

1. Srinivasan Desikan, Gopalaswamy Ramesh, “Software Testing – Principles and Practice”, Pearson Education, First Edition, 2006.

BCSCCS705 PARALLEL COMPUTING AND ALGORITHMS LAB

L	T	P	CREDITS
0	0	3	2

1. Basic arithmetic operations in parallel
2. Find out factorial of a number
3. Generation of Fibonacci series, finding prime numbers in an interval.
4. Evaluate integral of a function
5. Merging of two sorted lists
6. Parallel tree traversals
7. Matrix multiplication
8. Enumeration sort
9. Odd-Even transposition sort
10. Bitonic merge
11. Quick sort
12. Single source shortest path

Note: All exercises to be implemented with MPI-2.

BCSCCS706 DISTRIBUTED SYSTEMS LAB

L	T	P	CREDITS
0	0	3	2

1. Create and demonstrate the working of Distributed Processes.
2. Demonstrate a Chat application using Multithreading concept
3. Demonstrate the principle of Ordering of Events in Distributed Environment
4. Test: Synchronous Message Passing Interface
5. Test: Asynchronous Message Passing Interface
6. Implement the Right –Left Dining Philosophers Algorithm
7. Test the Coloring Algorithm.
8. Implement the Leader Election Algorithm for a ring network
9. Compute the Shortest path for a given Distributed Network
10. Demonstrate the working of Unicast, Multicast and Broadcast sessions
11. Implement multitier applications using CORBA and EJB