Bachelor of Technology (Computer Engineering)

Scheme of Courses/Examination
(w.e.f.: 2004-2005)
(6th Semester)

Sr. No.	Course No.	Subject	Teaching Schedule				Examination Schedule (Marks)				Duration of Exam (Hrs.)
			L	T	P	Total	Theory	Sessional	Practical	Total	
1.	*	Departmental Elective I	3	2	-	5	100	50	-	150	3
2.	CSE-302	Mobile Computing	4	2	-	6	100	50	-	150	3
3.	CSE-304	Computer Hardware Technologies	4	1	-	5	100	25	-	125	3
4.	CSE-306	Network Management & Security	4	1	-	5	100	50	-	150	3
5.	CSE-308	Software Engineering	4	1	-	5	100	25	-	125	3
6.	CSE-312	Computer Hardware & Troubleshooting (P)	-	-	3	3	-	50	50	100	3
7.	CSE-314	Mobile Computing (P)	-	-	3	3	-	50	50	100	3
8.	CSE-316	Software Engineering (P)	-	-	3	3	-	50	50	100	3
TOTAL			**19**	**7**	**9**	**35**	**600**	**350**	**150**	**1000**	

*Departmental Elective:

1. CSE-320   Digital Signal Processing
2. CSE-321   Multimedia Technique
3. CSE-322   Graph Theory & Combinations
4. CSE-323   Logic of Programming
5. CSE-324   Advanced Database Systems
6. CSE-325   Parallel Computing

CSE-324   **Advanced Database Systems**

L	T	P		Theory	: 100 Marks
3	2	-		Sessional	: 50 Marks

Unit 1.
Parallel & Distributed Databases
Architecture for parallel databases, Parallel query evaluation. parallel individual operations. parallel query optimization Introduction to distributed databases. distributed DBMS architectures. storing data in a distributed DBMS. distributed catalog management, distributed query processing. updating distributed data. introduction to distributed transactions. distributed concurrency control. recovery.

Unit 2.
Data Mining
Introduction, counting co-occurrences, mining for rules, tree structured rules. clustering, similarity search over sequences.

Unit 3.
Object Database Systems
User defined ADT. structured types. objects & reference types. inheritance. design for an ORDBMS. challenges in implementing an ORDBMS. ORDBMS. comparison of RDBMS with OODBMS & ORDBMS.

Unit 4.
Advanced Topics
Advanced transaction processing. integrated access to multiple data source. mobile databases main memory databases. multimedia databases. GIS. temporal & sequence databases.

Note: - There will be 8 questions in all. Two Questions will be set from each unit. Students arc required to attempt five questions selecting at least one question from each unit

BOOKS
1. R. Ramakrishnan & J. Gehrks Database Management Systems: MGH.
   International Ed. 2000.
2. Korth. Silberschatz. Sudcrshan: Data Base concepts. MGH. 2001.
3. C.I. Date. Database Systems:. 7th Ed.. Addison Wesley. Pearson Education.
   2000.

Mobile Computing

CSE-302

L	T	P		
4	2	-	Theory	: 100 Marks
			Sessional	: 50 Marks

Unit 1.

Introduction: Challenges in mobile computing. coping with uncertainties. Resource poorness, bandwidth, etc. Cellular architecture. co-channel interference. Frequency

reuse, capacity increase by cell splitting. Evolution of mobile system: CDMA.

FDMA, TDMA,GSM

Mobility Management: Cellular architecture. Co-channel interference. Mobility: handoff. types ofhandoffs; location management. HLR-VLR scheme. Hierarchical scheme. Predictive location management schemes. Mobile IP. cellular IP.

Unit 2.

Publishing & Accessing Data in Air: Pull and push based data delivery models. data dissemination by broadcast, broadcast disks. Directory service in air. Energy efficient indexing scheme for push based data delivery.

File System Support for Mobility: Distributed file sharing for mobility support. Coda and other storage manager for mobility support

Unit 3.

Ad-hoc Network Routing Protocols: Ad hoc network routing protocols. destination sequenced distance vector algorithm. cluster based gateway switch routing. global state routing. Fish-eye state routing. Dynamic source routing, ad hoc on-demand routing, location aided routing. zonal routing algorithm.

Unit 4.

Mobile Transaction and Commerce: Models for mobile transaction. Kangaroo al1d Joey transactions, team transaction. Recovery model for mobile: transactions. Electronic payment and protocols for mobile commerce.

Note: - There will be 8 questions in all. Two Questions will be set from each unit. Students are required to attempt five questions selecting at least one question from each unit

Books

1. Mobility: Processes. Computers. and Agcnts. Dejan Milojicic. I-'rederick Douglis. Richard Wheeler, Addison- Wesley Protess,ional; I st edition (April 19. 1999).
2. Ivan Stojmenovic' (Editor). Handbook of Wireles5 Networks and Mobile Computing . Wiley, ISBN: 0-471-41902-8. February 2002 .
3. Yi-Bing Lin & Imrich Chlamtac. "Wireless and Mobile Networks Architectures". John Wiley & Sons. 2001.
4. Raj Pandya. "Mobile and Personal Communication systems and services". Prentice Hall of India. 200 I.

CSE-304   **Computer Hardware Technology**

L   T   P   Theory   : 100 Marks
4   1   -   Sessional   : 25 Marks

Unit 1.
Memory
Memory, memory chips. & Modules, memory types, advanced memory technologies. Troubleshooting memory.
Power Supply
Power supply function and operation, power supply quality an&-: specification, power protection and back up. backup power system: UPS; troubleshooting power supply.

Unit 2.
Motherboard
PC family tree, motherboard controllers and system resources. input-output ports. IRQ, I/O bus system: ISA. MCA, EISA. VESA local bus. PCI. AGP. PCIX; 011 board
I/O devices, ROMBIOS, ROM POST. CMOS setup.

Unit 3
Interfaces and I/O Ports
Floppy disk interface:IDE interface: ATA standards, master-slave configuration. data transfer mode: SCSI interface: SCSI bus. SCSI standards: which is better SCSI or IDE: serial ports. parallel ports. USB. Video adapters. Troubleshooting video adapters.

Unit 4.
Device drives and peripherals
Floppy disk drive, hard disk drive, CD ROM drive, DVD ROM drive. Record able drives, keyboards, mice, printers and monitors, tro~lble-shootil1g drives and peripherals.

Note: - There will be 8 questions in all. Two Questions will be set from each unit. Students are required to attempt five questions selecting at least one question from each unit

BOOKS

1. Craig Zacker & .John Rourtrc: PC Hardware- The complete reference
2. Mark Minosi: The complete PC Upgrade & Maintenance Guide publications.
3. S.K. Chauhan: PC Upgrading. Maintenance and troubleshooting guide

Network Management and Security (CSE-306)

L   T   P   **Theory: 100 Marks**
4   1   -   **Sessional: 50 Marks**

Unit 1.

Introduction: need and basic goals for computer security. Security threats etc. Cryptographic building blocks: symmetric and asymmetric key cryptograph). Cryptographic hash functions, digital signature schemes etc. With representative applications for each.

Unit 2.

Operating System Security: low-level protection mechanisms, access control: models for access control. some confidentiality, integrity, and hybrid models of access control such as Bell-La Padula. Biba. Chinese Wall etc. Discretionary v/s mandatory access control.

Case Studies: Java access control policy specifications, SELinux security model
and implementation. Program flaws: bugs which have security implications such as buffer overflows, race conditions etc.

Unit 3.

Malicious code: viruses, Worms, Trojan horses: how they work and how to defend against them.

Network Security: problems in network security; kinds of attacks. PKI. Key exchange protocols, example protocols such as PGP. Kerberos, IPSECIVPN. SSL. S/MIME etc.

Unit 4.

Protocol vulnerabilities: examples or protocol vulnerabilities such as in TCP/IP. Denial of service attacks, etc.

Tools for network security such as firewalls and intrusion detection systems.

Note: - There will be 8 questions in all. Two Questions will be set from each unit. Students are required to attempt five questions selecting at least one question from each unit

Books

Michael E. Whitman & Herbert J. Mattord. Principles of Information Security. Vikash Publishing House Pvt. Ltd., New Delhi.

William Stalling "Cryptography and Network Security" Pearson Education.

Charcls P. Pfleegcr "Security in Computing" Prentice Hall.

Jeff Crume "Inside Internet Security" Addison Wesley.

CSE-308   **Software Engineering**

L	T	P		Theory	: 100 Marks
4	1	-		Sessional	: 25 Marks

Unit 1. Software and Software engineering- Software characteristics, software crisis, software engineering paradigm.
Planning a software project-software cost estimation, project scheduling. Personal planning. Team structure.
Unit 2 Software configuration management. quality assurance. project monitoring. risk management.Software requirement analysis- structured analysis, object oriented analysis and data modeling. software requirement specification, validation,
Unit 3. Design and implementation of software - software design fundamentals. design methodology (structured design and object oriented design). design verification, monitoring and control coding.
Software reliability: metric and specification. fault avoidance and tolerance. exception handling, defensive programming.
Unit 4. Testing - Testing fundamentals. white box and black box testing software testing software testing strategies: unit testing. integration testing. validation testing. system testing. debugging.
Software Maintenance -- maintenance characteristics. maintainability. maintenance tasks. maintenance side effects.CASE tools.

Note: - There will be 8 questions in all. Two Questions will be set from each unit. Students are required to attempt five questions selecting at least one question from each unit.
Books:
1. Pressman S.Rogcr, Software Engineering. 'Tata McGraw-Hill
2, Jalote Pankaj, An integrated approach to software engineering .Narosa Publishing
    House
3. Sommerville Ian. Software Engineering. 5th ed., Addison Wesley-2000
4. Fairley Richard, Software. Software Engineering Concepts. Tata Mcgraw-Hill

CSE-312   **Computer Hardware & Troubleshooting (Pr.)**

L   T   P   Practical   : 50 Marks
-     -   3   Sessional   : 50 Marks

I. To solder and de-solder various components.
2. To check and measure various supply voltages of Pc.
3. To make comparative study of motherboards: 386,486, PI. PII. PIII.
4. To observe and study various cables, connections and parts used in computer
    Communication.
5. To study various cards used in a system viz. display card, LA1'rbrd etc.
6. To remove, study and replace Floppy disk drive.
7. To remove, study and replace hard disk.
8. To remove, study and replace CD ROM drive.
9. To study monitor, its circuitry and various presets and some elementary fault
    Detection.
10. To study printer assembly and elementary fault detection of DMP and laser
    Printers.
11. To observe various cables and connectors used in networking.
12. To study pa!1S of keyboard and mouse.
13. To assemble a Pc.
14. Troubleshooting exercises related to various components of computer like
    monitor. drives, memory, and printers etc.

BOOKS

1. Mark Mines Complete PC upgrade & maintenance guide, BPB publications.
2. Craig Zacker & John Rouske, PC Hard ware: The Complete Reference. TMH.
3. Scott Mueller, Upgrading and Repairing PCs, PHI, 1999

CSE-314   **Mobile Computing (Pr.)**

L   T   P   Practical   : 50 Marks
-       -   3   Sessional   : 50 Marks

1. Design a prototype that implements the Cache management for a mobile
   computing environment?
2. Design a System: The challenges or developing high performance. high reliability. and
   high quality software systems arc too much for ad hoc and informal engineering
   techniques that might have worked in the past on less demanding systems. New
   techniques for managing these growing complexities are required to meet today's time-
   to-market. productivity and quality demands.
3. Peer-to-peer communication system: As computers become more pervasive and homes
   become better connected. a new generation of applications will be deployed over the
   Internet. In this model. peer-to-peer applications become very attractive because they
   improve scalability and enhance performance by enabling direct and real-time
   communication among the peers. We need to propose a decentralized management
   system that manages the peer-to-peer applications and the system resources in an
   integrated way: monitors the behavior of the peer-to-peer applications transparently and
   obtains accurate resource projections. Manages the connections between the peers and
   distributes the objects in response to the user requests and changing processing and
   networking conditions.
4. Write programs that implement the few sorting algorithms (bubble,selection, etc.)for
    n data. It stops the operation when the counter for sorting index is at   100,   1000.
    10000 and so on, stores the contents of the registers, program counter and partially
    sorted list of data, etc. It resumes the operation after 30 sec from the point of the
    termination.
5. Write a program that implements the bubble sort for *n* data. It stops the operation when
   the counter for sorting index is at 100, 1000, 10000. and so on. Stores the contents of
   the registers, program counter and partially sorted list of data. etc. It transfers the code
   and data - across the network on the new destination and resumes the operation from the
   point of termination on the previous node. Finally the result from the last node in the
   itinerary is sent back   to the process-initiating node.
6. Develop a prototype that perform parallel computation of the same task on different
   nodes. Finally process initiator (master node)- receive Yes the result It and computation
   time required to complete the task on an each node and displays to the user. Compare
   the computing power of different nodes.

Books
1. Mobility: Processes, Computers. and Agents. Dejan Milojieie. federick
   Douglis, Richard Wheeler, Addison-Wesley Professional; 1st edition (April
   19, 1999).
2. Ivan Stojmenovic' (Editor), Handbook of Wireless Networks and Mobile
    Computingm. Wiley, ISBN: 0-471-41902-8, February 2002
3. Core Java Volume I and II from Sun Micro Systems.
4.   Huges. Java Networking, Hut Publication. Pune
5. Java 2: The Complete Reference 4/c: Herbert Schildt, TMH Delhi.
6. Java Beans Programming from the Ground Up: Joseph Q'Neil, TMH. Delhi
7. Java Servlets: Application Development; Karl Moss. TMH, Delhi.

CSE-316   **Software Engineering (Pr.)**

L   T   P   Theory   : 50 Marks
-       -   3   Sessional   : 50 Marks

1. (i) Implement Receipt Acknowledgement and updation of Inventory (RAUP)
        a) Find unadjusted Functional points (UFP)
        b) Calculate FPC by Mark II Method
   (ii) To estimate effort and schedule
   Calculate the compression factor and the manpower required based on given
     information of software.
2. Suggest an action plan for the following risks without compromising the
   project, process or product parameters
   a) Language skills inadequate in two people in a team of five.
   b) Specially ordered hardware and software likely to be delivered three
       Months late.
   c) Customer and end user not convinced on new technology implementation
       as a correct choice.
   d) Software required interface with other technologies on which the project team has
       no experience.
3. Implement a Testing strategy for the following software development cases:
   (a) Rule based deterministic closed large but simple payroll system for a
       company.
   (b) Development or a customer relation management system lor a retail
       distribution chain. The retail organization is not sure about the scope, and failure
       feature.
   (c) Modification to existing order processing system for a multi location,multi-product
       company.
4. Build a work breakdown structure for the following
   a) Delivery orthe software, initiation to development covering lifecycle.
   b) Development of prototype
   c) Development of a process for a function
5. In a hospital management system develop the following diagrams for a Ward Service
   Management System (SMW).
        (a) Work Flow
        (b) System Flow
        (c) DFD
        Develop on effective modular design of SMW using these diagrams.
6. Draw three level DFD's for CLPS. Modl1larize the CLPS and structure them
     top-down as functional model.
7. Conduct a task analysis for the following users:
        (a) officer at railway ticket reservation window
        (b) officer at insurance claim settlement desk.
        (c) clerk at call center. answering queries of customers who have purchased
             cars from the company.
8. Based on the business model of DEL develop a modular structure for a business
    system model. Draw a complete system flowchart.

Books
1. W. S. Jawadekar, Software Engineering Principle and Approaches. TMH. 2004.
2. Pressman S.Roger. Software Engineering. Tata McGraw-Hill
3. Jalote Pankaj. An integrated approach to software engineering. Narosa Publishing
     House
4. Sommerville Lan. Software Engineering. 5th ed. Addison Wesley-2000
5. Fairley Richard, Software. Software Engineering Concepts. Tala McGraw-Hill

CSE-321   **Multimedia Techniques(Department Elective I)**

L	T	P
3	2	-

Theory   : 100 Marks
Sessional   : 50 Marks

Unit 1.
Basics of Multimedia Technology

Computers, Communication and Entertainment: Multimedia -An introduction: Framework for multimedia systems; multimedia devices CD Audio. CD-ROM. CD-I: presentation devices and the user interface; multimedia presentation and authoring; professional development tools: LANs & multimedia. Internet, World Wide Web & Multimedia; distribution network ATM & ADSL; multimedia servers & databases: vector graphics; 3-D graphics programs; animation techniques; shading; anti-aliasing; morphing: video on demand

Unit 2.
Image Compression & Standards

Making still images: editing and capturing images; scanning images; computer color models: color palettes; vector drawing; 3-D drawing and rendering; JPEG-objectives and architecture: JPEG-DCT encoding and quantization, JPEG statistical coding; JPEG predictive loss less coding; *JPEG* performance; Overview of other image file formats as GIF, TIFF. BMP. PNG etc.

Unit 3.
Audio & Video

Digital representation of sound: time domain sampled representation; method of encoding the analog signals; sub-band coding; Fourier method: transmission of digital sound; digital audio signal processing; stereophonic & quadraphonic signal processing; editing sampled sound: MPEG Audio; audio compression & decompression: brief survey of speech recognition and generation; audio synthesis; Musical Instrument Digital Interface (MIDI); digital video and image Compression; MPEG Motion video compression standard; DVI technology: time based media representation and delivery.

Unit 4.
Virtual Reality

Applications of multimedia, Intelligent multimedia system, Desktop Virtual Reality (VR). VR operating System, Virtual environment displays and orientation tracking; visually coupled system requirements; intelligent VR software systems.

Applications of environments in various fields viz. Entertainment. manufacturing. Business, education, etc.

Note: - There will be 8 questions in all. Two Questions will be set from each unit. Students are required to attempt five questions selecting at least one question from each unit

BOOKS
1. Villamil & Molina Multimedia: An Introduction. PHI.
2. Lozano. Multimedia: Sound & Video PHI.
3. Villamil & Molina Multimedia: Production. Planning and Delivery, PHI
4. Sinclair. Multimedia on the Pc. BPB.
5. Tay Vaughan. Multimedia :Making it work. TMH

CSE-322   **Graph Theory & Combinatorics (Department Elective I)**

L   T   P   Theory   : 100 Marks
3   2   -   Sessional   : 50 Marks

Unit 1.
Introduction
Basic concepts, sub graphs, vertex, degrees. walks. paths, circuits, cycles, trees. spanning trees, cut vertices and cut edges. connectivity, Euler tours and Hamiltonian cycles. matching perfect matching, connectivity. and
separability, network flows. I-isomorphism and 2-isomorphism.
Unit 2.
Advanced Features
Vertex coloring, chromatic polynomial. edge coloring, planar and non-planar graphs. Euler's formula Kuratowski's theorem. test for planarity. directed graphs. tournaments, networks. max now, min cut theorems. graph enumeration, Polya's counting theorem.
Unit 3.
Graph Algorithms
Computer representation of graph. shortest path algorithms, minimal spanning tree. fundamental circuit. depth first search. planarity testing. directed circuits. isomorphism. performance of graph theoretic algorithms.
Unit 4.
Combinatorics
Basic combination numbers. recurrence relations. generating functions. multinomial. counting principles, Polya' s theorem, inclusion and exclusion principles. block design and error correcting codes, Hadamard matrices, finite geometry.
Note: - There will be 8 questions in all. Two Questions will be set from each unit. Students are required to attempt five questions selecting at least one question from each unit
BOOKS
1. Deo N.: Graph Theory and Applications. Prentice Hall
2. D.B.West: Introduction to Graph Theory. Prentice Hall
3. S.A.Choudum: A First Course in Graph Theory, MacMillan [India]
4. V.Krishnamurthy: Combinatorics-- Theory and Applications. Affiliated East-West
5. Alan Tucker: Applied combinatories. Wiley. .

CSE-323   **Logic of Programming (Departmental Elective I)**

L	T	P		Theory	: 100 Marks
3	2	-		Sessional	: 50 Marks

Unit 1.
Fundamentals

Propositions. Tautologies, Precedence rules. System definition. J~easoning using Transformations. Formal Systems, Axioms, Inference Rules. Predicates. Quantification, Free and bound identifiers. Data Values & Types. Generators. semantic definitions of functions. Generator Induction, defined ness condition.

Unit 2.
Semantics

Predicate Transformers, various commands. Alternative and Iterative commands. Procedure call, The characterization of semantics. The semantic characterization of programming language. Two Theorems. Design of Properly terminating constructs. Euclid's Algorithms.. Interrupts. spin locks.

Unit 3.
Communicating Sequential Processes (CSP)

Parallel commands. Co routines. Subroutines and data representation. monitors and scheduling. Integer semaphore. Dining Philosophers Problcm

Note: - There will be 8 questions in all. At least two Questions will be set from each unit. Students are required to attempt five questions selecting at least one question from each unit

BOOKS
1. David Cries. The Science of Programming. Narosa Publishing House
2. E.W..Dijkstra. A Discipline of Programming PHI
3. Hoare and .lones, Essays in Computing Science, TMH.

CSE-324   **Advanced Database Systems (Departmental Elective I)**

L   T   P   Theory   : 100 Marks
3   2   -   Sessional   : 50 Marks

Unit 1.
Parallel & Distributed Databases
Architecture for parallel databases, Parallel query evaluation. parallel individual operations. parallel query optimization Introduction to distributed databases. distributed DBMS architectures. storing data in a distributed DBMS. distributed catalog management, distributed query processing. updating distributed data. introduction to distributed transactions. distributed concurrency control. recovery.

Unit 2.
Data Mining
Introduction, counting co-occurrences, mining for rules, tree structured rules. clustering, similarity search over sequences.

Unit 3.
Object Database Systems
User defined ADT. structured types. objects & reference types. inheritance. design for an ORDBMS. challenges in implementing an ORDBMS. ORDBMS. comparison of RDBMS with OODBMS & ORDBMS.

Unit 4.
Advanced Topics
Advanced transaction processing. integrated access to multiple data source. mobile databases main memory databases. multimedia databases. GIS. temporal & sequence databases.

Note: - There will be 8 questions in all. Two Questions will be set from each unit. Students arc required to attempt five questions selecting at least one question from each unit

BOOKS
1. R. Ramakrishnan & J. Gehrks Database Management Systems: MGH.
    International Ed. 2000.
2. Korth. Silberschatz. Sudcrshan: Data Base concepts. MGH. 2001.
3. C.I. Date. Database Systems:. 7th Ed.. Addison Wesley. Pearson Education.
    2000.

CSE-325   **Parallel Computing (Departmental Elective I)**

L   T   P   Theory   : 100 Marks
3   2   -   Sessional   : 50 Marks

Unit 1.
Introduction: Paradigms of parallel computing: Synchronous - vector/array. SIMD, Systolic; Asynchronous - MIMD, reduction paradigm.
Hardware taxonomy: Flynn's classifications, Handler's classifications.
Software taxonomy: Kung's taxonomy. SPMD.

Unit 2.
Abstract parallel computational models: Combinational circuits, Sorting network. PRAM models, Interconnection RAMs. Parallelism approaches - data parallelism, control parallel ism
Performance Metrics: Laws governing performance measurements. Metrics speedups, efficiency. utilization. communication overheads. single/multiple program performances. bench marks.

Unit 3.
Parallel Processors: Taxonomy and topology - shared memory multiprocessors, distributed memory networks. Processor organization - Static and dynamic interconnections. Embeddings and simulations.
Parallel Programming: Shared memory programming. distributed memory programming, object oriented programming, data parallel programming. functional and dataflow programming.

Unit 4.
Scheduling and Parallelization: Scheduling parallel programs. Loop scheduling. Parallelization of sequential programs. Parallel programming support environments.

Note: - There will be 8 questions in all. Two Questions will be set from each unit. Students are required to attempt five questions selecting at least one question from each unit.

Books
1. M. J. Quinn. *Parallel Computing: Theory and Practice.* McGraw Hill. New York,1994.
2. T. G. Lewis and H. EI-Rewini. *Introduction to Parallel Computing.* Prentice Hall, New Jersey, 1992.   .
3. T. G. Lewis. *Parallel Programming: A Machine-Independent Approach,* 1EEE Computer Society Press, Los A lamitos, 1994.