SHIVAJI UNIVERSITY, KOLHAPUR

(Implemented from June, 2005)

REVISED STRUCTURE & SYLLABII B.E. PART I & II OF COMPUTER SCIENCE AND ENGINEERING

B. E. PART – I

Sr. No.	Subject	L	T	P	Theory Marks	T/W	Orals	POE	Total Marks
1.	Advanced Computer Arch.	4	1	--	100	25	--	--	125
2.	Distributed Systems	4	--	2	100	25	--	50	175
3.	Network Engineering	2	--	4	---	25	--	50	75
4.	Information Technology	3	--	2	100	25	--		125
5.	Elective – I	3	1	--	100	25	--	--	125
6.	Project	--	--	4	--	25	50	--	75
		16	2	12	400	150	50	100	700

B. E. PART – II

Sr. No.	Subject	L	T	P	Theory Marks	T/W	Orals	POE	Total Marks
1.	Advanced Database Systems	4	--	2	100	25	--	--	125
2.	Component Technology	4	--	2	100	25	--	--	125
3.	Information Security	3	1	--	100	25	--	--	125
4.	Web Technology	2	--	2	---	25	--	50	75
5.	Elective – II	3	1	--	100	25	--	--	125
6.	Project	--	--	6	---	50	75	--	125
		16	2	12	400	175	75	50	700

ELECTIVE – I

1) Information Retrieval
2) Object Oriented Modeling & Design
3) Digital Signal Processing

ELECTIVE - II

1) Mobile Computing
2) Image Processing & Pattern Recognition
3) Artificial Neural Networks & Genetic Algorithms.

Any other elective based on the current developments with prior sanction from the University Authorities.

Note :

1. For the project head, the practical batch shall consist of 09 (Nine) students each.

2. Laboratory Term work as prescribed in the syllabus is to be periodically and jointly assessed by a team of teachers as appointed by the Head of the Institution.

3. In case of Tutorials, students of different batches be assigned problems of different types and be guided for the solution of the problem during tutorial session. Problems thus solved should be translated into computer programs wherever applicable and executed by respective batches during practical session.

4. The assignments of tutorials and practicals need to be submitted in the form of printout and /or written journal.

5. Breakup of term work marks shall be as follows:

a) Tutorial assignments and/or practical performance – 15 marks.
b) Mid-semester test – 3 marks
c) End-semester test – 3 marks
d) Practical / tutorial attendance – 2 marks
e) Theory lecture attendance – 2 marks

6. Instructions for POE : Set of problems for POE should be based on the list of term work assignments, however they should not be exactly the same.

Shivaji University, Kolhapur
(Introduced from June, 2005)
B. E. (Computer Science and Engg.) Part – I

1. Advanced Computer Architecture

Lectures : 4 hrs/week
Tutorials : 1 hr/week

Theory : 100 Marks
Term work : 25 Marks

Section – I

1. Introduction to Parallel Processing :
   a. Introduction, architectural classification schemes.
   b. Evolution of parallel processors, current & future trends towards parallel processors.
   c. Principles of pipelining and array processing.
   d. Scalar and vector pipelines. (7)

2. Vector and pipelined processors :
   a. Classification of pipelined processors, performance evaluation factors.
   b. Vector processing concepts, pipelined vector processors, Cray type vector processor -design example.
   c. Array processors, an example of data routing in array processor. (4)

3. Different parallel processing architectures:
   a. Introduction to Associative memory processors, examples – STARAN.
   b. Multithreaded arch –principles of multithreading, Latency hiding techniques.
   c. Scalable coherent multiprocessor model with distributed shared memory (6)

4. Interconnection networks & Distributed Memory Architectures :
   a. Various topologies, static and dynamic type of networks with examples.
   b. Loosely coupled and tightly coupled architectures.
   c. Cluster computing as an application of loosely coupled architecture. Example –CM* (7)

Section – II

5. Systolic Architectures :
   a. Systolic arrays and their applications.
   b. Wave front arrays. (3)

6. Dataflow Architectures :

Concepts of data flow computing, static and dynamic dataflow architectures.

Dataflow operators, data flow language properties, advantages & potential problems. (6)

7. Programmability Issues :
   a. Types of parallelism.
   b. Operating systems for parallel processing, Models of parallel operating systems.
      1. Master-slave configuration 2. Separate supervisor configuration 3. Floating supervisor control.
   c. Parallel programming models – shared memory, message passing, data parallel, object oriented models.
   d. Data dependency analysis - Bernstein's condition. (7)

8. Parallel Programming Languages :
   a. Introduction to HPF (Fortran – 90), C-Linda.
   b. Parallel algorithms - developing simple parallel programs using message-passing libraries like MPI. (5)

Books :

1. Advanced computer architecture – Kai Hwang (MGH).
2. Computer Architecture and Parallel Processing – Kai Hwang and Briggs (MGH).
3. Introduction to Parallel Processing – M. Sasikumar, Dinesh Shikare and P. Ravi Prakash (PHI)

Term Work : It should consist of 8-10 assignments with emphasis on solving exercise problems.

B. E. (Computer Science and Engg.) Part – I
2. Distributed Systems

Lectures : 4 hrs/week
Practicals : 2 hrs/week

Theory : 100 Marks
Term Work : 25 Marks
POE : 50 Marks.

Section – I

1. Introduction to distributed systems : Introduction, Characteristics, Design Goals, Hardware and software concepts. (3)

2. Communication in distributed systems : Client-Server communication, RPC, Remote Object Invocation, Message-oriented communication. (5)

3. Processes and Processors in distributed systems - Threads, Clients, Servers, Code Migration, Software Agents. (7)

4. Synchronization in distributed Systems : Clock Synchronization, Logical clocks, Election algorithm, Mutual Exclusion, Distributed Transactions. (7)

Section - II

5. Distributed File Systems : Distributed file system design and implementation – Coda file system, Other DFSs and their comparison. (7)

6. Distributed Systems : Case Studies – (1) Distributed document based system – Lotus Notes, (2) Distributrd Coordination based system – Jini. (7)

7. Distributed Operating Systems : Case studies – Mach, Chorus , Unix emulation in Mach & Chorus. (8)

Books :

1) Distributed Systems – Principles & Paradigms … A.S. Tanenbaum & Maarten Van Steen (PHI)
2) Distributed Systems – concepts and design – George Couloris, Jean Dollimore & Tim Kindberg (2nd Edition) Addison Wesley.
3) Distributed Operating Systems – concepts & design – P.K. Sinha (PHI)

Term Work : It should consist of 8-10 experiments based on the above topics.

B. E. (Computer Science and Engg.) Part – I

3. Network Engineering

Lectures : 2 hrs/week Term work : 25 Marks Practicals : 4 hrs/week
POE : 50 Marks.

1) Windows NT – overview, architectural features, kernel & its subsystems, communication methods in NT, networking in NT, security model and file-system. (6)

2) Windows 2000 – overview, network enhancements, ADS, RRAS, Mobile computing, File system, security services, clustering & terminal services. Features of Win XP professional and windows server 2003. (5)

3) Linux – boot and system configuration services, system crashes, Linux services & protocols – FTP, SMTP, Telnet, Newsgroup, NIS, SAMBA file-systems and devices. (5)

4) Novell Netware – Novell strategies, features, network communication & protocols – NCP, IPX/SPX, ODI, TCP/IP, expanding networks and building internetworks with IPX/SPX and TCP/IP. Novel services and products – NDS, Internet/intranet services, Border Manager, Groupwise, etc. Netware filing system organization, security model. (6)

Books :

1. The Complete Reference Win NT4 – Griffith Wm. Kadnier (TMGH)
2. Windows 2000 Complete Reference – Kathy Ivens, Kenton Gardinier (TMGH).
3. Linux the Complete Reference – Richard Petersen (TMGH)
4. The Complete Reference Netware 5 – Payne (TMGH)

References:

1. Network Programming in Win NT – Alok K. Sinha (Addison Wesley)
2. Unix network programming – W. Richard Stevens(PHI)
3. Internetworking with TCP/IP – D.E. Comer, D.L. Stevens (Pearson Edition Asia)
4. Windows Server 2003 Complete Reference –Kathy Ivens (TMGH)
5. Win XP Professional – Mark Minasi (bpb)
6. Manuals.

Term Work : It should consist of the following-

I) 8 -10 network programming assignments using different network services and protocol suites – TCP/IP, IPX/SPX, XNS, SNA, NetBIOS and OSI; and RPC.

AND

II) Installing, configuring, Managing and troubleshooting any one or more Network operating systems and services – Win NT/2000/XP/2003, Linux/Unix, Novell Netware and further using the services to build an internetwork / intranetwork – directory services, clustering, mobile computing, network integration services with – Novell Netware, Windows and Linux environments.

B. E. (Computer Science and Engg.) Part – I

4. Information Technology

Lectures : 3 hrs/week Theory : 100 Marks
Practicals : 2 hrs/week Term Work : 25 Marks

Section - I

1. Organizations, Environments & Information Technology : The new world of business, Examples of Information systems at work world wide, Information technology developments and trends, why should you learn about information technology? (4)

2. Information Technologies : concepts and managements – Information systems concepts and definitions, classification of information systems, transactional and functional processing, operational, managerial and strategic systems, information infrastructure and architecture, Managing information resources. (4)

3. Strategic Information systems : Strategic advantage and information technology, Porter's competitive forces model and strategies, Porter's value chain analysis model, strategic information systems frameworks, A framework for global competition, strategic information systems application. (4)

4. Business Process Re-engineering & Information Technology : Basic concepts & need for BPR, principles of BPR & the role of IT, BPR & restructuring the organization, The networked organizations, Virtual corporations, Total quality management and re-engineering, Implementing re-engineering. (5)

Section - II

5. Network computing: Discovery, communication & collaboration – The Internet, Groupware technology & infrastructure, Some internet implementation topics. (4)

6. Electronic Commerce: Foundation of E-commerce, Business to consumer applications, business-to-business applications. (5)

7. Impacts of IT on Organizations, Individuals and Society: Does it have only positive effects? Ethical issues, impacts on organization, impacts on individuals at work, Societal impacts and the internet community. (4)

8. Supporting Management and Decision making: The Managers and decision making, decision support systems, Corporate-level decision support, Advance decision support topics. (4)

Books:

1. Information Technology for Management – Turban, McLean, Wetherbe (John Wiley & Sons Inc., 2nd Edi.)
2. Information systems, theory and practice – John Burch Jr., Felix Strater Jr. (Hamilton publishing compamy)
3. Information system design – Brookes, Grouse, Jeffery and Lawrence (PHI).

Term Work: It should consist of developing a mini-project on any of the relevant information system.

Term work approach:

A batch as a single group or two/three sub-groups is to be formed. One of the students should lead the group and/or subgroup and discuss and plan in detail the nature, design, development and deployment of the mini-project. Further the leader has to distribute/assign the work planned to the team members/subgroups and involve in developing and coordinating with the team. Consider a system for computerization or upgradation from one platform to another. In view of this follow the assignments listed below.

Stress is expected on the following things:

1. As far as possible an actual customer / company be considered.
2. Group discussions amongst students are essential.
3. Group leader / System Analyst should maintain the diary.
4. Documentation of every stage be maintained and presented in the form of journal.
5. Formal presentation of analysis at each stage be given in seminar halls.

List of Assignments:

1. Present existing system's study by using fact finding methods – Interviews, questionnaires, Name of system, company/customer and its location, identify the problem.
2. Provide development/implementation plan of the system under consideration.
3. Provide your views and i/o media selection, hardware/software selection.
4. Provide proposed system for the existing system under consideration.
5. Design the system, forms, checklist for information collection of parts of proposed system.
6. Design the system using software engineering principles.
7. Develop the system under consideration.
8. List and detail essential factors to make the proposed system on-line.
9. Provide run-time and monetary audits of the system.
10. Gnatt chart and CPM/Pert chart implementation.

Example systems :

1. Student information system.
2. Library information system.
3. Hospital information system.
4. Business information system.
5. Reservation information system (Railway, Bus, Airline) – distributed approach.

Note :

1. No stand alone system to be developed. Network based systems are to be developed.
2. During practical session discussion, design, actual development and presentation work is to be carried out.

B. E. (Computer Science and Engg.) Part – I
5. Elective - I
i) Information Retrieval (Elective – I)

Lectures: 3 hrs/week
Tutorials : 1 hr/week

Theory : 100 Marks
Term work: 25 Marks

Section – I

1. Information Retrieval & IR Models : Information retrieval and data retrieval, Information retrieval process, A Formal Characterization of IR Models, Classic Information Retrieval
Set Theoretic Models, Algebraic Models, Probabilistic Model, Structured Text Retrieval Models, Models For Browsing. (8)
2. Query Languages: Keyword based querying, Pattern Matching, Structural Queries. (4)
3. Indexing and Searching: Inverted Files and Indices for text search, Boolean Queries, Sequential searching, Pattern Matching, Structural Queries. (5)

Section - II

4. Text and Multimedia Languages and Properties: Text data & formats, Multimedia Data & formats. (4)
5. Multimedia IR - Models and Languages: Data Modeling & Query Languages. (3)
6. Multimedia IR - Indexing and Searching: A generic multimedia indexing approaches, One dimensional time series, Two Dimensional color images, Automatic Feature Extraction. (5)

7. IR in WEB & Digital Libraries: Characterizing the Web & Search Engines, Architectural issues of Digital Libraries, Document models, Representation, and Access. (4)

Text Book -

1. Modern Information Retrieval - Ricardo Baeza-Yates and Berthier Ribeiro-Neto - Pearson Education (Low Price Edition)

Reference : www.dcc.ufmg.br/irbook or sunsite.dcc.uchile.cl/irbook

Term Work : It should consist of 8-10 assignments with emphasis on solving exercise problems.

B. E. (Computer Science and Engg.) Part – I
ii) Object Oriented Modeling & Design (Elective - I)

Lectures: 3 hrs/week Theory : 100 Marks
Tutorials : 1 hr/week Term work: 25 Marks

Section – I

1. Review of object modeling : New paradigm, object oriented thinking-rethinking, objects and classes, links and association, Generalization and specialization, Inheritance, Grouping concepts, aggregation, abstract classes, Polymorphism, Metadata, Constraints, Reuse, Dynamic modeling, event states, Operations, Concurrency. (10)

2. Importance of modeling, Object modeling technique, Use case drive approach (OOSE), CRC method. (7)

Section - II

3. Design methodology: OMT methodology, Analysis, object, dynamic and functional modeling, system design and object design. (8)

4. UML : Efforts of standardization / Integration, OMG approval for UML, Scope of UML, Conceptual model of UML, architecture-metamodel, mechanisms, Unified Software Development Lifecycle, UML diagrams.
– Advanced Class diagram: Advanced relationship, interface-types and rules, packages common modeling techniques, modeling groups of elements, modeling architectural views.
-- Instances and Object diagrams: modeling concrete / prototypical instances, links, objects interaction.
-- Collaborations, Use Cases, Interaction diagrams, State transition diagrams.
-- Architectural modeling: Component diagrams, deployment diagram, pattern and frame work..
(9)

Books :

1. Object Oriented analysis and Design with applications – Booch (Addison Wesley)
2. Object Oriented Modeling & Design – Rambaugh (PHI).
3. UML User Guide – Booch, Rambaugh, Jachobson (Addison Wesley)
4. UML-In a Nut Shell – Sinon Alhair.
5. Object Oriented Software Constructions – B. Meyer (PHI).

Term Work : It should consist of 8-10 assignments with emphasis on solving exercise problems.

B. E. (Computer Science and Engg.) Part – I
iii). Digital Signal Processing (Elective - I)

Lectures: 3 hrs/week — Theory : 100 Marks
Tutorials : 1 hr/week — Term work: 25 Marks

Section – I

1. Introduction: Signals, systems and signal processing, classification of signals, concept of frequency in continuous-time and discrete-time signals, Analog to digital and digital to analog conversions. (5)
2. Discrete – time signals and systems: Discrete-time signals, discrete-time systems, Analysis of discrete-time and linear time-invariant systems, discrete-time systems described by difference equations, Correlation of discrete-time signals. (5)
3. Z- transforms: Z- transform and its properties, Rational Z-transforms, one sided Z-transforms, Inversion of Z-transforms, Analysis of linear time-invariant systems in Z-domain. (4)
4. Frequency Analysis of discrete signals: Frequency analysis of discrete time signals, properties of Fourier transform for discrete-time signals, sampling of signals in the time and frequency domains. (4)

Section – II

5. Discrete Fourier Transform : DFT and its properties, FFT algorithms – direct, divide and conquer approach, radix-2 algorithm, implementation of FFT; Linear filtering methods based on DFT, Use of FFT in linear filtering and correlation. (7)
6. Digital Filter Design : Design of digital filters by placement poles and zeros in Z-plane, IIR systems and design of IIR filters from analog filters, Frequency transformation, Direct design techniques for digital IIR filters, design of FIR filters, Decimation and interpolation. (7)
7. Applications of DSP. (4)

Books :

1. Introduction to Digital signal processing – John G. Proakis, D.G. Manolakis (Maxwell Macmillan Int.)
2. Discrete time signal processing – A.V. Oppenhalm, R.W. Schafer (PHI)
3. Digital Signal Processing – A system design approach – D.T. Defrata, J.G. Lucas, W.S. Hodgkis (Wiley)
4. Designing digital filters – C.S. William (PHI)
5. Digital Signal processing – Natarajan & Nasir Ahmed.

Term Work : It should consist of 8-10 assignments with emphasis on solving exercise problems.

B. E. (Computer Science and Engg.) Part – I
6. Project

Practicals : 4 Hrs/week

Term Work : 25 Marks
Orals : 50 Marks

The project work is to be carried out in two semesters of B.E. (Comp. Sc. & Engg.). The project should be undertaken preferably by a group of 4 – 5 students who will jointly work and implement the project in the two semesters.

In Semester I, the group will select a project with the approval of the Guide (staff member) and submit the name of the project with a synopsis, of the proposed work, of not more than 02 to 08 pages, not later than second week of August in the academic year. The group is expected to complete detailed system design, analysis, data flow design, data structure layout, file design, Procurement of Hardware and/or software requirements , etc., at the semester –I as a part of the term work submission in the form of a joint report.

The term work assessment will be done jointly by a panel of teachers as appointed by Head of the Institution.

The oral examination will be conducted by an internal and external examiner as appointed by the University.

B. E. (Computer Science and Engg.) Part – II
1. Advanced Database Systems

Lectures : 4 hrs/week
Practicals: 2 hrs/week

Theory : 100 Marks
Term work: 25 Marks

Section - I

1. Object-Relational Databases – Nested relations, complex types, inheritances, reference types, querying with complex types, functions and procedures, OO versus Object-Relational. (5)
2. Database Systems architectures – centralized & C/S architectures, server systems, distributed systems, networks types. (5)
3. Distributed databases – Homogeneous & heterogeneous databases, distributed data storage, distributed transactions, commit protocols, concurrency control in distributed databases, availability, distributed query processing, heterogeneous distributed databases, directory systems. (6)
4. Parallel Databases – Integrated, I/O parallelism, inter-query parallelism, intra-query parallelism, intra-operation parallelism, inter-operation parallelism, design of parallel systems. (6)

Section – II

5. Application development & Administration – Web interfaces to databases, performance tuning, performance benchmarks, standardization, E-commerce, Legacy systems. (8)
6. Advanced Querying & Information Retrieval – Decision support systems, data analysis and OLAP, Data mining, data-warehousing, Information retrieval systems. (8)
7. Advanced transaction processing – Transaction-processing monitors, transactional workflows, main-memory databases, real-time transaction systems, long-duration transactions, transaction management in multi-databases. (6)

Books:

1. Database system concepts – Silberschatz, Korth, Sudarshan – 4th Edi (MGH International Edition).
2. Database Management System – Raghu Ramkrishnan (MGH)

Term Work : It should consist of 8-10 assignments, out of which

a) 7-8 assignments should be based on above syllabus topics AND
b) 1-2 assignment should be based on Oracle / DB2 / MS SQL Server as case studies.

B. E. (Computer Science and Engg.) Part – II
2. Component Technology

Lectures : 4 Hrs/week
Practicals: 2 Hrs/week

Theory : 100 Marks
Term Work : 25 Marks

Section - I

1. COM : Introduction, COM as better C++, S/W distribution, Dynamic linking, separating interface from implementation, Run time polymorphism. (3)

2. Interfaces : Introduction , Interface definition language(IDL), interfaces and IDL, Using COM interface pointers, Optimizing query interface, Code sharing and reuse. (5)

3. Classes and Objects : Introduction, Classes and servers, Optimization, Classes and IDL, Class emulation, Query interface types and properties, object services and dynamic composition, Apartments : Cross apartments access, Life cycle management. (6)

4. Distributed COM: Fundamental programming architecture of DCOM: Parallel processing, Advantages of distributed computing. Threading models and apartments: Apartments, Apartments interaction, Implementing multithreaded local components, facilities : Connection points and type information, Connectable objects. Remoting: DLL surgates and executable components. (8)

Section - II

5. CORBA: Introduction and concepts, Distributed objects in CORBA, CORBA components, Architectural features, Method Invocations: static and Dynamic. IDL (Interface Definition Language) models and Interfaces: Structure of CORBA IDL, CORBA's self describing data, CORBA interface repository. (5)

6. CORBA services: Services of object naming, object life cycle, event, Transaction service features, concurrency control services, persistent object service and CORBA security service. (5)

7. JAVA Beans : JAVA Beans, Bean Events, Bean Properties, Implementing JAVA Beans, Creating Bean Object, Serializing a Bean. (8)

8. Object Web: Web Technologies, Integration of Web & Distributed objects. (4)

Books:

1. Essential COM - Booch Jackobson, Rumbaugh, (Addison Wesley)
2. DCOM, Microsoft Press - Guy Eden and Henry Eden
3. CORBA fundamentals & programming - John Siegle (Jhon Wiley and Sum's 96)
4. Essential CORBA - Mowbray and Zahavi (Addison Wesley)
5. The essential distributed object survival guide – Orfali (SPD)
6. Learn ActiveX Template Library Development with VC++ - Nathan Wallace (BPB)
7. Client / Server programming with Java & CORBA – Robert Orfali, Dan Harkey (SPD)

Term work :

It should consist of 8-10 assignments based on the **TECHNOLOGIES** covered in the above topics on the following lines –

1. Building a simple COM object using ATL class, test this ATL based component using any language which supports it.
2. Building a COM client in JAVA.
3. Developing a program in JAVA to display the JAVA source files in a directory and allow the user to view these files. (Use multithreading)
4. Given root URL to a document, we wish to visit all the URLs which exist in the document and also those documents, reachable from it. Developing a program in JAVA which can be run as an aplet.
5. Develop a mini project using CORBA to implement – STORE / LIBRARY / EXAM SECTION activities.
6. Building a componentized application. Viz. Building a client/server order- entry application, which may have the following functions. ACCOUNTS: Creating new account/modifying/Viewing/Deleting. PRODUCTS and INVOICES may also have the similar kind facilities as that of ACCOUNTS.

B. E. (Computer Science and Engg.) Part – II

3. Information Security

Lectures : 3 Hrs/week
Tutorials: 1 hr/week

Theory : 100 Marks
Term work :25 Marks

Section – I

1. SYMMETRIC CIPHERS :
Overview - Services, Mechanism and Attacks, The OSI security Architecture, A model for Network security Classical Encryption techniques - Symmetric Cipher model, Substitution techniques, Transposition techniques, Rotor Machines, Steganography. Block Cipher and Data Encryption Standard - Simplified DES, Block cipher principles, The Data Encryption Standard, The strength of DES, Differental and Linear Cryptanalysis, Block Cipher Design Principles, Block Cipher mode of Operation. (6)

2. ASYMMETRIC CIPHERS :
Public Key Cryptography and RSA - Principles of Public Key Cryptosystems, The RSA Algorithm Key Management ; Other public key cryptosystems - Key Management, Diffe-Hellman Key Exchange, Elliptical Curve Arithmetic, Elliptical curve Cryptography , Message Authentication and HASH Functions - Authentication requirements, Authentication Functions, Message Authentication Codes, Hash Functions, Security of Hash Functions and MACS Digital Signatures and Authentication Protocols - Digital Signatures, Authentication Protocols, Digital Signature Standard. (10)

Section - II

3. NETWORK SECURITY PRACTICE :
Authentication Applications - Kerberos, X.500 Authentication Service, Electronic Mail Security - Pretty Good Privacy, S/MIME, IP Security - IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating security Payload, Combining Security Associations, Key Management, WEB Security - Web Security Considerations, Secure Socket Layer and Transport Layer Security, Secure Electronic Transaction. (10)

4. SYSTEM SECURITY :
Intruders - Intruders, Intruder detection, Password Management, Malicious Software - Viruses and Related Threats, Virus Countermeasures, Firewall - Firewall Design Principles, Trusted systems. (7)

Text Book :

1. Cryptography and Network security Principles and Practices - Williams Stallings (LPE).

Reference Books :

1. "Handbook of Applied Cryptography" - Menezes, A. J., P. C. Van Oorschot, and S. A. Vanstone.
2. "Applied Cryptography: Protocols & Algorithms" - Schneier, Bruce

Term work: It should consist of 8-10 assignments based on above topics and
1) Gathering information from WEB sites cited in the text book..
2) Study of problems given in appendices of the given books..

B. E. (Computer Science and Engg.) Part – II

4. Web Technology

Lectures : 2 Hrs/week
Practicals: 2 Hrs/week

Term work :25 Marks
POE : 50 Marks

1. Web Environment : WWW, HTTP, Web Server and its deployment, N-Tier Arch., Services of Web Server – Mail server, News server, Proxy server, Multimedia server, etc. (4)

2. XML Primer : Introduction, Benefits, components of XML, XML schemas, DTD, Parsing XML, Parsing methodologies, X Link, X pointer, X Include, XBase, XML Technologies & applications viz. E-Commerce, etc. (4)

3. XLS : Overview, applications and programming with XLS. (2)

4. JSP : JSP overview, JSP language basics, JSP translation and compilation directives, Standard java objects from JSP, JSP configuration and deployment, actions and tags of JSP; Java servlets – Arch, servlet interface, applications of servlets. (6)

5. ASP : Objects and Components, Handling databases, applications of ASP, session management, ASP with .NET (6)

Books :

1. Instant Java Servlets – Phil Hanna (TMGH)
2. Java Developer's Guide to E-Commerce with XML and ASP – Bill Brogden, Chris Minnick (bpb)
3. Active Server Pages Unleashed – Stephen Walther and others (SAMS Techmedia)
4. COM+ & XML: ASP.Net on the Edge – Rick Leinecker (IDG).

Term work: It should consist of 8-10 assignments based on above topics.

B. E. (Computer Science and Engg.) Part – II

5. Elective – II

i) Mobile Computing (Elective – II)

Lectures : 3 Hrs/Week Theory: 100 Marks
Tutorials: 1 hr/week Term work :25 Marks

Section – I

1. Introduction to wireless communication, Need and Applications of wireless communication, Wireless Data Technologies, Market for mobile communication, Mobile and wireless devices. (2)

2. Wireless transmission : Frequencies for radio transmission, signals, antennas, signal propagation, Multiplexing, Modulation, Spread spectrum and Cellular systems. (3)

3. Medium Access Control : Specialized MAC, SDMA, FDMA, TDMA and CDMA. (3)

4. Telecommunication Systems : GSM, DECT systems – Architecture and protocols, Tetra frame structure, UMTS basic architecture and UTRA modes. (4)

5. Wireless LAN : Introduction, Infrared v/s Radio transmission, Infrastructure and ad-hoc networks, IEEE 802.11, HIPERLAN, Blue Tooth. (6)

Section – II

6. Wireless ATM : WATM services, Reference model, functions, radio access layer, handover, Location management, Addressing, Mobile QoS, Access point control protocol. (6)

7. Mobile Network Layer : Mobile IP, DHCP. (2)

8. Mobile Transport Layer : Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast and selective retransmission & recovery, Transaction oriented TCP. (4)

9. Support for Mobility : File systems, World wide web and Wireless Application Protocol with example applications. (6)

Books :

1. Mobile Communications – Jachen Schiller (Addison-Wesley).
2. Wireless LAN – Peter T. Davis, Craig R. Mc Guffin (MGH International Edn).
3. The Wireless Application Protocol – Sandeep Singhal, Jari Alvinen and group.
   (Addison-Wesley).
4. Professional WAP – Charles Arehart and group (SPD).

Term Work : It should consist of 8-10 assignments on above topics with emphasis on designing & solving problems on above mentioned topics.

B. E. (Computer Science and Engg.) Part – II
ii) Image Processing & Pattern Recognition (Elective - II)

Lectures : 3 Hrs/Week Theory: 100 Marks
Tutorials: 1 hr/week Term work :25 Marks

Section – I

1. Introduction: Digital image processing – problems and applications, Image representation and modeling, 2D systems and necessary mathematical preliminaries. (4)

2. Image Transforms: 2-D orthogonal and Unitary transforms, 1-D DFT, 2-D DFT, Cosine and Hadamand transforms, Harr and Slant Transforms, KL transforms. (8)

3. Image Enhancement: Point operations, Histogram modeling, Spatial operations, Transform operations. (5)

Section – II

4. Image Filtering: Inverse and Wiener filtering, FIR Wiener filters, Filtering using image transforms, smoothing splines and interpolation, least square filters. (6)

5. Image Analysis: Spatial feature extraction, edge detection, boundary extraction, boundary representation, region representation, moment representation. (5)

6. Approaches to Pattern Recognition: Pattern vectors & pattern classes, pattern preprocessing, pattern classification methods- statistical approach. Use of decision functions. Clustering techniques, MMD and KNN approaches, Automatic cluster formation, memory network. Approach to pattern Recognition. (7)

Books:

1. Fundamentals of Digital Image Processing – A.K. Jain (PHI)
2. Introductory Computer Vision and Image Processing – A. Low (MGH)
3. Pattern Recognition Principles – J.T. Tou, R.C.Gonzalez (Addison-Wesley)

Term Work : It should consist of 8-10 assignments on above topics with emphasis on solving problems on above mentioned topics.

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B. E. (Computer Science and Engg.) Part – II
3. Artificial Neural Network & Genetic Algorithms (Elective - II)

Lectures : 3 Hrs/Week — Theory: 100 Marks
Tutorials: 1 hr/week — Term work :25 Marks

Section - I

1. Introduction : Inspiration from Neuroscience, History, Issues. (2)
2. Hopfield model :Associative memory problem, model, stochastic networks, capacity of stochastic n/w. (4)
3. Optimization problems: Weighted matching problem, Traveling salesman problem, Graph bipartioning, optimization problems in image processing. (4)
4. Simple perceptrons: feed forward n/w, Threshold units, linear units, nonlinear units, stochastic units, capacity of simple perceptron. (4)

5. Multi-layer n/w: Back propagation, examples & applications, performance of multilayer feed forward Network, Kohoanen self organizing n/w, Cognitron & neocognitron. (4)

Section - II

6. Recurrnt n/w: Boltzmann n/w, Recurrent Back-propagation, Learning time sequence, Reinforcement learning. (4)
7. Learning : Supervised, Unsupervised (Hebbian/Competitive), Adaptive resonance theory, Travelling salesman problem. (4)

8. Application of Artificial Neural Network. (2)
9. Genetic Algorithms : Introduction, Mathematical Foundations. (3)
10. Computer Implentation of a Generatic Algorithm :Data Structures, Reproduction, Crossover and Mutation, Mapping objective functions to fitness form, Fitness scaling, Codings, Discretization, Constraints. (5)

Books:

1] Introduction to the theory of Neural Computation - Hertz, Krogh, Palmer.
2] Artificial Neural Networks - B. Yegnanarayana (PHI)
3] Genetic Algorithms - David E. Goldberg (Addison Wesley)

Term Work : It should consist of 8-10 assignments on above topics with emphasis on solving problems on above mentioned topics.

B. E. (Computer Science and Engg.) Part – II

6. Project

Practicals : 6 Hrs/week

Term Work : 50 Marks
Orals : 75 Marks

The total work carried out by the group of students on the selected project topic along with the results and conclusions should be submitted in the form of a detailed report and be assessed for the term work by a panel of teachers appointed by the Head of the Institution.

Oral examination will be conducted by Internal and External examiners as appointed by the University.

SAWANT SP BIRJE SR/JC

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