

UNIVERSITY OF PUNE
B.E.(Information Technology) Syllabus.
Part-I

Sub.No.	Subject	Teaching Scheme			Examination Scheme			Marks Total
		Lect.	Pract.	Theory	T/W	Pract.	Oral	
410441	Information System Security	4	2	100	50	--	50	200
410442	Advance Database Management	4	--	100	--	--	--	100
410443	Organization & Management Behavior	4	--	100	--	--	--	100
410444	Softwar Testing & Quality Assurance	4	--	100	--	--	--	100
410445	Elective-I	4	2	100	--	--	--	100
410446	Computer Laboratory Practice-I	--	4	--	50	50	50	150
410447	Seminar & Technical Communication	--	2	--	50	--	--	50
410448	Project Work**	--	2	--	--	--	--	--
Total		20	12	500	150	50	100	800

**It is mandatory to submit preliminary project report for the grant of the term-I

Part-II

Sub.No.	Subject	Teaching Scheme			Examination Scheme			Marks Total
		Lect.	Pract.	Theory	T/W	Pract.	Oral	
410449	System Operation & Maintenance	4	--	100	--	--	--	100
410450	Distributed Systems	4	--	100	--	--	--	100
410451	Information Retrieval	4	--	100	--	--	--	100
410452	Elective II	4	2	100	25	--	50	175
410453	Computer Laboratory Practice-II	--	4	--	25	--	50	75
410448	Project Work	--	6	--	100	--	50	150
Total		16	12	400	150	--	150	700

410441 : Information System Security

Teaching Scheme :

Lectures : 4 Hrs./Week

Examination Scheme :

Theory : 100 Marks

1. Introduction to Security and Security management

Introduction : Types of attacks : passive and active attack, Threat Scenarios, Viruses, Principles of Security, Security Architecture, Model for Network Security, Multilevel Model of Security.

Management : Security Architectures as a Strategic Planning Tool, Information Security as Business Benefit, The Role of Audit in Security Management, Telecommunications and Electronic Commerce, Security Management-Policy, standard, regulatory consideration.

2. Cryptography

Cryptographic techniques : An introductory overview of the aims and types of cryptographic methods. Level of security-time and key exhaustion. Stream ciphers, Block ciphers : Design Principles, Modes of Operation. The Feistel principle, Symmetric cipher model, public key Cryptography, Differential and Linear Cryptanalysis.

3. Secret Key Cryptography

Simplified DES, DES, Triple DES, International Data Encryption Algorithm (IDEA), Blowfish, RC5, AES, MD5, SHA-1.

4. Public-key Encryption

Principle of Public key Cryptosystems, RSA Algorithm, Key Management, Diffie-Hellman key exchange, Elliptic Curve Cryptography, DSS.

5. Authentication

Authentication Requirements, Authentication Functions, Message Authentication Codes, Hash Functions, Security of Hash Functions and MACs, Mutual Authentication, Integrity/Encryption for data, Mediated Authentication, Kerberos Protocol V4 and V5.

6. Wireless and Network Security

E-mail Security : Basic e-mail security, POP, PEM. IP Security : IPsec, IPV4, IPV6. WEB Security : SSL/ TLS, WAP Security, Security in Wireless Networks : 802.11, Bluetooth, Network Security using Firewalls and Intrusion Detection Systems.

7. Computer security (operating systems)

Concepts and Terminology : Security : confidentiality, integrity, availability; reliability; security policies; security models. Access Control : Mandatory and discretionary access control, capabilities, access control lists, intermediate controls, lattice models, Security Models : Information flow; Bell—LaPadula model, basic security theorem; integrity models. Implementation of Mechanisms : Security mechanisms in operating systems, memory management, memory protection, logical protection.

Text Books

1. Cryptography and Network Security By : William Stallings (Second Edition, Pearson Education).
2. Network Security By : Charlie Kaufman, Radia Perlman, Mike Speciner (2nd Edition, Prentice-Hall India).

3. Security Architecture By : Christopher M. King, Curds E. Dalton, T. Ertem Osmanoglu (TMH).

410441 : Information System Security

Teaching Scheme : Practical : 2 Hrs./Week

Examination Scheme : Term Work : 50 Marks Oral : 50 Marks

The Laboratory work will consists of 8 assignments in implementing Security algorithms, protocols, firewall and case study of standard protocols.

The student will submit term work in the form of journal.

Oral will be based on Term Work. The candidate is expected to know the theory based on the subject.

List of Practicals

1. Obtaining IP address of remote system.
2. Configuration of Proxy Server.
3. Configuration of Firewall.
4. Implementation of Network Address Translation (NAT).
5. Implementation of PING.
6. Implementation of any One Encryption, Decryption Standard Algorithm.
7. Implementation of Deffie-Hellman key exchange Algorithm.
8. Implementation of any one Authentication Protocol.
9. Implementation of IPsec for (a) Tunnel Mode, (b) Transport Mode.
10. Implementation of SSL.
11. Procedure for Scanning, Finger Printing and Information Gathering.

410442 : Advanced Database Management

Teaching Scheme : Lectures : 4 Hrs./Week

Examination Scheme : Theory : 100 Marks

1. Database system Architectures

Centralized Systems, Client-Server systems, Server system Architectures, data servers, parallel systems, Parallel Database Architectures, Distributed systems Architectures, Middleware systems.

2. Distributed Databases

Homogeneous and Heterogeneous databases, Storing data in distributed DBMS, Distributed catalog management, Distributed Transactions and Query processing, Distributed Concurrency and recovery.

3. Parallel Databases

Parallel Query Evaluation, I/P parallelism, Interquery parallelism, Intraquery parallelism, Interoperation parallelism, Intraoperation parallelism, parallel Query optimization.

4. Object-Oriented Databases

Data types, objects, object identity, Reference types, Inheritance, object oriented data model, database design for an ORDBMS, OODBMS, ODMG data model OQL. Querying with complex types.

5. Internet Databases

Databases and the Web, Architecture, XML, structure of XML data, XML DTDs, XML-QL, Transformation, Application program Interface, Indexing for text search. Intranet Architecture.

6. Data Warehouse

Data warehousing, online-Analytical processing (OLAP), star schemes, Implementation techniques for OLAP, Views and Decision support, data Analysis and OLAP.

7. DATA mining

Counting Co-occurrences, Mining for Rules, Tree structured Rules, Decision Trees, Clustering.

8. Deductive Databases

Recursive Queries, Theoretical foundations, Recursive queries and negation, Evaluation of recursive queries.

9. Advanced Transaction Processing

TP Monitors, New transaction models, Real time DBMS, transactional workflows, Main memory databases, Real time transaction, Transaction management in Multidatabases.

10. Advanced Topics

Mobile Databases, Multimedia Databases, Spatial and Geographic data, Geographic Information systems, Temporal and sequence databases. Integrated Access to Multiple Data Resources.

Books

1. Silberschatz, Korth and Sudarshan : "Database System Concepts 4th Edition", (MGH).

2. Raghu Ramakrishnan and Johannes Gehrke: "Database: Management Systems 2nd Edition by" (MGH).

410443 : Organization and Management Behavior

Teaching Scheme : Lectures : 4 Hrs./Week

Examination Scheme : Theory : 100 Marks

1. Organization Behavior

The discipline of Organizational Behavior Definition-importance of its study in the work situation different models of organizational behavior i.e autocratic, custodial, supportive, collegial and SOBC

Managing self competency, communication competency, Perception and Attribution-perception process, selection organization, attributions, Motivation Process, content and process models of motivation motivating performance, goal setting and reward systems.

2. Individual

Motivation process-different types of motives intrapersonal conflict-frustration and defence mechanism-study of select theories of work motivation-Douglas McGregor's theory 'X' and 'Y'-Abraham Maslow's theory of need hierarchy-Fredrick Herzberg's two factor theory of motivation-Vector Vroom's expectancy theory of motivation-morale-relationship of morale to productivity-measurement of morale.

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Stress Management-concept of stress-sources of stress-ill-effects of stress on humans-management of stress.

3. Group and Impersonal processes

Group and team behaviour, development, team effectiveness, decision making, power and behaviour.

Managing human resources, human resource planning, hiring and training, performance appraisal.

Conflict management, levels of conflict, conflict handling and management.

4. Organisation

Organisational design-various organisational structures and their effects on human behaviour-organisational climate-organisational culture.

Leadership : Definition-its importance to the organisation-leadership style-approaches to the study of leadership-trait, behavioural and situational approaches-Fiedler's contingency model-Hersey and Blanchard's Theory, Black and Moutan's Theory, Path and Goal Theory.

Management of change-forces responsible for change-resistance to change-overcoming resistance to change-introduction of change in the organisation-organisation development-organisational effectiveness.

Conflict Management-traditional vis-a-vis modern view of conflict constructive conflict-conflict process-strategies for conflict resolution.

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5. Management of change-forces forces responsible for change-resistance to change-overcoming resistance to change-introduction of change in the organisation-organisation development-organisational effectiveness.

6. Conflict Management-traditional vis-a-vis modern view of conflict constructive conflict-conflict process-strategies for conflict resolution.

7. The Emerging Organisation-Total Quality Management-techniques of TQM-Re-engineering-empowerment, bench marking-downsizing-learning organisations.

8. Case studies, tools and techniques for strategy organisation behaviour.

Reference

Organisational Behaviour : Stephen Robbins, Prentice Hall of India.

410444 : Software Testing and Quality Assurance

Teaching Scheme : Examination Scheme : Lectures : 4 Hrs./Week Theory : 100 Marks

1. Software Measurement :

Measurement in Software Engineering, introduction to quality software models, classifying software measures, Applying the framework, software measurement validation.

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2. Software Engineering Measurement :

Fundamentals of measurement theory, Level of measurement, basic measures, control flow structure, modularity and attributes, reliability and validity measurement errors.

3. Software Quality metrics :

Definition, Storing, extracting and collection of data, product quality metrics, customer problem saturation metrics.

4. Software Reliability :

Basics of reliability theory, software reliability problem, parametric reliability growth models, predictive accuracy, importance of operational environment.

5. Making Process Predictions :

Goal estimates, cost estimation : problems and approaches, models of effort and cost, problem with existing modeling methods, dealing with problems of current estimation methods, implications for process predictions.

6. Software Quality Assurance :

Software verification and validation, inspections, reviews and audit testing strategies : Test Plan Development GUI testing, functional testing, robustness testing, usability testing, formal verification methods.

7. The Clean room Methodology, The defect prevention Process, process Maturity Framework and Quality Standards, The SEI Process Capability Maturity Model (CMM), The Malcolm Baldrige Assessment, ISO 9000.

8. Seven Basic Quality Tools in Software Development, Ishikawa's Seven Basic Tools, Checklist, Pareto Diagram, Histogram, Run Charts, Scatter Diagram, Control Chart, Cause-And-Effect Diagram.

9. Complexity Metrics and Models, Line of Code, Halstead's Software Science, Cyclomatic Complexity, Syntactic Constructs, Structure Metrics, An Example of Module Design, Metrics in Practice.

10. Test tools and Other Techniques.

References

1. Software Metrics-A Rigorous and practical Approach-Norman Fenton, Shari Lawrence Plunger-(Thomson-Learning).

2. Software Quality-Modechai Bem-Menachem/Garry S. Marliss-(Thomson-Learning).

3. Practical Software Measurement-Hughes-McGraw Hill.

4. CMMin Practice-Pankaj Jalota-CPerson Education.

410445 : Managerial Economics (Elective-I)

Teaching Scheme : Examination Scheme :

Lectures : 4 Hrs./Week Theory : 100 Marks

1. Definition, nature and scope of Managerial Economics

Managerial Economics and Micro-economics-Managerial Economics and Macro-economics-Applications of Economics in Managerial decision making.

2. Types of Business Organisations

Proprietary Firms, Partnership Firms, Joint Stock Companies, Public Sector Undertakings, Co-operative Societies, Non-profit Organisations, Business Organisations in New Millennium-Organisational Goals-Profit Maximisation, Sales Maximisation, Satisfying Theory-Enhancing value of the firm and its goals.

3. Demand Analysis

Determinants of Market Demand-Law of Demand-Elasticity of Demand-Measurement and its use-Demand Forecasting-Techniques of Demand Forecasting.

4. Production and Costs

Meaning of production Function-Law of variable proportions-Law of Supply and Elasticity of Supply-Costs and Cost Functions-Short Term Costs and then-use on decision making-determinants of costs-Break Even Analysis-Cost Forecasting.

5. Pricing and output determination

Pricing decisions under different market forms like perfect competition, monopoly, oligopoly-Pricing Methods-Pricing in Public Sector Undertakings and Co-operative Societies.

6. Cost benefit Analysis

Private Vs. Public Goods-Government investment-Overall resource allocation-Steps in cost benefit analysis-Justification for the use of cost benefit analysis.

7. Government and Business

Need for Government intervention in the market-Price Controls-Support prices and Administered Prices-Prevention and control of monopoly-Protection of consumer's interest-Economic Liberalisation-Process of disinvestments-Need and methods-Policy planning as a guide to overall business development. ,i.

References

1. Managerial Economics-D. Salvatore.
2. Managerial Economics-Mote, Paul and Gupta.

410445 : Enterprise Resource Planning (Elective-I)

Teaching Scheme : Lectures : 4 Hrs./Week

Examination Scheme : Theory : 100 Marks

Introduction

ERP-Overview, accommodating variety, integrated management information, integration, supply chain and resource management, integrated data model scope, Technology and benefits of ERP, ERP and modern enterprise.

2. Business Engineering and ERP

Overview, concept, significance and principles of business engineering, BRP, ERP and IT, Business Engineering with IT, ERP and Management concerns.

3. Business Modeling for ERP

Overview, Building of MIS, Business as a system, core processes in a manufacturing company, entities for data model in a manufacturing company, extended ERP.

4. ERP Implementation

Overview, role of consultants vendors and users, customization, precautions, post implementations, options, ERP Implementations methodology and guidelines for ERP implementation.

5. ERP and competitive advantage

Overview, understanding markets, order winners and qualifiers, Role of ERP in gaining competitive advantage.

6. The ERP Domain

Overview, MFC/PRO, IFS/Avlon as industrial and financial systems Baan IV, SAP, SAP R/3 applications.

7. Marketing of ERP

Overview, ERP Marketing Strategy Process, Relationship marketing, developing marketing strategies and planning programmes and actions ERP buying and selling process cycles.

8. Case Studies

Mercedes Bens, Keethin Industries, Bull Electronics, Angers Plant manufacturers, Twentieth Century companies, A meritech Essar steel, Jindal Iron and Steel Company Ltd. Godrej soaps and associate companies, TREDATA, comparison and conclusions.

References

Enterprise Resource planning, Concepts and Practice : by Vinod Kumar Garg, N. K. Venkita Krishanan (PHI).

410445 : Mobile Computing (Elective-I)

Teaching Scheme :

Examination Scheme :

Lectures : 4 Hrs./Week

Theory : 100 Marks

1. Introduction

Cell phone generations-(1G, 2G, 2.5G, 3G, 4G) timeline, Radio spectrum-radio and radiation, Bands, Interference, Analog Vs Digital, Spectrum regulation, Licensing methods.

2. Cellular Networks

Why cellular Networks ? History of 800 MHz spectrum allocation, a basic cellular system, Performance criterion, Operations of Cellular Networks, Concept of frequency reuse Channels, Co channel Interference and its reduction factor, types of non co channel Interference, Desired C/I from normal case on omni directional antenna systems handoff, Mechanism, Cell splitting.

3. Cell site antenna and mobile site antenna

Equivalent circuit for antenna, Antennas as cell site, Mobile antennas.

4. Handoffs and dropped calls

Value of implementing, Initialization of hand, off, Delaying a hand off, Forcing a hand off. Power different hand off, Mobile assisted hand off, Intersystem handoff, Dropped call rate formula.

5. Duplexing and Multiplexing

TDD, FDD, Rake receiver CDD, Spread spectrum, (direct and frequency hopping) Spread Aloha, Mac Protocols, IEEE 802.11 wireless standard.

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6. GSM Systems Overview

Architecture, Location tracking, and call setup. Security, Data Services N/W Signaling, GSM mobility management, Operations, Administration and maintenance.

7. GSM bearer Services

SMS architecture-Protocol Hierarchy, DTE-DCE interface, International roaming-international call set up, Reducing international call delivery cost. GSM on net, VoIP services for mobile networks, Mobile prepaid phone services.

8. WAP

Model and architecture, Gateway, Protocol stack, Wireless Application environment.

9. Telecommunication systems

GPRS, Wireless in local loop, DECT, EDGE, UMTS, Paging systems, CDPD, Blue tooth. *References*

1. Mobile Communication : Jachan Schiller, Adison-Wesley.
2. Wireless and Mobile Network Architecture : Yi-Bing Lin, Wiley.

410445 : CIS and Remote Sensing (Elective-I)

Teaching Scheme :

Lectures : 4 Hrs./Week

Examination Scheme :

Theory : 100 Marks

1. Map Language :

Map as a model, classification of maps, spatial referencing system, map projections, commonly used map projections, grid systems, computer in map production, digital database in a GIS, linkage of GIS to remote sensing.

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2. Remote sensing-Basic principles :

Electromagnetic remote sensing, Energy sources, atmospheric interactions with electromagnetic radiations, energy interactions with Earth's surface materials.

3. Microwave remote sensing :

The radar principle, factors affecting microwave measurements, Radar wavebands, SLAR systems, Sar, Interpreting sar images, Geometrical characteristics.

4. Remote sensing platform and sensors :

Satellite system parameters, sensor parameters, imaging sensor systems, Earth Resources Satellites, Meteorological Satellites, satellites carrying Microwave sensors, OCEANS AT-1 (IRS-4), IKONOS satellite series.

5. Visual image interpretation :

Types of pictorial data products, Image interpretation strategy, image interpretation process, overview of image interpretation equipments.

6. Digital image processing :

Basic character of digital images, preprocessing, registration, enhancement, spatial filtering, transformations, classification, image classification and GIS.

7. Fundamentals of GIS :

Roots of GIS, Overview of Information system, the four Ms, GIS definition and terminology, GIS queries, GIS architecture, Models of GIS, Framework for GIS, GIS categories, levels/scales of measurement.

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8. Spatial data modelling :

Stages of GIS data modelling, Graphic representation of spatial data, raster GIS models, vector GIS models.

9. GIS data management :

Data base management systems, GIS data file management, database models, storage of GIS data object based data models, temporal topology, organisational strategy of DBMS in GIS.

10. Data input and editing :

The data stream, data input models, data input methods, GPS for GIS data capture, data editing.

11. Data quality issues :

Components of data quality, accuracy, precision and resolution, consistency, completeness, sources of error in GIS, GIS output, modelling errors and error evaluation.

12. Data analysis and modelling :

Format conversion, Data medium conversion, spatial measurement methods, buffering techniques, overlay analysis, modelling surfaces, modelling networks.

13. Integration of remote sensing and GIS

14. Urban and Municipal Applications *References*

1. M. Anji Reddi, "Remote Sensing and Geographical Information Systems", BS Publications, Second Edition.
2. George B. Korte, "The GIS Book", Onword press (Thomson Learning), 5th edition.
3. Peter A. Burrough and McDonnell, "Principles of Geographical Information systems", Oxford University Press, 1998.

410446 : Computer Laboratory practice-I

Teaching Scheme : Examination Scheme :
Practical : 4 Hrs./Week Term Work : 50 Marks
Practical : 50 Marks Oral : 50 Marks

The student will design and implement three systems completely with synopsis, DFD, test procedures to cover Advanced database systems and Software Testing and Quality Assurance. Test reports to be generated using standard industrial testing tools. The staff in charge will frame the detail systems to be assigned to the students. The term work will be in form of journal with assignment using Software Engineering Principles. Practical examination will be based on the above. Oral examination will be based on term work.

410447 : Seminar and Technical Communication

Teaching Scheme : Examination Scheme : Practical : 2 Mrs. Term Work : 50 Marks

Each student will select a topic in the area of Information Technology and Computer Sciences preferably keeping track with the recent technological trends and development. The topic must be selected in consultation with the institute guide. Each student will make a seminar presentation in the term making use of audio/visual aids for a duration of 20-25 minutes and submit the seminar report in the form of a bound journal (1 copy) duly signed by the guide and Head of Department. Attendance for seminar for all students is compulsory.

The seminar will be assessed internally by a panel of staff members from the institute, during presentation.

410448 : Project Work

Teaching Scheme : Examination Scheme : Practical : 2 Hrs./Week (Term I) Term Work : 100 Marks Practical : 6 Hrs./Week (Term II) Oral : 50 Marks

The student will undertake one project over the academic year, which will involve the design of a system or subsystem in the area of Information Technology and Computer Science and Engineering.

The aim of project is to allow the student to study the feasibility of implementing project and planning project, studying existing systems, tools available and state of art software testing procedures and technology with use of case tools.

The project must involve the detail Software Design Specification, Data Structure Layout, File Design, Testing with complete documentation and user interface. With life cycle testing and as an executable package.

The project will be undertaken preferably by a group of at least 4 students who will jointly work and implement the project. The group will select a project with the approval of the guide (Staff-members assigned) and submit the name of the project with a synopsis of not more than 2 to 3 pages not later than the second week of August in the academic year. A preliminary report by the group must be submitted and certified at the end of Semester I. The preliminary report must minimally contain literature survey, project specification, SRS, plan of execution, preliminary design. This is compulsory for the grant of first term. The group will submit at the end of Semester II.

(a) The workable project.

(b) Project Report in the form of bound journal complete in all respect - 1 copy for the institute and 1 copy of each student in the group for certification.

The term work will be accessed by the examiners in consultation with the guide. Oral examinations will be based on the project work completed by the candidates. Preliminary report must also be presented during the oral examination.

The project report will contain the details

1. Problem definition and requirement specification, acceptance test procedure (ATP).
2. System definition-requirement Analysis.
3. System Design.
4. System implementation-code documentation-dataflow diagram/algorithm, protocols used.
5. Test results and procedure-test report as per ATP.
6. Platform choice use.
7. Conclusions.
8. Appendix tools used, References.

Documentation will use UML approach with presentation, Category, Use Case, Class Diagrams etc.

4110449 : System Operations and Maintenance

Teaching Scheme : Examination Scheme :
Lectures : 4 Hrs./Week Theory : 100 Marks

1. Operations, Business and Marketing support System :

Status, definitions, Markets of operations, business and market support, market drivers for support system documentation, organization structures if provider.

2. Management protocols :

Product and service their portfolio, telecommunication oriented management protocols, middleware solutions enterprise oriented management protocols, middleware solutions, enterprise oriented management protocols web for telecom provider, LDAP.

3. Customer Care and Billing Process :

Customer care, customer interface, sales process customer QOS management, Call rating, discounting Invoicing, IP billing, Economics of billing.

4. Inventory management process :

Inventory, service creation, Planning, Network planning, service order process, service configuration security management, Network operational management.

5. Support, documentation and management :

Management frame works, suite frame work product for support system, customer care, order processing monitoring applications for service level agreement.

6. Workforce management for service provider :

Building team, job profile and responsibilities, enabling new technologies for work force management, bench marking.

7. Service request and change :

Technology, trends, trends with support system.

8. Risk Management :

Risk identifications, risk analysis, risk control, tools.

9. Software Reuse and Re-Engineering :

Reuse process, domain engineering, building of reusable components, BPR, re engineering, reverse engineering, restructuring, economics of reengineering.

10. System and software maintenance components :

Kinds of software maintenance, designing software for maintainability, software maintenance techniques, software maintenance models.

Reference

OSS Essentials : Support systems solutions by Kernels Trepan, John Wiley.

410450 : Distributed Systems

Teaching Scheme : Examination Scheme : Lectures : 4 Hrs./Week Theory :
100 Marks

1. Introduction :

Introduction to distributed systems, Examples of distributed systems, Characteristics, goals, Hardware and software concepts, design issues, Design issues, Resource sharing and the web, challenges.

2. System models :

Introduction, Architectural Models. Fundamental Models, Client server model.

3. Networking and Internetworking :

Introduction, Types of Network, Network Principles, Internet Protocols. Network case Studies : Ethernet. Wireless LAN and ATM.

4. Interprocess communication :

Introduction, The APIs for the Internet Protocols, External Data Representation and Marshalling. Client-Server Communication, Group Communication, Case Study : Interprocess Communication in UNIX.

5. Distributed Objects and Remote Invocation : Introduction, Communication between Distributed Objects, Remote procedure Calling (RPC), Events and Notifications, Java RMI Case Study.

6. Operating System Support :

The Operating System layer. Protection, Processes and Threads, Communication and Invocation, Operating System Architecture.

7. Security :

Overview of Security Techniques, Cryptographic Algorithms, Authentication and Key distribution Digital, Signatures, Cryptographic Pragmatics, Case Studies : Needham-Schroeder, Kerberos, SSL and Millicent.

8. Distributed File Servers and systems :

Introduction, File Service Architecture. Sun Network File System The Andrew Fife System. Recent advances, Distributed file system design, Distributed file system implementation-NFS, Coda, DFS, trends in distributed file system.

9. Name service, Time and global states :

Name Services and the Domain Name System Directory and Discovery Services, case study of the Global Name Service, Case study of the X.SOO Directory Service, Clocks, Events and Process States, Synchronizing Physical Clocks. Logical Time and Logical Clocks, Global States, Distributed Debugging.

10. Coordination and Agreement :

Distributed Mutual Exclusion. Elections, Multicast Communication. Consensus and Related Problems.

11. Transactions and Concurrency Control and Distributed Transactions :

Transactions, Nested Transactions, Locks, Optimistic Concurrency Control, Timestamp Ordering, Comparison of Methods for Concurrency Control, Flat and Nested Distributed Transactions, Atomic Commit Protocols, Concurrency Control in Distributed Transactions, Distributed Deadlocks, Transaction, Recovery, Replication.

12. Case studies :

CORBA case study, RMI and services, Mach case study, Chorus and Ameoba.

References Books

1. George Coulouris, Queen mary and Westfield college, UK, "Distributed systems : concepts and design, 3/e", Addison-wesley.
2. A. S. Tanenbaum, "Modern Operating systems", Prentice Hall of India.

410451 : Information Retrieval

Teaching Scheme :

Lectures : 4 Hrs./Week

Examination Scheme :

Theory : 100 Marks

1. Introduction

Data Retrieval (DR) Information Retrieval (IR).

2. Automatic Text Analysis

How the text of a document is represented inside a computer.

3. Automatic Classification

Automatic classification methods in general and then takes a deeper look at the use of these methods in information retrieval.

4. File Structures

File structures from the point of view information retrieval.

5. Search Strategies

Search strategies when applied to document collections structured in different ways, use of feedback.

6. Probabilistic Retrieval

Formal model for enhancing retrieval effectiveness by using sample information about the frequency of occurrence and co-occurrence of index terms in the relevant and non-relevant documents.

7. Evaluation

Traditional view of the measurement of effectiveness, theory of evaluation.

8. The Future

Future of IR and areas of research.

9. Parallel and distributed IR

Algorithms and architectures.

10. User Interfaces and visualization

The main interface paradigms for query formation and visualization results.

11. Multimedia IR

Models and languages, including MULTOS and SQL3.

12. Libraries and Bibliographical Systems, digital libraries

Online systems and public access catalogs. Challenges for effective deployment of digital libraries.

References

1. Richardo Baeza-Yates, Berthier Ribiero-Neto, "Modern Information Retrieval", Addison-Wesley.
2. CJ van Rijsbergen "Information retrieval, A. book", Description : An online book by CJ Rijsbergen, University of Glasgow [www.dcs.gla.ac.uk/Keith/ Preface.html](http://www.dcs.gla.ac.uk/Keith/Preface.html).

410452 : Artificial Intelligence (Elective-II)

Teaching Scheme : Lectures : 4 Hrs./Week Practicals : 2 Hrs./Week

Examination Scheme : Theory : 100 Marks Term Work : 25 marks Oral : 50 Marks

1. Introduction to Artificial Intelligence

Definition, A.I. Applications, A.I. Representations, Properties of internal representations, Heuristic search techniques, Best file search, mean and ends analysis, A* and AO* Algorithms.

2. Game Playing

Minimize search procedure, Alpha-beta cutoffs, Waiting for Guiscence, Secondary search.

3. Knowledge representation using predicate logic Predicate Calculus, Predicate and arguments, ISA Hierarchy, Frame notation, Resolution, Natural Deduction.

4. Knowledge representation using non-monotonic logic

TMS (Truth Maintenance System), Statistical and probabilistic reasoning, Fuzzy-Logic, Structure knowledge representation, Semantic-net, Frames, Script, Conceptual Dependency.

5. Planning

Block world, strips, Implementation using goal stack, Non-linear planning using goal stacks, Hierarchical planning, List commitment strategy.

6. Perception

Action, Robot architecture, Vision, Texture and images, Representing and recognizing scenes, Walts algorithm, Constraints determination, trihedral and nontrihedral figures labelling.

7. Learning

By training neural networks, Introduction to neural networks and perception-qualitative analysis only, neural net architecture and applications.

8. Natural language processing and understanding and pragmatic, syntactic, semantic, analysis, finite, state m/c, RTN.ATN, understanding sentences.

9. Expert system

Utilization and functionality, Architecture of expert system, knowledge representation, Two case studies on expert systems.

References

1. Introduction to artificial intelligence : by Eugene, Charniak, Frew McDermott.
2. Artificial Intelligence : by Elaine Rich and Kerin Knight.
3. Artificial Neural Network : by Kishan Mehrotra, Sanjay Rawika, K. Mohan.

410452 : Object Oriented Components System (Elective-II)

Teaching Scheme : Lectures : 4 Hrs./Week Practicals : 2 Hrs./Week

Examination Scheme : Theory : 100 Marks Term Work : 25 marks Oral : 50 Marks

1. Client/Server Computing

Client/Server Concepts. Client/Server Architecture Models. Distributed Computing and Concurrent Computing. Summary.

2. Object Technology

A Typical OO System. Object-Oriented Concepts. Advantages of the Object Model. Summary.

3. Integrating Object Technology with Enterprise Systems

Objectifying Individual Modules. Objectifying the Conventional Architecture Model. Using an OO Language in an OO Architecture Model. Objectifying an Entire System. Summary.

4. Object-Oriented Clients

A Historical View of Clients. Fat and Slim Clients. Objects in Client Development. Summary.

5. Object-Oriented Services

Types and Characteristics of Servers. Transaction Servers. Database Servers. Native Servers. Pathways to OO Servers. Summary.

6. Object-Oriented Glue

The Plumbing. Different kinds of Glue. Local Glues. Distributed Glues. Summary.

7. Object Persistence and Sharing

Object persistence Concepts. Basic Tool Support. Transaction Models. Performance. Reasonable Expectations. Databases. Summary.

8. Objects Across the Internet

The Impact of the World Wide Web. An Architecture View of the Web. The Internet and OO Client/Server Computing. Summary.

9. End-to-End OO Enterprise Development

The Development Models. OO Enterprise Development Tools. Summary.

10. Performance

Throughput and Response Time. Optimization. Client Performance. Server Performance. Glue Performance. Data Performance. Load Balancing. Summary.

11. The Scaleable OO Enterprise System

Reliability and Fault Tolerance. System Management. Maintenance and Legacy System Integration. Summary.

12. Security

An Overview of Client/Server Security. Risk Assessment. Risk Prevention. Security in an OO C/S Environment. Summary.

13. Business Systems

Group Ware. Business System Engineering and Realization. Summary.

14. CORBA Architecture and Services

OMG and standards, CORBA's Objective and design criteria, CORBA Architecture : Stubs, Skeletons, static and dynamic invocation, Interface repository, Implementation repository, ORB Core, CORBA Library, CORBA Objects, CORBA Facilities, CORBA services Overview, BOA, POA. New features in CORBA 3.0 (concepts only on CORBA 3.0).

15. Introduction to COM (Concepts only)

COM History, OLE and COM, OLE Introduction, Concepts of Structured Storage, Embedded and linking, ActiveX Controls, VB and COM (Idispatch) etc.

16. Case Study

Design Patterns and Frameworks.

Books

1. Enterprise Computing With Objects : By Yen-Ping Shan, Ralph H. Earle, Marie A. Lenzi, (Addison-Wesley object Technology Series).
2. Object Models : Strategies, Patterns and Applications: By peter Coad, Mark Mayfield, (Yourdon Press Computing Series).

410452 : Real Time Systems (Elective-H)

Teaching Scheme : Lectures : 4 Hrs./Week Practicals : 2 Hrs./Week

Examination Scheme :

Theory : 100 Marks

Term Work : 25 marks

Oral : 50 Marks

1. Issues in real time computing, Structure of real time system. Task classes.

2. Characterizing real time systems and tasks

Performance measures for real time machines, estimating program run times.

3. Task assignment and scheduling

Classical uniprocessor scheduling algorithms, uniprocessor scheduling of IRIS tasks, task assignment, mode changes, fault tolerant scheduling.

4. Programming languages and tools

Desired languages characteristics, data typing, control structures, facilitating hierarchical decomposition, packages, run time errors handling, overloading and genetics, multitasking, low level programming, task scheduling, timing specification, some experimental languages, programming environments, run time support.

5. Real time databases

Basic definitions, real time vs general purpose databases, main memory data bases, transaction priorities, transaction aborts, concurrency control issues, disk scheduling algorithms, a two phase approach to improve predictability, maintaining serialization consistency, databases for hard real time systems.

6. Real time communication Network topologies, protocols.

7. Fault-tolerance techniques

fault types, fault detection, fault and error containment, Redundancy, Data diversity, Reversal checks, Malicious or Byzantine failures, Integrated failure handling.

8. Reliability evaluation techniques

Reliability models for hardware redundancy, software error models, taking time into account.

9. Clock synchronization

Clocks, nonfault tolerant synchronization algorithm, impact of faults, fault tolerant, Synchronization in hardware, synchronization in software.

10. Operating systems
Capabilities of real time O.S.

References

C. M. Krishna, Kang G. Shin, 'Real Time Systems', McGraw Hill International Edition, 1977,
Jane W. S. Liu, 'Real Time Systems', Peasson Education Asia, 2001.

410452 : Multimedia Application (Elective-II)

Teaching Scheme : Lectures : 4 Hrs./Week Practicals : 2 Hrs./Week

Examination Scheme :

Theory : 100 Marks

Term Work : 25 marks

Oral : 50 Marks

1. Multimedia operating systems

Operating System support for Continuous Media Applications, File systems and process Management, Middleware systems, services and architecture.

2. Multimedia networking

Multimedia communication systems, multimedia conferencing, Bandwidth Requirements, synchronisation, Traffic, latency issues, Standards, Protocols, H-231, H-243, H233, H-230, Internetworking.

3. Multimedia Database Management System (MDBMS)

Data Modelling issues, multimedia database architecture, multimedia integration, presentation and QOS, Indexing, Query Support, Information Retrieval, Distributed Multimedia Database Management.

4. Virtual Reality

Concept, augmented reality and virtual reality, VR block diagram, Devices, Reality Engine (loop), 3-D Sound, VRML.

5. Multimedia Interfaces

Visual Interfaces to multimedia databases, representation of information space, strategies, visual querying paradigm interaction techniques. Multimedia concept indication, issues, content indication, Granularity, content processing.

6. Programming Multimedia

Function calls API. Support from Windows, UNIX, LINUX, composition, synchronisation and synchronisation techniques.

7. Multimedia Messaging

References

1. William I. Grosky, Ramesh Jain and Rajiv Mehrotra : The Handbook of Multimedia Information Management, prentice Hall, PTR (97).
2. Ken Pimentel and Kelvin Teixeira, Virtual Reality, McGraw Hill.