

BE 7th sem CSE syllabus of RTM Nagpur University

77CS1: TCP / IP & Internet

Unit I:

Introduction and Overview, Comparison of OSI Model and TCP/IP model. Networking Technologies: LANS, WANS, Connecting Devices. Internetworking concept and Architectural model. Internet Backbones, NAP, ISP's, RFC's, Internet Standards.

Unit II:

Internet Addresses: IP address classes, subnet mask, CIDR, ARP, RARP, Internet Protocol, Routing IP Datagrams, ICMP and IGMP.

Unit III:

UDP, TCP, Sockets and socket Programming, Routing in Internet, Routing protocols- RIP, OSPF and BGP. Introduction to Multicasting and Multicast routing.

Unit IV:

Host Configuration: BOOTP, DHCP; Services: Domain Name System, FTP, TFTP and Electronic Mail: SMTP, MIME, IMAP, POP.

Unit V:

Network Management: SNMP, WWW: HTTP, Mobile IP. Multimedia : RTP, RTCP.

Unit VI:

Middlewares : RPC, RMI. Introduction to IPv6 and ICMPv6, Internet Security: IPsec, PGP, Firewalls, SSL.

Books:

- Internetworking and TCP/IP: Principles, Protocols and Architectures, Douglas Comer, Pearson Education.
- TCP/IP Protocol suite, Behrouz A. Forouzan, Third Edition, TMH.
- Computer Networking – A Top-Down Approach Featuring the Internet, James F. Kurose, Keith W. Ross, Pearson Education, Asia.

Approved

14/05/2018

- Computer Networks: A systems approach by Larry L. Peterson and Bruce S. Davie, 3rd Edition, Morgan Kaufmann Publishers

Reference Book:

- Stevens W. R. TCP/IP Illustrated, volume 1,2,3, Pearson education.

Book For Practical:

- "Hands-On Networking with Internet Technologies" by Douglas E. Comer, Pearson Education, Asia, 2002.
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77CS2: Language Processors

UNIT-I

Introduction to Compilers: Compilers and translators, Phases of compiler design, cross compiler, Bootstrapping, Design of Lexical analyzer, LEX.

UNIT-II

Syntax Analysis: Specification of syntax of programming languages using CFG, Top-down parser, design of LL (1) parser, bottom up parsing technique, LR parsing algorithm, Design of SLR, LALR, CLR parsers.

UNIT-III

Syntax directed translation: Study of syntax directed definitions & syntax directed translation schemes, implementation of SDTS, intermediate notations: postfix, syntax tree, TAC, translation of expression, controls structures, declarations, procedure calls, Array reference.

UNIT-IV

Storage allocation & Error Handling: Run time storage administration, stack allocation, symbol table management, Error detection and recovery: lexical, syntactic, semantic.

UNIT-V

Code optimization: Important code optimization techniques, loop optimization, control flow analysis, data flow analysis, Loop invariant computation, Induction variable removal, Elimination of Common sub expression.

UNIT-VI

Code generation – Problems in code generation, Simple code generator, Register allocation and assignment, Code generation from DAG, Peephole optimization.

Text Books:

- Compilers: Principles Techniques and Tools 1st edition by A. V. Aho, Sethi, Ullman, Pearson education.
- Principal of Compiler Design – Alfred V. Aho & Jeffery D. Ullman , Narosa Pub. House.

77CS3: Elective I :- Digital Signal Processing

UNIT""I

Basic elements of a Digital Signal Processing system, Classification of signals, Concept of frequency in Continuous-time and discrete-time signals, Sampling theorem, Quantization of continuous-amplitude signals, quantization of sinusoidal signals. Discrete-time signals, Discrete-time systems, Analysis of discrete-time LTI systems, Correlation of discrete-time signals.

UNIT""II

The Z-transform, Properties, Rational Z-transforms, The inverse Z-transform by Contour Integration, Power series expansion, Partial-fraction expansion, Decomposition of rational Z-transforms, One sided Z-transform, Properties, Solution of difference equations.

UNIT""III

Frequency analysis of Continuous-time signals, Frequency analysis of discrete-time signals, Fourier series for discrete-time periodic signals, Power density spectrum of periodic signals, Fourier transform of Discrete-time aperiodic signals, Energy density spectrum of aperiodic signals, Concept of bandwidth, Symmetry properties of the Fourier transform, Fourier transform theorems and properties.

UNIT””IV

The Discrete Fourier Transform: Its properties and applications, Frequency domain sampling: The DFT, Properties of the DFT, Linear filtering methods based on the DFT, Use of the DFT in linear filtering, Filtering of long data sequences, Frequency analysis of signals using the DFT.

UNIT””V

Introduction to FFT algorithms: Decimation in time-FFT algorithm, Decimation in frequency- FFT algorithm, Quantization effects in the computation of the DFT, Quantization errors in the direct computation of the DFT, Quantization errors in FFT algorithms, DCT.

UNIT””VI

Design of digital filters: Design of FIR filters based on windows, Design of IIR filters from analog filters, IIR filter design by approximation of derivatives, Impulse invariance, Bilinear transformation, Examples of digital filter designs based on the bilinear transformation.

Text Books:

- Digital Signal Processing: Alan V. Oppenheim, W. Schaffer, Pearson Education
- Digital Signal Processing: John G. Proakis and D. Manolakis & D. Sharma, Pearson Education

Reference Books:

- Digital Signal Processing, 2nd Edition by E. Proakis, Pearson Education
- Theory and application of signal processing””Rabiner & Gold (PHI)
- Digital filter design and analysis””Andreas Antoniou

77CS3: Elective I:- Computer Graphics

Unit 1:

Basic fundamentals of random scan, raster-scan devices and LCD displays. Video Basics, Interactive Devices. Line, Circle, Ellipse drawing techniques and Algorithms.

Unit 2:

Polygon filling methods: Scan Conversion Algorithms: Simple Ordered edge list, Edge Fill, Fence fill and Edge Flag Algorithm. ,Seed fill Algorithms: Simple and Scan Line Seed Fill Algorithm, Antialiasing and Halftoning techniques.

Unit 3:

2D Clipping algorithms for regular and irregular windows: Sutherland Cohen Outcode, Sutherland Cohen Subdivision, Mid-Point subdivision, Cyrus Beck and Sutherland Hodgman Polygon clipping Algorithm. Clipping about Concave regions. 2D Transformations, Normalized Device Coordinates and Viewing Transformations.

Unit 4:

3D System Basics and 3D Transformations, Parallel and Perspective projections, Hidden line/surface Removal Algorithms. Rendering- Shading, Ray tracing techniques and Color Systems.

Unit 5:

Curve generation – Interpolation Technique, B-spline and Bezier curves, Graphics Software Packages – Rules for designing Graphics Package, Segmentation and Display file Compilation.

Unit 6:

Graphics Systems- Display Processors, Device Independent Graphics Systems, User Interface Design. Graphics Standard – Basic principles of X-windows, X terminal.

Text Books:

- Computer Graphics, Hearn and Baker, Pearson Education
- Procedural Elements of Computer Graphics III Edition, Rogers, McGraw Hill.
- Principles of Interactive Computer Graphics, Newman and Sproull, McGraw Hill.

Reference Books:

- Computer Graphics : Principles and Practice in “C” by J. D. Foley Pearson Education

77CS3: Elective – I:- Real Time Operating Systems

UNIT – I:

Introduction : Car & driver example, Issues in real time systems, Structure of a Real time system. Hard versus soft real time systems: Jobs & processors, release times, deadlines, timing, constraints, Hard & Soft timing constraints, Hard real time systems , soft real time systems. A Reference model of Real-time systems : processors and resources, temporal parameters of real-time workload, periodic Task model, precedence constraints & data dependencies other types of dependencies, functional parameters, resource parameters of Jobs & parameters of resources, scheduling Hierarchy.

UNIT-II:

Effective release times and deadlines, Optimality and non optimality of EDF & LST, Challenges in validating timing constraints in priority-driven systems, off-line versus on-line scheduling. Clock-driven scheduling, Priority driven scheduling of periodic tasks.

UNIT-III:

Scheduling aperiodic & sporadic jobs in priority-driven systems : Deferrable servers, Sporadic servers, Constant utilization, total bandwidth and weighted fair-queuing servers, scheduling of sporadic jobs. Resources and resource access control: assumption on resources and their usage, effects of resource contention & resource access control, non preemptive critical sections, basic priority-inheritance protocol, basic priority-ceiling protocol, stack-based priority-ceiling protocol, use of priority-ceiling protocol in dynamic-priority systems, preemption-ceiling protocol, controlling accesses to multiple-unit resources.

UNIT-IV

Model of multiprocessor & distributed systems, Task assignment, Multiprocessor priority-ceiling protocol, Elements of scheduling algorithms for end-to end periodic tasks, Scheduability of fixed priority end-to-end periodic tasks, end-to-end tasks in heterogeneous systems.

Programming Languages and Tools : Desired language characteristics, Data typing, Control structures, Facilitating hierarchical decomposition , packages, Run time error handling, Overloading and generics, Multitasking, Lowlevel programming,

Task scheduling, Timing specifications, Programming environments, Run time support.

UNIT-V:

Real Time Databases : Introduction, Basic definitions, real time vs. general purpose databases, main memory databases, Transaction priorities, Transaction aborts, concurrency control issues, disk scheduling algorithms, maintaining serialization consistency, databases for hard real time systems.

Real Time Communication: Introduction, Network Topologies, Contention based protocol, token based protocol, Stop and go protocol, Polled bus protocol, Hierarchical round robin protocol, Deadline based protocols, Fault tolerant routing.

UNIT – VI :

Fault Tolerance Techniques : Causes of failures, Fault types, Fault detection, Fault and error containment, Redundancy, Data diversity, Reversal checks, Integrated failure handling.

TEXT-BOOK:

- Real-Time Systems : Jane W.S. Liu, Pearson Education.
- Real Time Systems : C.M.Krishna & Kang G. Shin [TMH]

77CS 3: Elective-I: Fundamentals of Multimedia

UNIT 1

Multimedia Authoring and Data Representations:

Introduction to Multimedia, Multimedia Authoring and Tools, Graphics and Image Data Representations.

UNIT 2

Color in Image and Video, Fundamental Concepts in Video, Basics of Digital Audio.

UNIT 3

Multimedia Data Compression: Lossless Compression Algorithms, Run-Length Coding, Variable-Length Coding (VLC), Huffman Coding, Adaptive Huffman Coding, Lossy Compression Algorithms, Quantization, Uniform Scalar Quantization, Nonuniform Scalar Quantization, Vector Quantization, Transform Coding, Discrete Cosine Transform (DCT), Image Compression Standards.

UNIT 4

Basic Video Compression Techniques, MPEG Video Coding I – MPEG-1 and 2, MPEG Video Coding II – MPEG-4, 7 and Beyond, MPEG Audio Compression.

UNIT 5

Multimedia Communication: Computer and Multimedia Networks, Multimedia Network Communications and Applications, Interactive TV (ITV) and Set-Top Box (STB), Broadcast Schemes for Video-on-Demand, Buffer Management, Further Exploration, Wireless Networks, Multimedia over Wireless Networks, Trends in Wireless Interactive Multimedia.

UNIT 6

Multimedia Retrieval: Content-Based Retrieval in Digital Libraries, Minimum three Case studies.

Text Book:

- Fundamentals of Multimedia 1st Edition by Mark S. Drew & Ze-Nian Li, Pearson Education

Reference Books:

- Multimedia Fundamentals, Volume 1: Media Coding and Content Processing, 2nd Edition by Ralf Steinmetz, Klara Nahrstedt, Pearson Education.
- Multimedia Making Work (TMH Pub.) by Tay Vaughan.
- Advanced Multimedia Programming (McGraw Hill Pub.) – Steve Rimmer
- Digital Image Processing – Gonzalez and Woods, Pearson Education

77CS4: Elective I:-Advanced Computer Architecture

Unit 1

Models of parallel computer, multiprocessors and multicomputers, multivector and SIMP computers, PRAM and VLSI models conditions of parallelism, data and resource dependencies, grain size and latency, grain packing and scheduling, program flow mechanisms, system interconnect architectures.

Unit 2

Principles of scalable performance, performance metrics and measures, speedup performance laws, advanced processor technology, superscaler and vector processors, verified memory, cache memory organizations, shared memory organizations.

Unit 3

Pipeline and superscalar techniques, linear pipeline processors, reservation and latency analysis, collision free scheduling, pipeline schedule optimization, instruction pipeline design, arithmetic pipeline design, superscaler and superpipeline design.

Unit 4

Multiprocessors and multicomputers, multiprocessor system interconnects, cache coherence and synchronization mechanisms, message passing schemes.

Unit 5

Multivector and SIMD computers vector processing principles, compound vector processing, SIMD computer organizations scalable multithread and dataflow architectures.

Unit 6:

Introduction to Parallel Programming Models , Parallel Language Constructs , Elementary theory about dependence analysis, Code optimizations and Scheduling.

BOOKS:

- Kai Hiwang, "Advanced Computer Architecture" McGraw Hill. Richard Y. Kausi, "Advanced Computer Architecture" Prentice Hall of India.
- Advanced Computer Architecture by D. Sima, Fountain & Kaesuk, 1st Edition, Pearson Education.

77CS4: Elective-II:- Artificial Intelligence

UNIT I

Introduction: Scope of AI, AI problems, AI technique, Production system Characteristics, Basics of problem solving: problem representation paradigms Defining problem as a state space representation.

UNIT II

Search Techniques: Problem size, complexity, approximation and search; depth, breadth and best search; Heuristic Based Search: Heuristic search, Hill climbing, best-first search, branch and bound

UNIT III

Knowledge representation: First order logic, Unification, Resolution in Predicate Logic. Structured Knowledge Representation: Semantic Nets, Frames, and Scripts.

Learning: Block architecture of learning system, Types of learning, performance Measures

UNIT IV

Uncertainty Treatment: formal and empirical approaches including Bayesian theory, belief functions, certainty factors and fuzzy sets.

UNIT V

Expert Systems: Fundamental blocks, Knowledge Engineering, Knowledge Acquisition, Need and justification for expert systems, Detailed Discussion from Example Domains – (From) Industry, Language, Medicine, Verification, Vision, Knowledge Based Systems; concept of shells.

UNIT VI

Language Machine: Introduction to Natural Language understanding. Level of knowledge in NLU, Approaches to NLU, Problems in NLU, Basic parsing techniques.

TEXT BOOKS:

- E.Rich and Knight, Artificial Intelligence, Tata McGraw Hill, 1992.
- Introduction to Artificial Intelligence by E.Charniack and D. Medermott, Pearson Education.
- Artificial Intelligence structures and strategies for complex problem solving, 4th edition, Pearson education.
- Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, 2nd edition, Pearson Education.
- Introduction to Artificial Intelligence & Expert system (PHI Pub.) – D.W.Patterson.

REFERENCE BOOKS:

- N. J. Nilsson, "Principles of AI" , Narosa Publ. House, 1990.
- P. H. Winston, "Artificial Intelligence", Pearson Education, 3rd Edition, 2002.
- M. N. Hoda, "Foundation Course in Artificial Intelligence" , Vikas Pub., 2004.

77CS4: Elective-II:- Enterprise Resource Planning

COURSE MODULES:

Show entries
Search:

MODULE	LEARNING OBJECTIVE	INDICATIVE HOURS
	Total	40
ERP – Curtain Raiser	An overview, Accommodating variety, Integrated Management Information, Seamless Integration, Supply Chain Management, Resource Management, Integrated data model, Scope, Technology, Benefits of ERP, Evolution, ERP revised, ERP & Modern Enterprise, problems.	6
ERP & Related Technologies	An overview, Business Process Reengineering(BPR), Management Information System(MIS), Decision Support Systems(DSS), Executive Information Systems (EIS), Data Warehousing, Data Mining, OLAP.	6
Business Engineering & ERP	An overview, What is Business Engineering (BE)? Significance of BE, Principles of BE, BPR, ERP & IT, BE with IT, ERP and Management concerns, problems.	6

MODULE**LEARNING OBJECTIVE****INDICATIVE HOURS**

	Business Modeling: An overview, Building the Business Model, problems.	
ERP Implementation and the Competitive Advantage	An overview, Role of consultants, vendors & users, customization, precautions, ERP:Post-implementation options, ERP implementation Lifecycle, Guidelines for ERP implementation, problems. ERP & competitive strategy, problems.	8
The ERP Market & Making of ERP	An overview, SAP AG, SAP R/3 Applications, Baan, Oracle, PeopleSoft, JD Edwards, Examples of Indian ERP packages, problems. An overview, Market Dynamics & Competitive Strategy, problems. Future Directions in ERP.	8
ERP Case Studies	Various ERP Case studies.	6

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PreviousNext

Textbook:

- Enterprise Resource Planning – Concepts & Practice (Second Edition) By V. K. Garg & N.K. Venkitakishnan (PHI)
- Enterprise Resource Planning- Alexis Leon (TMH)

Reference book:

- ERP Demystified – By Alexis Leon (TMH)

77CS4: Elective-II:- Operating System Design**UNIT-I**

General overview of the Unix System, Kernel: Architecture of Unix OS, Kernel data structures, system administration. The buffer cache; advantages & disadvantages.

UNIT-II

Internal representation of files, inodes, structures, directories, super block, allocation of disk blocks, System Calls for the file system in Unix.

UNIT-III

Processes: States & transitions, Layout of system memory. Context Sleep. Process Control, Process Scheduling and Time.

UNIT-IV

Memory management policies in Unix. Swapping, demand paging hybrid system. I/O subsystem : drivers & streams

UNIT-V

Interprocess Communication: Process tracing, System V IPC Network communications, Sockets.

UNIT-VI

Multiprocessor Systems: Problems & solutions with master slave processors. Distributed Unix System.

Text Books :

- M. J. Bach : The Design of Unix Operating System, Pearson Education
- A. S. Tanenbaum : Operating System Design & Implementation, 2nd edition, Pearson education
- D. Comer : Operating System Design (Prentice Hall)

BE 8th sem CSE syllabus of RTM Nagpur University

88CS1: Distributed And Object Oriented Database Management

UNIT 1

Distributed Databases:

Distributed Databases: What and Why? ; the Distributed Database Management Systems.

The Distributed Transparency -- the Reference Architecture for Distributed Databases, Data Fragmentation, Distributed Transparency for Read-Only and Applications, Distributed Database Access Primitives, Integrity Constraints in Distributed Databases.

UNIT 2:

Distributed Database Design:

Framework for Distributed Database Design, the Database Fragmentation Design, Allocation of Fragments. Translation of Global Queries to Fragment Queries The Equivalence Transformation for Queries, Transforming Global Queries into Fragment Queries, Distributed Grouping and Aggregate Function Evaluation, Parametric Queries.

UNIT 3:

Optimization Of Access Strategies:

Framework for Query Optimization, Join Queries -- use of Semi-Join Programs for Join Queries, the SDD-1 Algorithm, the AHY approach, Use of Join as Query Processing Tactic; General Queries -- Effect of Commuting Joins and Unions, Methods for the Optimization of General Queries. The Management of Distributed Transactions

The Framework for Transaction Management; Atomicity of Distributed Transactions; Concurrency Control for Distributed Transactions; Architectural Aspects of Distributed Transactions.

UNIT 4:

Concurrency Control Foundations of Distributed Concurrency Control; Distributed Deadlocks; Concurrency Control based on Timestamps; Optimistic Methods for Concurrency Control. Distributed Database Administration Catalog Management in Distributed Databases, Authorization and Protection. The System R * The Architecture of System R*; Compilation, Execution and Recompilation of Queries; Protocols for Data Definition and Authorization in R*, Transaction and Terminal Management.

UNIT 5:

The Object Oriented Databases Object Oriented Databases -- What and Why? ; the

Approved

(H. Jankar)
14/05/2018

Object Oriented Database Management Systems; Evolution of Object Oriented Concepts; Characteristics of an Object Oriented Data Model; Object Schema; Inter-object Relationships; Late and Early Binding; Similarities and differences between Object Oriented Database Models and other Data models.

Object Oriented DBMS Architectural Approaches The Extended Relational Model Approach; Semantic Database Approach; Object Oriented Programming Language Extension Approach; DBMS Generator Approach; the Object Definition Language and the Object Query Language.

UNIT 6:

The Object Oriented DBMS Architectures; Performance Issues in Object Oriented DBMS; Application Selection for Object Oriented DBMS; the Database Design for an Object Relational DBMS. The Structured Typed and ADTs; Extending the ER Model; Storage and Access Methods; Query Processing; Query Optimization; Design and Architecture of POSTGRES; Distributed Computing in CORBA and EJB.

(Practical Implementation in Oracle 8i or Oracle 9i covering both Distributed and Object Oriented Databases Features)

Textbooks:

- Distributed Databases – Principles and Systems; Stefano Ceri, Giuseppe Pelagatti; Tata McGraw Hill; 1985.
- Object Oriented Database Systems – Approaches and Architectures; C. S. R. Prabhu; Prentice Hall of India.
- Database Systems – Design, Implementation and Management; Peter Rob, Carlos Coronel; Course Technology; 2000.

Reference:

- Principles of Distributed database systems by M.T. Ozsu/S. Sridhar, Pearson education
 - Database Management Systems; Raghu RamaKrishnan, Johnas Gehrke; Tata McGrawHill; 2000.
 - Fundamentals of Database Systems – Third Edition; Elmasri, Navathe; Addison-Wesley; 2002.
 - Databases- Principles, Programming and Performance; Second Edition; Patrick O'Neil,
 - Elizabeth O'Neil; Morgan Kaufmann; 2002.
 - Oracle 8i – DBA Handbook; Loney, Koch; Tata McGraw Hill. 5. Oracle 9i – The Complete Reference; Tata McGraw Hill- Oracle Press; 2004.
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88CS2: Computer System Security

UNIT 1

Introduction to the concepts of security : need, principles, Types of Attacks , Services , Mechanisms, A model for network security , Encryption model Classical encryption techniques: substitution techniques, Transposition techniques, Rotor Machines, Steganography.

Block ciphers : simplified DES , Block cipher principles , Data encryption standard , Strength of DES , Block cipher design principles , Block cipher mode of operation, Characteristics of advanced symmetric block ciphers.

UNIT 2

Confidentiality using symmetric Encryption : Placement of encryption function , Traffic confidentiality , Key distribution , Random number generation , Public key cryptography : Principles , RSA algorithm , Key management , Diffie-Hellman key exchange

UNIT 3

Message authentication & Hash functions : Authentication requirements , Functions , Codes , Hash functions , Security of hash function & MAC's. Hash algorithms : MD5 message digest algorithm , Secure hash algorithm(SHA-I) , Digital signatures and authentication protocols : Digital signatures , Authentication protocols , Digital signature standard.

UNIT 4

Networks security practice : Authentication applications – Kerberos, X.509 directory authentication service E-mail security : Pretty good privacy , S/MIME

UNIT 5

IP security : Overview , 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, SHTTP.

UNIT 6

Security systems : Intruders , Intrusion detection, viruses and related threats , Firewalls design principles , Trusted systems, Virtual private networks.

Text Books:

- Cryptography & Networks Security Principles & Practice(Pearson Education) – William Stallings.
- Networks Security Essentials Applications & Standards(Pearson Education) – William Stallings.

- Cryptography and Network Security by Atul Kahate, Tata Mc. Graw Hill

Reference Books:

- Introduction to Computer Security by Matt Bishop Pearson education
- Security in computing by Pfleeger & Pfleeger Pearson education

88CS3: Elective-III:- Natural Language Processing

Unit- 1

Introduction and requirement of NLP, Words and their distribution, PERL Tutorial, Corpus Processing.

Unit – 2

Language modeling and Smoothing, Part of speech tagging, Word sense disambiguation. Basic Search algorithms, Blind Graph Search algorithm, Search Space with FSM and CFG, Search space for Bi-grams and Uni-grams, Viterbi Beam Search.

Unit – 3

Classification and retrieval of information, Syntax parsing.

Unit – 4

Clustering Techniques, Machine Translation and Sentence alignment, Document Structure detection, Text normalization: Domain specific tags, Number formats.

Unit – 5

Methodologies of discourse analysis, Context Sensitive Speech conversion, Text Summarization techniques.

Unit – 6

Dialog and Question-Answering, Information Retrieval Vector Space Model – Latent semantic indexing, etc. Information Extraction

Text Books:

- “Foundations of Statistical Natural Language Processing” by Manning & Schütze
- Natural Language understanding by James Allen, Pearson Education.
- “Speech and Language Processing” by Jurafsky & Martin

88CS3: Elective-III: Mobile Computing

UNIT-I

Introduction to wireless communication, wireless transmission, frequencies for radio transmission, signal propagation, multiplexing, modulation, spread spectrum, introduction to cellular system.

UNIT-II

Medium access control : Motivation for a specialized MAC, SDMA, FDMA, TDMA, CDMA, GSM : System architecture, protocols, localization and calling, handover.

UNIT-III

Satellite systems , Wireless LAN : IEEE 802.11

UNIT-IV

Wireless LAN : HIPERLAN, Bluetooth

UNIT-V

Mobile Network Layer : Mobile IP, dynamic host, configuration protocol, adhoc networks,. Mobile transport layer : Traditional TCP, Indirect TCP , Snoopy TCP, mobile TCP, Transaction oriented TCP.

UNIT-VI

Security Issues in Mobile Computing

TEXT BOOKS:

- Mobile Communication 2nd edition by Jochen Schiller, Pearson education
- Mobile Computing by Asoke Talukder, Roopa Yavagal (Tata McGraw Hill)

88CS3: Elective-III:- Soft Computing

UNIT-I

Learning and Soft Computing: Examples of Applications in Diverse Fields, Basic Tools of Soft Computing, Basic Mathematics of Soft Computing, Learning and Statistical Approaches to Regression and Classification.

UNIT-II

Single-Layer networks: The Perceptron, Adaline and the Least Mean Square Algorithm. Multilayer Perceptrons: The Error Backpropagation Algorithm, The

Generalized Delta Rule, Heuristics or Practical Aspects of the Error Backpropagation Algorithm

UNIT-III

Radial Basis Function Networks: Ill Posed Problems and the Regularization Technique, Stabilizers and Basis Functions, Generalized Radial Basis Function Networks, Moving Centers Learning, Regularization with Nonradial Basis Functions, Orthogonal Least Squares, Optimal Subset Selection by Linear Programming.

UNIT-IV

Fuzzy Logic Systems: Basics of Fuzzy Logic Theory, Crisp and Fuzzy Sets, Basic Set Operations, Fuzzy Relations, Composition of Fuzzy Relations, Fuzzy Inference, Zadeh's Compositional Rule of Inference, Defuzzification, Mathematical Similarities between Neural Networks and Fuzzy Logic Models, Fuzzy Additive Models.

UNIT-V

Evolutionary Algorithms: Difficulties with Classical Optimization Algorithms, Genetic Algorithms, Evolution Strategies, Evolutionary Programming, Genetic Programming, Multi-Modal Function Optimization, Crowding Model, Sharing Function Model.

UNIT-VI

Non-Elitist Multi-Objective Evolutionary Algorithms: Motivation for Finding Multiple Pareto-Optimal Solutions, Early Suggestions, Example Problems, Vector Evaluated Genetic Algorithm, Vector-Optimized Evolution Strategy, Weight-Based Genetic Algorithm, Random Weighted Genetic Algorithm, Multiple Objective Genetic Algorithm, non-Dominated Sorting Genetic Algorithm, Niche-Pareto Genetic Algorithm, Predator-Prey Evolution Strategy, Other Methods. Suggestions for Assignments: Implementation of algorithms in "C/C++/MATLAB".

Text Book:

- Learning and Soft Computing by Vojislav Kecman, Pearson education.
- Multi-Objective Optimization using Evolutionary Algorithms by Kalyanmoy Deb, WSE Willey

Reference Books:

- Artificial Neural Networks by Robert J. Schalkoff (McGraw Hill)

UNIT-I

Motivation and goals, broad overview and advantages of distributed systems main characteristics : absence of global clock and state and possibility of large network delays. Issues in distributed systems such as transparency, scalability, security, resource management etc. theoretical foundation – Lamport's clocks Chandy-Lamport Global State recording algorithm – termination detection.

UNIT-II

Distributed mutual exclusion – Lamport, Ricart – Agrawal non-token based algorithm – token based algorithms – comparative performance analysis.

UNIT-III

Distributed deadlock detection issues – central and distributed detection algorithm – agreement protocols – model of processor failures – Byzantine agreement and other problems – solutions and applications.

UNIT-IV

Distributed file systems – design issues – case studies with emphasis on NFS- distributed shared memory – coherence and coherence protocols – design issues and case studies.

UNIT-V

Distributed scheduling – issues, load distributing algorithms – load sharing policies and case studies – task migration and issues.

UNIT-VI

Recovery: introduction and basic concepts – backward and forward error recovery, checkpointing : synchronous and asynchronous – atomic actions and commit protocols – voting protocols – reliable communication – cryptography : private and public – implementation issues, RSA algorithm- authentication in distributed systems – Kerberos case study.

BOOKS:

- Advanced concepts in Operating Systems – Singhal and Shivratri; McGraw Hill
- Distributed Systems – George Colouris, Pearson Education.

Reference books:

- Modern Operating Systems – Tanenbaum, Pearson Education
- Distributed systems: Principles and Paradigms, A. S. Tanenbaum, Paerson Education.

88CS4 : ELECTIVE –IV: Data Warehousing and Mining

UNIT – I

The Compelling Need for data warehousing: Escalating Need for strategic information, failures of Past decision -support systems, operational versus decision-support systems, data warehousing – the only viable solution, data warehouse defined

UNIT-II

Data warehouse – The building Blocks: Defining Features, data warehouses and data marts, overview of the components, metadata in the data warehouse Defining the business requirements: Dimensional analysis, information packages – a new concept, requirements gathering methods, requirements definition: scope and content

UNIT – III

Principles of dimensional modeling: Objectives, From Requirements to data design, the STAR schema, STAR Schema Keys, Advantages of the STAR Schema Dimensional Modeling: Updates to the Dimension tables, miscellaneous dimensions, the snowflake schema, aggregate fact tables, families of STARS

UNIT – IV

OLAP in the Data Warehouse:

Demand for Online analytical processing, need for multidimensional analysis, fast access and powerful calculations, limitations of other analysis methods, OLAP is the answer, OLAP definitions and rules

UNIT-V

OLAP characteristics, major features and functions, general features, dimensional analysis, what are hypercubes? Drill-down and roll-up, slice-and-dice or rotation, OLAP models, overview of variations, the MOLAP model, the ROLAP model, ROLAP versus MOLAP, OLAP implementation considerations, Introduction to OLTP.

UNIT – VI

Data Mining Basics: What is Data Mining, Data Mining Defined, The knowledge discovery process, OLAP versus data mining, data mining and the data warehouse, Major Data Mining Techniques, Cluster detection, decision trees, memory-based reasoning, link analysis, neural networks, genetic algorithms, moving into data mining, Data Mining Applications, Benefits of data mining, applications in retail industry, applications in telecommunications industry, applications in banking and finance.

TEXT BOOKS:

- Data Mining and Data Warehousing and OLAP –Alex Berson and Smith (McGraw Gill Pub)

REFERENCES BOOKS:

- W. H. Inmon, "Building the operational data store" , 2nd Ed., John Wiley, 1999.
- Kamber and Han, "Data Mining Concepts and Techniques" , Haricourt India P. Ltd. 2001 3.Paul Raj Poonia, "Fundamentals of Dat Warehousing" , John Wiley & Sons, 2004.
- Sam Anthony, "Data Warehousing in the real world: A practical guide for building decision support systems" , John Wiley, 2004

88CS4: ELECTIVE-IV :- Grid Computing

UNIT – I

Overview. Focuses on grid computing as emerging new computing paradigm for solving complex collaborative problems that require massive resources and infinite CPU cycle. The topics included: Definition of Grid; Basic Building Blocks; Issues in Management of Grid Models; Evolution of Grid Models.

UNIT – II

Architecture. Deals with grid architecture providing an anatomical look into fundamental system components and their functionalities as well as interactions. Topics: Requirements concerning abstractions, behaviors, resources, connectivity and protocols; Open grid service architectures.

UNIT – III

Environment. Talks about grid computing environments. Topics : Overview of GCE; Programming models; Middleware for building grid computing environments; Language support (MPI-G, MPI-G2, etc) for grid computing; Meta models for grid programming; Security

UNIT – IV

Applications Delas with case studies, how the global computing infrastructure has become a reality for collaborative complex data intensive computing aid for federated database services, web services, bioinformatics. It will also include among others some selection of topics from Seti project, Sun grid engine Sky server and some national grid projects.

UNIT – V

Monitoring and evaluation It will include following: Monitoring; Scheduling; Performance tuning; Debugging and performance diagnostic issues;

UNIT – VI

Computational geometry, geometric preliminaries, models of computation

Text Books:

- Grid Computing: A research monograph: D. Janakiram, Tata McGrawhill Publication.
- The Grid: Blueprint for a New Computing Infrastructure (2nd edition) by Ian Foster (Editor), Carl Kesselman (Editor) Publisher: Morgan Kaufmann; 2nd edition (November 2003) ISBN: 1-558-60933-4.
- Grid Computing: Making the Global Infrastructure a Reality by Francine Berman (Editor), Geoffrey Fox (Editor), Tony Hey (Editor) Publisher: John Wiley & Sons; (April 8, 2003) ISBN: 0-470-85319-0.
- Grid Resource Management: State of the Art and Future Trends by Jarek Nabrzyski (Editor), Jennifer M. Schopf (Editor), Jon Weglarz (Editor) Publisher: Kluwer Academic Publishers; (September 2003) ISBN: 1-402-07575-8.

88CS4: Elective-IV:- Digital Image Processing

UNIT-I

Introduction: Introduction, Fundamental steps in Image Processing, Elements of DIP systems, Element of visual perception.

Fundamentals of Image Processing: A Simple Image Model, Sampling and Quantization, Some Basic Relationships between Pixels, Image Geometry in 2D.

UNIT-II

Image Enhancement in the Spatial Domain: Introduction to Spatial and Frequency Methods, Basic Gray Level Transformations, Histogram Equalization, Histogram Processing, Local Enhancement, Image Subtraction, Image Averaging, Basics of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters.

UNIT-III

Transforms:- Introduction to Fourier Transformation, Discrete Fourier Transformation, Fast Fourier Transformation, Fourier Properties, 2D FT, Inverse Fourier Transform.

UNIT-IV

Image Enhancement in the Frequency Domain: Filtering in the Frequency Domain, Correspondence between Filtering in Spatial and Frequency Domain, Smoothing Frequency Domain Filters, Sharpening Frequency Domain Filters, Homomorphic Filtering, Implementation. Introduction to Color Image Processing: RGB and HIS color Models.

UNIT-V

Image Segmentation: Point Detection, Line Detection, Edge Detection, Gradient Operator, Edge Linking and Boundary Detection, Thresholding, Region-oriented Segmentation.

UNIT-VI

Representation: Chain Codes, Polygonal Approximations, Signatures, Boundary Segments, Skeleton of a Region. Description: Boundary Descriptors, Shape Numbers, Fourier Descriptors, Regional Descriptors, Simple Descriptors, Topological Descriptors.

Suggestions for Assignments: Implementation of Image Processing algorithms in “C/C++/MATLAB”.

Text Book:

- Rafel C. Gonzalez and Richard E. Woods, “Digital Image Processing “, 2nd Edition, Pearson education

Reference Books:

- K. Jain,” Fundamentals of Digital Image Processing” , Pearson education.
- W. K. Pratt,” Digital Image Processing” ,3rd Edition, John Wiley and Sons, New York.

88CS4: ELECTIVE-IV:- Embedded Systems

UNIT I

AN INTRODUCTION TO EMBEDDED SYSTEMS

An Embedded system processor in the system. other hardware units, software embedded into a system. exemplary embedded systems, embedded system – on-chip (SOC) and in VLSI circuit. Processor and memory organization – Structural Units in a Processor. Processor selection for an embedded system, memory devices. memory selection for an embedded systems, allocation of memory to program cache and memory management links segments and blocks and memory map of a system, DMA. Interfacing processors, memories and Input Output Devices.

UNIT II

DEVICES AND BUSES FOR DEVICE NETWORKS

1/0 devices timer and colming devices. serial communication using the “12 C’ CAN. profibus foundation field bus. and advanced I/O buses between the network multiple devices. host systems or computer parallel communication between the networked 1/0 multiple devices using the ISA. PCL PCI-X and advanced buses.

UNIT III

DEVICE DRIVERS AND INTERRUPTS SERVICING MECHANISM Device drivers, parallel port and serial port device drivers in a system, device drivers for internal programmable timing devices, interrupt servicing mechanism.

UNIT IV

PROGRAMMING CONCEPTS AND EMBEDDED PROGRAMMING IN C, C++, VC++, AND JAVA

Interprocess communication and synchronization of processes, task and threads. multiple processes in an application. problem of sharing data by multiple tasks and routines, interprocess communication.

UNIT V

HARDWARE – software co-design in an embedded system, embedded system project management. embedded system design and co- design issues in system development process, design cycle in the development phase for an embedded system, use of target systems, use of software tools for development of an embedded system, use of scopes and logic analysis for system. hardware tests. Issues in embedded system design.

Text Book:

- Embedded systems: Architecture, programming and design by Rajkamal, TMH

Reference Books:

- Embedded system design by Arnold S Burger. CMP
- An embedded software primer by David Simon. PEA

BRANCH COMPUTER SCIENCE & ENGINEERING

ABBREVIATIONS

L: Theory Lectures	S: Semester	A: Paper Duration in Hrs.	F: MXM Ext
T: Tutorial	CS: Computer Science	B: MXM Theory	G: MXM -IA
P: Practical	MXM: Maximum Marks	C: MXM - IA	H: Total
IA: Internal Assessment	MNM: Minimum Marks	D: Total	I: MNM Pass Marks
		E: MNM Pass Marks	

SR NO	SUBJECT CODE	SUBJECT	TEACHING SCHEME				EXAMINATION SCHEME								
			L	T	P	Total Hrs/Week	THEORY			PRACTICAL					
1	77CS-1	TCP/IP & Internet	4	1	2	7	3	80	20	100	40	25	25	50	25
2	77CS-2	Language Processors	4	1	2	7	3	80	20	100	40	25	25	50	25
3	77CS-3	Elective-I	4	1	0	5	3	80	20	100	40	-	-	-	-
4	77CS-4	Elective-II	4	1	0	5	3	80	20	100	40	-	-	-	-
5	77CS-5	Project Seminar	0	0	3	3	-	-	-	-	-	-	50	50	25
TOTAL :			16	4	7	27				400				150	

Credits : 21.5

ELECTIVE: I

1. Digital Signal Processing
2. Computer Graphics
3. Real Time Operating System
4. Fundamentals of Multimedia

ELECTIVE: IV

1. Advanced Computer Architecture
2. Artificial Intelligence
3. Enterprise Resource Planning
4. Operating System Design

Approved

[Signature]

18

FOUR YEAR BACHELOR OF ENGINEERING (B.E.) DEGREE COURSE

Computer Science Engg

SEMESTER : EIGHTH

S/N Set 1

BRANCH COMPUTER SCIENCE & ENGINEERING**ABBREVIATIONS**

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SR NO	SUBJECT CODE	SUBJECT	TEACHING SCHEME				EXAMINATION SCHEME								
			L	T	P	Total Hrs/Week	THEORY			PRACTICAL					
1	88CS-1	Distributed & Object Oriented Database Management	4	1	2	7	3	80	20	100	40	25	25	50	25
2	88CS-2	Computer System Security	4	1	2	7	3	80	20	100	40	25	25	50	25
3	88CS-3	Elective - III	4	1	0	5	3	80	20	100	40	-	-	-	-
4	88CS-4	Elective - IV	4	1	0	5	3	80	20	100	40	-	-	-	-
5	88CS-5	Project	-	-	6	6	-	-	-	-	-	75	75	150	75
TOTAL :			16	4	10	30	400			400			250		
CREDITS: 16+7=23						GRAND TOTAL: 650									

ELECTIVE: III

1. Natural Language Processing
2. Mobile Computing
3. Soft Computing
4. Topics in Distributed System

ELECTIVE: IV

1. Data Warehousing and Mining
2. Grid Computing
3. Digital Image Processing
4. Topics in Distributed Embedded Sys.

Approved

15/11/2019