

34 COMPUTER SCIENCE AND ENGINEERING

MTH211 MATHEMATICS 3

Numerical Methods: Solution of algebraic and transcendental equations, Solution of linear Simultaneous Equations, Finite Differences, Interpolation and Extrapolation, Inverse Interpolation, Numerical Differentiation and Integration, Numerical solution of Ordinary & Partial Differential Equations.

Statistics: Curve fitting, Correlation and Regression Analysis Probability Distribution, Sampling and Testing of Hypothesis.

Reference

- | | | |
|----|--|-------------------|
| 1. | Numerical Analysis | Hildebrand |
| 2. | Numerical Analysis | Scarborough, |
| 3. | Numerical Methods | E .Balaguruswamy, |
| 4. | Numerical Methods for scientific and Engineering | M.K.Jain, |

or

CSE211 DATA STRUCTURE

Introduction to Data Structures, Algorithm Evaluation, Arrays, Multi-dimensional, Sparse Matrices, Structure, Pointers.Stacks: applications of Stacks, Prefix, Postfix and Infix notations and conversion, Recursion, Tail Recursion, Towers of Hanoi.Queues: Types of Queue and its application.Linked lists: Types of Linked list, implementation of Stack and Queue using Linked list, Josephus Problem, Polynomial representation and Arithmetic.Trees: binary tree, n-ary Tree, Tree Traversal, Huffman Coding, Binary Search Tree, AVL Tree.Graphs: Representation, Traversing, Shortest path, Minimum Spanning Tree. Searching: Sequential Search, Binary Search, Hashing, Other search techniques.Sorting: External and Internal Sort, Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort and Heap Sort, Radix Sort, Bucket Sort.

References:

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| 1.Data Structure Using C | Tanenbaum |
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CSE212 DISCRETE STRUCTURES

Set Theory, Principle of inclusion and exclusion, Logic, Mathematical Induction, Discrete Probability, Graph Theory, Relations, Partially ordered sets and lattices, Boolean algebra and Boolean Function, Discrete Numeric functions, Recurrence Relations.

References

- | | | |
|----|---|--|
| 2. | Elements of Discrete Mathematics | Liu C. L. |
| 3. | Discrete Mathematics for Computer Scientists and Mathematicians | Mott J. L. , Kandel A. and Baker T. P |
| 4. | Graph Theory | Harary F. |
| 5. | Introduction to Algorithms. | Thomas H. C., Leiserson C. E.; Rivest R. L.; Stein C |
| 6. | Discrete Mathematics with Applications | Thomas Koshy |

CSE213 DIGITAL ELECTRONICS

Number system, radix conversion, Binary codes, Boolean algebra, Logic gates, simplification of Boolean expressions, minimization techniques.Combinational circuit: Full and half adder, Full and half subtractor, Parallel adder and subtractor, BCD adder, Excess 3 adder, Magnitude comparator, Look-ahead carry generator, Multiplexer and Demultiplexer, Encoder and Decoder.Flip-Flop: RS, clocked RS, T, D, JK, race-around problem, master – slave JK, Sequential circuits: State diagrams, Designing of sequential circuit, Minimization of sequential circuit, Synchronous and Asynchronous system, Synchronous Counter

designing, Asynchronous counter, Registers, Shift registers, Serial and parallel registers, Johnson and rings counter.

References

1. Digital Electronics

Morris Mano

CSE214 DIGITAL COMMUNICATION

Characterization of communication signals, Sampling, signal space representation, equalisation, matched filtering, binary PSK, QPSK, FSK, QAM & M-Ary modulation techniques and their representation. Coherent & noncoherent detection, carrier & symbol synchronization, bits vs symbol error probability, bandwidth efficiency, Spread spectrum modulation: Pseudo noise sequences, DS & FH spread spectrum, Noise in Communication Systems

References

1. Digital Communications

Simon Haykin,

2. Principles of Communication Systems

Herbert Taub & Donald L Schilling

CSE215 COMPUTER GRAPHICS

Introduction to raster & random graphics fundamentals, Display devices & comparison Point plotting, line drawing & circle drawing & their algorithm like DDA & Bresenham's, Video Basics- Graphics input/ output devices techniques, Mouse, tablets, stylus, light pen, valuator, digitizers, and plotter Devices independent graphics systems, positioning constraints, rubber band technique, dragging, inking & painting, 2-D Transformation, Clipping, Windowing, View port, 3-D transformation, clipping, viewing transformations, projection, curve generation methods. Graphics packages, segmented files, geometric models, Picture Structure. Raster graphics, Character Displaying, Natural images Solid Area Scan Conversion, Raster display hardware, Filling areas, aliasing & anti-aliasing Hidden surface elimination, Shading.

References

1. Principles of Interactive Computer Graphics

William M. Newman

2. Computer Graphics

D. Horn and M.P. Baker.

3. Computer Graphics Multimedia and Animation

Malay k Pakhira. PHI

CSE216 PRINCIPLES OF PROGRAMMING LANGUAGE

Priliminary concepts of programming language, Issues in Language Translation: Syntax, Semantics, Stages, analysis and synthesis, Data types, Expressions and Statements, Subprograms and Blocks, Abstract Data types, Exception handling, Logic Programming Language, Functional Programming Languages, Object-oriented programming

References

1. Concepts of Programming Languages

Robert .W. Sebesta

2. Programming Languages

Louden,

3. Programming languages

Ghezzi

4. Programming Languages Design and Implementation

Pratt and Zelkowitz,

CSE217 DS LABORATORY

CSE 218 PPL LABORATORY

CSE219 CG LABORATORY

CSE221 PROBABILITY AND QUEUEING THEORY

Probability: Sample space and events – Probability – The axioms of probability – Some Elementary theorems - Conditional probability – Baye's theorem. Random variables – Discrete and continuous – Distribution – Distribution function. Distribution. Binomial and poisson distributions Normal distribution –

related properties. Classification, Stationary process, Markov process, Binominal process, Poisson process, Birth and death process, Renewal process, Markov chain, Transition probabilities, Limiting distributions, Concepts of reliability, Hazard function, Series Classification, Stationary process, Markov process, Binominal process, Poisson process, Birth and death process, Renewal process Markov chain, Transition probabilities, Limiting distributions, Concepts of reliability, Hazard function, Series

References

1. Probability and Statistics with reliability, Queuing and Computer Science Trivedi K.S
- 2 Reliability Engineering Balagurusamy .E
- 3 Fundamentals of Queuing Theory Gross D, and Harris C.M,
- 4 Probability Statistics and Queuing Theory Allen, A.O.

CSE222 COMPUTER ARCHITECTURE

Central processor organizations: basic building blocks, bus organized computer memory, address structure, register transfer languages, instruction formats and addressing modes. Control unit organization: hardwired control & micro-programmed control organization, control memory, address sequencing micro-instruction formats, micro-program sequencer, micro-programming. Arithmetic processor design: addition and subtraction algorithm, multiplication algorithm, division algorithm, processor configuration, and floating point arithmetic. Input-Output organization: Asynchronous Data Transfer, Asynchronous Communication Interface, Modes of Transfer: Interrupt-Initiated, Direct Memory Access (DMA). Memory Organization: Main Memory, Auxiliary Memory, Associative Memory: Hardware Organization, Cache Memory: Mapping Schemes, Virtual Memory: Address Space and Memory Space, Address Mapping. Structure of multiprocessors: parallel processing, pipeline processing.

References

1. Computer Organization and architecture William Stallings
2. Computer Architecture Morris Mano,
3. Computer Organisation& Architecture T.K. Ghosh,

CSE223 THEORY OF COMPUTATION

Finite State Systems, Basic Definitions Non-Deterministic finite automata (NFA), Deterministic finite automata (DFA), Equivalence of DFA and NFA Finite automata with E-moves, Regular Expressions, Equivalence of finite automata and Regular Expressions, Regular expression conversion and vice versa, Myhill-Nerode Theorem and minimization of finite Automata. Concept of basic Machine, Properties and limitations of FSM. Moore and mealy Machines, Equivalence of Moore and Mealy machines, Properties of Regular Sets: The Pumping Lemma for Regular Sets, Closure properties of regular sets. Context free grammar and Ambiguity, Reduced forms, Removal of useless Symbols and unit production, Chomsky Normal Form (CNF), Greibach Normal Form (GNF). Introduction to Pushdown Machines, Application of Pushdown Machines, context free grammar to PDA and vice versa, Closure properties of CFL. Deterministic and Non-Deterministic Turing Machines, Design of T.M, Halting problem of T.M., PCP Problem. Chomsky hierarchies of grammars, Context sensitive grammar, Unrestricted grammars, Context sensitive languages, Relation between languages of classes. Computability: Basic concepts, Primitive Recursive Functions.

References

1. Introduction to automata theory, language & computations Hopcroft&O.D.Ullman, R Mothwani,
- 2.Theory of Computer Sc.(Automata, Languages and computation): K.L.P.Mishra&N.Chandrasekaran,
- 3.Introduction to formal Languages & Automata Peter Linz,
- 4.Fundamentals of the Theory of Computation- Principles and Practice

CSE224 DATABASE MANAGEMENT SYSTEMS

Fundamentals of DBMS, different data models. Relational database systems, SQL. ER modelling, Enhanced ER Model, ER to Relational Mapping. Relational Database Design, integrity constraints, functional dependency constraints, assertions, triggers, Normalization in relational approach. Data storage and indexing in database systems, overview of query processing and cost estimation. Overview of advanced databases: object oriented databases, object relational model, distributed databases, parallel databases, temporal databases, spatial databases, web & multimedia databases.

References

1. Fundamentals of Database Systems Elmasri & Navathe
2. Database System Concepts Silberschatz, Korth & Sudershan .

CSE225 ANALYSIS AND DESIGN OF ALGORITHMS

Fundamentals of algorithm, asymptotic complexity, recursive algorithms, recurrence relation, disjoint set structure. Algorithm Design Techniques their control abstractions and related problems: Divide and conquer, Greedy strategy dynamic programming, Backtracking, Branch and bound, least cost search. Introduction to lower-bound theory, Introduction to NP-Complete and NP Hard problems.

References

1. Computer algorithms Horowitz and Sahani.
2. Introduction to algorithms Cormen and Rivest

CSE226 SOFTWARE ENGINEERING

Introduction to software engineering, software process & process models, capability maturity model (CMM). Software metrics and measurements, software project planning, scheduling and tracking, cost estimation methods and quality assurance. Requirements analysis: Principles, complexity, methods, structured analysis, SRS Documentation. Design principles: abstraction, refinement, modularity, control hierarchy, Structured partitioning, design types and methods. Software coding: coding style, coding efficiency. Software testing: Software testing techniques, choice and classification of test data, verification & validation methods. Software maintenance, configuration management, system documentation, software reusability.

References

1. An Integrated Approach to Software Engineering Pankaj Jalote,
2. Software Engineering: A Practitioner's Approach R S. Pressman,

CSE227 DBMS LABORATORY

CSE228 ADA LABORATORY

CSE229 SE LABORATORY

Fifth Semester

CSE311 COMPILER DESIGN

Compilers and translators, need of translators, structure of compiler :its different phases, Compiler construction tools. Role of lexical analyzer, design of lexical analyzer, regular expressions , Specification and recognition of tokens, input buffering, A language specifying lexical analyzer. Implementation of lexical analyzer.

Role of parsers, context free grammars, definition of parsing. Shift- reduce parsing, operator precedence parsing, top down parsing, predictive parsing. Syntax directed definition, construction of syntax trees, syntax directed translation scheme, implementation of syntax directed translation, three address code, quadruples and triples. Symbol tables, its contents and data structure for symbol tables; trees, arrays,

linked lists, hash tables. Errors, lexical phase error, syntactic phase error, semantic error. Code generation, forms of objects code, machine dependent code, optimization, register allocation for temporary and user defined variables.

References

- | | |
|--|---|
| 1. Compilers Principle, Techniques & Tools | Alfred V. AHO, Ravi Sethi & J.D. Ullman |
| 2. Theory and practice of compiler writing | Tremblay & Sorenson |
| 3. System software | Dhamdae |

CSE312 OPERATING SYSTEMS

Operating system functions and characteristics, design issues, Process abstraction, process management, system calls, threads, process hierarchy, cpu scheduling, comparative study of scheduling algorithms Process synchronization and inter-process communication, message passing mechanisms, Process synchronization constructs Deadlock Characterization, prevention and avoidance, deadlock detection and recovery. Memory management techniques, overlays, dynamic linking, virtual memory concept. Disk structure, Disk scheduling, File System, file access and allocation methods, directory system, file protection mechanisms, implementation issues, Device Management: Hardware organization, device scheduling policies, device drivers. Case Studies: Windows, Unix, Linux.

References

- | | |
|---------------------|-------------------------|
| 1. Operating system | Silberschatz and Galvin |
| 2. Operating system | Deital |
| 3. Operating system | Andrew S. Tanenbaum |

CSE313 MICROPROCESSORS

The processor: 8086/8088-Architectures, 8086/8088 instruction set and Addressing modes, Assembly language programming with 8086/8088, Special Architecture feature: interrupts and interrupt programming, Basic peripherals and their interfacing with 8086/8088, Special purpose programmable peripheral devices and their interfacing, DMA Floppy Disk and CRT controllers, An overview of RISC & CISC processors, An introduction to microcontroller 8051.

References

- | | |
|--|-------------------------|
| 1. Advanced Microprocessor and peripherals | A K Ray, K M Bhurchandi |
| 2. Microprocessor | D.V Hall |
| 3. 8051 Microcontroller | K.J Ayala |

CSE315 CD LABORATORY

CSE316 μ P LABORATORY

CSE 317 OS LABORATORY

Sixth semester

CSE321 COMPUTER NETWORK

Introduction to TCP/IP and OSI reference model, polling techniques, multiplexing, and concentration , transmission media used in physical layer. MAC protocols ALOHA, CSMA/CA, CSMA/CD Ethernet, token bus, token ring, (IEEE 802.3, IEEE 802.4, IEEE 802.5) DLL protocols, error correction and detection codes, flow control protocols performance evaluation with error or without error, protocol specification and verification, framing, HDLC. Switching techniques, Routing and congestion in network layer, routing and congestion control algorithms. Connection management in transport layer, protocols of transport layer, TCP , UDP etc. Data security and cryptography techniques, concepts of public key and private key cryptography, world wide web(www), electronic mail(E-mail), Queuing theory, Study of high speed fiber optic networks, FDDI, SONET, ATM, X.25 network, ARPANET, USENET etc.

References

- | | |
|---------------------|------------------------|
| 1.Computer Network | Tannenbaum. |
| 2. Computer Network | W.Stalling. |
| 3. Data network | Dimitris and Galliger. |

CSE322 DATA WAREHOUSING AND MINING

Introduction to data mining - kinds of data, relational databases, traditional databases, advanced database systems. Data Mining functionalities and patterns generated.Data Preprocessing: - Data Cleaning, Data Integration and Transformation, Data Reduction Data Discretization, Concept Hierarchy GenerationData Warehouse and OLAP Technology - A Multidimensional Data Model Stars, Snow flake and Fact Constellations Schemas for Multidimensional Databases, OLAP operations, Data Warehouse ArchitectureAssociations and Correlations- The Apriori Algorithm, Finding Frequent Item sets Using Candidate Generation Mining, Frequent Item sets without Candidate Generation Mining, Frequent Item sets Using Vertical Data Format Classification- Classification by Decision Tree Induction, Bayesian Classification Rule-Based Classification, Associative Classification Prediction- Linear Regression and Non linear Regression Clustering- Portioning and hierarchical MethodsMining Social Network, spatial databases, multidimensional databases, text databases and World Wide Web.

References

- | | |
|--|---|
| 1.Data Mining: Concepts and Techniques | Jiawei Han, MichelineKamber and Jian Pei, |
| 2.Data Mining Introduction and Advance Topic | Margaret H. Dunham and S. Sridhar |

CSE323 ARTIFICIAL INTELLIGENCE

Meaning and definition of artificial intelligence, Production systems: types, characteristics, study and comparison search techniques:BSF, DSF,hill climbing, best first search, A* algorithm, AO* algorithm etc.types of control strategies. Knowledge representation: Problems faced, propositional and predicate logic, resolution and refutation, deduction, theorem proving. Reasoning: introduction, reasoning methods, Baye's theorem, Bayesian network, fuzzy logic. Slot and filler structures: semantic networks, frames, conceptual dependency,scripts etc. Game playing and its techniques, planning techniques, study of blocks world problem in robotics, understanding, natural language processing and common sense. Learning and its techniques, neural networks and its applications, expert systems.

References:

- | | |
|---|------------------------------------|
| 1.Artificial Intelligence | Elaine Rich and Kevin Knight . |
| 2.Introduction to Artificial Intelligence | Eugene Charniak and Drew McDermott |

CSE325 NETWORK LABORATORY

CSE326 UNIX LABORATORY

CSE 327 MINOR PROJECT

Department electives

CSE331 ADVANCE COMPUTER ARCHITECTURE

Pipeline processor principles and design, Instruction set architecture; Memory addressing; Instruction composition; Instruction-level parallelism; Hazards: dynamic scheduling, branch prediction; Memory hierarchy; Processor case studies; Multiprocessor introduction: Shared-memory architectures and their synchronisation and consistency issues, Advanced multi-core topics; Transactional Memory; Interconnection networks.

References

- | | |
|---|-------------------|
| 1.Computer Architecture and parallel processing | Kai Hwang, Briggs |
| 2.Advanced Computer Architecture: Parallelism, Scalability, Programmability | Kai Hwang, |

3. Computer Architecture: A Quantitative Approach, . J. L. Hennessy and D. A. Patterson
4. Parallel Computer Architecture: A Hardware/Software Approach

David Culler, J.P. Singh and Anoop Gupta

CSE332 SOFTWARE REUSABILITY

Software Engineering Process, Software Reuse Factors, Reuse driven Software Engineering Business, Overview of software reuse metrics. Architectural Style: Object oriented software engineering Application and component systems, Use Case Components, Object components, Layered architecture. Approaches for software reuse - Patterns, Frameworks and Components. Pattern and Framework Approaches: Design patterns, Analysis patterns, Organizational patterns, Anti-patterns. Creational Patterns, Structural Patterns, Behavioural Patterns, Architectural Patterns. Component System Engineering & Application System Engineering: Requirement analysis, Robustness analysis, Designing, Implementing, Testing and Packaging of the Component system. Case Studies.

References

- 1 Reusability and Software Construction: C and C Jerry D. Smith.
2. Design Patterns: Elements of Reusable Object-Oriented Software
Richard Helm, Erich Gamma, John Vlissides and Ralph Johnson.
3. Reuse-Based Software Engineering: Techniques, Organizations, and Controls
Hafedh Mili and Sherif M. Yacoub.
- 4 Software Reusability Wilhelm Schafer , Diaz Prieto and Wilhelm Shafer .

CSE333 VLSI DESIGN

Digital Systems And VLSI, Basic Electrical Properties Of Cmos, Data Structure in VLSI design, Fabrication And Devices, Logic Gates, Combinational Logic Networks, Sequential Machines, Subsystem/ Peripheral Design, Validation And Testability, Floor planning And Architecture Design

References

1. Modern VLSI Design: IP-Based Design Wayne Wolf
2. Basics VLSI Design Pucknell and Eshraghian

CSE334 PARALLEL AND DISTRIBUTED ALGORITHMS

Introduction to parallel algorithm, data parallel and control parallel approach, models of parallel computation, dense matrix algorithm , sorting searching, selection and graph algorithms. Introduction to distributed algorithms, synchronous algorithms network model, leader election algorithm, minimum spanning tree, shortest path , distributed consensus k agreement problem, two phase commit, three phase commit , mutual exclusion algorithms, applications of distributed algorithm.

References

1. Parallel algorithms Michael . J . Quinn
2. Distributed algorithms Nancy Lynch

CSE335 DISTRIBUTED DATABASE

Introduction to Distributed Database Systems, Distributed DBMS Architecture, Distributed Database Design, Semantic Data Control, Overview of Query Processing, Introduction to Transaction Management, Distributed Concurrency Control, Parallel Database Systems, Distributed Object Database Management systems, Database Interoperability

References

1. Principles of Distributed Database Systems M. Tamer Ozsu Patrick Valduriez
2. Distributed Databases Principles and Systems Stefano Ceri and Giuseppe Pelagatti,

CSE336 EMBEDDED SYSTEMS

Introduction, Hardware & electronics fundamentals, Peripherals Program Design and Analysis, Processes and Operating system, Real time **Operating system** Memory, Interfacing Examples of Embedded systems: Digital Camera Examples, Smart card application, Embedded database applications, etc State Machine and Concurrent Process Models, Control Systems Verilog programming, Programming of mobile and Hand-held devices **IC Technology** Full-Custom (VLSI) IC Technology, Semi-Custom (ASIC) IC Technology, Programmable Logic Device (PLD) IC Technology, FPGA Hardware Software Partitioning, Hardware/Software Co-Simulation, Intellectual Property Cores, Low Power design

References

- | | |
|---|----------------------------|
| 1. Embedded system Design | Frank Vahid, Tony Givargis |
| 2. Computer as Components | Wayne Wolf |
| 3. 8051 Microcontroller & Embedded Systems | Rajiv Kapadia |
| 4. The 8051 Microcontroller & Embedded Systems, | Mazidi & Mazida |

CSE337 CRYPTOGRAPHY

Introduction to cryptography. Security Attacks, mechanism and Services. Cryptosystems, Conventional encryption model and techniques, classical encryption techniques- substitution ciphers and transposition ciphers, cryptanalysis, stream and block ciphers. Block ciphers principals, feistel structure, SPN, DES, triple DES, AES, IDEA encryption and decryption, key distribution. finite field: Introduction to group, ring and field, modular arithmetic, Fermat's and Euler's theorem, Euclid's Algorithm, Chinese Remainder theorem, Entropy and Huffman's coding, Comparison of symmetric and public-key cryptographic systems, Principals of public key crypto systems, RSA algorithm, Diffie-Hellman key exchange algorithm, Message Authentication and Hash Function: security of hash functions and MACS, MD5 message digest algorithm, secure hash algorithm (SHA). Digital Signatures.

References

- | | |
|---|---------------------|
| 1. Cryptography and Network Security: Principles and Practice | William Stallings, |
| 2. Cryptography Theory and Practice | Douglas R. Stinson. |

CSE338 HETEROGENEOUS COMPUTING

Heterogeneous computing: Overview, Types of system, Areas of heterogeneity, Shortcomings of Homogeneous System.

Heterogeneous computing by multiple CPUs: Grid, Cluster and Other multi-core architectures.

Heterogeneous computing using CPU-GPU: Overview of GPUs, Introduction of GPGPU, Architecture, Features, Programming model, Thread Organization, Memory management, GPU-CPU load balancing, Optimization, Floating Point Performance, Multiple GPUs.

Case study: GPGPU based Heterogeneous computing by OpenCL and CUDA.

References

- | | |
|---|----------------------------|
| 1. State-of-the-art in heterogeneous computing | Andre R. Brodtkorb |
| 2. Heterogeneous Processing: a Strategy for Augmenting Moore's Law, | Amar Shan, |
| 3. Heterogeneous Computing with OpenCL | Benedict Gaster |

CSE339 DIGITAL IMAGE PROCESSING

Introduction to Image Processing Systems, Digital Image Fundamentals:- Image model, Relationship between Pixels, Imaging geometry, Camera model. Image Sensing and Acquisition. Sampling and quantization. Image Enhancement and in spatial Domain: Point processing, Neighbourhood Processing, High pass filtering, High boost filtering, zooming. Image Enhancement based on Histogram modelling. Image Enhancement in frequency domain: 1D & 2D Fourier transform, Low pass

frequency domain filter, High pass frequency domain filters, Homomorphics filtering. Image Segmentation:- Detection of discontinuation by point detection, line detection, edge detection. Edge linking and boundary detection:- Local analysis, global by graph, theoretic techniques. Thresholding. Morphology, Representation and description. Discrete image transform. Image Compression. Wavelet transformation.

References

- | | |
|-----------------------------|-----------------|
| 1. Digital Image Processing | Gonzalez & Wood |
| 2. Digital Image Processing | A.K. Jain |
| 3. Image Processing | Dhananjayk. |

CSE341 E-COMMERCE AND E-GOVERNANCE

Introduction: Electronic Commerce, Technology and Prospects, forces behind E-Commerce, Advantages and Disadvantages, Architectural framework, E-Commerce Strategy, E-Commerce emerging Issues and implementation issues, E-Commerce Law, Govt. policies and Agenda. Electronic Payment Systems: Credit cards, debit cards, smart cards, e-credit accounts, e-money, Marketing on the web, marketing strategies, advertising on the web, customer service and support, introduction to m-commerce. E-payment security. E-Government, theoretical background of e-governance, issues in e-governance applications, evolution of e-governance, its scope and content, benefits and reasons for the introduction of e-governance, e-governance models- broadcasting, critical flow, comparative analysis, mobilization and lobbying, interactive services / G2C2G. E-readiness, e-government readiness, E- Framework, step & issues, application of data warehousing and data mining in e-government, Case studies: NICNET-role of nation wide networking in e governance, e-seva. E-Government systems security: Challenges and approach to e-government security, security concern in e-commerce, security for server computers, communication channel security, security for client computers.

Open electives

CSE351 MULTIMEDIA

Introduction to multimedia, Multimedia system design, data and file format standards, data compression and decompression techniques, lossy and lossless compression. Multimedia input and output technologies, storage and retrieval technologies. Multimedia Communications, multimedia communication protocols (UDP, RTP, RTCP, XTP, TELNET, IP Multicast etc), network performance parameters, streaming. Multimedia Applications and Design issues, hypermedia message, integrated multimedia message standards. Multimedia authoring system and tools user interface design.

References

- | | |
|------------------------------|--------------------------------------|
| 1. Multimedia system Design | Prabhat K Andleigh and Kiran Thakrar |
| 2. Multimedia Communications | Fred Halsall |

CSE352 OBJECT ORIENTED PROGRAMMING

Object Orientation, OMT Methodology, Object and Class, Link and Association, Generalization, Aggregation Multiple Inheritance, Packages, Object Meta modeling, Metadata and Metamodels, Functional Modeling Pseudocode, Pseudocode with the Object Navigation Notation, ONN Constructs, combining ONN Constructs, Analysis:- Object Model, Data Dictionary, Dynamic Model, Functional Model System Design- Devising an Architecture, Database Management Paradigm, Object Identity, Policies for Detailed Design Dealing with temporal data. Detailed Design:- Object Model Transformations, Elaborating the Object Model, Elaborating the Functional Model, Evaluating the Quality of a Design Model.

References

- | | |
|--|-------------------------|
| 1. Object-Oriented Modeling and Design Premierlani, | Michael Blaha / William |
|--|-------------------------|

CSE353 SIMULATION AND MODELING

Systems, modeling, general systems theory, concept of simulation, simulation as a decision making tool, types of simulation. Pseudo random numbers, methods of generating random variables, discrete and continuous distributions, testing of random numbers, concepts of Queuing theory. **Design of simulation experiments:** Problem formulation, data collection and reduction, time flow mechanism, key variables, logic flow chart, starting condition, run size, experimental design consideration, output analysis and interpretation validation. **Simulation languages:** Comparison and selection of simulation languages, study of these simulation language. **Case studies:** Development of simulation models using simulation language studied for systems like queuing systems, Production systems, Inventory systems, maintenance and replacement systems and Investment analysis.

References

- | | |
|---|-----------------|
| 1.System Simulation | Geoffrey Gordon |
| 2.System Simulation with Digital Computer | NarsinghDeo |

CSE354 UNIX INTERNALS AND SHELL PROGRAMMING

Architecture of the UNIX OS, the buffer cache, internal representation of files(inode, accessing blocks, releasing blocks, structure of regular files, conversion of a path name to an inode, inode assignment to a new file, allocation of disk block). System calls for the file systems, OPEN, READ, WRITE, and CLOSE, PIPES, the pipe system call , opening a named pipes, reading and writing pipes, closing pipes, DUP, mounting and amounting file system, LINK ,UNLINK, SYSTEM call for TIME and CLOCK. The structure of processes, process states and transitions, layout of system memory, the context of a process, saving the context of the process, manipulation of the process address space. Process control, process creation, signals, process termination, awaiting process termination, the user id of a process, changing the size of the process, the system BOOT and INIT process. Shell programming, study of different type of shell like C shell, Bourne shell etc. shell script, shell command, looping and making choices, for Loop, while and until, passing arguments to scripts, programming in different shells. Inter process communication, process tracing, network communication, sockets multiprocessor system, problem of multiprocessor systems, solution with master a slave processor, solution with semaphores, study of distributed UNIX system.

References

- | | |
|---------------------------------------|-----------------|
| 1.The Design Of UNIX Operating System | Maurice J Bach. |
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Seventh semester

CSE411 SOFT COMPUTING

Introduction to neural networks, Working of an artificial neuron, Perceptron, Back propagation algorithm, Adalines and Madalines.Supervised and unsupervised learning, Counter-propagation networks, Adaptive Resonance Theory, Kohonen's Self Organizing Maps, Neocognitron, **Associative memory**, Bidirectional Associative Memory. Introduction to fuzzy logic and fuzzy sets, fuzzy relations, fuzzy graphs, fuzzy arithmetic and fuzzy if-then rules, Process control using fuzzy logic, Decision-making fuzzy systems, Applications of fuzzy logic, Hybrid systems like neuro-fuzzy systems. Evolutionary Computation: Population-based Search: genetic algorithms and evolutionary computation, Genetic Programming. Search techniques like Simulated Annealing, Tabu search etc.

References

- | | |
|---|---------------------------|
| 1.Soft Computing and Intelligent Systems Design | F.O.Karray and C.DeSilva, |
| 2.Neural Networks, Fuzzy Logic and Genetic Algorithms | Rajsekaran and Pai |

CSE412 SOFT COMPUTING LABORATORY

CSE413 MAJOR PROJECT AND SEMINAR

The student has to select a project work based on topic of interest. Periodically the implementation will be evaluated by the project guide. The work starts in seventh semester and continues through eighth semester. The end of each semester student will be evaluated by department committee formed by HOD

CSE414 EDUCATIONA TOUR / INDUSTRIAL TRAINING

Student has to select the industry for his/her training program. After the training , student has to submit a report about the training. Based on the report and presentation, student will be evaluated by department committee formed by HOD

Eighth Semester

CSE421 NETWORK SECURITY

Introduction to Network security: Network security needs. Threats to network security, kind of computer security. security policies, security mechanisms, Attacks, security tools and Basic Cryptography, Transposition/Substitution, Block Cipher Principles, Introduction to Symmetric crypto primitives, Asymmetric crypto primitives, Secret Key Cryptography , Data Encryption Standard (DES), Message Digests, MD5, Message Authentication and Hash Functions, Hash And Mac Algorithms, RIPEMD , HMAC, Principles of Public Key Cryptosystems, Diffie Hellman Key Exchange , Elliptic Curve Cryptography, Cryptanalysis, SHA-1, RSA, Selection of public and private keys.Key distribution centers and certificate authorities, digital signature standards (DSS), proof of digital signature algorithm. Kerberos, Real-time Communication Security, IPsec,Electronic Mail Security . Firewalls and Web Security, Intruders and Viruses, trusted system, password management. Cyber crime

References

- | | |
|--------------------------------------|-------------------|
| 1. Cryptography and Network Security | William Stallings |
| 2.Introduction to network security | Krawetz, Cengage |

CSE422 MAJOR PROJECT AND SEMINAR

The student has to select a project work based on topic of interest. Periodically the implementation will be evaluated by the project guide. The work starts in seventh semester and continues through eighth semester. The end of each semester student will be evaluated by department committee formed by HOD

CSE423 GENERAL PROFICIENCY

Department electives

CSE431 SOFTWARE TESTING

Software Testing Principles, Quality, Testing flow process. Defect Classification: Origin of Defects, Classes, Repository and Design, Developer/Tester Support for Developing a Defect Repository.Test Case Design Strategies: Black Box Approach , Random Testing, Equivalence Class Partitioning, Boundary Value Analysis, COTS, White Box approach, Test Adequacy Criteria, Coverage and Control Flow Graphs, Covering Code Logic, Additional White Box Test Design Approaches, Evaluating Test Adequacy Criteria.Unit testing, Integration testing, System testing, Regression testing and Acceptance testing, Test Plan Writing. Testing Tools.Criteria for Test Completion.

References:

- | | |
|---|-----------------|
| 1. Software Testing in the Real World – Improving the Process | Edward Kit |
| 2.Effective Software Testing | Elfriede Dustin |

CSE432 CLOUD COMPUTING

Cloud Computing: Introduction, Working of cloud computing, benefits; Understanding Cloud Computing: Developing cloud computing services, Discovering cloud services; Cloud Computing for Everyone: Centralizing email communications, Cloud computing for community; Cloud Computing for the Corporation: Managing Schedules, Managing Projects; Using Cloud Services: Collaborating on

Calendars, Schedules, and Task Management, Collaborating on Project Management Outside the Cloud: Other Ways to Collaborate Online: Collaborating via Web-Based Communication Tools, Collaborating via Social Networks and Groupware.

References

1. Cloud Computing Michael Miller,
2. Implementing and Developing Cloud Computing Applications David E., Y. Sarna,

CSE433 DISTRIBUTED COMPUTING

Distributed Computing: Introduction, Types, Various system models. Communication and Processes: RPC, RMI and others, Client and Server threads. Clock Synchronization: Types of clock and their synchronization, Introduction to distributed mutual exclusion, Election of a process, Consensus and related problems; Consistency: Various types of consistency, Consistency protocols, Fault tolerance: Introduction to fault tolerance, Process resilience; Protection and security in distributed systems: Various types of security techniques, Cryptography; Examples of distributed systems: Distributed file systems, Distributed shared memory and others.

References

1. Distributed Systems Principles and paradigms Andrew S. Tanenbaum and Maarten
2. Distributed systems, concepts and design, George Colouris, Jean Dollimore and Tim Kindberg.

CSE434 PATTERN RECOGNITION

Introduction to Pattern Recognition, Regular Pattern, Irregular Pattern, Approaches to Pattern Recognition, Parametric, Non-Parametric Approaches. Parzen window method for density estimation, Feature selection, Search methods, Pattern Recognition Applications., Discriminant functions, Decision surfaces, Classification algorithms: Naive Bayes, Random Tree, Random Forest, , Multiple Polynomial Regression, Classification using SVM. Classifier Ensembles, , Linear Regression, Introduction to hidden Markov models (HMMs), Discrete HMMs and Evaluation problem, Forward method for evaluation problem, Backward method for evaluation problem, Parameter estimation for HMMs, Continuous density HMMs (CDHMMs), Types of Clustering, K-Mean Clustering, Iso-data Clustering, Clustering Metrics, Clustering applications, Fuzzy K-Mean, Clustering tendency, Semi Supervised learning. Fuzzy variants of classification and clustering algorithms, Neural networks fundamentals, Genetic Algorithms, Neural and Genetic based approaches for Pattern recognition, Self organizing maps, Advantages/Disadvantages of Neural based approaches for Pattern Recognition.

References

1. Pattern recognition and image processing Earl Gose
2. Pattern classification Duda ,Hart, stork.

CSE435 COMPUTER VISION

Introduction to computer vision, computer imaging system, Image formation and sensing CVIP tools, Image representation. Elements of Visual Perception, Light and the Electromagnetic Spectrum, Image Sensing and Acquisition, Image Sampling and Quantization. Image Enhancement in the Spatial Domain, Image Enhancement in the Frequency Domain, Homomorphic Filtering. Image Restoration, Color Image Processing, Segmentation, Thresholding, The Use of Motion in Segmentation, Image Compression, Error-Free Compression, Lossy Compression, Image Compression Standards, Wavelets and Multiresolution Processing, Multiresolution Expansions, Wavelet Transforms.

References

1. Computer Vision Young, Tzay Y.
2. Computer visioin [Dana H. Ballard](#)

CSE436 RANDOMIZED ALGORITHMS

Introduction to randomized algorithms. Game Theoretic Techniques. Probabilistic Method, Markov Chains and Random Walks. Randomized Data Structures: Treaps, skip lists, Hash tables. Geometric algorithms and linear programming, Graph algorithms, Approximate Counting, Online Algorithms.

References

1. Randomized Algorithm

Motwani and Raghavan

CSE437 NATURAL LANGUAGE PROCESSING

Regular Expressions and Automata, N-grams, Part-of-Speech Tagging, Hidden Markov and Maximum Entropy Models, Formal Grammars of English, Syntactic Parsing, Statistical Parsing, Features and Unification, Language and Complexity, The Representation of Meaning, Computational Semantics, Computational Lexical Semantics, Information Extraction, Question Answering and Summarization, Machine Translation

References

1. Speech and Language Processing: An Introduction to Natural Language Processing,

Computational Linguistics, and Speech Recognition

D. Jurafsky and J. Martin

2. Foundations of Statistical Natural Language Processing

C. Manning and H. Schütze

CSE438 MOBILE COMPUTING

Introduction to Mobile Communications and Computing, novel applications, GSM: Mobile services, System architecture, and new data services. (Wireless) Medium Access Control :Motivation for a specialized MAC, DMA, FDMA, TDMA, CDMA. Mobile Network Layer :Mobile IP, IP packet delivery, Dynamic Host Configuration Protocol (DHCP). Mobile Transport Layer : Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP. Database Issues: client server computing with adaptation, transactional models, and quality of service issues. Mobile Ad hoc Networks (MANETs): Properties of a MANET, spectrum of MANET applications, routing and various routing algorithms, security in MANETs. Protocols and Tools: Wireless Application Protocol-WAP. Bluetooth and J2ME.

References

1. Mobile Communications

Jochen Schiller

2. Handbook of Wireless Networks and Mobile Computing

Stojmenovic and Cacute

3. Fundamentals of Mobile and Pervasive Computing

Adelstein, Frank, Gupta, Sandeep KS, Richard III, Golden, Schwiebert, Loren

CSE439 QUANTUM COMPUTING

Quantum Computing: Overview of traditional computing and Quantum computing, Church-Turing thesis, Circuit model of computation, Quantum physics and Computation, Dual vectors, Operators; Qubits and Quantum model of computation: State of a quantum system, Time evolution of a closed system, Composite systems, States and general quantum operations, Quantum gates, Universal sets of quantum gates; Quantum Algorithms: Superdense coding, quantum teleportation, probabilistic versus quantum algorithms, phase kick-back, the Deutsch algorithm, Quantum phase estimation and Quantum Fourier Transform, Shor's algorithm for order finding, Quantum search algorithm; Quantum computational complexity and error: Computational complexity, Black-box model, Lower bounds for searching, General black-box lower bounds, Classical error correction, Fault tolerance, Quantum error correction.

References

1. Quantum Computing

V. Sahni,

2. An introduction to Quantum Computing

P. Kaye, R. Laflamme, and M. Mosca,

CSE441 SENSOR NETWORKS

Introduction of ad-hoc/sensor networks: key definitions, advantages, unique constraints and challenges, applications, and wireless communications/radio characteristics. Media Access Control and routing protocols for Ad-Hoc wireless networks: issues, classification and protocols. Networking Sensors: features, deployment of sensor networks, sensor tasking and control. Sensor Network platforms and tools :Berkley Motes ,Sensor network programming challenges ,Embedded Operating System.Transport layer, QoS issues and security protocols for ad hoc and sensor networks. Simulators for wireless ad hoc and sensor networks.Applications of Ad-Hoc/Sensor Network and Future Directions.

References

- 1.Ad hoc Wireless Networks C. Siva Ram Murthy & B. S. Manoj
- 2.Wireless Sensor Networks: An Information Processing Approach Feng Zhao and Leonidas J. Guibas,

CSE442 WEB SEARCH & MINING

Introduction, Document Representation, Tokenization, term-document matrix,Query languages and query,operation,Indexing and searching, clustering, ranking,Ontology, domain specific search,Parallel and distributed information retrieval,Text and multimedia languages,Social networks.

References

1. An introduction to Information Retrieval Manning, C., Raghavan, P., and Schutze, H
2. Mining the web: Mining the Web: Discovering knowledge from hypertext data. Chakrabarti, S

Open electives

CSE451 GRAPH THEORY

Definition of a graph and directed graph, simple graph. Degree of a vertex, regular graph, bipartite graphs, subgraphs, complete graph, complement of a graph, operations of graphs, isomorphism and homomorphism between two graphs, directed graphs and relations. Walks, paths and circuits, connectedness of a graph, Disconnected graphs and their components, Konigsberg 7-bridge problem, Around the world problem, Euler graphs, Hamiltonian paths and circuits, Existence theorem for Eulerian and Hamiltonian graphs. Trees and their properties, distance and centre in a tree and in a graph, rooted and binary trees, spanning trees and forest, fundamental circuits, cut sets, connectivity and separability, 1-isomorphism, 2-isomorphism, breadth first and depth first search. Incidence matrix and its sub matrices, Reduced incidence matrix, circuit matrix, fundamental circuit matrix, cut set matrix, fundamental cut set matrix, path matrix, adjacency matrix of a graph and of digraph. Planar graphs, Euler's formula, Kuratowski's graphs, detections of planarity, geometric dual, combinatorial dual. Chromatic number, independent set of vertices, maximal independent set, chromatic partitioning, dominating set, minimal dominating set, chromatic polynomial, coloring and four colour problem, coverings, machings in a graph. Network flows, Ford-Fulkerson algorithm for maximum flow, Dijkstra algorithm for shortest path between two vertices, Kruskal and Prim's algorithms for minimum spanning tree.

References

1. Graph Theory with Applications to engineering and computer science Deo Narsingh.
2. A first Look At Graph Theory Clark John and Holton D.A.,
3. Graphs and Applications: An Introductory Approach Aldous and Wilson,
4. Graph Theory Reinhard Diestel,

CSE452 OPTIMIZATION TECHNIQUES

Engineering application of Optimization, Formulation of design problems as mathematical programming problems, General Structure of Optimization Algorithms ,Constraints, The Feasible Region, Branches of Mathematical Programming ,Gradient Information, The Taylor Series, Types of Extrema, Necessary and

Sufficient Conditions for Local Minima and Maxima, Classification of Stationary Points , Convex and Concave Functions, Optimization of Convex Functions, General Properties of Algorithms ,An Algorithm as a Point-to-Point Mapping,An Algorithm as a Point-to-Set Mapping Closed Algorithms , Descent Functions, Global Convergence, Rates of Convergence. Unconstrained Optimization: One dimensional optimization techniques: Dichotomous Search, Fibonacci Search ,Golden-Section Search, Quadratic Interpolation Method ,Cubic Interpolation, The Algorithm of Davies, Swann, and Campey, Inexact Line Searches , Multidimensional Gradient Methods ,Steepest-Descent Method, Newton Method Gauss-Newton Method, Conjugate-Direction Methods: Conjugate Directions, Basic Conjugate-Directions Method, Conjugate-Gradient Method, Minimization of Non-quadratic Functions, Fletcher-Reeves Method, Powell's Method, Partan Method. Quasi-Newton Methods: The Basic Quasi-Newton Approach, Generation of Matrix S_k ,Rank-One Method, Davidon-Fletcher-Powell Method, Broyden-Fletcher-Goldfarb-Shanno Method, Hoshino Method, The Broyden Family, The Huang Family, Practical Quasi-Newton Algorithm,Applications of Unconstrained Optimization,Nonlinear Least Squares Problem and Algorithms. Linear Programming: Graphical method, Simplex method, Duality in linear programming (LP),Sensitivity analysis, Interior-Point Methods, Primal-Dual Solutions and Central Path, Primal Affine-Scaling Method, Primal Newton Barrier Method, Primal-Dual Interior-Point Methods. Nonlinear Constrained Optimization: Constrained Optimization, Constraints, Classification of Constrained Optimization Problems, Simple Transformation Methods ,Lagrange Multipliers , First-Order Necessary Conditions, Second-Order Conditions, Convexity , Duality Quadratic And Convex Programming: Convex QP Problems with Equality Constraints, Active-Set Methods for Strictly Convex QP Problems , Interior-Point Methods for Convex QP Problems, Cutting-Plane Methods for CP Problems, Ellipsoid Methods. Minimax Methods: Minimax Algorithms, Improved Minimax Algorithms,

References

1. Practical Optimization Algorithms And Engineering Applications, Andreas Antoniou
2. An Introduction To Optimization Edwin K., P. Chong & Stanislaw h. Zak

CSE453 CYBER CRIME AND INFORMATION WARFARE

Introduction of cyber crime, challenges of cyber crime, categorizing cyber crime, cyber terrorism, virtual crimes, perception of cyber criminals: hackers, insurgents and extremist group, interception of data, surveillance and protection, criminal copy right infringement, cyber stalking, hiding crimes in cyber space and methods of concealment. Anonymity and markets, privacy and security at risk in the global information society, privacy in cyber space, war fare concept, information as an intelligence weapon, attack and retaliation attack and defense. An I-WAR risk analysis model, implication of I –WAR for information managers, perceptual intelligence and I-WAR, handling cyber terrorism and information warfare, Jurisdiction.

References

1. Principle of cyber crime Jonathan Clough
2. Information warfare: Corporate attack and defense in digital world William Hutchinson, Mathew Warren

CSE454 WIRELESS NETWORKS

Introduction to wireless communication, and future trends, Wireless Generations and Standards, Wireless Physical Layer Concepts, fundamentals of antennas, Cellular Concept and Cellular System Fundamentals. Spread Spectrum Modulation Techniques, Coding and Error Control, Multiple Access Technique for Wireless Communications, OFDM. Wireless LAN Technologies, Wireless IEEE Standards, Mobile Network Layer (Mobile IP). Mobile Transport Layer (Mobile TCP), Mobile Data network (GPRS), WAP Model and architecture, Introduction to Ad hoc networks, Sensor networks, Bluetooth networks and Wireless Mesh networks.

References

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| 1. Wireless communication Principles and Practice, | T. S. Rappaport |
| 2. Mobile Communications | Schiller |
| 3. Principles of Wireless Networks: A Unified Approach | Pahalvan, K. and Krishnamurthy, |
| 4. Wireless Communications and Networking | William Stallings |

CSE455 INTERNET TECHNOLOGY

Inter networking:- Concept architecture, protocols and devices like bridge(spanning tree concept), switch(switching technique) and hub. IP(v4), IP Addressing scheme ARP, RARP, IP routing , IP datagram and datagram forwarding, IP encapsulation. ICMP error message and ICMP query message, TCP, UDP, three way handshaking, segment format, fragmentation and reassembly, timer and retransmission, concept of MTU(maximum transmission unit), MSS(maximum segment size), RTT(round trip time), ISN (initial sequence number), the transport layer congestion management (congestion window & threshold value). Application layer protocols firewalls, digital signature, http, DNS, SMTP, POP, FTP command, file translation, TFTP, NFS, concept of virtual terminals, browser architecture, HTML, XML, basic concepts of client-server computing, CGI techniques for Dynamic Web documents, network Management:-SNMP, NMS. Network security, protocol startup procedure, BOOTP, DHCP, Intranet contents, security aspects, Internet site and troubleshooting, world wide web.

References

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| 1. TCP/IP vol 1 | Richard Stevens |
| 2. Computer Network and Internet | D.E. Comer |
| 3. Internet | Coleman& Dyson |

CSE 456 EHTICAL HACKING

Ethical hacking Overview, TCP/IP Concepts Review, network and computer Attacks, Foot printing and social engineering, port scanning enumeration, Programming for security professionals Password hacking, windows hacking, network hacking, anonymity and email hacking. web Servers hacking, session hijacking, Surveillance, desktop and server OS Vulnerabilities, Database attack, hacking wireless networks, cryptography, network protection systems, Trojan and backdoor applications, legal resources, virtualization and Ethical Hacking

References

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| 1. Ethical Hacking and Network Defense. | Michael T. Simpson, Kent Backman, James Corley |
| 2. Hacking Exposed—Network Security Secrets & Solutions, | Stuart McClure Joel Scambray, George Kurtz |
| 3. Network Security, A Hacker Perspective | AnkitFadia |

35 DEPARTMENT OF PLANNING (B. Plan)

PLA 111 INTRODUCTIONS TO PHYSICAL PLANNING

Planning as a discipline, multidisciplinary nature, role of a planner, fields of planning- Urban, regional, environmental, transport and infrastructure.

Various definitions of town and country planning; Goals and objectives of planning; Components of planning; Benefits of planning; Arguments for and against planning

Economics and social planning as bases of physical planning, Types of plans: Definition of development plan; Types of development plans: master plan, city development plan, structure plan, district plan, action area plan, subject plan. Hierarchy of plans: regional plan, sub-regional plan; Sector plans and spatial plans; Town planning schemes.