

SYLLABUS OF V SEMESTER B.E. COMPUTER SCIENCE (SEMESTER PATTERN)

55CS1: Data Communication

UNIT 1:

SIGNALS:

ANALOG AND DIGITAL: Analog and digital data, Analog and digital signals; PERIODIC AND APERIODIC SIGNALS, ANALOG SIGNALS: Simple analog signals; TIME AND FREQUENCY DOMAINS; COMPOSITE SIGNALS: Frequency spectrum and Bandwidth; DIGITAL SIGNALS: Decomposition of digital signal; TRANSMISSION MODES: Serial and Parallel transmission, Asynchronous and Synchronous Transmission, Simplex, Half-Duplex and Full-Duplex communication.

UNIT 2:

ENCODING AND MODULATING:

DIGITAL-TO-DIGITAL CONVERSION: Unipolar, Polar, Bipolar; ANALOG-TO-DIGITAL CONVERSION: Pulse Amplitude Modulation (PAM), Pulse Code Modulation (PCM), Sampling Rate, How many Bits per Sample? Bit rate; DIGITAL-TO-ANALOG CONVERSION: Aspects of Digital-to-Analog conversion, Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK), Phase shift Keying (PSK), Quadrature Amplitude modulation (QAM), Bit / Baud comparison; ANALOG-TO-ANALOG CONVERSION: amplitude modulation (AM), Frequency Modulation (FM), Phase Modulation (PM);

UNIT 3:

INTERFACES AND MODEMS: DIGITAL DATA TRANSMISSION: Parallel transmission, Serial Transmission; DTE-DCE INTERFACE: Data Terminal Equipment (DTE), Data Circuit-Terminating Equipment (DEC), Standards, EIA-232 Interface; OTHER INTERFACE STANDARDS: EIA-449, EIA-530, X.21; MODEMS: Transmission rate, Modem standards; 56K MODEMS: Traditional Modems, 56K Modems;

UNIT 4:

COMMUNICATION MEDIA: GUIDED MEDIA: Twisted pair cable, Coaxial cable, Optical Fiber cable; UNGUIDED MEDIA: Radio frequency allocation, Propagation of Radio waves, Terrestrial microwave, Satellite communication, Cellular Telephony; TRANSMISSION IMPAIRMENTS: Attenuation, Distortion, Noise; PERFORMANCE: Throughput, Propagation Speed, Propagation time;

UNIT 5:

MULTIPLEXING: FREQUENCY DIVISION MULTIPLEXING (FDM). TIME DIVISION MULTIPLEXING (TDM): Inverse Multiplexing, WAVE-DIVISION MULTIPLEXING, MULTIPLEXING APPLICATIONS: THE TELEPHONE SYSTEM: Common carrier services and hierarchies, Analog services, Digital Services; DIGITAL SUBSCRIBER LINE (DSL): ADSL, RADSL, HSDL, SDSL, VDSL; FTTC: FTTC in the Telephone Network, FTTC in the Cable TV Network.

UNIT 6:

DATA COMPRESSION: Huffman code, Run-Length Encoding, Relative Encoding, Lempel-Ziv Encoding, Image Compression, JPEG, MPEG

Text Books:

Data Communications and Networking by Behrouz A. Forouzan, 4th Edition, Tata McGraw Hill
Understanding Data Communications and Networks by William A. Shay, 2nd Edition, Vikas Publishing House.

Reference Book:

Electronic communication Systems by Kennedy.
Communication systems by Singh and Sapre.
Data communication by Fred Halsall, Pearson Education.

55CS2: Numerical Computing

Polynomial Equations: Newton-Raphson method, Regula Falsi Method, Muller method, Bairstow method, Multipoint iteration method, Convergence / Rate of Convergence of iterative method, Evaluation of Multiple & complex roots. Simultaneous equations.

Linear Systems & Matrices: Gauss elimination with pivoting, Gauss-Seidal iteration, Triangularization / Cholesky method, Iterative determination of Eigen values. Interpolation & Approximation: Lagrange's bivariate interpolation, Least squares approximation, Uniform approximation, Rational Approximation, Hermite Interpolation. Differentiation / Integration: Double integrals by Trapezoidal & Simpson rule, Methods of undetermined coefficients for numerical integration, Gauss-Legendre, Gauss-Hermite formula, Romberg Integration, Approximation of derivatives, Richardson's Extrapolation. Differential Equations: Initial value problems by Euler's method, Picard's, Taylor series, Runge-Kutta methods, Predictor-Corrector methods, Boundary value problems (Second order) by finite difference methods.

Related topics: Simplex method for linear programming problems, Errors & Methods of error analysis.

Text Books:

- Numerical methods for Scientific and Engg. Computations by M.K. Jain, SRK Iyengar, R. K. Jain, Wiley Eastern Ltd.
- Numerical methods for Science & Engg. By Stanton R. G., PHI
- Introductory Methods of Numerical Analysis by Sastry S. S., PHI.
- 55CS3: Object Oriented Methodologies

55CS3: Object oriented Methodologies

UNIT-1

The Object Oriented Paradigm

What is Object Orientation? , What is Object Oriented Development? , The Object Oriented Themes; The Object modeling Technique (OMT).

Object Modeling

Objects and Classes; Links and Associations; Advanced Links and Associations Concepts; Generalization and Inheritance; Grouping Constructs; A Sample Object Model. Advanced Object Modeling Aggregation; Abstract and Concrete Classes; Generalization as Extension and Restriction; Multiple Inheritance; Metadata; Candidate Keys.

UNIT-2

Dynamic Modeling

Events and States; Operations; Nested State Diagrams; Concurrency of States; Advanced Dynamic Modeling Concepts; A Sample Dynamic Model; Relation of Dynamic Model to Object Model. Functional Modeling The Functional Model; the Data Flow Diagrams (DFD); Properties of DFD; Construction of DFD; Specifying Operations; Constraints; A Sample Functional Model; Relationship between the Object, Dynamic and the Functional Models.

UNIT-3

Pre-Analysis The need for Pre-Analysis; Pre-Analysis Steps: Interviews, Questionnaire, Observation, Documentation and Notations; the Bus Stop Problem Domain Example. Analysis: The Analysis Overview; the Problem Statement; the ATM example; Object Modeling in ATM; Dynamic Modeling in A TM; Functional Modeling in A TM; Adding Operations; Iterating Analysis; Recording Analysis.

UNIT-4

Design

How does Design differ from Analysis? The Logical and Physical Design; Qualities and Objectives of Analysis and Design; Measurable Objectives in Design; Planning for Design. System Design Overview of System Design; Breaking System into Subsystems; Identifying Concurrency; Allocating Subsystems to Processors and Tasks; Managing Data Stores; Handling Global Resources; Choosing Software Control Implementation; Handling Boundary Conditions; Setting Trade-Off Priorities; Common Architectural Frameworks; the Architecture of A TM System.

UNIT-5

The object design paradigm:

Overview of Object Design; Class Specifications; Interfaces; Criteria for Good Design; Designing Algorithms; Design Optimization; Implementation of Control; Adjustment of Inheritance; Design of Associations; Integrity Constraints; Object Representations; Physical Packaging; Documenting Design Decisions.

UNIT-6

The Human Computer Interaction

What is Human Computer Interaction? , Qualities of Good User Interface; Approaches to User Interface Design; the Standards and Legal requirements. The Programming Style The Object-Oriented Style; Extensibility and Robustness; Programming-in-the-Large; Late Binding and Early Binding. Reusable Components What is meant by Reuse? , Why Reuse? ,Planning Strategy for Reuse; the Reusability approaches.

Software Development Methodologies The Method and the Methodology; Why use Methodology?, the Unified Software Development Process; Participative Design Approaches; Issues in Choosing Methodology; Hard Vs Soft Methodologies. (Practical Implementation in "C++")

Textbooks:

- Object Oriented Modeling and Design; James Rumbaugh, Michael Blaha, Pearson Education

References:

- Object Oriented System Analysis and Design using UML; Second Edition; Simon Bennett, Steve McRobb, Ray Farmer; Tata McGraw Hill; 2004.
- Object Oriented Analysis and Design with Applications; Second Edition; Grady Booch; Pearson Education.
- Object Oriented Analysis and Design; Andrew Haigh; Tata McGraw Hill; 2001.

55CS4: Operating Systems

UNIT-I

Introduction: Evolution of OS, Types of OS, Basic h/w support necessary for modern operating systems, services provided by OS, system programs and system calls, system design and implementation.

UNIT-II

File systems: File concept, Access methods, Disk space management and space allocation strategies, directory structures, Recovery, Log-structured File System, disk arm scheduling strategies.

UNIT-III

Scheduling: Process concept, process control block, Types of scheduler, context switch, threads, multithreading model, goals of scheduling and different scheduling algorithms, examples from WINDOWS 2000 & LINUX.

UNIT-IV

Memory management: Contiguous allocation, Relocation, Paging, Segmentation, Segmentation with paging, demand paging , page faults and instruction restart , page replacement algorithms , working sets , Locality, Thrashing, Garbage Collection .

UNIT-V

Process cooperation and synchronization: Concurrency conditions, Critical section problem, software and hardware solution, semaphores, conditional critical regions and monitors, classical inter process communication problems.

UNIT-VI

Deadlocks & Protection: Deadlock definition, Prevention, Avoidance, Detection and recovery, Goals of Protection, access

matrix, implementation, Security problem.

BOOKS:

- Operating System concepts – Silberchatz & Galvin, Addison Wesley, 6th Edn.
- Modern Operating Systems – Tanenbaum, Pearson Edn. 2nd edn.

Reference Books:

- Operating System –Milan Milenkovic
- Operating Systems, 3rd Edition by Gary Nutt, Pearson Education

55CS5: Concept In Programming Language

UNIT I

Definition of Programming language, Implementation of high-level languages, Data elements, binding time, binding identifiers to names, binding of attributes, Binding time. Concept of r-value and l-value and their implementation. Effect of Environment on a language, Language paradigms. Language translation issues.

UNIT II

Data type, Type checking and type conversion, elements of specification and implementation of data type. Implementation of elementary data types: integer, real, character, Boolean Pointer, enumerated type Implementation of structured data types. Vectors & arrays, Sets, Files.

UNIT III

Abstract data type, encapsulation. Implementation of new data types, Subprogram definition and activation, their Implementation, parameter passing methods, generic subprograms, Scope rules

UNIT IV

Type equivalence, type definitions with parameters, Implementation of Inheritance. Storage management issues like static and dynamic allocation, stack based allocation and management, Heap based allocation and management.

UNIT V

Sequence control, Implicit and explicit sequence control, Sequencing with arithmetic expression, Sequence control between statements, prime programs, implementation of case statement,

UNIT VI

Subprogram sequence control, recursive and non recursive subprogram. Data control, referring environment, dynamic and static scope, static chain implementation and display implementation.

BOOKS:

- Programming Languages, 1st edition by T.W. Pratt and M.V. Zelkowitz & T. V. Gopal by Pearson Education, 2006
- Programming Languages, Ravi Sethi, Addison Wesley.

55CS6: System Programming

UNIT 1:

IBM 360/370 & Assembler– Introduction to System Programming & its components, M/c Architecture, Data Formats & Register Formats, Concept of assembler, design of single pass and two pass assembler.

UNIT 2:

Microprocessor- Concept of macro, macro call within macro, macro definition within macro, recursive macro calls, design of macro processor.

UNIT 3 :

Linker and Loader- Concept of static and dynamic relocation, external symbols, design of linker, design of object file for different loading schemes.

UNIT 4:

Common Object file format & System Utilities- Structure of object file and executable file, section or segment headers, symbol table, concept of storage class, string various, data types line insert, character, arrays structures. Source code control system, make, link editor, symbolic debugger.

UNIT 5:

Unix Device Drivers- Definition, Anatomy and Types, Device programming, Installation, Incorporation of driver routines, Basic device driver operation, Implementation with Line Printer & Disk, Comparative study between device drivers for UNIX & Windows.

UNIT 6:

Compiler- Phases of Compilers, Overview of Databases and Algorithms required for all phases. Role of lexical analyzer, recognition of tokens, Study of LEX & YACC.

Books:

- System Programming- J. J. Donovan.
- System Programming and Operating systems- D. M. Dhamdhare
- Unix system Utilities manual.
- Unix programming Environment- Keringham and Pike, Pearson Education
- Unix Device Drivers- George Pajari, Pearson Education.

