System Programming

Course Title : System Programming

Course Code: : CS311

Credits : 03

Unit I: Language Processors
Introduction, Language processing activities, Fundamentals of language processing, Fundamentals of language specification, Language processor development tools.

Unit II: Assemblers
Elements of assembly language programming, a simple assembly scheme, pass structure of assemblers, design of a two pass assembler, a single pass assembler for IBM PC.

Unit III: Macro Processors
Macros facility, Macro definition and call, Macro Expansion, Nested macro calls, Advanced macro facilities, Design of macro preprocessor.

Unit IV: Compilers and Interpreters
Aspects of compilation, memory allocation, compilation of expressions, compilation of control structures, code optimization, Interpreters.

Unit V: Linkers & Loaders
Relocation and linking concepts, design of a linker, Self-relocating programs, a linker for MS DOS, Linking for overlays, Loaders.

Unit VI: Software Tools
Software tools for program development, Editors, Debug monitors, Programming Environments, User interfaces, DLLs

Text Books :

1. "System Programming and Operating Systems", D. M. Dhamdhere, TMGH, 2nd Edition.

Reference Books :

1. "System Programming", J. J. Donovan, Mc-Graw Hill.
2. "Systems Programming" by A A Puntambekar and I A Dhotre
3. "System Programming and Compiler Construction (Includes Labs)" by R K Maurya and Anand A Godbole

Computer Algorithm

Course Title : Computer Algorithm

Course Code: : CS311

Total Credits : 03+01=04

Unit 1 Introduction
What is algorithm, Algorithm Specification, Performance Analysis, heap.

Unit 2 Divide and Conquer
The general method, Binary search, Finding the maximum and minimum, Merge sort, Quick sort, and analysis of these algorithms.

Unit 3 The Greedy Method
The general method, Knapsack problem, Job sequencing with deadlines, minimum-cost spanning trees – Prim's and Kruskal's Algorithms, Optimal storage on tapes, Single source shortest paths.

Unit 4 Dynamic Programming
The general method, Multistage graphs, All pair shortest paths, Optimal binary search trees, 0/1 knapsack, Reliability design, Traveling Sales person problem.

Unit 5 Backtracking
The general method, 8-queen problem, sum of subsets, Knapsack Problem, Hamiltonian Cycle, and Graph Coloring.

Unit 6 Basic Traversal and Search Techniques and Polynomial Problems

Techniques for Binary Trees, Game Tree; Techniques for Graphs – Breadth First Search & Traversal, Depth First Search & Traversal, AND/OR graphs; Connected components and Spanning Trees; Bi-connected components and depth first search. NP Hard and NP Complete.

Text Books :

1. "Fundamentals of Computer Algorithms", Horowitz, Sahni and Rajasekaran, Galgotia Publications.

Reference Books :
1. "Fundamentals of Computer Algorithms", Horowitz and Sahni, Galgotia Publishers.
2. "Design and Analysis of Algorithms", Aho, Hopfcraft and Ullman, Addison Wesley.
3. "Introduction to Algorithms", Thomas Cormen, PHI Publication.
4. "Introduction to Design and Analysis of Algorithm", Goodman, McGraw Hill.

Operating System-I

Course Title : Operating System-I

Course Code: : CS313

Total Credits :03+01=04

Unit: I Introduction
What is an operating system?, Simple Batch System, Multi programmed Batch System, Time Sharing System, Personal Computer System, Parallel System, Real Time System, System Calls.

Unit: II Process
Process Concept, Process Scheduling, Operation on process, Cooperating process, Threads, Inter process communication (Algorithm evaluation). Process Scheduling: Basic concept, Scheduling Criteria, Scheduling Algorithms, Multiple processor scheduling, real time scheduling.

Unit: III Interprocess Synchronization
Background, Classical problems of synchronization, Critical Region, The critical section problem, Synchronization Hardware Monitors, Semaphores.

Unit: IV Deadlocks

System modes, Deadlock characterization, Methods for handling, deadlocks Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock, combined approach to dead lock.

Unit: V Memory Management

Background, Logical Versus Physical Address space, Swapping Contiguous Allocation, Paging, Segmentation, Segmentation with paging. Virtual Memory: Background, Demand paging, Page replacement, Page replacement algorithms, Allocation of frames, Thrashing, Demand segmentation.

Unit: VI I/O System

Overview, I/O hardware, Application I/O interface, Kernel I/O subsystem, Transforming I/O request to hardware operation.

Text Books :

"Operating System Concepts", Silberschatz Galvin, John Wiley, 5th Edition.

Reference Books :

1."Operating System Concepts and Design " , Milan Milenkovic TMGH Second Edition
2. "Operating System A Design Oriented Approach", Charles Crowley, TMGH.
3. "Operating System with Case Studies in Unix, Netware and Windows NT", Achyut S. Godbole, TMGH.

Software Engineering

Course Title : Software Engineering

Course Code: : CS314

Credits : 03

Unit: I Introduction & Software Processes:

The S/W problem, S/W applications, the S/W Engineering Approach & Benefits. Software Process, Characteristics of a software process, Software development process, project management process, Software configuration management process, process management

process

Unit:II S/W requirements Engineering & Planning Software Project:
S/W requirements, problem Analysis, Requirements Specification, validation, metrics. Project Management Plan, a. Cost estimation, project scheduling, staffing and personnel planning. b. Software Configuration Management plans, Quality Assurance plans. c. Project Monitoring Plans, Risk Management.

Unit:III Software Design:
Objective, Design principles, module level concepts, Design notation and specifications, Artifacts system design document & detailed design document, Structured Design methodology, Verification, Metrics.

Unit:IV Object Oriented Design with UML:
Introduction , Object Technologies, Unified Process, Use Case Model : methods, Use Case View - Use Case diagrams, Activity diagrams, Design Views- Class Diagrams, Interaction Diagrams, State Chart Diagrams, Process View- Class and Interaction Diagrams, Implementation View- Component Diagrams, Deployment View- Deployment Diagrams. (Case studies on UML views for business requirements).

Unit:V Coding & Software Testing:
Programming Practice, verification, Metrics: Testing Fundamentals, Testing Levels, Functional testing, Structural testing, Testing object oriented programs, Regression Testing, Testing process Metrics- Reliability Estimation.

Unit:VI Software Quality & Project Monitoring and Control:
Objectives, need for improvement, cost of Quality, Software quality factors, Total Quality Management, Quality standards such as ISO, CMM and CMMI along with their comparison, Six Sigma Project Manager Skills, Team management, Project tracking, milestone analysis, Activity – level Analysis using SPC, Defect Analysis and prevention, Process monitoring and Audit.

Text Books :

1. "An integrated approach to S/W engineering", Pankaj Jalote, Narosa Publishers, 2nd Edition.
2. "Software Project Management in practice", Pankaj Jalote, Pearson

Education.

Reference Books :

1. "Software Engineering: Practitioner's Approach", Roger S. Pressman.
2. "Software Engineering", Jawadekar W.S, TMGH.
3. "Managing Software Engineering: CASE studies and solutions", Gillies A.C. and Smith P, Chapman and Hall, London.
4. "Object oriented software concepts", Bertrand Mayer.

Computer Graphics and Multimedia Techniques

Course Title : Computer Graphics and Multimedia Techniques

Course Code: : CS315

Credits : 03

Unit 1 Introduction to Graphics Devices:
Display Devices and Adapters, Working of Printers, LCD Display.

Unit 2 Transformations:
Basic 2D & 3D transformations - Translation, Scaling, Rotation, Reflection, Shearing, Multiple Transformations, Rotation about an axis parallel to a coordinate axis, Rotation about an arbitrary axis in space, Affine and Perspective Geometry, Orthographic projections and Axonometric projections.

Unit 3 Raster Scan Graphics:
Bresenham's line and circle drawing algorithms, Scan Conversion techniques: RLE, Frame Buffer, Scan converting polygons: Edge fill and Seed fill algorithms, Anti- aliasing and Half-toning.

Unit 4 Viewing and Clipping:
Introduction, Windowing and View-porting, Introduction to clipping, Point clipping, Line clipping: Sutherland - Cohen line clipping algorithm.

Unit 5 Curves and Surfaces
Curve Representation, Non-parametric and parametric curves, representation of space curves, Cubic Spline, Parabolic Blended curves, Bezier curves and B-spline curves, Z- buffer, Warnock algorithm.

Unit 6 Multimedia Applications

Media preparation, composition, integration, communication, entertainment using commercial tools

Text Books :

1. "Mathematical elements for Computer Graphics" - David F. Rogers, J. Alan Adams (MGH Int.) (For chapters 1, 2, 5)
2. "Procedural elements for Computer Graphics" - David F. Rogers, (MGH Int.) (For chapters 3, 4)
3. "Multimedia Making it Work", Tay Vaughan, TMGH, 5th Edition.
4. "Multimedia Communication", Fred Halsall, Pearson Education.

Reference Books :

1. Newman Sproul, "Principles of Interactive Computer Graphics" - (MGH) (chapters 1,4)
2. Prof. Rajesh Maurya, "Computer Graphics" (Wiley India Pvt. Ltd.) (Chapter 4)
3. Hearn & Baker, "Computer Graphics".
4. Ranjan Parekh, "Principles of Multimedia", TMGH