Interactive Syllabus-Sem: 1st & 2nd  Common Papers

UNIT 1: INTRODUCTION
 Definition, Application areas of Computer graphics, Graphical user interface, Cathode ray tubes.

RANDOM & RASTER DISPLAYS
 Random scan displays, Raster scan displays (with introduction to flickering, interlacing. American standard video etc),

HARDWARE
 Color CRT monitors, Flat panel displays (Plasma Panels, Liquid crystal displays, Electroluminescent displays), Graphics software (GKS, PHIGS ), Color Models (RGB, CMYK, HSV, Lookup Tables etc.)

UNIT 2: RASTER GRAPHICS ALGORITHMS
 Raster Graphics Algorithms: Line drawing algorithms (DDA, Bresenham’s algo), Circle and Ellipse drawing algorithms

2-D TRANSFORMATIONS
 2-D Transformations and Projections: Transformations (Rotation, Reflection, shearing, scaling), Homogeneous coordinate representation, Translation.

UNIT 3: 3-D TRANSFORMATIONS
 3-D Transformations: Transformations (Rotation, Reflection, shearing, scaling), Homogeneous coordinate representation, Translation.

3-D PROJECTIONS
 Projection classification, Parallel projections, Perspective projections (One point, Two).

UNIT 4: CLIPPING
 Two dimensional Clipping, Viewing pipeline, window and viewport, Sutherland Cohen sub division algorithm, Cyrus-beck algorithm.

VISIBLE SURFACE DETECTION METHODS
 Classification of visible surface detection algorithm, Backface algorithm, Depth sorting method, Area subdivision method etc.

SUGGESTED READINGS:

Subject: Advanced Computer Architecture  Code: MT 12

SECTION A
 Overview: Register and bus organized computers and instruction execution. Output, input memory and control organization. Hard-wired and Micro programmed control.


SECTION B

SECTION C
 Memory Organization: Types of memories-serial access, random access and semi-random access, core, semiconductor and bubble memories, memory device characteristics-density, speed, access time, costs, destructive non-destructive read out, static memories, dynamic memories and memory refresh. Word length and size of memory, memory expansion. Fixed &

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variable length word organization of Memories. Main memory, memory hierarchy, memory references, address mapping, relocation mechanism, concepts of memory compaction, principles of virtual memory, segmentation and paging.

SECTION D
Interleaved memories and principles of address interleaving. Associative memories- word organized associative memory, masking. Hardware protection features in multi-programmed systems.
Input-Output systems: Programmed I/O, DMA, Interrupt control, I/O processors.
Operating Systems: Introduction, concurrency control, system management.
Parallel Processing: Introduction types of parallel processors, performance considerations, pipelined.

References:
1. John P. Hayes, Computer Architecture & Organization, McGraw-Hill Publisher
3. TanejaGauri, Computer Organisation & Architecture, Practice Hall of India

Subject: Algorithm Analysis and Design Code: MT 13

UNIT 1: TREES
Search Trees, AVL trees, threading.

STORAGE MANAGEMENT:
Run time storage management, garbage collection and compaction.

SORTING TECHNIQUES
Insertion sort, quick sort, merge sort, heap sort selection sort, radix sort, external sort; lower bound for sorting by compression of keys.

UNIT 2: SHORTEST SPANNING TECHNIQUES
Selection and adversely argument Traversal: minimum spanning tree.

SHORTEST PATH
Shortest path, graph component algorithms, String Matching KMP and Boyer Moore algorithms

UNIT 3: GREEDY ALGORITHMS:

DYNAMIC PROGRAMMING
Matrix multiplication and optional binary search tree algorithms.

UNIT 4: NP COMPLETE PROBLEM
Complexity classes P and NP; examples of problems in the NP class.

PARALLEL ALGORITHMS
Parallelism, PRAM and other models, Parallel algorithms finding, maximum element in a list, merging and sorting.

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Subject: Advanced DBMS

Unit 1 Introduction
Introduction, History, Database models, Flat Model, Hierarchical Model, Network Model, Relational Model, Relational Operations, Normal Forms, First Normal Form, Second Normal Form, Third Normal Form, Boyce-Codd Normal Form, Fourth Normal Form, Domain/Key Normal Form, Dimensional Model, Object Database Models, Post-relational Database Models, Database Internals, Indexing, Transactions and Concurrency, Replication.

Query Processing

Advanced Data Management Systems

Unit 2 Advanced Data Modeling

SQL 3 – Querying Complex Objects

Unit 3 Object Oriented Databases
Introduction, Query Processing in Object-Oriented Database Systems, Type System Encapsulation, Complex Objects and Inheritance, Object Models, Query Processing Architecture, Query Processing Methodology, Object – Relational Database Implementation, DB Components, DB Design, From Requirement Analysis to DB Specification, Schema Architecture, SQL3 DB specification, Complex’s, Hierarchical’s Relationships, Large Objects, LOBs, Storage of LOBs.

Data Warehouse & Data Mining
Introduction, History of Data Warehousing, Data Warehouse Architecture, Data Storage Methods, Advantages of using Data Warehouse, Introduction to Data Mining, Data dredging, Data Mining Functions, Classification, Associations, Sequential/Temporal patterns, Clustering/Segmentation, IBM - Market Basket Analysis example, Data Mining

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Distributed Database Systems and Data Replication

Transaction Management in Distributed Database Management

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Subject: OO Software Engineering with UML  

Code: MT 21

SECTION A
Software Project Planning: Problems, goals and requirements of software development and the case for engineered software, measures of productivity, software development cost factors and cost estimates. Planning software development - resource estimation and planning.

Specifications of Software: Specification drafting phase and the process of refinement, specification formats and specification depths, specification recording methods specially in relation to updating.

SECTION B
Software Design Techniques and Tools: Top down, bottom up design, data flow oriented, data structure oriented, object oriented and real time design.

Software Development Methodology and Tools: CASE concepts, CASE methodology and CASE tools. Other software development tools

Software Testing: Types of tests - module testing, integration testing, top down versus bottom up testing, mixed testing, statistical testing, comparisons of test methods, graph model, debugging techniques. Choice of test data, generation.

SECTION C
Software Complexity: Complexity measurement – Heuristic measurement of complexity, instruction count, statistical measurement, graph theoretic complexity measurement. Complexity versus number of errors and development time. Memory requirements and processing time.

Software Reliability: Concepts of software reliability – Probabilistic and deterministic models, failure model.

SECTION D
Management of Software Development Project: Monitoring the project, effective communication between the development teams, prototype development and intermediate review.

Software Evaluation.

UML: Introduction to UML, Classes, Relationships, Common mechanism, Diagrams and class diagrams.

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Subject: AI and Neural Networks

Code: MT 22

Section A
1. Introduction to Artificial Intelligence: Overview of AI ~ Definition of AI ~ Relationships between AI Systems and other computing systems ~ comparison between AI Programming and other conventional programming ~ AI and related fields ~ key issues in AI Research ~ AI Problems ~ Examples ~ Problem spaces ~ production systems and characteristics ~ knowledge ~ General concepts

Section B
2. Knowledge Representation: Approaches to knowledge representation ~ Issues in knowledge representation ~ Formal systems ~ basic concepts ~ Symbolic logics ~ syntax and semantics of FOPL ~ properties of wff ~ clausal forms ~ resolution principle ~ Examples of Resolution ~ Structural knowledge ~ graphs ~ frames ~ CD’s and Scripts ~ Probability reasoning ~ Bayesian Networks ~ Dempster Shafer theory ~ Non Monotonics Reasoning ~ TMS, Model and Temporal Logics ~ Fuzzy sets & Fuzzy Logics

Section C

Section D
4. AI Languages: LISP ~ Basic Limit manipulation functions ~ predicates ~ conditionals ~ Inputs ~ Output and Local variables ~ Iteration and Recursion in LISP ~ Property lists and arrays ~ Prolog ~ Introduction ~ Facts ~ questions ~ variables ~ conjunctions ~ syntax of character ~ Operators ~ Equality ~ matching ~ arithmetic expressions ~ Goals ~ Back tracking ~ cut predicates ~ Input and Output Operations

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