

DIRECTORATE OF DISTANCE EDUCATION
KURUKSHETRA UNIVERSITY KURUKSHETRA
 (Established by the State Legislature Act XII of 1956)
 ("A+" Grade, NAAC Accredited)

Scheme of Examination M.Sc. Computer Science (Software) 2nd Year / MCA 2nd Year (w.e.f. 2019-20)					
Paper Code	Nomenclature	Max. Marks			Pass Marks
		External	Internal	Total	
CS-DE-21	Computer Graphics	80	20	100	35
CS-DE-22	Object Oriented Analysis and Design using UML and C++	80	20	100	35
CS-DE-23	Software Engineering	80	20	100	35
CS-DE-24	Visual Programming	80	20	100	35
CS-DE-25	Artificial Intelligence	80	20	100	35
CS-DE-26	Software Lab-I (C++)	80	20	100	35
CS-DE-27	Software Lab-II (VB)	80	20	100	35
	Total Marks			700	245

CS-DE-21 COMPUTER GRAPHICS

Maximum Marks: 100

Minimum Pass Marks: 35

Time: 3 hours

External: 80

Internal: 20

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus. All questions will carry equal marks.

Students will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, students will have to attempt four more questions selecting one question from each Unit.

UNIT – I

Introduction to Computer Graphics and its applications; Components and Working of Interactive Graphics; Display Processors; Look-up table; Popular Graphics Softwares; Coordinate Systems;

Graphics Devices: Raster scan and Random Scan systems, Resolution, Aspect Ratio, Refresh CRT, Color CRT monitors, Plasma Panel and LCD monitors, Interlacing; Grey shades; Interactive Input Devices: Pointing Devices, Image and Video Input Devices; Hard Copy Devices: Printers, Plotters;

UNIT – II

Drawing Geometry: Points and Lines; Output Primitives: Symmetrical and Simple DDA line drawing algorithms, Bresenham's line drawing; loading frame buffer; symmetrical DDA for drawing circle; DDA approach for drawing a Circular Arc; Polynomial method for Circle drawing; Circle drawing using Polar coordinates, Bresenham's circle drawing; generation of ellipse;

Line Styles; Generation of Bar Charts, Pie-Charts; Parametric representation of Cubic Curves; Bezier curves; Anti-Aliasing;

UNIT – III

2-D Transformations: Geometric Transformations, Coordinate Transformations, Translation, Rotation, Scaling; Matrix representations and Homogeneous Coordinates; Composite transformations; general pivot point rotation; general fixed point scaling; Shearing; Reflection about X- Axis and Y- Axis; Reflection through an Arbitrary Line; General Concatenation Properties;

2-D Viewing: Window, Viewport; Window-to-Viewport coordinate transformation, Zooming, Panning; Clipping operations: Point and Line clipping, Cohen-Sutherland line clipping, Mid-point Subdivision line clipping, Liang-Barsky line clipping, Sutherland-Hodgman polygon clipping;

UNIT – IV

Graphical User Interface; Input of Graphical Data: Logical Classification of Input Devices; Interactive Picture Construction Techniques; Positioning Constraints; Grids; Gravity Field; Rubber-Band technique; Dragging; Polygon Area Filling: Flood Fill ; Scan-line fill algorithm; Boundary Fill; 3-D Graphics: 3-D modeling of objects, 3D Geometric transformation; Parallel projection; Perspective projection; Hidden surface removal: Back Face removal, Z-buffer, Scan line, Depth-Sorting, Area subdivision, Ray-Tracing, BSP Tree; Colours and Shading: Modelling light intensities, Gouraud shading, Phong shading; Introduction to animation; Tweening;

Text book:

1. Donald Hearn, M. Pauline Baker, Computer Graphics, PHI.

Reference books:

1. Apurva A.Desai, Computer Graphics, PHI.
2. D.P.Mukherjee, Debasish Jana, Computer Graphics: Algorithms and Implementations, PHI.
3. D.P. Mukherjee, Fundamentals of Computer Graphics and Multimedia, PHI.
4. Newmann & Sproull, Principles of Interactive Computer Graphics, McGraw Hill.
5. Foley etc., Computer Graphics Principles & Practice, Addison Wesley.
6. Rogers, Procedural Elements of Computer Graphics, McGraw Hill.
7. Anirban Mukhopadhyay, Arup Chattopadhyay, Introduction to Computer Graphics and Multimedia, Vikas.
8. Zhigang Xiang, Roy Plastock, Computer Graphics, Tata McGraw Hill.
9. Malay K. Pakhira, Computer Graphics, Multimedia and Animation, PHI.

CS-DE-22 OBJECT ORIENTED ANALYSIS & DESIGN USING UML AND C++

Maximum Marks: 100
External: 80

Minimum Pass Marks: 35
Internal: 20

Time: 3 hours

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Students will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, students will have to attempt four more questions selecting one question from each Unit.

Unit I

Introduction to UML: History of UML, Principles of Modeling, Overviews of UML Views, Things – Structural, Behavioral, Grouping and Annotational Things, Relationships in UML, Adornments, Stereotypes, Tagged Values, Constraints, Overviews of UML Diagrams, Class Modelling using UML: Object, Class, Link, Association, generalization & Inheritance, Association Ends, N-ary associations, Aggregation vs Composition, Abstract Classes, Metadata, Reification, Constraints, Derived Data, Drawing Class Diagrams.

Unit II

State Modeling with UML: Events, States, Transitions, Conditions, Action, Activity, State Diagrams, Nested States, Signal Generalization, Concurrency, Relationships between Class and State Models.

Interaction Modeling: Use Case Models – Actors, Use Cases, Include & Extend Relationships, Use Case Diagrams; Sequence Models – Scenarios, Sequence Diagrams; Activity Models – Activities, Branches, Concurrent Activities, Swim Lanes, Activity Diagrams.

System Design: Estimating System Performance, Making a Reuse Plan, Breaking a System into Subsystems, Identify Concurrency, Allocate Subsystems to Hardware, Managing Data Stores, Handling Global Resources, Choosing a Software Control Strategy, Handling Boundary Conditions, Setting Trade-Off Priorities, Selecting an Architectural Style.

Unit III

Introduction to C++: Class and Objects, Inline functions, Static data members and members functions, Dynamic memory allocation and de-allocation, constructors and destructors, unformatted and formatted I/O operations. Compile-time Polymorphism in C++: unary and binary; arithmetic and relational operators; Friend Function and its need, Friend Class, Function overloading, overloading operators through friend function.

Unit IV

Inheritance in C++: Derivation Rules, Single Inheritance, Multiple Inheritance, Hierarchical Inheritance, Multilevel Inheritance, Roles of constructors and destructors in inheritance.

Run-time Polymorphism in C++: Virtual functions and their needs, Pure virtual function, virtual derivation and its need, abstract class.

Generic programming & Exception Handling in C++: Template function, Template class, Exception handling features of C++.

Text Books:

1. M. Blaha , J. Rumbaugh , Object-Oriented Modeling and Design with UML , pearson Education-2007
2. Herbert Schildt, C++, the complete Reference, Tata McGraw-Hill

Reference Books:

1. Bjarne Stroustrup , The C++ Programming Language , pearson
2. Satzinger, Jackson , Burd , Object-Oriented Analysis & Design with the Unified Process , Thomson -2007
3. Lippman , C++ Primer , 3/e, Addison –Wesley
4. Balaguruswami, E., Object Oriented Programming In C++ , Tata McGraw-Hill

CS-DE-23 SOFTWARE ENGINEERING

Maximum Marks: 100
External: 80

Minimum Pass Marks: 35
Internal: 20

Time: 3 hours

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Unit-I

Introduction: Software Crisis-problem & causes, Software Processes, Development models: Waterfall, Prototype, Evolutionary & Spiral models, Quality Standards like ISO 9001, SEI-CMM.

Requirement Analysis: Structured Analysis, Behavioral & non-behavioral requirements, Software requirement specification: components & characteristics, Function point metric.

Unit-II

Software Project Planning: Cost estimation, static, Single & multivariate models, COCOMO model, Putnam Resource Allocation Model, Risk management, project scheduling, personnel planning, team structure, Software configuration management, quality assurance, project monitoring.

Unit-III

Software Design: Fundamentals, problem partitioning & abstraction, design methodology, Function Oriented Design, Cohesion, Coupling & their classification, User Interface Design, Detailed design, Information flow metric, Cyclomatic complexity.

Coding: Style, structured programming, Metrics: LOC, Knot count, live variable, Halstead's measures.

Unit-IV

Testing: Static & dynamic testing, Functional testing: Boundary Value Analysis, Equivalence class testing, Decision table testing, Cause effect graphing; Structural testing: Control-flow & data-flow based testing, loop testing, mutation testing; performance testing; testing strategies: unit & integration testing, System testing, Alpha & Beta testing, debugging.

Maintenance: Types & characteristics of maintenance, Reverse Engineering & Re-engineering.

Text Books:

1. Pressman R. S., "Software Engineering – A Practitioner's Approach", Tata McGraw Hill.
2. Jalote P., "An Integrated approach to Software Engineering", Narosa.

Reference Books:

1. Sommerville, "Software Engineering", Addison Wesley.
2. Fairley R., "Software Engineering Concepts", Tata McGraw Hill.
3. James Peter, W Pedrycz, "Software Engineering", John Wiley & Sons.

CS-DE-24 VISUAL PROGRAMMING

Maximum Marks: 100
External: 80

Minimum Pass Marks: 35
Internal: 20

Time: 3 hours

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Students will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, students will have to attempt four more questions selecting one question from each Unit.

UNIT-I

Introduction to Visual Basic: VB IDE, An overview of VB project types, VB as event-driven & object-based language, Default controls in Tool Box

Programming with VB: Variables, Constants, Data types, Arithmetic operators, String Operations, Built-in function, I/O in VB, Branching & Looping statements, Procedures, Arrays, collection.

UNIT-II

Menus and Dialog Boxes: Adding menus and manipulating, using Common Dialog Box

Working with Forms: Working with multiple forms, MDI form, loading, showing and hiding forms, drag and drop operation

Advanced Controls in VB: Scroll Bar, Slider Control, TreeView, List View, RichText Box Control, Toolbar, Status Bar, Progress Bar, Cool bar, Image List, Tab Strip.

UNIT-III

File Handling & File Controls: Working with sequential & random files, performing operations on a file

Working with Graphics: Using Paint, Line, Circle, RGB and other related method, manipulating graphics.

OOP in VB: Classes, Creating a new Class, Creating a new object using a class, choosing when to create New Objects, The Initialize & Terminate events.

UNIT-IV

ActiveX: Creating & using ActiveX Controls, Creating & using ActiveX Documents, ActiveX EXE, and ActiveX DLL

Accessing Database: Creating the database files for use by Visual Basic , Using the Data Control ,setting its property, Using Data Control with forms, navigating the database in code, checking for BOF & EOF, using listboxes & combo boxes as data bound controls, updating a database file .

Text Books:

1. Visual Basic 6 Programming : Black Book By Steven Holzner dreamtech PRESS
2. Mastering Visual Basic 6 By Evangelos Petroutsos BPB
3. Programming in Visual Basic 6.0 By Julia Case Bradley & Anita C. Millspaugh Tata McGraw-Hill Edition

Reference Books:

1. Step by Step Microsoft Visual Basic 6.0 Professional By Michael Halvorson PHI
2. Visual basic 6 Complete BPB
3. Teach Yourself Visual basic 6 By Scott Warner Tata McGraw-Hill Edition
4. Using Visual Basic 6 Special Edition By Brian Siler and Jeff Spotts PHI

CS-DE-25 ARTIFICIAL INTELLIGENCE

Maximum Marks: 100
External: 80

Minimum Pass Marks: 35
Internal: 20

Time: 3 hours

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Students will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, students will have to attempt four more questions selecting one question from each Unit.

UNIT – I

Introduction: Background and history, Overview of AI applications areas.

Predicate calculus: Syntax and semantic for propositional logic and First Order Predicate Logic (FOPL), Clausal form, inference rules, resolution and unification.

Knowledge representation: Network representation-Associative network & conceptual graphs, Structured representation- Frames & Scripts.

UNIT – II

Search strategies: Strategies for state space search, data driven and goal driven search; Search algorithms- uninformed search (depth first, breadth first, depth first with iterative deepening) and informed search (Hill climbing, best first, A* algorithm, mini-max etc.), computational complexity, Properties of search algorithms-Admissibility, Monotonicity, Optimality, Dominance, etc.

UNIT – III

Production system: Types of production system-commutative and non-commutative production systems, Decomposable and non-decomposable production systems, Control of search in production system.

Expert systems: Architecture, development, managing uncertainty in expert systems - Bayesian probability theory, Stanford certainty factor algebra, Nonmonotonic logic and reasoning with beliefs, Fuzzy logic, Dempster/Shaffer and other approaches to uncertainty.

UNIT – IV

Knowledge acquisition: Types of learning, learning automata, genetic algorithms, intelligent editors, learning by induction.

AI Programming Language: PROLOG: Introduction, Clauses: Facts, goals and rules. Prolog unification mechanism, arithmetic operator, list manipulations, Fail and Cut predicates.

Text Books:

1. George F. Luger, Artificial Intelligence, 5th edition, Addison Wesley, 2008.
2. Dan W. Patterson, Introduction to Artificial Intelligence and Expert system PHI.

Reference Books:

1. Ben Coppin, Artificial Intelligence Illuminated, Narosa Publishing House – 2005.
2. Nils J. Nilsson Principles of Artificial Intelligence Narosa publishing house.