

## OTHER DEPARTMENT ELECTIVES LIST

<b>Subject Code</b>	<b>Subject</b>
UCS001N	Data Structures Using C
UCS002N	Computer Graphics and Visualization
UCS003N	Artificial Intelligence & Expert Systems
UCS004N	Web Programming

UCS001N

DATA STRUCTURES USING C

3 CREDITS

Hours/Week: 03

Total Hours: 40

CIE Marks: 50

SEE Marks: 50

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### UNIT I

10 Hours

**Pointers:** Concepts, Pointer variables, Accessing variables through pointers, Pointer declaration and definition, Initialization of pointer variables, Pointers and functions, Pointer to pointers, Compatibility, Lvalue and Rvalue, Arrays and pointers, Pointer arithmetic and arrays, Passing an array to a function, Memory allocation functions, Array of pointers, Strings and pointers, array of strings, string manipulation functions, abstract data type, pointers to functions.

**Derived types-Enumerated, Structure and Union:** The type definition, Enumerated types, Structure, Accessing structures, Complex structures, Array of structures, Structures and functions, Unions, pointers to structures.

### UNIT II

10 Hours

**Files:** Concept of a file, files and streams, standard library i/o functions, fscanf, fprintf, character i/o functions, Classification of Files, creating, reading, printing and copying text file, Using Binary Files, Standard Library Functions for Files.

**Bitwise operators:** logical bitwise operators, shift operator, bitwise use.

**Preprocessor directives:** File inclusion, macro definition, and conditional compilation.

**Command line arguments:** Definition and use.

**Storage classes:** Types and type qualifiers.

**Separate compilation:** Writing separate compilation units, procedures for separate compilation units.

**Stack: Definition and Examples:** Primitive operations, stack as an abstract data type, Representing Stacks in C: Implementing pop operation, testing for exceptional conditions, implementing the push operations, An Example – Infix, Postfix, and Prefix: Evaluating postfix expression, program to evaluate a postfix expression, converting an expression from infix to postfix,

**Recursion:** Recursive Definition and Processes, Recursion in C, Writing Recursive Programs, Tower of Hanoi problem.

### UNIT III

10 Hours

**Queues: The Queue and its Sequential Representation:** The queue as an abstract data type, C implementation of queue, operations on queue, priority queue, array implementation of priority queue.

**Linked lists:** Linked list structure, primitive linked list functions traversing linked lists, building a linked list, linked implementation of stacks, getnode and free node operations, linked implementation of queues, linked list as a data structure, examples of linked list operations, list implementations of priority queues, **lists in C:** Array implementation of Lists, limitations of array implementations, allocating and freeing dynamic variables, linked lists using dynamic variables, Queues as lists in C, examples of list operations in C, comparing

dynamic and array implementations of lists, implementing header nodes, programming examples.

#### UNIT IV

**10 Hours**

**Other List structures :** Circular lists, stack as a circular list, queue as a circular list, primitive operations on circular lists, header nodes, doubly linked lists.

**Trees: Binary Trees :** operations on binary trees, applications of binary trees, Binary Tree Representations: Node representation of binary trees, Internal and external nodes, implicit array representation of binary trees, choosing a binary representation, Constructing a binary tree, binary tree traversals in C, threaded binary trees, applications of trees.

#### TEXT BOOKS:

1. Behrouz A. Forouzan and Richard F. Gilberg , Thomson, 2003, **Computer Science A Structured Programming Approach Using C, Second Edition.**  
(Chapter 4:4.1 to 4.5,Chapter 7:7.1-7.3,Chapter 9:9.1 to 9.9, Chapter 10:10.1 to 10.7 Chapter 11:11.1 to 11.5, Chapter 12:12.1 to 12.8, Chapter 13.1 to 13.3, Chapter 14, Chapter 15:15.1,to 15.3,Appendix G,I,J,K,L).
2. **Data Structure using C**, Aaron M. Tenenbaum, Yedidyah Langsam & Moshe J. Augenstein, Pearson Education/PHI, 2006. (Chapter 2, 3, 4 (except 4.4), 5 except (5.6),6,7).

#### REFERENCE BOOKS:

1. A Holistic approach to learning C, Basavraj S Anami,Shanmukhappa Angadi,Sunil Kumar S Manvi, PHI Publications 2007, **Computer Concepts and C programming.**
2. Richard F. Gilberg and Behrouz A. Forouzan, Thomson, 2005, **Data Structures A Pseudocode approach with C.**
3. Robert Kruse & Bruce Leung, Pearson Education, 2007, **Data Structures & Program Design in C.**

**UCS002N      COMPUTER GRAPHICS AND VISUALIZATION**  
**3 CREDITS**

**Hours/Week: 03**  
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**Unit I**

Introduction: Application of computer graphics, Elements of pictures created in computer graphics, graphics display devices, Basic raster graphics algorithms for drawing 2D primitives: Midpoint line & circle drawing algorithm, scan-line polygon filling algorithm, antialiasing,

10 hours

**Unit II**

2D geometric transformations: Basic transformations, 2D transformation matrix representations and homogeneous coordinates, composite transformations, window-to-view port coordinate transformation, clipping operations- Cohen Sutherland line clipping, Sutherland-Hogeman polygon clipping, 3D object representations: polygon surfaces, curved lines and surfaces, quadric surfaces,

10 Hours

**Unit III**

THE OPENGL: The OpenGL API; Primitives and attributes; Color; Viewing; Control functions; The Gasket program; Polygons and recursion; The three-dimensional gasket; Plotting implicit functions. INPUT AND INTERACTION: Interaction; Input devices; Clients and servers; Display lists; Display lists and modeling; Programming event-driven input; Menus;

10 Hours

**Unit IV**

VIEWING: Classical and computer viewing; Viewing with a computer; Positioning of the camera; Simple projections; Projections in OpenGL; Hidden-surface removal; Parallel-projection matrices; Perspective-projection matrices;  
LIGHTING AND SHADING: Light and matter; Light sources; The Phong lighting model; Computation of vectors; Polygonal shading; Light sources in OpenGL; Specification of materials in OpenGL; Shading of the sphere model;

10 Hours

**TEXT BOOK:**

1. Computer Graphics - OpenGL Version – Donald Hearn and Pauline Baker, 2nd Edition, Pearson Education, 2003
2. Interactive Computer Graphics A Top-Down Approach with OpenGL -Edward Angel, 5th Edition, Addison-Wesley, 2008.

**REFERENCE BOOKS:**

1. Computer Graphics – James D Foley, Andries Van Dam, Steven K Feiner, John F Hughes, Addison-wesley 1997.
2. Computer Graphics Using OpenGL – F.S. Hill,Jr. 2nd Edition, Pearson Education, 2001.

# UCS003N ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS

## 3 CREDITS

Hours/Week: 03  
Total Hours: 40

CIE MARKS: 50  
SEE Marks: 50

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### UNIT I

10 Hours

**Problems and Search** : Introduction, Concepts and definition of AI, AI Problems, The Underlying assumption, What is an AI technique?, AI characteristics, AI versus Natural Intelligence, Applications of AI. **Problems, Problem Spaces, and Search:** Defining the Problem as State Space Search, Production Systems, Problem Characteristics, Production Systems Characteristics, Advantages and Disadvantages of DFS & BFS Techniques. **Heuristic Search Techniques:** What is heuristic?, Heuristic Function, Importance of Heuristic Function, Examples, Search Techniques: Generate – and – Test, Hill Climbing, Best-First Search.

### UNIT II

10 Hours

**Knowledge Representation:** Representations and Mappings, Approaches to Knowledge Representation, Issues in Knowledge Representation. Procedural versus Declarative Knowledge, Logic Programming, Forward versus Backward reasoning, Matching. Approaches: Propositional Logic, Predicate Logic, Representing Simple Facts in Logic, Representing Instance and Isa Relationships, Computable Functions and Predicates, Resolution, Natural Deduction>**Structured Representation:** Approaches: Semantic Networks, Frames, Conceptual Dependency, Scripts, Etc.

### UNIT III

10 Hours

**Reasoning under Uncertainty:** Introduction to Nonmonotonic Reasoning, Logics for Nonmonotonic Reasoning, Augmenting a Problem Solver, Statistical Reasoning, Probability and Bay's Theorem, Certainty Factors and Rule-based Systems, Bayesian Networks, Dempster-Shafer Theory. **Game Playing:** Overview, The Minima Search Procedure, Adding Alpha-Beta Cutoffs, Additional Refinements, Examples. **Expert Systems:** Basic Concepts of Expert System, Structure of Expert Systems, The Human Element in Expert Systems, How Expert Systems Work, Example of an Expert System Consultation, Problem Areas Addressed by Expert Systems, Benefits of Expert Systems, Problems and Limitations of Expert Systems, Expert System Success Factors, Type of Expert Systems.

### UNIT IV

10 Hours

**Learning:** What is Learning?, Rote Learning, Learning by taking Advice, Learning in Problem Solving, Learning from Examples: Induction, Explanation-based Learning, Discovery Analogy, Formal Learning Theory, Neural Net Learning and Genetic Learning.

**Planning:** Overview, An Example Domain: The Blocks world, Components of a Planning System, Goal Stack Planning, Nonlinear Planning using Constraint Posting, Hierarchical Planning, Other Planning Techniques. **Natural Languages Processing & Understanding:** What is Understanding?, What makes Understanding Hard?, Understanding as Constraint satisfaction, Introduction to NLP, Syntactic Processing, Semantic Analysis, Discourse and Pragmatic Processing.

### **Text Books**

1. Elaine Rich, Kevin Knight, **Artificial Intelligence**, Second Edition, Tata McGraw Hill.
2. Efraim Turban and Jay E. Aronson, **Decision Support Systems and Intelligent Systems**, Sixth Edition 2002, Pearson Education Asia.

**UCS004N**

**WEB PROGRAMMING**

**3 CREDITS**

**Hours/Week: 03**

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**SEE Marks: 50**

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**UNIT - I**

**10 Hours**

**Fundamentals of Web, XHTML** : Internet, WWW, Web Browsers, and Web Servers; URLs; MIME; HTTP; Security; The Web Programmers Toolbox. XHTML: Origins and evolution of HTML and XHTML; Basic syntax; Standard XHTML document structure; Basic text markup. XHTML : Images; Hypertext Links; Lists; Tables; Forms; Frames; Syntactic differences between HTML and XHTML. CSS: Introduction; Levels of style sheets; Style specification formats; Selector forms; Property value forms;

**UNIT – II**

**10 Hours**

**CSS**: Font properties; List properties; Color; Alignment of text; The Box model; Background images; The <span> and <div> tags; Conflict resolution. **JAVASCRIPT**: Overview of Javascript; Object orientation and Javascript; General syntactic characteristics; Primitives, operations, and expressions; Screen output and keyboard input; Control statements; Object creation and modification; Arrays; Functions; Constructor; Pattern matching using regular expressions; Errors in scripts; Examples.

**UNIT – III**

**10 Hours**

**JAVASCRIPT AND HTML DOCUMENTS**: The Javascript execution environment; The Document Object Model; Element access in Javascript; Events and event handling; Handling events from the Body elements, Button elements, Text box and Password elements; The DOM 2 event model; The navigator object; DOM tree traversal and modification. **DYNAMIC DOCUMENTS WITH JAVASCRIPT**: Introduction to dynamic documents; Positioning elements; Moving elements; Element visibility; Changing colors and fonts; Dynamic content; Stacking elements; Locating the mouse cursor; Reacting to a mouse click; Slow movement of elements; Dragging and dropping elements.

**UNIT – IV**

**10 Hours**

**XML**: Introduction; Syntax; Document structure; Document Type definitions; Namespaces; XML schemas; Displaying raw XML documents; Displaying XML documents with CSS; XSLT style sheets; XML processors; Web services. **PERL, CGI PROGRAMMING**: Origins

and uses of Perl; Servlets: Introduction, comparison servlet & CGI, Servlet Basics, Servlet API Basics, example, cookies, state and session management, Database Access with JDBC: JDBC architecture, accessing database, JDBC servlet **ASP.NET**: Advantages of ASP.NET, ASP.NET Namespaces, creating ASP.NET web application, ASP.NET compilation cycle

### **TEXT BOOK:**

1. Programming the World Wide Web – Robert W. Sebesta, 4th Edition, Pearson Education, 2008.
2. Inside Servlets server-side programming for java platform- Dustin R. Callaway, Pearson Education, 2001

### **REFERENCE BOOKS:**

1. Andrew Trolsen, 2007, “**C# and the .NET platform**”, Second Edition, Dream tech Press,
2. M. Deitel, P.J. Deitel, A. B. Goldberg, “2004, **India Internet & World Wide Web How to H program** “, 3rd Edition, Pearson Education / PHI
3. Chris Bates, 2006, “**Web Programming Building Internet Applications**”,3rd edition, Wiley India
4. Xue Bai et al, Thomson, 2003,“**The Web Warrior Guide to Web Programming**”