DR. BHIMRAO AMBEDKAR UNIVERSITY, AGRA

BACHELOR OF COMPUTER APPLICATION

(B.C.A.)

COURSE STRUCTURE

THIRD YEAR

V SEMESTER

Paper Code	Paper Name	Term Exam Max./Min. Marks	Internal Assessment Max./Min. Marks	Total Max./Min. Marks
C-501	Network Security	50/20	50/20	100/40
C-502	Visual Basic .NET	50/20	50/20	100/40
C-503	Computer Graphics	50/20	50/20	100/40
C-504	Artificial Intelligence	50/20	50/20	100/40
C-505	Design & Analysis of Algorithms	50/20	50/20	100/40
C-506	Practical based on above Papers			100/40
Total marks of V Semester				600/300

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DETAILED SYLLABUS

FIFTH SEMESTER

PAPER CODE: C-501

Network Security

UNIT-I

Network Security: Introduction: OSI Security Architecture-Classical Encryption techniques Cipher Principles, Data Encryption Standard, Block Cipher Design Principles and Modes of Operation.

UNIT-II

Introduction to Number Theory: modular arithmetic, prime and relative prime numbers, Extended Euclidean Algorithm, Fermat's and Euler's theorem, Primarily testing, Chinese Remainder theorem, Discrete Logarithmic Problem . Public Key Cryptography: Key Management, Diffie Hellman key Exchange-Elliptic Curve . Architecture and Cryptography, Confidentiality using Symmetric Encryption, Public Key Cryptography and RSA.

UNIT-III

Authentication and Hash Function: Authentication requirements, Authentication functions– Message Authentication Codes, Hash Functions, Security of Hash Functions and MACs, MD5 message Digest algorithm, Secure Hash Algorithm, RIPEMD, HMAC Digital Signatures, Authentication Protocols, Digital Signature Standard

UNIT-IV

Network Security: Authentication Applications: Kerberos, X.509 Authentication Service, Electronic Mail Security, PGP, S/MIME, IP Security, Web Security.

UNIT-V

System Level Security: Intrusion detection, password management, Viruses and related Threats, Virus Counter measures, Firewall Design Principles, Trusted Systems.

Suggested Books:

1. William Stallings, "Cryptography and Network Security, Principles and Practices ", Prentice Hall of India, Third Edition,2003.

2. Atul Kahate-"Cryptography and Network Security ",Tata McGraw,Hill,2003.

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DETAILED SYLLABUS

FIFTH SEMESTER

PAPER CODE: C-502

Visual Basic .NET

UNIT-I

Visual Basic .NET and the .NET Framework: Introduction to .net framework ,Features, Common Language Runtime (CLR) ,Framework Class Library(FCL).Visual Studio.Net – IDE, Languages Supported, Components, Visual Programming, VB.net, Features, IDE, Menu System, Toolbars, Solution Explorer, Object Browser, Toolbox, Class View Window, Properties Window, Server Explorer, Task List, Output Window, Command Window.

UNIT-II

Programming in Visual basic .net: Data Types, Keywords, Declaring Variables and Constants, Operators, Understanding Scope and accessibility of variables, Conditional Statements, If- then, If- then- else, Nested If, Select Case, Looping Statement, Do loop, For Loop, For Each, Next Loop, While Loop, Arrays, Static and Dynamic.

UNIT-III

Functions, Built-In Dialog Boxes, Menus and Toolbar: Menus and toolbars, Menu Strip, Tool Strip, Status Strip, Built-In Dialog Boxes –Open File Dialogs, Save File Dialogs, Font Dialogs, Color Dialogs, Print Dialogs, Input Box, Msgbox, Interfacing With End user, Creating MDI Parent and Child, Functions and Procedures, Built-In Functions, Mathematical and String Functions, User Defined Functions and Procedures.

UNIT-IV

Elements of Visual Basic .Net: Properties, Events and Methods of Form, Label, TextBox, ListBox, ComboBox, RadioButton, Button, Check Box, Progress Bar, Date Time Picker, Calendar, Picture Box, HScrollbar, VScrollBar, Group Box, ToolTip, Timer.

UNIT-V

Advanced Concepts in VB.Net: Object Oriented Programming, Creating Classes, Objects, Fields, Properties, Methods, Events, Constructors and destructors, Exception Handling, Models, Statements, File Handling, Using File Stream Class, File Mode, File Share, Opening or Creating Files with File Stream Class, Reading and Writing Text using StreamReader and StreamWriter Classes, Data Access with ADO.Net – What are Databases? Data Access with Server Explorer, Data Adapter and DataSets, ADO.NET Objects and Basic SQL. Creating Windows/Web Applications with the help of databases.

Suggested Books:

1. Jesse liberty :"Learning Visual Basic.net"
2. Steven Holzner: " VB.NETBlackBook "
3. Chuck Easttom: " Learn VB.NET"

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DETAILED SYLLABUS

FIFTH SEMESTER

PAPERCODE: C-503

Computer Graphics

UNIT I

Introduction: Interactive Graphics , Advantages of Interactive Graphics, Uses of Computer Graphics, Conceptual Framework for Interactive Graphics: Overview, Scan Converting Lines, Scan Converting Circles, Scan Converting Ellipses.

UNIT II

Hardcopy Technologies, Display Technologies, Raster Scan Display System, Video Controller, Random, Scan Display processor, Image Scanners, Line Clipping: Clipping Southland, Cohen Algorithm, Cyrus Beck Algorithm, Midpoint Subdivision Algorithm

UNIT III

Geometrical Transformation: Introduction, types of transformation, **2D Transformation:** Homogeneous Coordinates and Matrix Representation of 2D Transformations, composition of 2D Transformations, the Window to Viewport Transformations, Introduction to 3D Transformations Matrix.

UNIT IV

Polygon meshes: uses of Polygon meshes, Representation way of Polygon meshes, **Curves:** types of curve, Parametric Cubic Curves, Quadric Surface. **Solid Modeling:** Representing Solids, Regularized Boolean Set Operation, primitive Instancing, Sweep Representations, Boundary Representations, Spatial Partitioning Representations, Constructive Solid Geometry, Comparison of Representations.

UNIT V

Introductory Concepts: Multimedia: Definition, Multimedia processing techniques, Uses of Multimedia, CD-ROM and the multimedia highway, Computer Animation (Design, types of animation, using different functions).

Suggested Books:

1. Foley, Van Dam, Feiner, Hughes, Computer Graphics Principles& practice,2000.
2. D.J. Gibbs & D.C. Tsichritzs: Multimedia programming Object Environment & Frame work, 2000.
3. D.Haran& Baker. Computer Graphics Prentice Hall of India, 1986

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DETAILED SYLLABUS

FIFTH SEMESTER

PAPERCODE: C-504

Artificial Intelligence

UNIT-I

AI Concepts, Various definitions of AI, Knowledge, Knowledge Pyramid, Characteristics of AI Problems, Problem Representation in AI, Components of AI, AI Evolution, Application Areas of AI, History of AI, The Turing Test and The Revised Turing Test.

UNIT-II

Expert System: Components of Expert System: Knowledge Base, Inference Engine, User Interface, Features of Expert System, Expert System Life Cycle, Categories of Expert System, Rule Based vs. Model Based Expert Systems, Advantages/Limitations of Expert System, Developing an Expert System: Identification, Conceptualization, Formalization, Implementation, Testing, Using an Expert System, Application Areas of Expert System.

UNIT-III

AI and Search Process: Brute Force Search, Depth First/Breadth First Search, Heuristic Search: Hill Climbing, Constraint Satisfaction, Mean End Analysis, Best First Search, A* Algorithm, AO* Algorithm, Beam Search.

UNIT-IV

Natural Language Processing: Introduction, Need, Goal, Fundamental Problems in Natural Language Understanding, How People overcome Natural Language Problems, Text and Speech Recognition: Introduction, Advantages and Approaches.

UNIT-V

Applications: Communication ,Communication as action, Formal grammar for a fragment of English, Syntactic analysis, Augmented grammars, Semantic interpretation, Ambiguity and disambiguation, Discourse understanding, Grammar induction, Probabilistic language processing, Probabilistic language models, Information retrieval, Information Extraction, Machine Translation.

Suggested Books:

1. V S Janakiraman, “Foundation of Artificial Intelligence and Expert Systems”
2. Dan W. Patterson, “Introduction to Artificial Intelligence and Expert Systems”

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DETAILED SYLLABUS

FIFTH SEMESTER

PAPER CODE: C-505

Design and Analysis of Algorithm

UNIT-I

Basic Concepts of Algorithms: Definition of algorithm, Characteristic of algorithm, Complexity Analysis techniques, Asymptotic Notations (Growth of Functions).Master theorem, Substitution Method, Iteration Method

UNIT-II

Sorting: Insertion Sort, Selection Sort, Bubble Sort, Binary Search, Maximum & Minimum, Merge Sort, Quick Sort, Heap Sort.

UNIT-III

Greedy method: General method, Knapsack Problem, Huffman Codes.
Dynamic Programming: Matrix, Chain Multiplications, Longest Common Subsequence-Backtracking: General method, N Queens Problem, Sum of subsets.

UNIT-IV

Analysis of Graph Algorithms: Elementary Graph Algorithms, Multistage Graphs, Basic Traversals and search techniques, techniques of graphs: BFS, DFS.
Minimum Spanning Trees: Kruskal's & Prim's Algorithm, Single Source Shortest Path, Dijkstra's & Bellman Ford, All Pairs Shortest Path: Warshal Algorithm.

UNIT-V

Introduction to Complexity Theory: The class P and NP, Polynomial reduction, NP- Complete Problems, NP-Hard Problems

Suggested Books:

1. Thomas H. Coremen, "Introduction to Algorithms", PHI.
2. Horowitz & Sahani,"Fundamental of Algorithms", Galgotia.
3. Aho,"Design & Analysis of Computer Algorithms", Pearson.
4. Johnson baugh, "Algorithms", Pearson.