

UIT-RGPV (Autonomous) Bhopal

Subject code-CS-402

Subject: Analysis & Design of Algorithm

Semester : IV

For credits & marks refer your scheme

Course Objective: Student will be able to learn algorithm designing, various problem solving strategies like divide and conquer approach, Greedy strategy, Dynamic Programming, Backtracking etc.

COURSE CONTENT:

Unit I

Algorithms, Designing algorithms, analyzing algorithms, asymptotic notations, heap and heap sort. Introduction to divide and conquer technique, analysis, design and comparison of various algorithms based on this technique, example binary search, merge sort, quick sort, strassen's matrix multiplication.

Unit II

Study of Greedy strategy, examples of greedy method like optimal merge patterns, Huffman coding, minimum spanning trees, knapsack problem, job sequencing with deadlines, single source shortest path algorithm

Unit III

Concept of dynamic programming, problems based on this approach such as 0/1 knapsack, multistage graph, reliability design, Floyd-Warshall algorithm

Unit IV

Backtracking concept and its examples like 8 queen's problem, Hamiltonian cycle, Graph coloring problem etc. Introduction to branch & bound method, examples of branch and bound method like traveling salesman problem etc. Meaning of lower bound theory and its use in solving algebraic problem, introduction to parallel algorithms.

Unit V

Binary search trees, height balanced trees, 2-3 trees, B-trees, basic search and traversal techniques for trees and graphs (In order, preorder, postorder, DFS, BFS), NP-completeness.

References:

1. Cormen Thomas, Leiserson CE, Rivest RL; Introduction to Algorithms; PHI.
2. Horowitz & Sahani; Analysis & Design of Algorithm
3. Dasgupta; algorithms; TMH
4. Ullmann; Analysis & Design of Algorithm;
5. Michael T Goodrich, Roberto Tamassia, Algorithm Design, Wiley India

List of Experiments(expandable):

1. Write a program for Iterative and Recursive Binary Search.
2. Write a program for Merge Sort.
3. Write a program for Quick Sort.
4. Write a program for Strassen's Matrix Multiplication.
5. Write a program for optimal merge patterns.
6. Write a program for Huffman coding.
7. Write a program for minimum spanning trees using Kruskal's algorithm.
8. Write a program for minimum spanning trees using Prim's algorithm.
9. Write a program for single sources shortest path algorithm.
10. Write a program for Floyd-Warshall algorithm.
11. Write a program for traveling salesman problem.

UIT-RGPV (Autonomous) Bhopal

Subject code-CS-403

Subject: Object Oriented Analysis and Design

Semester : IV

For credits & marks refer your scheme

Course Objective: Major objective of this course is to make student familiar with Object oriented concepts. Students gain knowledge about various modeling technique.

COURSE CONTENT:

Unit I:

Overview of Object Oriented concepts: Objects and classes, abstraction, generalization and inheritance, encapsulation, multiple inheritance, aggregation abstraction classes, polymorphism, link and association, Need for object oriented approach.

Unit II:

System design life cycle, object oriented S/W development process model, Object Oriented Analysis, Object Modeling Technique (OMT): object model, function model, relationship among models, object diagrams, state diagrams, data flow diagrams, analysis.

Unit III:

Object oriented Design: Overview of object design, Combination the models, Designing algorithms, design optimization, Implementation of control, Adjustment, Design of association, object representation, physical packaging, documenting design decision, comparison of use-case driven approach.

Unit IV:

Translation Object Oriented design into implementation, Programming style, documentation, characterization of object oriented languages, Comparison of object oriented language like C++, JAVA, object programming.

Unit V:

Unified Modeling Language (UML): Class diagram sequence diagram Use case diagram, Collaboration, diagram, state, chart diagram, Activity diagram, component diagram, deployment diagram, Object oriented Database: Relational Vs .object oriented database, the architecture of object oriented database, query language for Object Oriented database.

References:-

1. Satzinger, Jackson and Burd, "Object oriented Analysis and design with the Unified Process", CENGAGE Learning.
2. Michael Blaha and J. Rumbaugh, "Object oriented Modeling and design with UML", Pearson Education
3. O'Docherty, "Object Oriented Analysis and Design Understanding, System Development with UML2.0", Wiley India.

UIT-RGPV (Autonomous) Bhopal

Subject code-CS-404

Subject: Theory of Computation

Semester : IV

For credits & marks refer your scheme

Course Objective: The purpose of this subject is to cover the underlying concepts and techniques used in Theory of Computation. In this syllabus we cover finite automata, pushdown automata, Context free grammars and Turing machines.

COURSE CONTENT:

UNIT 1:

Automata: Basic machine, FSM , Transition graph, Transition matrix, Deterministic and nondeterministic FSM'S, Equivalence of DFA and NDFA, Mealy & Moore machines, minimization of finite automata, Two-way finite automata. Regular Sets and Regular Grammars: Alphabet, words, Operations, Regular sets, Finite automata and regular expression, Myhill- Nerode theorem Pumping lemma and regular sets, Application of pumping lemma, closure properties of regular sets.

UNIT 2:

Context –Free Grammars: Introduction to CFG, Regular Grammars, Derivation trees and Ambiguity, Simplification of Context free grammars, Normal Forms (Chomsky Normal Form and Greibach Normal forms).

UNIT 3:

Pushdown Automata: Definition of PDA, Deterministic Pushdown Automata, PDA corresponding to given CFG, CFG corresponding to a given PDA. Context Free Languages: The pumping lemma for CFL's, Closure properties of CFL's, Decision problems involving CFL's.

UNIT 4:

Turing Machines: Introduction, TM model, representation and languages acceptability of TM Design of TM, Universal TM & Other modification, Church's hypothesis, composite & iterated TM. Turing machine as enumerators. Properties of recursive & recursively enumerable languages, Universal Turing machine

UNIT 5:

Tractable and Untractable Problems: P, NP, NP complete and NP hard problems, examples of these problems like satisfy ability problems, vertex cover problem, Hamiltonian path problem, traveling sales man problem, Partition problem etc.

References:-

1. John E. Hopcroft, Jeffery Ullman, "Introduction to Automata theory, Languages & computation" , Narosa Publishers.
2. K.L.P Mishra & N.Chandrasekaran, "Theory of Computer Science", PHI Learning
3. Michael Sipsev, "Theory of Computation", Cenage Learning
4. John C Martin, "Introduction to languages and theory of computation", McGraw Hill
5. Daniel I.A. Cohen, "Introduction to Computer Theory", Wiley India.
6. Kohavi, "Switching & Finite Automata Theory", TMH

UIT-RGPV (Autonomous) Bhopal

Subject code-CS-405

Subject: Analog & Digital Communication

Semester : IV

For credits & marks refer your scheme

Course Objective: To familiarize students with the fundamentals of analog and digital communication systems and provide students with tools for communication signal analysis. The students familiarize with various techniques for amplitude modulation and demodulation of analog signals.

COURSE CONTENTS:

Unit-I

Signal Analysis: Time domain and frequency domain representation of signal, Fourier Transform and its properties, Transform of Gate, Periodic gate, Impulse periodic impulse sine and cosine wave, Concept of energy density and power, Power density of periodic.

Unit-II

Amplitude Modulation: Introduction of modulations techniques and its applications, Amplitude modulation, Equation and its frequency domain representation, Bandwidth, Power distribution. AM suppressed carrier waveform equation and frequency domain representation Generation (Balance/Chopper modulator) and synchronous detection technique, errors in synchronous detection. Introduction to SSB and VSB.

Unit-III

Angle Modulation

Modulation equation and their relative phase and frequency deviations, modulation index frequency spectrum, NBFM and WBFM, Bandwidth comparison of modulation techniques.

Unit-IV

Signal Sampling & Analog Pulse Communication

Sampling of signal, sampling theorem for low pass and Band pass signal, PAM, TDM. Channel Bandwidth for PAM-TDM signal, Type of sampling instantaneous (Natural and Flat Top), Aperture effect, PPM, PDM.

Unit-V

Digital Communication

Digital signal Quantization, Quantization error, PCM, S/N Ratio, Companding, Data Rate, Baud Rate, Bit Rate, Multiplexed PCM signal, DPCM, DM, ADM). Digital modulations techniques, ASK, BPSK, DPSK, offset and non-offset QPSK, M-Ary PSK, BFSK, M-Ary FSK, QAM).

References:

1. Singh & Sapre, Communication System, TMH
2. B.P. Lathi & Zhi Ding, Modern Digital and Analog Communication System, 4th Edition, Oxford University Press.
3. Taub & Shilling, Communication System, TMH
4. George Kennedy & Davis, Electronic Communication System, 4th Edition, TMH.
5. Abhay Gandhi, Analog & Digital Communication: Theory & Lab Work, Cengage Learning, India.

List of Experiments (Expandable)

1. Study of sampling process and signal reconstruction and aliasing.
2. Study of PAM PPM and PDM
3. Study of PCM transmitter and receiver.
4. Time division multiplexing (TDM) and De multiplexing
5. Study of ASK PSK and FSK transmitter and receiver.
6. Study of AM modulation and Demodulation techniques (Transmitter and Receiver) Calculate of parameters
7. Study of FM modulation and demodulation (Transmitter and Receiver) & Calculation of parameters
8. To construct and verify pre emphasis and de-emphasis and plot the wave forms.
9. Study of super heterodyne receiver and characteristics of ratio radio receiver.

10. To construct frequency multiplier circuit and to observe the waveform
11. Study of AVC and AFC.



UIT-RGPV (Autonomous) Bhopal

Subject code-CS-406

Subject: Programming Lab –II (.Net Technologies)

Semester : IV

For credits & marks refer your scheme

Course Objective: To introduce and understand students to programming concepts and techniques using the C# language in .NET framework .

COURSE CONTENT:

UNIT I

Introduction .NET framework, features of .Net framework, architecture and component of .Net, elements of .Net.

UNIT II

Basic Features Of C# Fundamentals, Classes and Objects, Inheritance and Polymorphism, Operator Overloading, Structures. Advanced Features Of C# Interfaces, Arrays, Indexers and Collections; Strings and Regular Expressions, Handling Exceptions, Delegates and Events.

UNIT III

Installing ASP.NET framework, overview of the ASP .net framework, overview of CLR, class library, overview of ASP.net control, understanding HTML controls, study of standard controls, validations controls, rich controls. Windows Forms: All about windows form, MDI form, creating windows applications, adding controls to forms, handling Events, and using various Tolls

UNIT IV

Understanding and handling controls events, ADO.NET- Component object model, ODBC, OLEDB, and SQL connected mode, disconnected mode, dataset, data-reader Data base controls: Overview of data access data control, using grid view controls, using details view and frame view controls, ado .net data readers, SQL data source control, object data source control, site map data source.

UNIT V

XML: Introducing XML, Structure, and syntax of XML, document type definition (DTD), XML Schema, Document object model, Presenting and Handling XML. xml data source, using navigation controls, introduction of web parts, using java script, Web Services

References:

1. C# for Programmers by Harvey Deitel, Paul Deitel, Pearson Education
2. Balagurusamy; Programming in C#; TMH
3. Web Commerce Technology Handbook by Daniel Minoli, Emma Minoli , TMH
4. Web Programming by Chris Bates, Wiley
5. XML Bible by Elliotte Rusty Harold ,
6. ASP .Net Complete Reference by McDonald, TMH.
7. ADO .Net Complete Reference by Odey, TMH

List of Experiments/ program (Expandable):

1. Working with call backs and delegates in C#
2. Code access security with C#.
3. Creating a COM+ component with C#.
4. Creating a Windows Service with C#
5. Interacting with a Windows Service with C#
6. Using Reflection in C#
7. Sending Mail and SMTP Mail and C#
8. Perform String Manipulation with the String Builder and String Classes and C#:
9. Using the System .Net Web Client to Retrieve or Upload Data with C#
10. Reading and Writing XML Documents with the XML Text-Reader/-Writer Class and C#
11. Working with Page using ASP .Net.

UIT-RGPV (Autonomous) Bhopal

Subject code-CS-407

Subject: Network & Communication Workshop

Semester: IV

For credits & marks refer your scheme

Course Objective: To introduce and understand students various peripheral devices and networking devices, various memories, cable and connectors with PC troubleshooting techniques.

COURSE CONTENT:

UNIT – I

Peripheral Device – 1 Input Devices: Keyboard; Principle of Operation, Interface Logic, Function and its type, Pointing Device: Touch Screen, Mouse: Principle of Operation, Function and its Types. Video Input device: Introduction, Operation and Function of Digital Camera, Webcam, Image Scanner, Fingerprint Scanner, Barcode Reader, 3D Scanner. Audio Input Devices: Microphone, Game Controller.

UNIT – II

Peripheral Device – 2 Output Device: Principle Operation and Function of Monitor (CRT, TFT, LCD, LED and Plasma Display), Printer (Dot matrix, Plotter, Laser, Ink Jet), Speaker, Head phone.

UNIT – III

Major Component, Connector, Ports etc. Major Component: CPU, Mother Board. Memory: RAM DRAM, SDRAM, DDRSDRAM, ROM and its type, HARD DISK, SMPS, LAN CARD, CMOS BATTERY, Coolent (Fans, Heat Sink), Graphic Card, and Sound Card. Blue – Ray Disk, Pen drive or USB Flash drive Data traveler.

UNIT – IV

Connectors: Unshielded Twisted pair (UTP) Cable Connectors: RJ-45, RJ-12, UHF, D-shell connector DB9, Insulation Displacement Connector (IDCs), "Jones" or "Cinch-Jones" connector. Shielded Twisted Pair Cable Connectors, Coaxial Cable Connectors: BNC Connector, Audio, Video, Digital, RF connector, RCA, TNC, Type-N connectors T-connector, Barrel Connector, Fiber Optic Cable, Single mode and multi mode connector, HDMI, VGA, F- Connector. Ports: Ethernet, Fire wire (IEEE1394), Parallel Port, Serial Port, Thunderbolt, Universal Serial Bus (USB), RS-232, RS485, RS422.

UNIT – V

PC TROUBLESHOOTING: Definition, Need and major Steps of PC Troubleshooting. Basic Hardware Troubleshooting: Drive Troubleshooting. Troubleshooting, Benefits of Troubleshooting. Troubleshooting of Motherboard (Possible Problems, Diagnosis Procedure and Troubleshooting), Troubleshooting key board, Troubleshooting of Printer (Possible Problems, Diagnosis Procedure and Troubleshooting).

List of Experiments:-

1. Testing internal working of Different types of Mouse.
2. Testing internal working of Keyboard.
3. Identifying and verifying internal working of CRT, TFT.
4. Troubleshooting of Printers.
5. Troubleshooting of Motherboard.

Reference Book:

1. Computer installation and servicing, D. Balsubramanian, TATA McGraw Hill Publication, Second Edition.
2. Troubleshooting, Maintaining and repairing PCs, Stephen J Bigelow TATA McGraw Hill Publication.
3. Introduction to computers, Peter Norton, McGraw Hill Publication, 7th Edition.