SANT GADGE BABA AMRAVATI UNIVERSITY GAZETTE

Official Publication of Sant Gadge Baba Amravati University

PART- TWO

Thursday, the 9th March, 2023

NOTIFICATION

No. 37/2023 Dated :09/03/2023

Subject : Implementation of the syllabus of the subjects 3KE02 Discrete Mathematics & 4KE02 Computer Networks of Semester III & IV of B.E. (Computer Engineering) (C.B.C.S.).

Ref'ce : SGBAU Gazette Part II Notification No. 80/2020 dated 26.10.2020.

It is notified for general information of all concerned that the authorities of the University have accepted to implement the syllabus along with the Subject Codes of the subjects 3KE02 Discrete Mathematics & 4KE02 Computer Networks of Semester III & IV of B.E. (Computer Engineering) (C.B.C.S.) for its implementation from Even Semester of the Course i.e. Semester IV from Summer - 2023 examination and Semester III from Winter - 2023 examination to implemented from the academic session 2022-2023 onwards as mentioned below.

Syllabus along with the Subject Codes Prescribed for Semester III & IV B.E. (Computer Engineering) (C.B.C.S.)

3KE02 DISCRETE MATHEMATICS (L-3, C-3)

Course Pre-requisite: Basic knowledge of Mathematics

Course Objectives: Throughout the course, students will be expected to demonstrate their understanding of Discrete Structure by being able to do each of the following:

1. Use mathematically correct terminology and notation.
2. Construct correct direct and indirect proofs.
3. Apply logical reasoning to solve a variety of problem

Course Outcomes (Expected Outcome): On completion of the course, the students will be able to:

1. Analyze and express logic sentence in terms of predicates, quantifiers, and logical connectives.
2. Derive the solution for a given problem using deductive logic and prove the solution based on logical inference.
3. Classify algebraic structure for a given mathematical problem.
4. Perform combinatorial analysis to solve counting problems.
5. Perform operation on trees data structures.
6. Develop the given problem as graph networks and solve with techniques of graph theory

Unit I: The Foundations: Logic and Proofs: (Hours: 8)
Propositions, Truth Tables, Compound Propositions, Logical Operators, Logic and Bit Operations; Logical Equivalences, De Morgan's Laws, Satisfiability: Applications and Solving Problems; Predicates, Quantifiers: Restricted Domains, Precedence, Logical Equivalences; Rules of Inference for Propositional Logic, Use to Build Arguments, Resolution, Combination for Propositions and Quantified Statements;

Unit II: Sets, Functions and Relation: (Hours:8)
Introduction, Venn Diagrams, Subsets, Size of a Set, Power Sets, Cartesian Products, Set Notation with Quantifiers, Truth Sets and Quantifiers, Set Operations ,Functions, Inverse Functions, Compositions and Graphs of Functions, Partial Functions; Sequences, Recurrence Relations, Special Integer Sequences, Summations; Countable Sets, An Uncountable Set; Functions as Relations, Relations on a Set, Properties of Relations, Combining Relations; n-ary Relations, Operations on n- ary Relations; Representing Relations Using Matrices; Relations and Their Properties, n-ary Relations and Their Applications, Representing Relations, Closures of Relations, Equivalence Relations, Partial Orderings.

Unit III: Algebraic Structures: (Hours:8)
Algebraic Systems: Examples and General Properties; Semigroups and Monoids: Homomorphism of Semigroups and Monoids, Subsemigroups and Submonoids; Groups: Definitions, Subgroups and Homomorphisms, Cosets and Lagrange's Theorem, Normal Subgroups, algebraic Systems with Two Binary Operations; Group Codes: The Communication Model and Basic Notions of Error Correction, Hamming Distance.

Unit IV: Boolean Algebra: (Hours:7)
Lattices, Boolean Algebra: Boolean Functions, Representing Boolean Functions, sum of product expansions, Functional Completeness, Logic Gates, Combinations of Gate, Minimization of Circuits, Karnaugh Maps.

Unit V: Tree: (Hours:7)

Introduction, Rooted Tree, ordered rooted tree, tree as model, Properties of Trees, Applications of tree, Binary Search Trees, Decision Trees, Prefix Codes, Huffman Coding, Game Trees, Tree traversal, Preorder Traversing, In order Traversing, Post order Traversing, Spanning Tree, Minimum spanning tree

Unit VI: Graph: (Hours:7)

Graph Models; Basic Terminology, Special Simple Graphs, Bipartite Graphs, Matchings, Applications of Special Types of Graphs, New Graphs from Old; Graph Representation, Adjacency and Incidence Matrices, Isomorphism of Graphs, Determining Isomorphism; Paths, Connectedness in Undirected Graphs and Directed Graphs, Paths and Isomorphism, Counting Paths Between Vertices; Euler Paths and Circuits, Hamilton Paths and Circuits, Applications of Hamilton Circuits; Planar Graphs: Euler's Formula, Kuratowski's Theorem; Graph Coloring: Introduction, Applications of Graph Colorings;

Text Books:

1. Kenneth H. Rosen: Discrete Mathematics and Its Applications, 7th Edition, McGraw-Hill.
2. J. P. Tremblay and R. Manohar: Discrete Mathematical Structures with Applications to Computer Science, TataMcGraw-Hill Edition, McGraw-Hill.

Reference Books:

1. Norman L. Biggs: Discrete Mathematics, 2nd Edition, Oxford University Press.
2. Seymour Lipschutz and Marc Lars Lipson: Schaum's Outline of Theory and Problems of Discrete Mathematics,3rd Edition, Schaum's Outlines Series, McGraw-Hill.
3. C. L. Liu and D. P. Mohapatra: Elements of Discrete Mathematics: A Computer Oriented Approach, 3rd Edition,Tata McGraw-Hill, McGraw-Hill.

4KE02 COMPUTER NETWORKS (L-3, C-3)

Course Pre-requisite: Computer and Data Communication Requirements

Course Objectives: Throughout the course, students will be expected to demonstrate their understanding of Data Communication and Networking by being able to do each of the following:

1. Study the basic taxonomy and terminology of the digital communication system & computernetworking and enumerate the layers of OSI model and TCP/IP model.
2. Acquire knowledge of Application layer paradigms and protocols.
3. Study Transport layer design issues, Transport layer services, and protocols.
4. Gain core knowledge of Network layer routing protocols and IP addressing.
5. Study data link layer concepts, design issues, and protocols.
6. Study various network security issues and firewalls.

Course Outcomes (Expected Outcome): On completion of the course, the students will be able to:

1. Describe the functions of each layer in OSI and TCP/IP model.
2. Describe the Transport layer and Transport layer services.
3. Classify the routing protocols and analyze how to assign the IP addresses for the given network.
4. Explain the functions of Application layer and Presentation layer paradigms and Protocols.
5. Describe the functions of data link layer and explain the protocols.
6. Explain the types of transmission media with real time applications.

Unit I: Introduction: (Hours: 7)

Introduction: Data Communication, Components, Networks, Network types, Switching, The Internet, Accessing the Internet, Internet Standards & Administration, Layered architecture, Network Models: TCP/IP Protocol Suite, The OSI Model, Transmission media: Introduction, Guided media & Unguided Media-Wireless. Switching: Introduction,Circuit Switched Networks, Packet Switching.

Unit II: Application Layer: (Hours: 7)

Introduction to Application layer, Application-Layer Paradigms & Services, Client-Server Programming, Application Programming Interface, Principles of Application-Layer protocols: HTTP, FTP, SMTP and DNS.

Unit III: Transport Layer: (Hours: 7)

Introduction to Transport layer, Transport Layer services & principles, multiplexing & de-multiplexing applications, Connectionless and Connection Oriented Protocols, UDP Protocol, principles of reliable data transfer, TCP Protocol,principles of congestion control, TCP congestion control, Flow Control, Error Control.

Unit IV: Network Layer: (Hours: 6)

Introduction to Network layer, Network Layer Services, Datagram & Virtual-Circuit Approach, Network Layer performance, IPV4 Addressing, Dynamic Host Configuration Protocol (DHCP), Network Address Resolution (NAT), Forwarding of IP packets, Internet Protocol (IP), Datagram Format, Fragmentation, ICMPV4: Messages, ICMP Checksum, Routing algorithms: Distance Vector routing & Link State Routing, IPV6 Addressing, Transition from IPV4 to IPV6.

Unit V: Link Layer: (Hours: 6)

Introduction to Link Layer, Link layer Services, Categories of links, Error detection and correction: Block Coding, Cyclic codes, Checksum, Forward Error Correction, Data link control: DLC services, Data-Link Layer Protocol, HDLC, Point-To-Point Protocol, Media Access Control (MAC), LAN addresses & ARP, CSMA / CD, PPP details.

Unit VI: Network Management & Security: (Hours: 7)

Introduction to Network Management, Configuration Management, Fault Management, Performance Management, Security Management, Accounting Management, SNMP: Managers and Agents, Management Components, Introduction to Network security, Principles of cryptography, authentication and authentication protocol, version, integrity, digital signatures, message digests, hash function algorithm, key distribution & certification, secure e- mail, E-Commerce: SSL & SET.

Text Books:

[1] Behrouz A. Forouzan: Data Communication and Networking, (5/e) (TMH)
[2] James F. Kurose & K W Ross: Computer Networking, Pearson Education (LPE)

Reference Books:

[1] William Stallings: Data & Computer Communications, 6/e, Pearson Education
[2] William L. Schweber : Data Communication, McGraw Hill
[3] Douglas E. Comer: Computer Network & Internet, Addison Wesley.
[4] Andrew S. Tanenbaum: Computer Networks, PHI (5E)
[5] Leon Garcia & Widjaja: Communication Networks, TMH.

Sd/-
(Dr. T.R. Deshmukh)
Registrar
Sant Gadge Baba Amravati University

****