KVR GOVT. COLLEGE FOR WOMEN (AUTONOMOUS), KURNOOL.
Re-Accredited by NAAC with Grade "A".
CHOICE BASED CREDIT SYSTEM (w.e.f. 2020-21)
I M.Sc Computer Science I Semester
DISCRETE MATHEMATICS

Theory: 4 Periods | Max Marks: 80
Exam: 3 Hrs | Credits: 4

Unit I

Introduction: Statements and Notations, Well-Formed Formulas, Connectives, Logic-Propositional Equivalences-Truth tables-Tautologies-Predicates and Quantifiers-Normal Forms. Sets-Operations on sets-Sequences and Summations -Growth functions - relations and their properties- n-ary relations and their applications Representation of relations-Closures of relations-Equivalence relations-Partial Orderings.

Unit II

Counting Techniques: Basics of Counting- Pigeonhole Principle- Combinations and Permutations-Generalized Permutations and Combinations Recurrence relations: Solving Recurrence Relations-Divide and Conquer relations Inclusion and Exclusion-Applications of Inclusion-Exclusion.

Unit III

Graphs: Introduction to Graphs-Terminology-Relations and Directed Graphs - Representations of Graphs- Isomorphism-Connectivity- Euler and Hamiltonian Paths-Shortest Path problems- Planar Graphs- Graph Coloring Trees: Introduction to trees-Applications of trees- Traversals-Trees and sorting Spanning Trees-Minimum Spanning Trees.

Unit IV

Boolean Algebra and Models of Computation: Boolean Functions Representing Boolean Functions-Logic Gates-Minimizations of Circuits- Finite State Machines with and with no output.

Text Book:

1) “Discrete Mathematics and its Applications to Computer Science”, Jean Paul Tremblay and R.Manohar Tata McGraw-Hill Publishing Company, New Delhi

2) “Discrete Mathematics for computer scientists & Mathematicians”, Joe L. Mott, Abraham Kandel & T. P. Baker,Prentice Hall of India Ltd, New Delhi

3)"Introduction to Automata Theory,Languages and Computation"John E. Hopcroft,Rajeev Motwani,Jeffrey D.Ullman, Third Edition, Pearson Education.

Reference Books:

1) “Discrete mathematics”, Richard Johnsonbaug, Pearson Education, New Delhi

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CHOICE BASED CREDIT SYSTEM (w.e.f. 2020-21)
I M.Sc Computer Science I Semester
COMPUTER ORGANIZATION

Theory: 4 Periods | Max Marks: 80
Exam: 3 Hrs | Credits: 4

Unit I:

Logic Circuits: Basic Logic Functions, Synthesis of Logic Functions using AND, OR, NOT Gates, Minimization of Logic Experssion, Karnaugh Maps, Synthesis with NAND and NOR Gates, Practical Implementation of Logic Gates, Flip-Flops, Registers and Shift Registers, Counters, Decoders, Multiplexers, Programmable Logic Devices (PHDs), Filed Programmable Gate Arrays, Sequential Circuits. **Basic Structure Of Computer Hardware and Software:** Functional units, Basic operational concepts, Bus structures, Software, Performance, Distributed Computing. **Addressing Methods:** Basic Concepts, Memory Locations, Main Memory Operations, Addressing Modes, Assembly Language, Basic I/O operations, Stacks and Queues, Subroutines.

Unit II

Processing Unit: Some fundamental concepts, Execution of complete instruction, Hardwired Control, Performance Considerations, Microprogrammed Control, Signed Addition and Subtraction, Arithmetic and Branching Conditions, Multiplication of positive numbers, Signed-Operand Multiplication, Fast Multiplication, Integer Division, Floating-point Numbers and Operations.

Unit III

Input-Output Organization: Accessing I/O Devices, Interrupts, Processor Examples, Direct Memory Access, I/O Hardware, Standard I/O Interfaces, The Motorola 680X0 and Cold Fire families , The Intel IA-64 Family ,The Power PC Family, A Stack Processor.

Unit IV

Memory: Semiconductor RAM memories, Read-Only Memories, Cache Memories, Performance Considerations, Virtual Memories, Memory Management Requirements. **Introduction To Computer Peripherals:** I/O Devices, On-Line Storage.

Text-Book:

"Computer Organization", V.C. Hamacher: 3 rd & 5th Edition, (Tata McGraw Hill)

Reference Books:

1. "Computer Systems Design and Architecture", Vincent P. Heuring& Harry F. Jordan (Pearson Education)

2. "Computer Organization", Moris Mano (PHI)

3. "Computer Architecture & Organisation", Hayes (TMH)

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CHOICE BASED CREDIT SYSTEM (w.e.f. 2020-21)
I M.Sc Computer Science I Semester
PYTHON PROGRAMMING

Theory: 4 Periods | Max Marks: 80
Exam: 3 Hrs | Credits: 4

Unit – I:

Introduction to Scripting languages: Scripts and Programs, Scripting today, Characteristics of Scripting languages, uses of scripting languages, Web Scripting, Universe of Scripting languages. **Introduction to Python:** Feature of Python Language, installing Python, Environment Setup, Running a python script, Python 2.x Vs Python 3.x, data types, operators, Expressions. Control statement, Standard I/O Operations.

Unit – II

Functions: Declaration and Definition, Function Calling, More on defining functions, Doc Strings, Built-in functions **Sequence:** Lists, Tuples, Sets, Dictionaries

Unit – III

Strings and Regular expressions: String operations, Built-in string methods and functions, comparing strings, Functions in regular expression.

Object Oriented Programming: Classes and Objects, Class method and self argument, The __Init__ Method, Class Variables and Object Variables, The __Del__ Method, Public and Private Data Members Private Methods, Built-In Functions to Check, Get, Set and Delete Class Attributes, Garbage Collection (Destroying Objects)

Unit-IV

Inheritance and polymorphism: Inheriting Classes in Python , Polymorphism and Method Overriding , Types of Inheritance, Composition/ Containership, Abstract Classes and Interfaces, Metaclass **Exception Handling:** Introduction, Handling exceptions, multiple except blocks and multiple exceptions, finally block . **Python Packages:** Creating & Importing of Packages.

Text Books:

1.”Reema Thareja”, Python Programming using problem solving approach, First Edition, Oxford higher Education.

References:

1. “Fundamentals of Python” Kenneth A. Lambert,
2. “Beginning Python using Python 2.6 and Python 3” James Payne,
3. “Introduction to Computer Science using Python” Charles Dierach,

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CHOICE BASED CREDIT SYSTEM (w.e.f. 2020-21)
I M.Sc Computer Science I Semester
UNIX PROGRAMMING

Theory: 4 Periods | Max Marks: 80
Exam: 3 Hrs | Credits: 4

UNIT – I

Understanding the unix command: Operating system, features, Scheduling algorithms, Kernel – functions of Kernel, Scheduling- Level of Scheduling - Locating Commands, Internal and external Commands, Command Structure, Flexibility of Command Usage, **man:** Browsing the Manual pages On-line.**The shell:** The shell's Interpretive Cycle, Shell Offerings – Pattern Matching, Escaping and Quoting, Redirection: The Three Standard Files, /dev/null and/tty: Two Special Files, Pipes, tee: Creating a Tee, Command Substitution, Shell Variables.**Process:** Process Basics ,ps:Process status, System Processes, Mechanism of Process Creation, Internal and External Commands, Running Jobs in Background, nice: Job Execution with Low Priority, killing Processes with Signals, Job Control, at and batch: Execute Later, cron: Running Jobs Periodically, time: Timing Processes.
Customizaing the environment: Environment Variables, Aliases, Command History, In-Line Command Editing, Miscellaneous Features, The initialization Scripts.

UNIT – II

Essential shell programming: Shell Scripts, read: Making Scripts Iterative, Using Command Line Arguments, exit and Exit Status of Command, The Logical Operator && and – Conditional Execution, The if Conditional – Using test and [ ] to Evaluate Expressions – The case Conditional – expr: Computation and String Handling, $0: Calling a Script by Different Names, while: Loping, for: Looping with a List, set and Shift: Manipulating the positional Parameters, The Here Document, trap: Interrupting a Program, Debugging Shell Scripts with set-x, Sample Validation and Data Entry Scripts.**(Ch 3,8,9, 10,11 and 16 TB-1)**

UNIT –III

Interprocess comunication ; Introduction, File and Record Locking, Simple Client-server pipes, FIFO's, Streams and Messages, Name Spaces, System V IPC, Message Queues, Semaphores, shared memory, Sock and TLI.Communication Protocols: Introduction, TCP/IP, XNS, SNA, NetBIOS, OSI Protocols UUCP, Protocols Comparisons.
(Ch 3.1 to 3.12 of TB- 2 and 4, 5.1 to 5.8 of TB -2)

UNIT –IV

Berkeley sockets: Introduction, Overview, Unix Domain Protocols, socket Address, Elementary Socket System Calls, Simple Examples, Advanced Socket, System Calls, Reserved Ports. Stream Pipes, Passing File Descriptors, VI Editor - Editing commands - Vi basics, Input mode, ex mode, navigation, editing text, undo, repeat, search, substitution **(Ch 6.1 to 6.17 of TB- 2)**

TEXT BOOK:

1. Unix V.3 Concepts And Applications By Sumitabha Das (Tata Mcgraw Hill)
2. Unix Network Programming By W Richard W Richard Stevens (Phi or Pearson Asia)
3. Yashavant Kanetkar, UNIX shell programming,BPB publications.

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CHOICE BASED CREDIT SYSTEM (w.e.f. 2020-21)
I M.Sc Computer Science I Semester
DESIGN AND ANALYSIS OF ALGORITHMS

Theory: 4 Periods | Max Marks: 80
Exam: 3 Hrs | Credits: 4

UNIT I :
Introduction: Algorithm, Psuedo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Probabilistic analysis, Amortized analysis, Randomized algorithms. Disjoint Sets- disjoint set operations, union and find algorithms, spanning trees, connected components and biconnected components.

UNIT II :
Divide and conquer: General method, applications-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication. Greedy method: General method, applications-Job sequencing with dead lines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

UNIT III :
Dynamic Programming: General method, applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem, Reliability design. Backtracking: General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

UNIT IV :
Branch and Bound: General method, applications - Travelling sales person problem, 0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution.
NP-Hard and NP-Complete problems: Basic concepts, non deterministic algorithms, NP - Hard and NP Complete classes, Cook's theorem.

TEXT BOOKS:
1. https://kailash392.files.wordpress.com/2019/02/fundamentalsof-computer-algorithms-by-ellis-horowitz.pdf
2. https://www2.cs.duke.edu/courses/fall08/cps230/Book.pdf (Armotized Analysis)

REFERENCES:
1. "Algorithm Design: Foundations, Analysis and Internet examples", M.T.Goodrich and R.Tomassia,John wiley and sons.
2. "Introduction to Algorithms", secondedition,T.H.Cormen,C.E.Leiserson,R.L.Rivest,and C.Stein,PHI Pvt. Ltd./ Pearson Education
3. "Introduction to Design and Analysis of Algorithms A strategic approach", R.C.T.Lee, S.S.Tseng, R.C.Chang and T.Tsai, Mc Graw Hill.