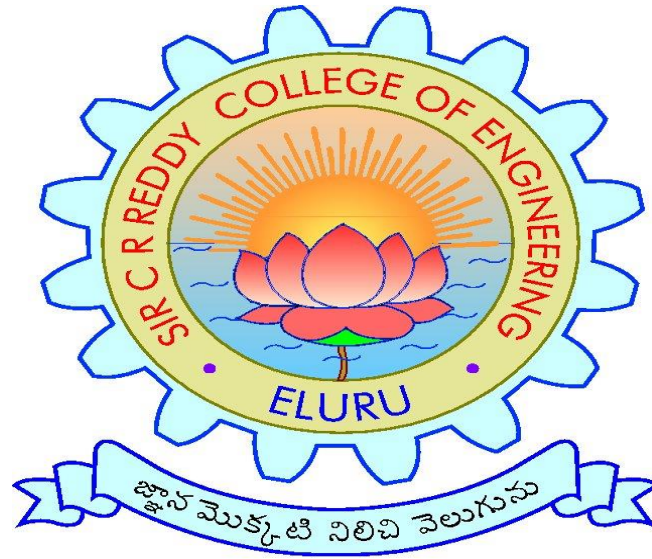


SIR C.R.REDDY COLLEGE OF ENGINEERING, ELURU

DEPARTMENT OF INFORMATION TECHNOLOGY

LESSON PLAN



SUBJECT: MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE

CLASS: II/IV B.Tech, I SEMESTER, A.Y.2019-20

INSTRUCTOR: Sri G. Vihari

SIR C.R.REDDY COLLEGE OF ENGINEERING, ELURU

DEPARTMENT OF INFORMATION TECHNOLOGY

Programme: B.Tech

Semester: II/IV 1st Semester

Academic Year: 2019-2020

Course: **MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE**

Instructor: G. Vihari

Course Contents

Course Title	Course Code	Credits	Theory Paper
MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE	R1621052	3	Max.Marks-70 Duration-3hrs.

Course objectives:

1. To introduce the students to the topics and techniques of discrete methods and combinatorial reasoning.
2. Introduce a wide variety of applications. The algorithmic approach to the solution of problems is fundamental in discrete mathematics, and this approach reinforces the close ties between this discipline and the area of computer science.

Course Outcomes:

- CO1: Student will be able to demonstrate skills in solving mathematical problems
CO2: Student will be able to comprehend mathematical principles and logic
CO3: Student will be able to demonstrate knowledge of mathematical modeling and Proficiency in using mathematical software
CO4: Student will be able to manipulate and analyze data numerically and/or graphically using appropriate Software

Online References:

1. <http://nptel.ac.in/courses/106106094/>
2. http://www.cse.iitd.ac.in/~bagchi/courses/CSL105_06-07/

Prerequisite: NIL

Internal Assessment Details:

Internal Test 1 & 2: 30Marks

Assignment-1: 5 Marks

Assignment-2: 5 Marks

Total: 30 Marks

MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE

Credits:3

Instruction: 3 Periods & 1 Tut /week

Sessional Marks: 30

University Exam: 3 Hours

University Exam Marks: 70

UNIT -I:

Mathematical Logic: Propositional Calculus: Statements and Notations, Connectives, Well Formed Formulas, Truth Tables, Tautologies, Equivalence of Formulas, Duality Law, Tautological Implications, Normal Forms, Theory of Inference for Statement Calculus, Consistency of Premises, Indirect Method of Proof. Predicate Calculus: Predicative Logic, Statement Functions, Variables and Quantifiers, Free and Bound Variables, Inference Theory for Predicate Calculus.

UNIT -II:

Set Theory: Introduction, Operations on Binary Sets, Principle of Inclusion and Exclusion, *Relations:* Properties of Binary Relations, Relation Matrix and Digraph, Operations on Relations, Partition and Covering, Transitive Closure, Equivalence, Compatibility and Partial Ordering Relations, Hasse Diagrams, *Functions:* Bijective Functions, Composition of Functions, Inverse Functions, Permutation Functions, Recursive Functions, Lattice and its Properties.

UNIT- III:

Algebraic Structures and Number Theory: *Algebraic Structures:* Algebraic Systems, Examples, General Properties, Semi Groups and Monoids, Homomorphism of Semi Groups and Monoids, Group, Subgroup, Abelian Group, Homomorphism, Isomorphism, *Number Theory:* Properties of Integers, Division Theorem, The Greatest Common Divisor, Euclidean Algorithm, Least Common Multiple, Testing for Prime Numbers, The Fundamental Theorem of Arithmetic, Modular Arithmetic (Fermat's Theorem and Euler's Theorem)

UNIT -IV:

Combinatorics: Basic of Counting, Permutations, Permutations with Repetitions, Circular

Permutations, Restricted Permutations, Combinations, Restricted Combinations, Generating Functions of Permutations and Combinations, Binomial and Multinomial Coefficients, Binomial and Multinomial Theorems, The Principles of Inclusion–Exclusion, Pigeonhole Principle and its Application.

UNIT -V:

Recurrence Relations: Generating Functions, Function of Sequences, Partial Fractions, Calculating Coefficient of Generating Functions, Recurrence Relations, Formulation as Recurrence Relations, Solving Recurrence Relations by Substitution and Generating Functions, Method of Characteristic Roots, Solving Inhomogeneous Recurrence Relations

UNIT -VI:

Graph Theory: Basic Concepts of Graphs, Sub graphs, Matrix Representation of Graphs: Adjacency Matrices, Incidence Matrices, Isomorphic Graphs, Paths and Circuits, Eulerian and Hamiltonian Graphs, Multigraphs, Planar Graphs, Euler’s Formula, Graph Colouring and Covering, Chromatic Number, Spanning Trees, Algorithms for Spanning Trees (Problems Only and Theorems without Proofs).

TEXT BOOKS:

1. Discrete Mathematical Structures with Applications to Computer Science, J. P. Tremblay and P. Manohar, Tata McGraw Hill.
2. Elements of Discrete Mathematics-A Computer Oriented Approach, C. L. Liu and D. P. Mohapatra, 3rd Edition, Tata McGraw Hill.
3. Discrete Mathematics and its Applications with Combinatorics and Graph Theory, K. H. Rosen, 7th Edition, Tata McGraw Hill.

REFERENCE BOOKS:

1. Discrete Mathematics for Computer Scientists and Mathematicians, J. L. Mott, A. Kandel, T.P. Baker, 2nd Edition, Prentice Hall of India.
2. Discrete Mathematical Structures, BernandKolman, Robert C. Busby, Sharon Cutler Ross, PHI.
3. Discrete Mathematics, S. K. Chakraborty and B.K. Sarkar, Oxford, 2011.

SIR C R REDDY COLLEGE OF ENGINEERING: ELURU
DEPARTMENT OF INFORMATION TECHNOLOGY
COURSE SCHEDULE

The schedule for the whole Course/Subject is:

Unit No	Description of the Chapter	Description of the Topics	Total no of periods (L+T)
1	Mathematical	Propositional Calculus: Statements and Notations, Connectives, Well	8+2

	Logic	<p>Formed Formulas, Truth Tables, Tautologies, Equivalence of Formulas, Duality Law, Tautological Implications, Normal Forms, Theory of Inference for Statement Calculus, Consistency of Premises, Indirect Method of Proof.</p> <p>Predicate Calculus: Predicative Logic, Statement Functions, Variables and Quantifiers, Free and Bound Variables, Inference Theory for Predicate Calculus.</p>	
2.	Set Theory	<p>Set Theory: Introduction, Operations on Binary Sets, Principle of Inclusion and Exclusion,</p> <p>Relations: Properties of Binary Relations, Relation Matrix and Digraph, Operations on Relations, Partition and Covering, Transitive Closure, Equivalence, Compatibility and Partial Ordering</p> <p>Relations, Hasse Diagrams,</p> <p>Functions: Bijective Functions, Composition of Functions, Inverse Functions, Permutation Functions, Recursive Functions, Lattice and its Properties.</p>	8+2
3.	Algebraic Structures and Number Theory	<p>Algebraic Structures: Algebraic Systems, Examples, General Properties, Semi Groups and Monoids, Homomorphism of Semi Groups and Monoids, Group, Subgroup, Abelian Group, Homomorphism, Isomorphism,</p> <p>Number Theory: Properties of Integers, Division Theorem, The Greatest Common Divisor, Euclidean Algorithm, Least Common Multiple, Testing for Prime Numbers, The Fundamental Theorem of Arithmetic, Modular Arithmetic (Fermat's Theorem and Euler's Theorem)</p>	8+2

4.	Combinatorics	<p>Combinatorics: Basic of Counting, Permutations, Permutations with Repetitions, Circular Permutations, Restricted Permutations, Combinations, Restricted Combinations, Generating Functions of Permutations and Combinations, Binomial and Multinomial Coefficients, Binomial and Multinomial Theorems, The Principles of Inclusion–Exclusion, Pigeonhole Principle and its Application.</p>	8+2
5.	Recurrence Relations	<p>Recurrence Relations: Generating Functions, Function of Sequences, Partial Fractions, Calculating Coefficient of Generating Functions, Recurrence Relations, Formulation as Recurrence Relations, Solving Recurrence Relations by Substitution and Generating Functions, Method of Characteristic Roots, Solving Inhomogeneous Recurrence Relations</p>	8+2
6.	Graph Theory	<p>Graph Theory: Basic Concepts of Graphs, Sub graphs, Matrix Representation of Graphs: Adjacency Matrices, Incidence Matrices, Isomorphic Graphs, Paths and Circuits, Eulerian and Hamiltonian Graphs, Multigraphs, Planar Graphs, Euler’s Formula, Graph Colouring and Covering, Chromatic Number, Spanning Trees, Algorithms for Spanning Trees (Problems Only and Theorems without Proofs).</p>	8+2

Total no of instructional periods available for the course : 60 periods

Total no of estimated periods : 60 periods

Signature of the H.O.D

Signature of the Faculty

Date: