COURSE CONTENT

MATHEMATICS FOR COMPUTING								
III Semester: CSE / IT								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
AITD01	**Core**	3	0	0	3	40	60	100
Contact Classes: 45	**Tutorial Classes: Nil**	**Practical Classes: Nil**				**Total Classes: 45**		
Prerequisite: Python Programming								

I. COURSE OVERVIEW:

Computer science depends up on the science of mathematics, in order to acquire the knowledge in computing, mathematical ideas are required. Course is to provide a clear understanding of the concepts that underlying fundamentals with emphasis on their applications to computer science. It highlights mathematical definitions and proofs as well as applicable methods. The contents include formal logic notation, proof methods; induction, well-ordering; sets, relations; growth of functions; permutations and combinations, counting principles, recurrence equations.

II. COURSES OBJECTIVES:

The students will try to learn

I. The fundamental knowledge of statement notations and logical connectives which are used to convert English sentences into logical expressions.
II. The effective use of combinatory principles for calculating probabilities and solving counting problems
III. Relate practical examples to the functions and relations and interpret the associated operations and terminology used in the context
IV. The characteristics of generating functions for finding the solution of linear homogeneous recurrence relations

III. COURSE OUTCOMES:

At the end of the course students should be able to:

CO1 Make use of Number system and converting Decimal to binary, octal and hexadecimal and also gray code to binary, Binary to gray code..
CO2 Demonstrate notations for reformulating statements in formal logic and validating normal forms.
CO3 Demonstrate operations on discrete mathematical structures like sets, functions, lattices for representing the relations among them.
CO4 Illustrate rings, integral domains, and field structures with binary operations defined on them. .
CO5 Apply addition rule and substitution rule for solving the problems of combinatory
CO6 Develop solutions for recurrence relations and generating functions to obtain terms of equations.

IV. COURSE CONTENT:

MODULE – I: NUMBER SYSYTEM (10)

Number Systems: Basics, Numbers in base 10, The Binary System, Calculating the system, Octal number system, Hexa Decimal number system, Converting Decimal to Binary, Octal and Hexadecimal System. Gray code, Converting Gray code to Binary and Binary to Gray code.

MODULE – II: MATHEMATICAL LOGIC (10)

Propositional logic and Predicate Calculus: Statements and Notations, Connectives, Truth Tables, Tautologies, Equivalence of Formulas, Tautological Implications, Normal Forms, Theory of Inference for Statement Calculus, Consistency of Premises, Indirect Method of Proof, Predicative Logic, Statement Functions,

MODULE – III: RELATIONS, FUNCTIONS AND LATTICES (10**)**
Introduction to Sets, representation of Sets, Operation on Sets, Properties of Binary Relations, Relation Matrix, Operations on Relations, Transitive Closure, Equivalence Relation, Compatibility and Partial Ordering Relations, Hasse Diagrams, Lattices: LUB, GLB. Functions: Bijective Functions, Composition of Functions, Inverse Functions,

MODULE – IV: ALGEBRAIC STRUCTURES AND COMBINATORICS (09)
Algebraic structures: Algebraic systems, examples and general properties, semi groups and monoids, groups, sub groups, homomorphism, isomorphism, rings.
Combinatory: The fundamental counting principles, permutations, disarrangements, combinations, permutations and combinations with repetitions, the binomial theorem, multinomial theorem, generalized inclusion exclusion principle.

MODULE – V: RECURRENCE RELATION (09)
Recurrence relation: Generating functions, function of sequences calculating coefficient of generating function, recurrence relations, solving recurrence relation by substitution and generating functions, Characteristics roots solution of homogeneous recurrence relation.

V. TEXT BOOKS:

1. J. P. Tremblay, R. Manohar, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw Hill, India, 1st edition, 1997.
2. JoeL. Mott, Abraham Kandel, Theodore P. Baker, "Discrete Mathematics for Computer Scientists and Mathematicians", Prentice Hall of India Learning Private Limited, New Delhi, India, 2nd edition, 2010.

VI. REFERENCE BOOKS:

1. Kenneth H. Rosen, "Discrete Mathematics and Its Applications", Tata Mcgraw-Hill, New Delhi, India, 6th edition, 2012.
2. C. L. Liu, D. P. Mohapatra, "Elements of Discrete Mathematics", Tata Mcgraw-Hill, India, 3rd edition, 2008.
3. Ralph P. Grimaldi, B. V. Ramana, "Discrete and Combinatorial Mathematics - An Applied Introduction", Pearson Education, India, 5th edition, 2011.
4. D. S. Malik, M. K. Sen, "Discrete Mathematical Structures: Theory and Applications", Thomson Course Technology, India, 1st edition, 2004.

VII. ELECTRONIC RESOURCES:

1. https://swayam.gov.in/explorer?searchText=Discrete+Mathematical+Structures
2. https://www.javatpoint.com/discrete-mathematics-tutorial.
3. http://www.web.stanford.edu/class/cs103x
4. http://www.cs.odu.edu/~cs381/cs381content/web_course.html
5. http://www.cse.iitd.ernet.in/~bagchi/courses/discrete-book
6. http://www.nptel.ac.in/courses/106106094/
7. http://www.tutorialspoint.com/discrete_mathematics
8. http://www.dmtcs.org/dmtcs-ojs/index.php/dmtcs.

VIII. MATERIALS ONLINE

1. Course template
2. Tutorial question bank
3. Tech-talk topics

4. Open-ended experiments
5. Definitions and terminology
6. Assignments
7. Model question paper – I
8. Model question paper – II
9. Lecture notes
10. PowerPoint presentation
11. E-Learning Readiness Videos (ELRV)