Content

Course Code	Course Name	Semester	Theory	Practice	Lab	Credit	ECTS
INF315	Discrete Mathematics	5	3	0	0	3	4

Prerequisites	
Admission Requirements	

Language of Instruction	French
Course Type	Compulsory
Course Level	Bachelor Degree
Objective	The aim of this course is to provide students with the fundamental concepts of discrete mathematics that form the basis of computer science and computer engineering, and to develop their logical reasoning, mathematical modeling, problem-solving, and proof-writing skills. Students will learn to relate concepts such as sets, relations, combinatorics, number theory, graph theory, algebraic structures, algorithms, and computability to problems in computer science.
Content	Propositional logic and truth tables; predicates, quantifiers, and proof techniques; set theory and power sets; partially ordered sets; relations, closures, and equivalence relations; number theory, modular arithmetic, and cryptography; combinatorics and counting principles; inclusion-exclusion and generating functions; recurrence relations and algorithm analysis; fundamental concepts of graph theory and graph isomorphism; trees, traversals, and Huffman coding; graph algorithms, paths, and spanning trees; algebraic structures for computer science; finite-state automata and computability theory.
References	Rosen, Kenneth H., and Kamala Krithivasan. Discrete mathematics and its applications: with combinatorics and graph theory. Tata McGraw-Hill Education, 2012.

Theory Topics

Week	Weekly Contents
1	Propositional Logic and Truth Tables
2	Predicates, Quantifiers, and Proof Techniques
3	Set Theory, Power Sets, and Partially Ordered Sets
4	Relations, Closures, and Equivalence Relations
5	Number Theory, Modular Arithmetic, and Cryptography
6	Combinatorics I: Fundamental Principles and Counting
7	Combinatorics II: Inclusion-Exclusion and Generating Functions
8	Mid term exam
9	Recurrence Relations and Algorithm Analysis
10	Graph Theory I: Fundamental Concepts and Isomorphism
11	Trees, Graph Traversals, and Huffman Coding
12	Graph Algorithms: Paths and Spanning Trees
13	Algebraic Structures for Computer Science
14	Finite-State Automata and Computability Theory