Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Sessional	Final Exam	Total
BSC-401	Discrete Mathematics	BSC	3	3	0	0	50	100	150

Course Outcomes:

At the end of the course students will be able to	
CO1	Explain basic principles of sets and operations in sets.
CO2	Analyze relations and functions and be able to determine their properties.
CO3	Apply logical notation to describe an argument.
CO4	Evaluate the basics concepts of groups, its examples, and related results.
CO5	Create graphs and trees using different transversal methods.

Detailed Syllabus

Section-A

Unit 1: Sets, Relation and Function: Operations and Laws of Sets, Cartesian Products, Finite and infinite sets, countable and uncountable sets, Binary Relation and its types, Functions and its types, Principles of Mathematical induction, Principle of inclusion and exclusion, pigeon-hole principle. **(10 Hrs.)**

Unit 2: Algebraic Structure: Groups and subgroups, related theorems, Cosets, Normal subgroups and Group homomorphism. Rings, Integral domains, and fields: examples and related results. **(8 Hrs.)**

Unit 3: Basic Logic: Propositional logic, Logical connectives, Truth tables, Normal forms (conjunctive and disjunctive), Validity of well-formed formula, Propositional inference rules (concepts of modus-ponens and modus tollens), Predicate logic, Universal and existential quantification. **(8 Hrs.)**

Section-B

Unit 4: Graphs: Basic terminology, multi-graphs and weighted graphs, connectivity, walk and path, circuits and cycles, shortest path in weighted graphs, Algorithm of shortest path. Hamiltonian and Eulerian paths and circuits, Eulerian graphs, Hamiltonian graphs, Konigsberg bridge problem, Chinese postman problem, Travelling salesperson problem, Planar graph and Euler's formula. **(11 Hrs.)**

Unit 5: Trees and cut sets: Trees, rooted trees, path lengths in rooted trees, spanning trees and cut sets. **(3 Hrs.)**

Text Books

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Discrete Mathematics	Kenneth Rosen	McGraw Hill Education	7th (2017)
2	Graph Theory with applications to Engineering and Computer Science	Narsingh Deo	Prentice Hall	1st (2016)
3	Discrete Mathematics structure with applications to Computer Science	Jean-Paul Tremblay and R Manohar	McGraw Hill Education	1st (2017)

Reference Books

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Concrete Mathematics	Ronald Graham, Donald Knuth, and Oren Patashnik	Pearson Education Publishers	2nd (2008)
2	Elements of Discrete Mathematics	C. L Liu	McGraw-Hill Inc	2nd (1985)
3	Discrete Mathematics Schaum 's Outline	Lipschutz, S. and Mark Lipson	Tata McGraw Hill	3rd (2007)