



Elements of Sets & Structures

Course Code	Course Num.	Course Name	Credit Hours	Lec	Lab	Tut	Prerequisites
MAT	220	Elements of Sets & Structures	3	2	0	2	MAT 101

Objectives:

- To give students the rudiments of mathematical logic and set theory and introduce the important concepts of relations and their types.
- To let students be familiar to the formal definitions of function and binary operations and study their elementary properties.
- To expose students to some abstraction by presenting the group concept and studying some of its elementary properties.

Syllabus:

- **Elementary logic and set theory:** Simple and compound statements, Logical connectives, Truth tables, Basic logic laws, Methods of proofs, Mathematical induction, Operations on sets, Basic laws of set theory, Cartesian product of sets.
- **Relations and functions:** Basic definitions on relations, Binary relations and their types, Equivalence relation and set partition, Functions and their types, Bijective function and its inverse.
- **Binary operations:** Definitions and basic properties, Identity and inverse elements, Semigroups and monoids.
- **Groups:** Definitions and basic properties, Cayley tables, Subgroups, Group order, Order of an element and cyclic groups, Modular groups and symmetric groups.

References:

- **Set Theory and Related Topics**, K. Heal & K. Rickard, Cambridge University Press (1997)
- **An Introduction to Mathematical Reasoning: Numbers, Sets and Functions**, P. Eccles, Academic Express, 1997.
- **Modern Abstract Algebra**, F. Ayres, Schaum's Outline, McGraw-Hill (1965).

