Commun core of mathematics students
Content of module algebra 1 (First semester)

Chapter 1 : Introduction to Mathematical logic. (3 weeks)

- *Definitions and examples.*
- *Basic operators (Negation, conjunction, disjunction, implication, equivalence , properties)*
- *Quantifiers (Universal quantifier, existential quantifier and properties)*
- *Type of reasoning. (Direct reasoning, reasoning by conter example, reasoning by contrapositive, reasoning by contradiction, reasoning by induction), for each type , we give some examples.*

Chapter 2 : Sets and functions (3 weeks)

- *Definitions and examples (sets , elements, subset, union, intersection.*
- *Definition and examples (functions, definitions , and examples).*
- *Direct image and inverse image.*
- *Injective, surjective, bijective function.*
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Chapter 3 : Binary relation on a set. (2 weeks)

- *Basics definitions (reflexive, symmetric, antisymmetric, transitive relations).*
- *Equivalence relations.*
- *Order relations.*

Chapter 4 : Algebraic structures (02 weeks)

- *Internal composition laws and their properties (definitions and exmaples)*
- *Algebraic structures:*
  1. *Groups (definitions, examples), group homomorphism.*
  2. *Rings, ideal in a ring, rules of calculation in a ring.*
  3. *Field.*

Chapter 5 : Polynomial rings (2 weeks)

- *Definitions*
- *Polynomial arithmetic*
- *Roots of a polynomial and factorization*