

Title	Discrete Mathematics
Code	CMP-301
Credit Hours	3
Category	Computing
Prerequisite	None
Co-Requisite	None
Follow-up	None
Course Description	<p>Topics: Propositional logic: Logical operators, translations between symbolic expressions and formal english expression, logical equivalences, Predicate logic: Quantifiers, Nested quantification, equivalences, translations between symbolic forms and formal English. Rules of inference, Proof methods and strategies: Direct proof, Proof by contraposition, Existence proof, Uniqueness proofs, trivial proofs, vacuous proofs, Sets: notations, set operations, Venn diagrams, countable and uncountable sets, Functions: injective, surjective, bijective, special types of functions, compositions, Sequences, Summations: Single summation, double summation, shifting indices, evaluating summations, formulas Growth of functions: Big-O notation, Integers and divisibility: Division theorem, modular arithmetic, lcm, gcd, Euclidean and Extended Euclidean method, finding solutions to congruences, Primes: Fundamental theorem of arithmetic, characterizations of primes, Mersenne primes, Induction: weak induction, strong induction, Recursion and recurrences: formulation of recurrences, closed formulas, Counting: product rule, sum rule, principle of inclusion-exclusion, combinations and permutations, binomial coefficients, Pascal's identity and Pascal's triangle, binomial theorem, pigeonhole principle, Relations: reflexive, symmetric, transitive, antisymmetric, equivalence relations and equivalence classes, partial orders, Graph Theory: terminologies, handshaking lemma and corollary, special families of graphs, graph representations, isomorphism, planarity, eulerian and hamiltonian graphs, trees</p>
Text Book(s)	Kenneth H. Rosen, Discrete Mathematics and Its Applications, 7 th Edition, McGraw Higher-Ed, 2011, ISBN: 0073383090.
Reference Material	None