CSCA 431: MATHEMATICS FOR COMPUTER SCIENCE

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Pre-requisite:

- Knowledge of functions and basic Algebra

Objectives:

- Introduce the mathematical concepts fundamental to Computer science.
- To illustrate the applications of Mathematical concepts to Computer science

Outcomes:

- Ability to understand the fundamental mathematical concepts involved in Computer Science
- Getting familiarized with mathematical concepts such as number theory, algebraic structures.

Module-I: (10 Hrs)

Logics and Proofs: Propositional Logic – Predicates – Proofs – Methods and strategies.

Module-II: (9 Hrs)

Basic Structures and Relations: Sets – Functions – Sequences – Sums – Matrices. Relations – properties – representation

Module-III: (9 Hrs)

Number Theory: Divisibility and Modular Arithmetic – integer – algorithm – prime and GCD – Congruences.

Module-IV: (9 Hrs)

Algebraic Structures: Groups – cyclic group - Homomorphism – Cosets and Lagrange's Theorem- Normal Subgroups –Rings and Fields (definition and examples)

Module-V: (8 Hrs)

Counting: Basics – Pigeon hole principle – Permutations and combinations – Binomial coefficients.

Text Books:

1. Kenneth H. Rosen, "Discrete Mathematics and its Applications", 7th Edition, Jones & Bartlett Learning, 2012.
2. Trembley. J.P and Manohar.R." Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw Hill Pub. Com. Ltd., New Delhi, Reprinted in 2007.