This course builds the mathematical foundation of computer science. It introduces the elements of mathematics like sets, functions, relations that form the basics of almost the entirety of computer science. It gives a clear understanding about the formal statements and their proofs and the counting techniques. The course develops the concept of algebraic structures and how they are used in defining mathematical applications. All the topics are illustrated with a handful of problems to make the course interesting as well as easy to understand.

**ABOUT INSTRUCTOR:**

Prof. Dipanwita Roy Chowdhury has received her B.Tech and M.Tech degrees in Computer Science from University of Kolkata and the PhD degree from the Department of Computer Science and Engineering, Indian Institute of Technology, Kharagpur. She is a Professor in the Department of Computer Science and Engineering, IIT Kharagpur, India. Currently, she is also the Chairman of Kalpana Chawla Space Technology Cell at IIT Kharagpur. Her current research interests are in the field of Cryptography, Error Correcting Code, Cellular Automata, and VLSI Design and Testing. She has guided 15 PhD students and published more than 150 technical papers in International Journals and Conferences. Prof. Roy Chowdhury is the recipient of INSA Young Scientist Award and Associate of Indian Academy of Science. She is a Senior Member of IEEE and the fellow of Indian National Academy of Engineers (INAE).

**COURSE PLAN:**

- **Week 01**: Introduction to Propositional Logic
- **Week 02**: Predicate Logic
- **Week 03**: Methods of Proofs and Induction
- **Week 04**: Sets and Functions
- **Week 05**: Relations and their Properties
- **Week 06**: Recursion
- **Week 07**: Recurrence Relations
- **Week 08**: Counting Techniques and Pigeonhole Principle
- **Week 09**: Combinatorics
- **Week 10**: Algebraic Structures
- **Week 11**: Rings and Modular Arithmetic
- **Week 12**: Finite Fields and Applications