DISCRETE STRUCTURES

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TYPE OF COURSE   **:** Rerun | Core | UG
COURSE DURATION **:** 12 Weeks (24 Jan' 22 - 15 Apr' 22)
EXAM DATE   **:** 23 Apr 2022

PRE-REQUISITES : Knowledge of Class 12 Mathematics and basics Computer Programming

INTENDED AUDIENCE : Computer Science, Mathematics

INDUSTRIES APPLICABLE TO : All companies that work on research problems

COURSE OUTLINE :
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 Calcutta 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 1**:** Introduction to Propositional Logic

 Week 2**:** Predicate Logic

 Week 3**:** Methods of Proofs and Induction

 Week 4**:** Sets and Functions

 Week 5**:** Relations and their Properties

 Week 6**:** Recursion

 Week 7**:** Recurrence Relations

 Week 8**:** Counting Techniques and Pigeonhole Principle

 Week 9**:** Combinatorics

 Week 10**:** Algebraic Structures

 Week 11**:** Rings and Modular Arithmetic

 Week 12**:** Finite Fields and Applications