



DISCRETE MATHEMATICS

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INTENDED AUDIENCE : Any Interested Learners

INDUSTRIES APPLICABLE TO : Every industry expects candidates to have good aptitude. This course sharpens the overall Quant skills.

COURSE OUTLINE :

The course will be an introduction to Discrete Mathematics which comprises of the essentials for a computer science student to go ahead and study any other topics in the subject. The emphasis will be on problem solving as well as proofs. We will be providing motivational illustrations and applications through out the course. The course doesn't assume any pre-requisites except for high school level arithmetic and algebra.

ABOUT INSTRUCTOR :

Prof. Sudarshan Iyengar, Associate Professor at the CSE at IIT Ropar has a Ph.D. from the Indian Institute of Science (IISc). An exemplary teacher who has delivered over 350 popular science talks to students of high school and advanced graduate programmes. Prof. Sudarshan has offered more than 100 hours of online lectures with novel teaching methodologies that have reached lakhs of Students. His research interests include Data Sciences, Social Computing, Social Networks, Collective Intelligence, Crowdsourced Technologies and Secure Computation.

Prof. Prabuchandran K.J. is an Assistant Professor at IIT Dharwad. He completed Ph.D. from the Department of Computer Science and Automation, IISc in the area of Reinforcement Learning. Post his PhD, Prabuchandran worked as Research Scientist at IBM Research Labs, India for an year and half on change detection algorithms for multivariate compositional data. After that he pursued his postdoctoral research at IISc, Bangalore as an Amazon-IISc Postdoctoral scholar for an year and half on Multi-agent Reinforcement Learning and Stochastic Optimization algorithms. His research lies in the intersection of reinforcement learning, stochastic control & optimization, Machine Learning, Bayesian Optimization and stochastic approximation algorithms. His research interest also focuses on utilizing techniques from these fields in solving problems arising in applications like wireless sensor networks, traffic signal control and social networks.

COURSE PLAN :

Week 1: Counting

Week 2: Set Theory

Week 3: Logic

Week 4: Relations

Week 5: Functions

Week 6: Mathematical Induction and Pigeonhole Principle

Week 7: Graph Theory - 01

Week 8: Graph Theory - 02

Week 9: Graph Theory - 03 and Generating Functions

Week 10: Principle of Inclusion-Exclusion

Week 11: Recurrence relations

Week 12: Advanced Topics