

**INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

**NAME OF SCHOOL:** Mehta Family School of Data Science and Artificial Intelligence

**Subject Code:** DAI-101

**Course Title:** Data Science

**L-T-P:** 3-1-0

**Credits:** 4

**Subject Area:** DSC

**Course Outlines:** Reading data, Data Exploration, Data Visualization, Data Cleaning and Munging, Dimensionality Reduction, Data Resampling, Data and Sampling Distributions, Statistical Experiments and Significance Testing, Introduction to Big Data, HDFS, Map Reduce.

**INDIAN INSTITUTE OF TECHNOLOGY ROORKEE****NAME OF SCHOOL:** Mehta Family School of Data Science and Artificial Intelligence**Subject Code:** DAC-151**Course Title:** Fundamentals of AI/ML**L-T-P:** 2-0-0**Credits:** 2**Subject Area:** PCC

**Course Outlines:** Data analytic thinking and pipeline, data driven dashboards, ML and AI including basics of data science, basic concepts in statistics and exploratory data analysis, data visualization, State space search and search algorithms, progress in big data, ethics in data science and AI.

**INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

**NAME OF SCHOOL:** Mehta Family School of Data Science and Artificial Intelligence

**Subject Code:** DAC-201

**Course Title:** Discrete Structures

**L-T-P:** 3-1-0

**Credits:** 4

**Subject Area:** PCC

**Course Outlines:** Propositional logic and equivalences, predicates and quantifiers, nested quantifiers, rules of inference, proof techniques, operations on sets, relations and binary relations, partial ordering relations, equivalence relations, inclusion and exclusion principle, Pigeon-hole principle, recurrence relations and generating functions, graph models, graph isomorphism, connectivity, Euler and Hamiltonian Paths, shortest path, planar graphs, coloring, trees, minimum spanning tree, Boolean algebra and modeling computation, finite state machines.

**INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

**NAME OF SCHOOL:** Mehta Family School of Data Science and Artificial Intelligence

**Subject Code:** DAC-203

**Course Title:** Artificial Intelligence

**L-T-P:** 3-1-0

**Credits:** 4

**Subject Area:** PCC

**Course Outlines:** Artificial intelligence (AI) - history, current state, and future prospects, key concepts - agents, environments, and problem-solving techniques, searching methods, Alpha-Beta pruning strategy, propositional and predicate calculus, semantics, inference rules, and unification, Bayesian reasoning, random sampling, sampling techniques, distributions, and mixture models, inductive and decision tree learning, advanced topics in language understanding, rule-based expert systems, neural networks, genetic algorithms, large language models, and recent AI advancements.