Syllabus for Data Science and Artificial Intelligence Master's

Section 1: Subject Knowledge

Please Note: A Total of 40 Questions will be asked, combining the following topics, with the difficulty level commensurate to a Master's Candidate.

Unit I: Probability and Statistics

Permutation and Combinations, Probability Axioms, Sample Space, Events, Conditional and Joint Probability, Bayes Theorem, Measure of Central Tendency, Discrete and Continuous Distribution, Statistical Inference and Probability Distributions.

Unit II: Linear Algebra

Vector and Vector Space, Matrices Operations and Determinants, Linear Transformations, System of Linear Equations, quadratic forms, Eigenvalues and Eigenvectors, Orthogonality and Inner Product Spaces.

Unit III: Calculus and Optimization

Functions of a single variable, limit, continuity, and differentiability, Taylor series, maxima and minima, optimization involving a single variable.

Unit IV: Programming, Data Structures and Algorithms

 Programming in Python, Data structures: stacks, queues, linked lists, trees, hash tables, Search algorithms, Sorting algorithms, Divide and Conquer, and Basic graph algorithms.

Unit V: Database Management and Warehousing

ER model, Relational model, SQL, Database Design, Normalization, integrity constraints, File organization, Indexing, Data types, Discretization, Sampling, Compression, Data warehouse modelling, and Measures.

Unit VI: Machine Learning

(i) Supervised Learning, Simple linear regression, Multiple linear regression, Ridge regression, Logistic regression, k-nearest neighbour, naive Bayes classifier, linear discriminant analysis, support vector machine, decision trees, bias-variance trade-off, cross-validation methods.

(ii) Unsupervised Learning: clustering algorithms, k-means/k-medoid, hierarchical clustering, top-down, bottom-up: single-linkage, multiple-linkage, dimensionality reduction, principal component analysis.

Unit VII: Artificial Intelligence (AI)

Search, Logic, Propositional, Predicate, Reasoning under uncertainty topics, Exact inference through variable elimination, and approximate inference through sampling.

Section 2: Fundamental Skills

Please Note: A Total of 24 Questions will be asked, combining the following topics, with the difficulty level commensurate to a Master's Candidate.

Unit I: Data Analysis

Unit II: Math and Statistics

Unit III: Reasoning and Aptitude

Unit IV: Reading and Writing

Section 3: Specific Skill Proficiency

This section has multiple skills. You can select the ones you are proficient in from the enrollment form. You can select a maximum of 4 skills.