M.Sc. Computer Science (Artificial Intelligence and Data Science)

Scheme and Syllabus for Entrance Test

The entrance examination will primarily check basic aptitude in mathematics, statistics, computer fundamentals and programming. Entrance test will consist of 100 multiple-choice questions from the following three sections.

Scheme for Entrance Test

Max. Marks: 100
Time: 90 Minutes

i. **There will 100 questions consisting of three sections as under:**

Section I: Computer Science	**40 Questions (1-40)**	**40 Marks**
Section II: Mathematics	**30 Questions (41-70)**	**30 Marks**
Section III: Statistics	**30 Questions (71-100)**	**30 Marks**

ii. **There will be only multiple-choice questions with one correct answer will be asked in the Entrance Test. There will be no negative marking.**

Syllabus for Entrance Test

Section I: Computer Science

Digital Electronics: Binary system, Boolean algebra and logic gates, simplification of Boolean functions, combinational logic, sequential logic

Fundamental of Computers: Generation of computers, Personal computer, workstation, mainframe computer and super computers. Computer Organization: Central processing unit, computer memory – primary memory and secondary memory. Secondary storage devices – Magnetic and optical media. Input and output units. OMR, OCR, MICR, scanner, mouse, modem, Basic Operating System concepts, Basic Database Concepts.

C Programming concepts: Data types, operators and expressions, decision making and branching, decision making and looping, functions, arrays, strings

Networking: Types of networks, LAN, Intranet and Internet, Internet applications, World Wide Web, HTML, E-mail, browsing and searching, search engines, multimedia applications.

Section II: Mathematics

Set Theory: Sets and elements, subsets, Combinations of Sets, Venn diagrams, algebra of sets, duality, finite and infinite sets, counting principle, classes of sets, power sets, partitions, Propositions, mathematical induction.

Functions of one real variable: Limit, continuity, intermediate value property, differentiation, Rolle ’s theorem, mean value theorem, L’Hospital rule, Taylor’s theorem, maxima and minima

Integral calculus: Integration as the inverse process of differentiation, definite integrals and their properties, fundamental theorem of calculus, double and triple integrals, change of order of integration.

Differential equations: Ordinary differential equations of first order: linear equations, Bernoulli’s equation, exact differential equations, integrating factor, orthogonal trajectories; homogeneous differential equations, linear second order differential equations with constant coefficients, method of variation of parameters for nonhomogeneous equations, Cauchy-Euler equation

Linear algebra: Finite dimensional vector spaces, linear independence of vectors, basis, dimensions, linear transformations, matrix representation, range space, null space, rank-nullity theorem, rank and inverse of a matrix, determinant, solutions of systems of linear equations, consistency conditions, eigenvalues and eigenvectors for matrices, Caley-Hamilton theorem.

Section III: Statistics

Descriptive Statistics: Measures of central tendency, dispersion, skewness and kurtosis

Probability: Axiomatic approach to probability, Laws of addition and multiplication of probability, Conditional probability, Bayes' theorem and independence of events.

Random Variables: Discrete and Continuous random variables, Function of Random variable, Distribution Function and its properties. Conditional and marginal distributions. Independence of random variables, Probability mass function, Probability density function and cumulative distribution functions. Mathematical expectations.

Distributions: Uniform, Bernoulli, Binomial, Poisson, Exponential, Normal distributions. Central limit theorem, Correlation and Regression.