

Faculty of Science

M.Sc. / M.A. (Operations Research)

DEPARTMENT OF STATISTICS & OPERATIONS RESEARCH ALIGARH MUSLIM UNIVERSITY ALIGARH

Syllabus for M.A./M.Sc. Entrance Test in Operations Research

SECTION I

Mathematics

Sequences and Series: Convergence of sequences of real numbers. Functions and its properties, Limits, continuity and differentiability of functions, Function optima, increasing and decreasing functions. Matrix Algebra and its Properties, Elementary set theory, Vector space, Subspaces, Linear transformations, Rank, Nullity, Eigen values, system of linear equations.

SECTION II

Statistics

Types of data, graphical representation of data, central tendency measures and dispersions measures, Skewness and Kurtosis. Correlation and Regression Analysis, Rank correlation.

Definitions of probability and its properties, conditional probability, multiplication rule, independence of events, Bayes' theorem. Random variables: Probability mass function, probability density function and cumulative distribution functions, Distribution function of a random variable.

Discrete and continuous distributions (pmf, pdf, cdf). Binomial, negative binomial, geometric, Poisson, hypergeometric, uniform, exponential, gamma, beta and normal distributions. Properties of a good estimator, Methods of estimation (maximum likelihood method, method of moments).

SECTION III

Linear Programming Problem & Statistical Quality Control

Linear Programming Problems (LPP), Graphical and Simplex Method, Artificial Variable Method, Concept of Duality in LPP, Dual Simplex Method. Transportation problems and Assignment problems. Basics of Statistical Quality Control, Statistical Quality Control Charts (Variables & Attributes).

SECTION IV

Computer Science

Basic Concepts of Computer, C / C++ Programming and introduction to R Language: Data objects in R, vector, matrix and data frame, listed data objects. Defining new function and programming tools. Data import and export operations on matrices and introduction to graphics with R.

SECTION V

General Awareness and Reasoning

Logical Reasoning, Analytical Reasoning, Mathematical Reasoning, Verbal and Non-Verbal Reasoning.