

# INDIAN INSTITUTE OF TECHNOLOGY MADRAS

Department of Management Studies

Subjects and Syllabus for Comprehensive Viva

-Ajay Philip (MS19D009)

## MS6031: Data Analysis for Research

Course Instructor: Dr. R.K Amit

**Introduction to Statistics and Descriptive Statistics:** Measures of Central Tendency, Measures of Dispersion, Scatter Plot, Box Plot, Histogram

**Probability Distributions:** Bernoulli, Binomial, Poisson, Normal, Chi-squared, t-distribution, F distribution.

**Sampling:** Distribution of sample statistics; Central limit Theorem; Sampling from finite population

**Estimation:** Estimation of  $\mu$  and  $\sigma$ ; Properties of Point Estimators; Confidence Interval

**Hypothesis Testing:** Null and Alternate Hypothesis, Type 1 and Type 2 error, Tests for means and variances

**Regression:** Linear regression, Method of Least Squares

Tests of fits

## MS7080: Research Methodology in Business and Management

Course Instructor: Dr. Saji K Mathew

**Approach to Research:** What is research? Researcher Bias, Fundamental vs. applied research, Science of social science, research paradigms in management research

**Foundations of Theory:** Theory in management research, law and theory, hypotheses and propositions, theory building, Epistemology and Ontology, Quantitative vs. Qualitative Research

**Qualitative Research:** Qualitative research in management, different qualitative approaches, checking validity in qualitative research, Grounded Theory

**Quantitative Research:** Concepts, constructs and measurement, scales of measurement, survey based research, experimental design

**Research design:** Level of analysis and measurement, experimental approach, cross sectional design, longitudinal design, case study design

## **MS5510-Logistics and Distribution Management**

**Course Instructor: Dr. C. Rajendran**

**Primitives:** Linear Programming (LP), Mixed Integer Linear Programming (MILP), Dynamic Programming

**Decision Making Models:** Analytical Hierarchy Process, TOPSIS, Multi-Criteria Decision-Making

**Point to Point Vs Hub and Spoke Distribution Models**

**Production Planning:** Capital Budgeting Problem, Fixed Charge Problem, Warehouse Location Problem, Job-sequencing Problem

**Transportation and Logistics:** Transportation Problem, Travelling Salesman Problem, Vehicle Routing Problem, Maximal Flow Problem, Shortest Route Problem

## **MS5570- Heuristics in Decision Making**

**Course Instructor: Dr. C. Rajendran**

**Introduction to Conventional Search Techniques:** Random Search, Steepest Ascent/Descent Search, Greedy Search

**Introduction to Meta-Heuristics:** Genetic Algorithm, Simulated Annealing, Ant-Colony Optimization, Particle Swarm Optimization

**Applications of Heuristics:** Traveling Salesman Problem- Nearest Neighbour Algorithm, Penalty Cost Method; Vehicle Routing Problem- Clarke and Wright Savings Heuristic

## **MS5550- Operations Research Applications**

**Course Instructor: Dr. G. Srinivasan**

**Topics Covered:** Auto Assembly Analysis, Transportation Problem, Cutting Stock Problem, Data Envelopment Analysis (DEA), Stable Marriage Problem, Bin-Packing Problem, Sudoku, Binary Knapsack, Location Allocation, Sequencing and Scheduling, Travelling Salesman Problem, Assignment Problem, Vehicle Routing Problem, Maximum Flow Problem, Goal Programming