STATISTICS 213
"STATISTICAL METHODS I"

Calendar Description: H(3-2)
Collection and presentation of data, introduction to probability, including Bayes' law, expectations and distributions. Properties of the normal curve. Introduction to estimation and hypothesis testing.
Prerequisite: Mathematics 30 or Pure Mathematics 30.

Syllabus

Topics	Number of hours
EXPLORATORY DATA ANALYSIS Populations and sampling, simple random sample. Measures of location and spread: mean, median, mode, variance and standard deviation, quartiles. Grouped data, frequency histograms, shape, symmetry and skewness. The empirical rule. Graphical methods: Stem-and-leaf plots, Box-and-whisker plots.	6
REGRESSION AND CORRELATION Scatter diagrams, linear regression and correlation. Regression predictions - descriptive methods.	2
INTRODUCTION TO PROBABILITY Sample spaces and random events, Venn diagrams. Permutations and combinations. Definitions of probability. Basic probability laws.	4
CONDITIONAL PROBABILITY Conditional probability, probability trees, Formula of total probability and Bayes' Theorem. Independence of random events.	4
RANDOM VARIABLES Random variables and their distributions, Joint probability distributions and independence.	3
DISCRETE DISTRIBUTIONS Uniform, binomial, hypergeometric, and Poisson distributions.	3
EXPECTATIONS AND VARIANCES Expectations, variances and covariances of random variables and their linear combinations. Application to discrete random variables.	6
CONTINUOUS RANDOM VARIABLES Concept of continuous random variable and its distribution. Uniform and normal distributions and their properties. Central Limit Theorem. Approximation of the binomial by the normal distribution. Optional: exponential distribution.	5
SAMPLING DISTRIBUTIONS Distribution of the sample mean from the normal population. Central Limit Theorem and large sample mean distribution. Distribution of the sample proportion.	2
ESTIMATION AND HYPOTHESIS TESTING Introduction to confidence intervals and hypothesis. Testing using simple examples involving means and proportions.	3
TOTAL HOURS	38

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