

Probability and Statistics
BEG203SH

YEAR-II

SEMESTER-II

Teaching Schedule			Examination Scheme						Total Marks
			Final				Internal Assessments		
Hours/ Week			Theory		Practical		Theory Marks	Practical Marks	
			L	P	T	Duration			Marks
3	-	1	3	80	-	-	20		100

Course Objective:

Course Contents:

1. Introduction and Descriptive Statistics

(5 hrs)

- 1.1 An overview of Statistics: Application of Statistics in Engineering
- 1.2 Pictorial Representation of Data (Pie-Chart, Histogram and Ogive Curves)
- 1.3 Measures of Location: Mean, Median, Mode and Partition Values
- 1.4 Measures of Variability (Standard Deviation, CV and their application)

2. Correlation and Regression

(4 hrs)

- 2.1 Correlation
- 2.2 Coefficient of Correlation (Karl Pearson's and Spearman's), the coefficient of determination, properties and interpretation
- 2.3 Regression, Simple lines of regression
- 2.4 Properties of regression coefficient

3. Probability

(4 hrs)

- 3.1 Sample spaces and events
- 3.2 Axioms, interpretations and properties of probability
- 3.3 Counting techniques
- 3.4 Conditional probability
- 3.5 Theorems on probability (Addition, Multiplication and Bayes and their Applications)

4. Random Variables and Mathematical Expectation

(3 hrs)

- 4.1 Introduction, types of random variable, Probability mass function and probability density function.
- 4.2 Mathematical Expectation and its physical meaning
- 4.3 Probability distribution and its types

5. Discrete Probability Distributions

(6 hrs)

- 5.1 The Binomial and Poisson probability distribution, introduction, characteristics, mean and variance and its application
- 5.2 Fitting of Binomial and Poisson distribution
- 5.3 The Hyper-Geometric and Negative Binomial Distributions (introduction and properties only)

6. Continuous Probability Distribution

(4 hrs)

- 6.1 The Normal, Standard Normal, The Gamma, Chi-squ are and t-distribution

(Introduction, characteristics and its applications)

7. Estimation (5 hrs)

7.1 Parameters and Statistics

7.2 Standard error and sampling distribution

7.3 Point estimation

7.4 Interval Estimation (single proportion and mean, difference of proportion and mean)

7.5 Properties of good estimator

8. Statistical Inference (9 hrs)

8.1 Hypothesis, types of hypothesis, Error in testing of hypothesis, level of significance, degree of freedom, one tailed and two tailed, some comments on selecting a test procedure

8.2 Large-sample tests (z-test), Test for population mean, population proportion, different Between two population means and proportions 8.3 Small sampling distribution (t-test): t-test for single mean, difference of two means, and paired t-test

9 The Analysis of categorical data (5 hrs)

9.1 Chi-square test

9.2 Test procedures for a population variance

9.3 Test for goodness of fit

9.4 Two way contingency table and test of independence of attributes

References:

- Jay L. Devore, "Probability & Statistics for Engineering & the Sciences", Brooks/Cole Publishing Company, Monterey, California, 1982
- S. C. Gupta: "Fundamental of Statistics, Sultan Chand Publication Arjun K. Gaire, "Probability & Statistics for Engineering", Kathmandu
- Arjun K. Gaire, "Probability & Statistics for Engineering", Kathmandu