

**PROBABILITY AND STATISTICS**  
**BEG203SH**

Year: III

Semester: II

Teaching Schedule			Examination Scheme				
Hours/Week			Internal		Final		Total
Theory	Tutorial	Practical	Theory	Practical	Theory	Practical	100
3	2	-	20	-	80	-	

**Course Objectives**

To be able to use statistical tools needed to make evaluations of experimental data, apply elementary rules of probability in handling probability distributions and sampling distributions, obtain point and interval estimates for means and proportions, test hypotheses involving means and proportions and draw conclusions based on the results of statistical tests.

- 1. Introduction and Descriptive Statistics 5 hours**
  - 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
  
- 2. Correlation and Regression 4 hours**
  - 2.1 Correlation
  - 2.2 Coefficient of Correlation (Karl Pearsons only) and the coefficient of determination
  - 2.3 Regression
  - 2.4 Simple Regression Lines
  - 2.5 Properties
  
- 3. Probability 4 hours**
  - 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)
  
- 4. Discrete Random Variables and Probability Distributions 7 hours**
  - 4.1 Random variables
  - 4.2 Probability distributions for random variables
  - 4.3 Probability mass function and cumulative distribution function.
  - 4.4 Expected values of discrete random variables
  - 4.5 The binomial probability distribution
  - 4.6 The hyper-geometric and negative binomial distributions (introduction only)
  - 4.7 The Poisson probability distributions

- 5. Continuous Random Variables and Probability Distributions** **6 hours**
- 5.1 Continuous random variables and probability density functions
- 5.2 Cumulative distribution functions and expected values for continuous random variables
- 5.3 The normal distribution
- 5.4 The Gamma Distribution(Introduction)
- 5.5 Chi-Square Distribution (Introduction)
- 6.0 Estimation** **5 hours**
- 6.1 Parameters and statistics
- 6.2 Standard error and sampling distribution
- 6.3 Point estimation and its properties
- 6.4 Interval Estimation(single of proportion & mean, difference of proportion & mean)
- 7.0 Statistical Inference** **6 hours**
- 7.1 Error in sampling ,type I and II errors, level of significance , degree of freedom, one tailed and two tailed , some comments on selecting a test procedure
- 7.2 Large-sample tests (z-test)
- 7.3 Test for mean of normal population
- 7.4 Test for population mean, population proportion, difference between two population means and proportions
- 8.0 Exact sampling distribution** **4 hours**
- 8.1 Small sampling distribution (t-test)
- 8.2 t-test for single mean , two-samples t – test , analysis of paired data
- 9.0 The analysis of categorical data** **4 hours**
- 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

- 1 Jay L. Devore, “Probability and Statistics for Engineering and the Sciences”, Brooks/Cole publishing Company, Monterey, California, 1982.
- 2 Arjun K Gaire , “Probability and Statistics for Engineering”,Kathmandu

### Marks distribution:

- There are two groups
- Group A contains 5 questions from Chapter 1 to 4.
- Group B contains 5 questions from Chapter 5 to 9.
- 10 questions will be asked.
- 8 to be attempted.
- Each question carries equal marks.