Purbanchal University
Faculty of Engineering, Biratnagar, NEPAL
<u>Syllabus</u>

Probability and Statistics

Year: II   **Semester: IV**

Teaching Hours/week				Examination Scheme						Total Marks
				Internal		Final				
				Theory	Practical	Theory		Practical		
Credit Hour	L	T	P			Duration	Marks	Duration	Marks	
3	3	2	2	20	20	3 Hrs.	60	-	-	100

Objectives:

1. To give an exposure to the students the basic concepts of probability and statistical methods and their application.
2. To serve as a foundation to analyze problems in engineering applications through statistical testing methods.

<u>Course contents</u>

Unit1. Descriptive Statistics   [6 Hrs]

Measures of location: mean, combined mean, median, mode, partition values and their properties; Measures of dispersion: absolute and relative measure of variation; standard deviation, variance and Coefficient of variation

Unit 2. Correlation and Regression   [5 Hrs]

Simple Correlation: Karl Pearson's correlation coefficient and its properties, Simple Linear Regression: Model and assumptions of simple linear regression; Least square estimators of regression coefficients; properties of regression coefficients; Coefficient of determination

Unit 3 Probability   [6 Hrs]

Introduction of probability: Basic terminology in probability: random experiment ,sample space, trial and events, type of events: mutually exclusive events, equally likely events, independent events; Definitions of probability, basic principles of counting; Laws of probability: Additive and multiplicative; Conditional probability; Bayes' Theorem.

Unit 4. Random Variable and Expectation   [3 Hrs]

Random Variables: Discrete and continuous random Variables; Probability distribution of random variables; Expected value of discrete & continuous random Variable.

Unit 5. Discrete Probability Distributions   [5 Hrs]

Binomial distribution, condition for using for using binomial distribution, properties of binomial distribution, Computing binomial probabilities, Fitting of binomial distribution; poisson distribution, condition for using for using poisson distribution, properties of poisson distribution, Computing poissson probabilities, Fitting of poissson distribution.

Unit 6. Continuous Probability Distributions   [7 Hrs]

Normal distribution, standard normal distribution, curve of normal and standard normal distribution, properties of normal distribution, computing normal probabilities, Measurement of areas under the normal curve; student's t-distribution and its application, chi-square distribution and its application

Unit 7. Estimation   [4 Hrs]

Concept of sample, population, statistic, parameter, estimation and its types, criteria for good estimator, confidential interval, standard error, confidential interval of mean for mean, confidential interval of mean for the difference of two means, confidential interval of mean for proportion, confidential interval of mean for the difference of two proportions.

Unit 8. Testing of hypothesis   [8Hrs]

Concept of hypothesis testing; hypothesis and its types, level of significance, degree of freedom, error in testing of hypothesis, z-test: for single proportion, for the difference of two proportions, for single mean, for the difference of two means, t-test: for single mean, t-test for the difference of two means, paired t-test, chi-square test: for goodness of fit, for independence of attributes, ,validity of chi-square test.

Laboratory

Practical problems to be covered in computer lab using any one of application software(Excel, SPSS, Minitab, etc.)

References:

1. Gupta, S.C.. Fundamental of statistics, Sultan Chand and Sons, delhi
    2. Richard A. Johnson, Miller and Freund's probability and Statistics for Engineers, 6th Edition, Indian reprint: Pearson Education, 2001.
    3. Ronald E. Walpole, R.H. Myers, S.L. Myers, and K. Ye, Probability and Statistics for Engineers and Scientists, 7th Edition, Indian reprint: Pearson Education, 2005.