Pokhara University
Faculty of Management Studies

Course Code: STT 220
Course title: **Linear Algebra and Probability**
Nature of the course: Theory + Practical
Year: Second
Level: Bachelor
Semester: III

Full marks: 100
Pass marks: 45
Credit Hrs: 3
Total periods: 48 hours
Program: BCSIT

1. Course Description:

This course covers the descriptive statistics, inferential statistics and probability distribution that guide IT students in research and project work. This course provides students a deeper understanding about the statistical data its types, collection, interpretation and analysis of data. The Students will able to learn and use the concepts of theory of probability, probability distribution and their application in IT.

2. General Objectives:

The general objectives of this course are

a) To understand and know different statistical tools, basic concept of Probability and probability distribution.
b) To equip students with sampling distribution and infer via various tools such as estimation and hypothesis.
c) To prepare a project work report for the presentation in the classroom

3. Methods of Instructions:

Lecture, Tutorial, Discussion, Readings, Case study, Assignment and project work

4. Course Contents

Specific Objective	Contents
• Explain the meaning and definition of statistics • Describe the importance and application of statistics in management and IT. • To identify the limitation of statistics in daily life	**Unit 1: Introduction (2 hours)** 1.1 Meaning and Definition of Statistics 1.2 Application of Statistics in IT 1.3 Variable and its types 1.4 Limitation
• To measure the central values (mean, median and mode only), measure of location, absolute and relative measure of dispersion	**Unit 2: Summarization and Analysis of Data (8 hours)** 2.1 Construction of GFD, Relative frequency, cumulative frequency distribution 2.1 Measure of Central Tendency 2.2 Measure of Location 2.2 Measure of dispersion
• Describe different terminology and approaches of probability with	**Unit 3: Basic Probability (6 hrs)** 3.1 Terminology and definition of

properties of probability • Calculate probability using addition and multiplication law (dependent and independent case) • Application of conditional probability using Bayes theorem	probability 3.2 Addition and multiplication Law 3.3 Conditional probability and Baye's Theorem related to IT
• Explain the meaning and importance of correlation and regression. • Describe the difference between correlation and regression coefficient • To measure the relationship between variables by Karl Pearson's correlation coefficient • To fit a simple regression equation, interpret the coefficients, residuals • Calculate standard error of estimate and coefficient of determination and interpret them	**Unit 4: Correlation and Regression Analysis (6 hours)** 4.1 Meaning, definition of correlation 4.2 Karl Pearson's correlation coefficient 4.3 Meaning and definition of simple regression 4.4 Standard error of estimate 4.5 Coefficient of Determination
• Describe random variable, types of random variable with examples • Measure expected value and variance of a discrete random variable. • Calculate probability using binomial and poisson probability of a discrete random variable (approximation of binomial to poisson) • Describe normal curve, characteristics of a normal curve and its application	**Unit 5: Probability Distribution (8 hours)** 5.1 Random variable and its types 5.2 Expectation and variance of a Discrete random variable 5.3 Binomial Probability distribution 5.4 Poisson Probability distribution 5.5 Normal Probability distribution
• Explaining sampling distribution, sampling distribution of sample mean, population, statistics • Application of estimation theory • Drawing inference for a population by estimation theory by using IT problems • Confidence interval estimation of mean and proportion (single only) • Sample size determination for mean and proportion	**Unit 6: Theory of Estimation (6 hours)** 6.1 Sampling Distribution 6.2 Parameters, Statistic, point estimation and Interval Estimation 6.3 Sample size Determination
• Explaining the meaning of hypothesis and its importance in IT research work • To learn the steps of hypothesis testing and use those steps to test different hypothetical statement • Distinguish the difference of one-way	Unit 7: **Hypothesis Testing (12 hours)** 7.1 Meaning and Definition 7.2 Types of errors Significance level, degree of freedom, 7.3 Steps in Hypothesis Testing 7.4 Single and double mean test for population Standard Deviation known

ANOVA and t Test to test the mean test	7.5 Single and double proportion test 7.6 Single and double mean test for population Standard Deviation unknown 7.7 pair t test 7.8 One Way ANOVA

5. Evaluation System and Students' Responsibilities

Evaluation System

The internal evaluation of a student may consist of assignments, attendance, term-exams, lab reports and projects etc. The tabular presentation of the internal evaluation is as follows:

Internal Evaluation	**Weight**	**Marks**	**External Evaluation**	**Marks**
Theory		**30**	**Semester End**	**50**
Attendance & Class Participation	10%			
Assignments	20%			
Presentations/Quizzes	10%			
Internal Assessment	60%			
Practical		**20**		
Attendance & Class Participation	10%			
Project Work	20%			
Practical Exam/Project Work	40%			
Viva	30%			
Total Internal		**50**		
Full Marks: 50 + 50 = 100				

Students' Responsibilities

Each student must secure at least 45% marks separately in internal assessment and practical evaluation with a minimum of 80% attendance in the class in order to appear in the Semester End Examination. Failing to get such score will be given NOT QUALIFIED (NQ) to appear the Semester-End Examinations. Students are advised to attend all the classes, formal exam, test, etc. and complete all the assignments within the specified time period. Students are required to complete all the requirements defined for the completion of the course.

6. List of Tutorials

SN	Lists of Tutorials
1.	Solving the problems related to measure of central values, location and dispersion
2.	Solving the problems related to correlation and simple regression
3.	Solving the problems related to probability and probability distribution
4.	Solving the problems related to estimation and hypothesis
5.	Solving the problems related to matrix and determinant

7. Laboratory Work

SN	List of Lab Work	Hour
1.	Calculate descriptive tools such as mean, median, mode, quartiles, deciles,	4 hours

	percentiles, SD and CV using EXCEL	
2.	Measure different probability using EXCEL	3 hours
3.	Calculate simple correlation and fit simple regression model using EXCEL	3 hours
4.	Calculate confidence interval, test different hypothesis using EXCEL	5 hours

8. Prescribed Books and Reference Book

Text Books:

1. Agarwal, B.L., "Basic Statistics". New Delhi, New Age, 2000

2. Douglas A. Lind, William G. Marchal and Samuel A. Wathen, "Statistical Techniques in Business and Economics", McGraw-Hill, 15th Ed.

References Books

1. Shrestha H. B. (2006) Statistics and Probability: Concepts and Techniques, Second Edition, EKTA Books