MAT5007	Applied Statistical Methods	L	T	P	J	C
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Pre-requisite	None	Syllabus version				
		v.3.0				

Course Objectives:

1. To provide students with a framework that will help them to choose the appropriate descriptive statistics in various data analysis situations.
2. Recognize and appreciate the connections between theory and applications;
3. To apply estimation and testing methods to make inference for decision making using various statistical techniques.

Expected Course Outcome: Students will be able

1. Independently calculate basic statistical parameters. (measures of central tendency, measures of dispersion)
2. Provide a clear sense of how to investigate the strength and direction of a relationship between two or more variables by collecting measurements and using appropriate statistical analysis.
3. Apply basics of discrete and continuous random variables
4. Understand the logical frame work of testing of hypothesis and based on the acquired knowledge to interpret the meaning of the calculated statistical indicators.
5. Choose a statistical method for solving practical problems.
6. Demonstrate R programming for statistical data

Student Learning Outcomes (SLO):	2, 7, 9

Module:1	Introduction to Statistics:	7 hours

Introduction to Statistics and data analysis-Measures of central tendency, Measures of dispersion, Skewness and Kurtosis.

Module:2	Correlation and regression:	5 hours

Correlation and Regression–Rank Correlation-Partial and Multiple Correlation Regression, Multiple Regression.

Module:3	Random Variables	5 hours

Introduction to discrete random variables – Binomial – Poisson – Geometric, continuous random variables-Normal, Student's T, expectation of random variables, mean and variance.

Module:4	Testing of hypothesis I:	5 hours

Introduction-Types of errors, Critical region, procedure of testing hypothesis- tests of hypotheses-Z- test for Single Proportion, Difference of Proportion, Single mean and difference of means.

Module:5	Testing of hypothesis II:	6 hours

Small Sample Tests - Student t-test, F-test, Chi-Square test for independence of Attributes, Analysis of Variance-Principles of experimental design, Completely randomized design, Randomized block design, Latin Square design- Problems.		
Module:6	**Contemporary issues:**	**2 hours**
Lecture by Industry Experts		
	Total Lecture hours:	**30 hours**
Text Book(s)		
1.	Applied Statistics and Probability for Engineers, Douglas C. Montgomery George C. Runger, 6th edition, John Wiley & Sons, (2016)	
2	Introduction to Probability and Statistics: Principles and Applications for Engineering and the Computing Sciences, J. Susan Milton and Jesse Arnold, Mc.Grawhill education, (2017).	
Mode of Evaluation		
Digital Assignments, Quiz, Continuous Assessment Test, Final Assessment Test		
Reference Books		
1.	Statistics for Engineers and scientists, Navidi ,W., McGraw-Hill Education (2017)	
2	Fundamentals of Statistics, S.C. Gupta 7th edition, Himalaya Publishing House Pvt. Ltd. (2016)	
List of Challenging Experiments (Indicative)		
1.	Introduction: Understanding Data types; importing/exporting data.	**3 hours**
2.	Computing Summary Statistics /plotting and visualizing data using Tabulation and Graphical Representations.	**3 hours**
3.	Applying correlation and simple linear regression model to real dataset; computing and interpreting coefficient of determination	**3 hours**
4.	Applying multiple linear regression model to real dataset; comput-ing and interpreting the multiple coefficient of determination	**3 hours**
5.	Testing of hypothesis for One sample mean and proportion from real-time problems.	**3 hours**
6	Testing of hypothesis for Two sample mean and proportion from real-time problems.	**3 hours**
7	Applying the t test for independent and dependent samples	**2 hours**
8	Applying Chi-square test Contingency test to real dataset	**2 hours**
9	Performing ANOVA for One-way, Two-way classification for real dataset	**2 hours**
10	Performing ANOVA in Design of Experiments- Completely randomized design, Randomized Block design, Latin square Design.	**2 hours**
11	Performing two-way ANOVA in Randomized block design	**2 hours**
12	Performing Three-way ANOVA in Latin square Design.	**2 hours**
	Total Laboratory Hours	**30 hours**
Mode of Evaluation		
Weekly Assessment Test, Final Assessment Test		
Recommended by Board of Studies		
Approved by Academic Council	47 Date	05.10.2017