

Course Code	CSE609		
Course Name	Statistical Computation		
Credits	4		
Course Offered to	UG/PG		
Course Description	The objective of this course is to provide knowledge about concepts and methods of statistical analysis. Data can be generated by machine or manually collected during surveys. All kinds of data-sets need analysis to the point such that we can make conclusions about the trend in the data. Hence statistical modelling and inference is often needed. Recently multiple kinds of statistical modelling approach have been suggested. Some statistical methods have been implemented as tools while some are implemented by users according to need of data-analysis. This course would provide the basics of statistical inference and methods introducing some computational techniques to perform modelling of systems. Through this course student will also learn about weakness and strength of such statistical modelling methods which could guide them to distinguish or develop suitable analysis techniques.		
Pre-requisites			
Pre-requisite (Mandatory)	Pre-requisite (Desirable)		
MTH201 (Probability and Statistics)	Basic understanding of R or matlab programming (Desirable)		
*Please insert more rows if required			
Post Conditions			
CO1	CO2	CO3	CO4
Students shall be able to explain and summarise several statistical approaches.	Students shall be able to identify and justify relevance of different statistical methods for example data analysis problem.	Students will utilize computational tools designed for few statistical approaches.	Students shall be able to implement known statistical methods and critique on concluding about results of analysis.
Weekly Lecture Plan			
Week Number	Lecture Topic	COs Met	Assignment/Labs/Tutorial
1	Basics of Data Comprehension, Visualisation	CO1, CO2	3+2 hours (Exercises)
2	Samples and Populations, Sampling Distribution: Student-t, Chi-square	CO1, CO2, CO3	3+2 hours (Exercises)
3	Distribution contd., Mathematical functions and the	CO1, CO2	3+2 hours (Exercises+Assignment-1)
4	Fitting distributions, Hypothesis testing, Parametric tests	CO1, CO2, CO3	3+2 hours (Exercises)
5	Hypothesis testing, Non-parametric tests	CO1, CO2, CO3, CO4	3+2 hours (Exercises+Assignment-2)
6	Limit theorems and bounds	CO1, CO2, CO3	3+2 hours (Exercises)
7	Parameter estimation	CO1, CO2	3+2 hours (Exercises+Assignment-3)
8	Parameter estimation contd.	CO2, CO3, CO4	3+2 hours (Exercises)
9	Joint distributions	CO1, CO2, CO3	3+2 hours (Exercises)
10	Joint distributions contd.	CO2, CO3, CO4	3+2 hours (Exercises+Assignment-4)
11	Approximate inference	CO1, CO2, CO3	3+2 hours (Exercises)
12	Structure estimation	CO2, CO3	3+2 hours (Exercises+Assignment-5)
13	Project presentations	CO3, CO4	3+2 hours (Presentations)
*Please insert more rows if required			
Weekly Lab Plan			
Week Number	Laboratory Exercise	COs Met	Platform (Hardware/Software)
*Please insert more rows if required			
Assessment Plan			
Type of Evaluation	% Contribution in Grade		
Mid-Sem	20		
Assignments	40		
End-Sem	30		
Presentation	10		
*Please insert more row for other type of Evaluation			
Resource Material			
Type	Title		
Textbook	Methods of multivariate analysis (Alvin C. Rencher)		
Textbook	Handbook of Biological Statistics (John H. McDonald)		
Textbook and link	Multivariate Data Analysis using R (Darren J wilkinson)		
Textbook	Doing Bayesian Data Analysis (J.K. Kruschke)		
Textbook and link	Quick-R (by Robert I. Kabacoff)		