BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI
HYDERABAD CAMPUS
FIRST SEMESTER 2020-2021
COURSE HANDOUT (Part II)

17-08-2020

In addition to Part I (General Handout for all courses appended to the time table) portion:

Course Number   : **MATH F432**
Course Title   : **Applied Statistical Methods**
Instructor-In charge : **V V Hara Gopal.**
Instructors   : -------------

1. **Scope and objective of the course:**

This Course helps the student in two phases firstly, it helps in understanding the methods, theory and its applications by hands on, precisely course gives exposure to different multivariate techniques, Secondly, it improves the methodological maturity.

2. **Text Books:**

    David R Anderson, Dennis J Sweeney, Thomas A Williams, Jeffrey D. Camm and James J. Cochran, Statistics for Business and Economics,12th Edition, Cengage Learning,2014

3. **Reference Books:**
    2. Deepak Chawla and Neena Sondhi, Research Methodology, Vikas,2012
    3. Applied Multivariate Statistical Analysis by Richard Johnson and Dean W Wichern, Pearson,2007
    4. Douglas C. Montgomery, "Statistical Quality Control", Wiley Student Education.
    5. Applied Multivariate Techniques by Subhash Sharma, John Wiley & Sons, Inc
    6. Multivariate Statistical Methods by Donald F. Morrison ,4th Edition, TMH, 2005.

4. Lecture Plan:

Lecture	Learning Objectives	Topics to be covered	Chapter in the Text Book
1-2	These topics enhances the understanding of different sampling procedures, sampling distribution and Inferential procedures.	Introduction, Review of Sampling, Selecting a Sample, Sampling from a finite and infinite population, Point Estimation, Sampling distribution of sample mean and Properties of Point Estimators, Other sampling methods	7,7.2,7.3,7.4,7.5,7.7,7.8(T1)
5-6	To gain knowledge on importance of variance, chi-square distributions and its types.	Inferences about Difference of means, Paired, Inferences about Population Variances, Interval estimation.	10,10.1,10.2,10.3,11,11.1.11.2(T1)
7-9	It helps us to gain knowledge to obtain accurate and replicable findings at reasonable allocations of resources. We review some general	Testing the equality of population proportions, Test of Independence, Goodness of fit test, An Introduction to Experimental Design and Analysis of Variance of Completely Randomized Design, Randomized Block Design and Multiple comparison Procedures.	12,12.1,12.2,12.3(T1) 13,13.1,13.2,13.3,13.4(T1)

	principles of Designs and its types.		
10-12	To gain knowledge on basic Regression model.	Simple Linear Regression Model, Least Squares Method, Coefficient of Determination, Model Assumptions, Test for significance, Using the estimated regression equation for estimation and prediction, Residual analysis: Validating model assumptions, outliers and influential observations. Discuss case Studies	14,14.1,14.2,14.3,14.4,14.5,14.6,14.8.14.9(T1)
13-15	It helps in understanding more than two variables in Regression analysis and also gives insight on the concept of multicollinearity.	Multiple Regression Model, Least Squares Method, Multiple coefficient of determination, Model Assumptions, Testing for significance, Multicollinearity. Regression equation for estimation and prediction, residual Analysis, Discuss Case Studies.	15,15.1,15.2,15.3,15.4,15.5,15.6,15.8(T1)
16-18	It gives exposure to distinguish between Categorical Independent and Categorical Dependent Regression Analysis.	Categorical Independent Variable, Logistic Regression. Discuss Case Studies.	15.7,15.9(T1)
19-21	It helps in assessing the classification accuracy of Multivariate data modelling.	Hoteling T^2 and Mahalanobis D^2 Discriminant Analysis, Objectives and its Uses, Illustration of Discriminant Analysis, Assessing Classification Accuracy. Discuss Case Studies.	5.3(R2) 3.2.1,3.2.2(R4) 17(R1)
22-25	It helps in understanding hierarchical, non-hierarchical cluster analysis.	Cluster Analysis-A classification technique, Statistics associated with Cluster Analysis, an illustration of the technique, Key Concepts in Cluster Analysis, Process of Clustering, Establishing Cluster Algorithms. Discuss case studies	18(R1)
26-30	It helps in understanding Multivariate data reduction methods.	Factor Analysis and its Uses, Conditions for a Factor Analysis, Illustration of Factor analysis, Applications of Factor Analysis in other Multivariate Technique. Discuss Case Studies.	7.1, 7.2, 7.3, 7.4(R1)
31-32	In helps in understanding distribution free methods in parallel to Parametric procedures.	Kruskal Wallis test, Mann Whitney Wilcoxon Test, KS two sample test	Class notes

33-36	These topics gives basic idea on forecasting methods for Time series data.	Forecasting, Components of a Time series, Smoothing Methods, Trend Projections, Trend and Seasonal Components, Regression Analysis, qualitative approaches with time series data.	6,6.1,6.2,6.3,6.4,6.5,6.6(R5)
37-42	Statistical Quality Control (SQC) Procedures for Quality data situations.	Introduction to SQC, Control Charts for variables, Control Charts attributes, Modified Control Charts.	6,6.2,6.3,6.4,6.5 (R3) 7,7.1,7.2,7.3,7.4(R3) 10.2(R3)

5. Evaluation Scheme:

Component	Weightage (%)	Duration (Minutes)	Date, Time &	Nature of Component.
Test 1	15	30	September 10 – September 20 (During scheduled class hour)	Open Book
Test 2	15	30	October 09 –October 20 (During scheduled class hour)	Open Book
Test 3	15	30	November 10 – November 20 (During scheduled class hour)	Open Book
Quiz	10	20 To be announced	To be Announced	Open Book
Live Project	10			
Comprehensive Examination	35	120	As announced in the timetable-Open Book	Open Book

6. Notices: All Notices about the course will be put on CMS.

7. Chamber Consultation Hour: To be announced in the class by the respective Instructor.

8. Make-up: Make up for the tests will normally be held in the following week. Make up will be Granted only in genuine cases. Permission must be taken in advance except in extreme cases.

9. **Academic Honesty and Integrity Policy:** Academic honesty and Integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

Instructor in charge