BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI
HYDERABAD CAMPUS
FIRST SEMESTER 2019-2020
COURSE HANDOUT (Part II)

01-08-2019

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.
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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:

1. Deepak Chawla and Neena Sondhi, Research Methodology, Vikas Publishing House, 2012
2. Applied Multivariate Statistical Analysis by Richard Johnson and Dean W Wichern, Pearson, 2007
3. Douglas C. Montgomery, "Statistical Quality Control", Wiley Student Education, 1985.
4. Applied Multivariate Techniques by Subhash Sharma, John Wiley & Sons, Inc.
5. 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	It enhances the understanding the 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 principles of designs and its types.	Testing the equality of population proportions, Test of Independence, Goodness of fit test, An introduction to Experimental Design and Analysis of Variance (Completely randomized design, Multiple comparison Procedures ,Randomized Block Design)	12,12.1,12.2,12.3(T1) 13,13.1,13.2,13.3,13.4(T1)

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 model.	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 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 walls test, Mann Whitney Wilcoxon Test,KS two sample test	Class notes
33-36	In gives basic idea on forecasting methods.	Forecasting, Components of a Time series, Smoothing Methods, Trend Projections, Trend and Seasonal Components, Regression Analysis, qualitative approaches.	6,6.1,6.2,6.3,6.4,6.5,6.6(R5)

37-42	Statistical Quality Control	Introduction, 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)

6. Evaluation Scheme:

Evaluation Component	Duration	Weightage	Date & Time	Nature of Component
Two Quizzes	15 Min	10%	Will be announced in the class	Closed book
Mid Semester	90 Min	30%	5/10, 11.00 -- 12.30 PM	Closed Book
Assignments		20%	Will be announced in the class	Open Book
Comprehensive Exam.	180 Min	40%	13/12 AN	Closed Book

6. Chamber Consultation hours: To be announced in class by the respective instructors.

7. Notices: All notices in relation to above course will be put up only on the CMS notice board

8. Make up policy: 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