BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE
INSTRUCTION DIVISION

FIRST SEMESTER 2015-2016

Dated: 03/08/2015

Course No. : **ECON F213/FIN F213**
Course Title : **MATHEMATICAL AND STATISTICAL METHODS**
Instructor-in-Charge : **Remica Aggarwal**

1. Course Description:

Methods of collection and presentation of statistical data; calculation and interpretation of various measures like standard deviation, variance, Kurtosis, correlation coefficient; Sampling Methods: Simple random sampling, with and without replacement, stratified random sampling. Statistic and sample moments, Sampling Distributions - Properties of Student's – t, Chi-square and F-distributions. Theory of Estimation ; Testing of Hypothesis ; Analysis of Variance; Theory of Index Numbers and an Introduction to Regression Analysis - Specification of simple linear regression model, least square method of estimation, classical assumptions, general and confidence approach to hypothesis testing.

2. Scope and Objective:

This course concentrates on review of the mathematical fundamentals, statistical methods and techniques necessary for quantitative economics and finance. The course is designed to give emphasis on the topics for the student to be able to comfortably work standard problems in beginning graduate level economics and finance courses . It emphasizes on the application of real life examples on various fundamental issues of economics and finance.

3. Text Book:

Lind A Douglas, Marchal G William & Wathen A Samuel, "Statistical Techniques in Business and Economics" 13th Edition, 2008. Reprint 2012.

Reference Books:

R1. Anderson D. , Sweeney D. and Williams T ," Statistics for Business and Economics " , 11th Edition Cengage learning 2011.
R2. Alpha Chiang and Kelvin Wainwright, "Fundamental methods of Mathematical Economics", TMH, 4th Ed., 2005

4. Course Plan:

Lecture No.	Objective	Topic(s)	References (TB)
1	Introduction	Course Introduction. Mathematics & Statistical Methods in Economics and Finance – Brief Review	
2-4	Statistics, Data Descriptions and Presentations	Statistics, Descriptive and Inferential Statistics, Discrete and Continuous Variables, Nominal, Ordinal, Interval and Ratio levels of Measurement, Data Descriptions, Frequency	Ch 1 -Ch 3

		Distributions, Numerical Measures	
5-6	Concept and use of Quartiles, Deciles and Percentiles, Measures of Dispersion	Dot plots and box plots, Skewness, Moments and Kurtosis	Ch 4
7-9	Probability Concepts, Discrete and Continuous Probability Distributions	A survey of Probability concepts, Discrete and Continuous Probability Distributions	Ch 5, 6 and 7
10	**Review of Ch 1-7**	**Quiz 1 / Problem set**	
11-14	Application of Mathematical Concepts in Economics and Finance	Economic models , equilibrium analysis in economics , matrix algebra and its applications to market and national income models , Leontief input -output models . Exponents and Logarithms, Linear Transformation, Determinants and Cramer rule, Differential Calculus and Comparative Statics, Economic Applications.	Class Notes Ch 1-5 R2
15	**Review of concepts on Mathematical Economics**	**Quiz 2 / Problem set**	
16-18	Sampling and Sampling Distributions	Sampling Methods and the Central Limit Theorem	Ch 8
19-20	Estimation, Point and Interval estimation	Point Estimates, Confidence Intervals	Ch 9
21-24	Hypothesis Testing	One and Two Sample Tests of Hypothesis, One tailed and Two tailed Tests of Hypothesis, Type I and II Errors, conducting different tests of Hypothesis	Ch 10 and 11
25--27	Concept of Analysis of Variance	F-distribution, one Way and Two Way Analysis of Variance	Ch12
28	**Review of Ch 8-12**	**Quiz 3/ Problem set**	
29-31	Correlation and Regression Analysis, multiple regression	Correlation, Linear Regression, Least Squares, Assumptions, Calculation and Interpretation of Coefficient of Determination, Least Squares Estimates, Standard Error Estimate, Confidence and Prediction Intervals	Ch13 ,14
32-34	Non-parametric methods : chi-square applications and other methods	Non parametric methods, Chi-square , sign test , Walfowitz sign rank and rank sum tests	Ch17, Ch 18 and Class Notes
35	Theory of Index numbers	Index Numbers, Construction and Interpretations, Consumer Price Indices	Ch 15
36	**Review of Ch 13,14,15, 17**	**Quiz 4/ Problem set**	
37-40	Application of Mathematical Concepts in Economics and Finance	Optimization, optimization and multivariate case, Optimization and equality constrains, Difference equations, General equilibrium	Class notes

Note: Text book has list of datasets in attached as appendix which will be use as reference data sets for problems/ exercises as part of tutorials.

5. Evaluation Scheme:

EC No.	Evaluation Component	Duration	Weightage	Date & Time	Nature of Component
1	Mid Semester Test	90 min	30	8/10 2:00 - 3:30 PM	Closed Book
2	Assignments/ Problem Sets/ Class Participation /Quizzes/Tutorials	--	30	To be announced in the class	-
3	Comprehensive Examination	180 min	40	9/12 FN	Partly Open Book

6. **Chamber Consultation hours: FRIDAY 4.00-5.00 pm**

7. **Notices:** Notices would be displayed on **DEPARTMENT OF MANAGEMENT Notice Board or mail to class group mail id.**

8. **Make-up:** No Make-ups.
9. **Others:**

- Students are required to attend classes and tutorials regularly and actively participate in all class actions.
- **E-MAIL ID.: remica.aggarwal@pilani.bits-pilani.ac.in**

Instructor-in-Charge
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