

Shyama Prasad Mukherji College for Women

Teaching Plan (August-December 2022)

Course and Year: B.A. (Hons) Economics/ Second Year/ Section B

Semester: Third

Taught individually or shared: Individually

Paper: Statistical Methods in Economics

Faculty: Pallavi Manchanda

No. of Classes (per week): 5

Teaching Plan
<p><b>Unit 1: Introduction and overview, the distinction between populations and samples and between population parameters and sample statistics</b></p> <p>a) Devore, J. L. (2012). <i>Probability and Statistics for Engineering and the Sciences</i> (8th ed.). Massachusetts, USA: Cengage Learning. Chapter 1.1</p> <p><i>To be Completed by 30<sup>th</sup> August 2022</i></p> <p><b>Unit 2: Elementary probability theory: Sample spaces and events; probability axioms and properties; counting techniques; conditional probability and Bayes' rule; independence</b></p> <p>a) Devore, J. L. (2012). <i>Probability and Statistics for Engineering and the Sciences</i> (8th ed.). Massachusetts, USA: Cengage Learning. Chapter 2.</p> <p><i>To be Completed by 12<sup>th</sup> September 2022</i></p> <p><b>Unit 3: Random variables and probability distributions: Defining random variables; probability distributions; expected values and functions of random variables; properties of commonly used discrete and continuous distributions (uniform, binomial, exponential, Poisson, hypergeometric and Normal random variables)</b></p>

- a) Devore, J. L. (2012). *Probability and Statistics for Engineering and the Sciences* (8th ed.). Massachusetts, USA: Cengage Learning. Chapter 3 (except Negative Binomial Distribution), Chapter 4.1-4.3 and pgs. 165-166

*To be Completed by 3<sup>rd</sup> October 2022*

**Unit 4: Random sampling and jointly distributed random variables: Density and distribution functions for jointly distributed random variables; computing expected values of jointly distributed random variables; covariance and correlation coefficients**

- a) Devore, J. L. (2012). *Probability and Statistics for Engineering and the Sciences* (8th ed.). Massachusetts, USA: Cengage Learning. Chapter 5.1-5.3 (except pgs 200-202)

*To be Completed by 17<sup>th</sup> October 2022*

**Unit 5: Point and interval estimation, estimation of population parameters using methods of moments and maximum likelihood procedures; properties of estimators; confidence intervals for population parameters**

- a) Devore, J. L. (2012). *Probability and Statistics for Engineering and the Sciences* (8th ed.). Massachusetts, USA: Cengage Learning. Chapter 6 (except pages 249-250), Chapter 7 (till page 289)

*To be Completed by 14<sup>th</sup> November 2022*

**Unit 6: Hypothesis testing: Defining statistical hypotheses; distributions of test statistics; testing hypotheses related to population parameters; Type I and Type II errors; power of a test; tests for comparing parameters from two samples**

- a) Devore, J. L. (2012). *Probability and Statistics for Engineering and the Sciences* (8th ed.). Massachusetts, USA: Cengage Learning. Chapter 8 (except  $\beta$  and sample size determination in each case)

*To be Completed by 6<sup>th</sup> December 2022*

*Revision and Practice Questions till 12<sup>th</sup> December 2022*

No of classes required to complete the unit (approx.):

1. Unit 1: 3
2. Unit 2: 8
3. Unit 3: 15
4. Unit 4: 9
5. Unit 5: 18
6. Unit 6: 12
7. Revision: 4

Methodology of Teaching:

1. Classroom lectures
2. Explaining application on software for statistical analysis and spreadsheet like MS Excel for understanding graph theory, probability distributions, and estimation theory (ICT).
3. Useful Links for e-learning: a. <https://ocw.mit.edu/courses/economics/14-30-introduction-to-statistical-methods-in-economics-spring-2009/lecture-notes/> b. <https://www.economics.utoronto.ca/jfloyd/stats/ecstats.pdf> c. <http://www.thphys.uni-heidelberg.de/~amendola/teaching/compstat-hd.pdf> d. <http://eclr.humanities.manchester.ac.uk/images/5/50/RedBook.pdf> e. <http://www.math.louisville.edu/~pksaho01/teaching/Math662TB-09S.pdf> f. [https://www.dartmouth.edu/~chance/teaching\\_aids/books\\_articles/probability\\_book/amsbook.mac.pdf](https://www.dartmouth.edu/~chance/teaching_aids/books_articles/probability_book/amsbook.mac.pdf)
4. ADDITIONAL READINGS
  - (1) Larsen, R., Marx, M. (2011). *An introduction to mathematical statistics and its applications*. Prentice Hall.
  - (2) Miller, I., Miller, M. (2017). *John E. Freund's Mathematical statistics with applications*, (8th ed.). Pearson.
  - (3) Gelman, A., & Nolan, D. (2017). *Teaching statistics: A bag of tricks*. Oxford University Press.
  - (4) Cochran, William G. (2007). *Sampling Techniques*. John Wiley.
  - (5) Freund, John E. (1992). *Mathematical Statistics*. Prentice Hall.

The additional books would be referred to provide more examples and clarify concepts wherever additional help is required. Students would be encouraged to refer to the additional books to practise numerical problems. They would be used to illustrate the main concepts in a better way wherever needed. The students would also be using them for several proofs of important theorems.

**Tutorial: Meeting students once every week to solve their problems, clear doubts, assist in understanding difficult concepts and practise questions.**

## **ASSESSMENT**

**This course carries 100 marks of which the end semester examination is of 75 marks and internal assessment (IA) is worth 25 marks.**

**IA is taken as per the prescribed norms: Two class tests of 10 marks each (the best to be counted for assessment), one assignment of 10 marks and 5 marks for attendance.**

**Dates of assessments:**

- 1. Test 1: 10<sup>th</sup> October 2022**
- 2. Test 2: 14<sup>th</sup> November 2022**
- 3. Assignment Submission: 30<sup>th</sup> November 2022**

**Criteria of Assessment: Clarity and understanding of concepts tested through class tests and assignment.**