Minutes of the Meeting

Intermediate Statistics for Economics

Date: 4ᵗʰ December, 2024

Course Title   Intermediate statistics for Economics - DSC-6

Course Code   ECON006

Credits   4

Duration (per week)   4 hours (3 Lectures+ 1 Tutorial)

Date of Meeting   4ᵗʰ December, 2024

Venue   Delhi School of Economics (online)

(https://meet.google.com/mvp-catn-ded)

Convenors   Rohini Somanathan and Reetika Garg

Attended By:

Rachit Saini	Kalindi College
Poonam Kalra	St. Stephen's College
Namita Mathur	Indraprastha College for Women
Manisha Jayant	Shivaji College
Ankita	Kalindi College
Gaganpreet Kaur	SGTB Khalsa College
Shubhi Singh	Lady Shri Ram College for Women
Dr. Deepika Goel	Aryabhatta College
Ankur Bhatnagar	Satyawati college
Dr Subasini Maharana	Jesus and Mary College

Enakshi Sinha Ray Chaudhury   Rajdhani College

Madhavi Moni K   Hansraj College

Gunjan Khandelwal   Shyam Lal College

Ritika Chowdhary   Shyam Lal College (E)

Learning Objectives
The Learning Objectives of this course are as follows:
• This course focuses on techniques for statistical inference. The main objective of the course is to help students understand how to draw inference from samples regarding the underlying populations using point estimation, interval estimation and hypothesis testing.

Learning outcomes
The Learning Outcomes of this course are as follows:
• An important learning outcome of the course will be the capacity to use and analyse statistics in everyday life. The course will improve students' ability to analyse data, make decisions, form predictions, and conduct research.

A meeting of teachers of this course was held to discuss the following:

- The detailed reading list to be implemented in the academic session 2024-2025.
- The pattern of the semester-end exam.
- How to give a good intuition of the concepts to the students by using some practical concepts.
- How to assess students for the continuous assessment

The issues discussed and the decisions taken at the meeting are given below:

1. It was felt that multiple textbooks with different notation and slightly different definitions are confusing for students. It would be better to focus on a single textbook and use the others as supplementary material for practice with problem-solving. This would also allow more material in the basic textbook to be covered. Accordingly, it was decided to use J. Devore's textbook as the principal text.
2. Given the conceptual difficulty involved in properly understanding the notion of sufficiency listed in Unit 2 of the syllabus, it was decided not to examine the students on this concept.
3. The teacher's expressed the difficulty in grading the paper in the required period of time at the end of the semester exams. There were two main causes for this:
    a) Not all teachers were willing to do a reasonable share of the corrections.
    b) Each examination had too many questions and sub-parts, making grading more time-consuming than it need be.

It was also felt that mistakes in exam papers would be avoided if a exam setters sent in a pdf file to the exam branch.

4. In order to achieve uniformity in evaluation of final answer scripts, it was decided to include the following notes in final question paper:

(i) All questions within each section are to be answered in a contiguous manner on the answer sheet. Start each question on a new page, and all sub-parts of a question should follow one after the other.

(ii) All intermediate calculations should be rounded off to 3 decimal places. The values provided in statistical tables should not be rounded off. All final calculations should be rounded off to two decimal places.

5. **End semester exam**: This would be of 90 marks. The following decisions were taken regarding the choice offered within topics and the weightage given.

(i) **Unit 1** would be given a weight of 20 marks, **Unit 2** of 30 marks and **Units 3 and 4** would be combined to give a weightage of 40 marks.

(ii) All questions in Units 1 and 2 would be compulsory. There would be two questions in each of these units.

(iii) Units 3 and 4 would together have 3 questions, of which students would be required to do 2 questions.

(iv) There would be a limited number of sub-parts per question. No sub-part would be less than 5 marks and if a sub-part had more than 5 marks, the marks would be in multiples of 5.

6. The **internal assessment** would comprise two class tests of 12 marks each. Lecture attendance will carry 6 marks. Problem solving during tutorials/ interpretation of results pertaining to a set of data should be the preferred medium for continuous assessment of 35 marks out of 40. Five marks will be for attendance in tutorials.

The details of the Course Content, Topic-wise Reading list, recommended textbooks are given below:

Content (Unit-wise):

UNIT - 1: Sampling distribution of a Statistic (12 Hours)

Concept of Statistic and parameter, Sampling distributions, Central Limit Theorem.

UNIT - 2: Estimation (12 Hours)

Estimator and methods of estimation, Point Estimation: method of moments and method of maximum likelihood; Interval Estimation, Properties of an estimator: Consistency, Unbiasedness, Efficiency and Sufficiency, confidence level and sample size, intervals based on Z-distribution, t-distribution and chi-squared distribution, F-distribution.

UNIT – 3: Inference (9 Hours)

Meaning of a statistical hypothesis, errors in hypothesis testing: Type 1 and Type 2 errors, power of a test.

UNIT - 4: Hypothesis Testing (12 Hours)

Testing of a population Mean, proportions - small and large sample tests, P-value; Testing for variance; Testing hypothesis for two samples, testing for equality of means; testing for ratio of variances.

Unit No.	TOPIC	READINGS FROM CORE TEXTS
1.	**Sampling distribution of a Statistic**	*Devore: Ch 5.3, 5.4, 5.5*
2.	**Estimation**	*Devore: Ch 6, Ch 7, selected sections of Ch 9* *(in Ch-7, discussion of prediction intervals and tolerance intervals may be de-emphasized)*
3.	**Inference**	*Devore: Ch 8.1*
4.	**Hypothesis Testing**	*Devore: Ch 8.2 – 8.5, Ch 9 (excluding section 9.3)* *(β and sample size calculation using standard normal distribution for mean may be emphasized, Likelihood ratio principle from section 8.5 may be de-emphasized))*

Essential Reading:

Devore, J. (2012). Probability and Statistics for Engineers, 8th ed. Cengage Learning.

Supplementary Reading:

1. Hogg, R., Tanis, E., Zimmerman, D. (2021) Probability and Statistical inference, 10th Edition, Pearson.
2. Larsen, R., Marx, M. (2011). An introduction to mathematical statistics and its applications. Prentice Hall.
3. Miller, I., Miller, M. (2017). J. Freund's Mathematical Statistics with Applications, 8th ed. Pearson.
4. Anderson, D. R, Sweeny, D. J, et. al (2019), Statistics for Business and Economics, 13th edition, Cengage Learning.
5. Jan Kmenta (1997), Elements of Econometrics, 2nd ed. Macmillan publishing; New York and Collier Macmillan; London.

Recommended Readings for Teachers:
1. John A. Rice (2007). Mathematical Statistics and Data Analysis, 3rd ed. Thomson Brooks/Cole.
2. Demetri Kantarelis, D. and Malcolm O. Asadoorian, M. O. (2009). Essentials of Inferential Statistics, 5th edition, University Press of America.