

<b>Course title:</b> Introductory Statistical Methods				
<b>Course code:</b> UEO 104		<b>No. of credits:</b> 4	<b>L-T-P:</b> 44-12-8	<b>Learning hours:</b> 60
<b>Pre-requisite course code and title:</b> N/A				
<b>Department:</b> Department of Policy and Management Studies				
<b>Course coordinator:</b> Dr.Subhasree Sarkar			<b>Course instructor:</b>	
<b>Contact details:</b> subhasree.sarkar@terisas.ac.in				
<b>Course type:</b> Core			<b>Course offered in :</b> 2 <sup>nd</sup> Semester	
<b>Course description:</b> This course is an introduction to the statistical tools that are widely used in various areas of economics. The course will cover elementary probability theory, discrete and continuous random variables, joint probability distribution and descriptive statistics.				
<b>Course objective:</b> 1. To familiarize the students with the core concepts and techniques of statistics that are used in economics. 2. To introduce the key concepts of probability theory. 3. To help students apply these techniques in economic applications.				
<b>Course contents</b>				
S.N.	Topics	L	T	P
1	<b>Introduction and Overview</b> <ul style="list-style-type: none"> <li>Application of statistics in Economics</li> <li>Data- elements, variables and observations</li> <li>Scales of measurement of data</li> <li>Types of data- categorical, quantitative, cross-sectional and time series</li> <li>Distinction between population and sample</li> </ul>	6	0	0
2	<b>Elementary Probability Theory</b> <ul style="list-style-type: none"> <li>Sample spaces and events (concepts and definitions using set theory)</li> <li>Conditional probability</li> <li>Bayes' theorem and its applications.</li> </ul>	14	4	0
3	<b>Probability Distributions</b> <ul style="list-style-type: none"> <li>Random variables (discrete and continuous)</li> <li>Probability distributions (pmf, pdf. Distribution functions)</li> <li>Expected values of random variables (mean, variance, raw moment, central moment, moment generating functions)</li> <li>Properties of commonly used discrete and continuous distributions: Uniform, Binomial, Poisson, Normal</li> <li>Joint distribution functions of random variables (discrete and continuous) - joint pdf (pmf)</li> <li>Expected values of jointly distributed random variables</li> <li>Conditional distributions and expectations</li> <li>Association between two variables: covariance, correlation coefficient</li> </ul>	12	6	0
4	<b>Measures of central tendency</b> <ul style="list-style-type: none"> <li>Mean, weighted mean, geometric mean, harmonic mean</li> <li>Median, mode</li> <li>Quartiles, Deciles and Percentiles</li> </ul>	4	2	0

5	<b>Descriptive Statistics</b> <ul style="list-style-type: none"> <li>Representation of data- graphical (dot plot, line diagram, bar diagram, scatter diagram and trendline, histogram, pie chart) and tabular method</li> <li>Frequency Distribution</li> <li>Relative frequency and percent frequency distributions</li> <li>Cumulative distribution</li> <li>Distribution shape, z-Scores , Chebyshev's Theorem, detecting outliers</li> <li>Dispersion (range, inter-quartile range, variance, standard deviation, coefficient of variation)</li> <li>Moments, Skewness and Kurtosis (definition, computation)</li> <li>To introduce students to analysing data using R/Stata</li> </ul>	8	0	8
	<b>Total</b>	<b>44</b>	<b>12</b>	<b>8</b>

**Pedagogical approach:**  
Classroom teaching and problem-solving sessions.

**Evaluation criteria:**

Minor 1: Written Examination - 20% [Syllabus: Module 1]  
 Minor 2: Written Examination - 20% [Syllabus: Module 2-3]  
 Assignment: Homework (software based)- 20% [Syllabus: Module 5]  
 Major: Written Examination - 40% [Entire Syllabus]

**Learning outcomes:**

At the end of the course, the students will be able to:

- Understand the core statistical concepts. [Minor 1, Minor 2, Assignment, Major]
- Understand the key concepts of probability theory. [Minor 2]
- Apply the techniques learned during the course in economic problems. [Minor 1, Minor 2, Assignment Major]
- Provide economic interpretations of the statistical results. [Minor 1, Minor 2, Assignment, Major]

**Core reading:**

- Anderson, D. R, Sweeny, D. J, et.al (2019), Statistics for Business and Economics, 13th edition, Cengage Learning (AS)
- Additional readings:
- Mittelhammer, R. C. (1996). Mathematical statistics for economics and business (Vol. 78). New York: Springer.
- James McClave, P. George Benson, Terry Sincich (2017), Statistics for Business and Economics, Pearson Publication.

**Module-wise chapters from the core readings:**

- Module 1: AS, Chapter 1, Sections 1.1-1.5.
- Module 2: AS, Chapter 4, Sections 4.1-4.5
- Module 3: AS, Chapter 5, Sections 5.1-5.7, 6.1-6.2
- Module 4: AS, Chapter 2, Sections 2.1-2.4,  
AS, Chapter 3, Sections 3.1-3.3, 3.5

**Additional information:**

Course prepared by: Dr. Subhasree Sarkar

**Student responsibilities:**

Attendance, feedback, discipline: as per university rules.

**Course reviewers:**

- (1) Sourabh B Paul (Associate Professor, IIT Delhi)
- (2) Gaurav Arora (Associate Professor, IIIT Delhi)
- (3) JV Meenakshi (Professor, IIIT Delhi)