

As Per NEP 2020

University of Mumbai



Syllabus for Basket of OE	
Board of Studies in Statistics	
UG First Year Programme	
Semester - II	
Title of Paper	Credits 2
I) Introduction to Basic Statistics-II	2 credit
II)	
III)	
From the Academic Year	2024-25

Open Elective-I
Name of the Course: Introduction to Basic Statistics-II

Sr. No.	Heading	Particulars
1	Description the course : Including but Not limited to :	Introduction: Introduction to Basic Statistics-II course is focuses on to equip students with basic theory of probability and standard discrete distributions. Student will learn basic elementary probability theory, discrete random variables and continuous random variables. Also students will be acquiring knowledge about correlation and predictive analysis. This course will be useful for science, humanity and commerce faculty. This course will be offered other than science faculty students which will be very useful to gain knowledge about basic statistics in their field. This course will be applicable to various field to analyze their basic data structure. This course is focuses practical as well as theoretical aspects of basic statistics along with subjects from psychology, Economics, sociology, commerce, Computers , Mathematics , IT etc. There is growing demand for highly skilled statisticians in the 21st century in many fields including government, banking sector, health sciences, veterinary sciences, agricultural sciences, business, and social sciences etc
2	Vertical :	Minor
3	Type :	Theory
4	Credit:	2 credits (1 credit = 15 Hours for Theory or 30 Hours of Practical work in a semester)
5	Hours Allotted :	30 Hours
6	Marks Allotted:	50 Marks

7	Course Objectives: : Students will be able to, 1. Understand difference between random and non-random experiment. 2. Understand the concept of probability and its applications 3. Understand the meaning of continuous and discrete random variable. 4. Understand discrete distributions and their properties. 5. Solve the examples on probability and probability distributions.	
8	Course Outcomes: On successful completion of this course Students Should be able to, 1. Identify the types of events 2. Calculate probabilities and conditional probabilities. 3. Apply the concept of probability in real-life situations. 4. Compute the expectation of the uni-variate discrete random variable. 5. Write probability mass functions (p.m.f.) of various discrete distribution and their real-life applications. 6. Understand the concept and difference between correlation and regression	
9	Modules:-	Lect ures
	Module 1: Elementary Probability Theory	
	• Definitions: Trial, random and non-random experiment, sample point and sample space. • Definition of an event and different types of events: complementary event, equally likely events, certain event, impossible event, independent events, mutually exclusive and exhaustive events. • Different definitions of Probability: Classical (Mathematical), Empirical(Statistical) and Axiomatic definitions of Probability. • Conditional probability. • Theorems (without proof) and their applications: i. Addition theorem on probability for two and three events ii. Multiplication theorem on probability for two events. iii. Bayes' theorem. Simple examples based on all concepts. • Random variable: discrete and continuous random variables.	15

Definition and properties of probability mass function . cumulative distribution function. • Expectation and variance of a random variable. Theorems and properties on Expectation and variance of random variables without proof. • Raw and Central moments (definition only) and their relationship. (up to order four). • Joint probability mass function of two discrete random variables. Covariance	
Module 2: Correlation and Regression Analysis.	15
• Correlation analysis: Meaning, types of correlation • Scatter Diagram, product moment or Karl Pearson's correlation coefficient and its properties. • Spearman's Rank correlation (With and without ties) • Concept of linear regression, Principle of least squares, fitting of regression lines by method of least squares. • Properties of regression equations. • Relation between regression coefficients and correlation coefficient. • Concept and use of coefficient of determination (R^2). • Introduction of discrete distributions- Discrete Uniform distribution, Binomial distribution, Poisson distribution and their characteristics (without proof) formulae) and their interpretation	
Reference Books • David S. : Elementary Probability, Cambridge University Press. • Hoel P.G. : Introduction to Mathematical Statistics, Asia Publishing House. • Hogg R.V. and Tannis E.P. : Probability and Statistical Inference. McMillan Publishing Co. Co. Inc. • Pitan Jim : Probability, Narosa Publishing House. • Goon A.M., Gupta M.K., Dasgupta B. : Fundamentals of Statistics, Volume II : The World Press Private Limited, Calcutta.	

- Mukhopadhyay P. An Introduction to the Theory of Probability, World Scientific Publishing Company, 2011.
- Grewal P. S, Methods of Statistical Analysis, Sterling Publishers, 1990
- S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand and Sons

Format of Question Paper:

Internal Continuous Assessment: (20 marks)

Assignment/viva Quizzes, Class Tests, presentation, project, assignment etc	Class Test	Total
05	15	20

Semester End Examination: (30 marks)

Semester End Examination will be of 30 marks of 01 hour duration covering entire syllabus of the semester. All questions are Compulsory.

Theory Question Paper Pattern:

Q 1	Attempt any one question out of two questions (Module I and II)	Max. marks: 10
Q 2	Attempt any two questions out of three questions (Module I)	Max. marks: 10
Q 3	Attempt any two questions out of three questions (Module II)	Max. marks: 10

**Sign of the BOS
Chairman
Dr. Santosh Gite
Board of Studies in
Statistics**

**Sign of the
Offg. Associate Dean
Dr. Madhav R. Rajwade
Faculty of Science &
Technology**

**Sign of the
Offg. Dean
Prof. Shivram S. Garje
Faculty of Science &
Technology**