AC – 20/04/2024
Item No. – 6.7 Sem. II (7b)

As Per NEP 2020

University of Mumbai

Syllabus for
Basket of Minor

Board of Studies in Statistics	
UG First Year Programme	
Semester - II	
Title of Paper	**Credits 2/ 4**
I) Statistical Methods-II	**Credits 2**
II)	
III)	
From the Academic Year	**2024-25**

Semester-II
Minor-II
Name of the course: Statistical Methods-II

Sr. No.	Heading	Particulars
1	**Description the course :** **Including but Not limited to :**	Introduction: Statistical methods-II course is focuses on to equip students with basic theory of continuous probability distributions, basic theory of estimation and testing of hypothesis concept. Students will learn basic continuous distribution such as exponential, uniform and normal distribution and their application in real life problems. Also student will learn to find estimate and estimator by method of estimation and test statistics. This course will be useful for science, humanity and commerce faculty also. This course will be applicable to various fields to analyze their data. 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 the fundamental concepts of continuous probability distributions. 2. Study the concept of estimate and estimator. 3. Understand the concept of testing of hypothesis and large sample test
8	**Course Outcomes**: **Students Should be able to,** 1. Explain the continuous probability distributions such as Uniform, Exponential, Normal distributions and apply to real life applications. 2. Compute mean, variance and standard deviations for continuous probability distributions. 3. Apply testing of hypothesis technique to solve statistical problems.

9	**Modules**:-	**Lectures**
	Module 1: Continuous Probability Distributions	
	• Concept of continuous random variable, probability density function and its properties. Cumulative distribution functions of continuous random variables and its properties. • Definition and derivation of mean, variance and median of Uniform and Exponential distributions. Memory less property of Exponential distribution. i. Normal distribution. Properties of Normal distribution (without proof). ii. Normal approximation to Binomial and Poisson distribution (statement only). iii. Properties of Normal curve. Use of normal tables.	10
	Module 2: Estimation	**10**
	• Sampling from a distribution: Concept of a statistic, parameter ,estimate and estimator, sampling distribution of statistic. • Concept of bias and standard error of an estimator. • Central Limit theorem (statement only).and properties on Expectation and variance of random variables with proof. • Joint probability mass function of two discrete random variables. • Marginal and conditional distributions. • Covariance and Coefficient of Correlation. Independence of two random variables. • Sampling distribution of sample mean and sample proportion. (For largesample only)	

	• Standard errors of sample mean and sample proportion. • Point and Interval estimate of single mean, single proportion from sample of large size. • Point and interval estimate of difference between two means and proportions.	
	Module 3: Testing of Hypothesis and Large Sample Test	**10**
	Testing of hypothesis: • Concept of hypothesis • Simple and composite hypothesis • Null and alternate hypothesis • Test statistic, Critical region, Types of error, Level of significance and power of the test. **Large sample tests:** • For testing specific value of population mean • For testing specific value in difference of two means • For testing specific value of population proportion • For testing specific value of difference of population proportion(development of critical region is not expected)	

11	**Reference Books** **Reference Books** 1. Saxena S., Kapoor J. N., Mathematical Statistics, Sultan Chand & Sons, Delhi, 2010 2. Gupta S. P, Statistical Methods, Sultan Chand and Sons, New Delhi, 2002 3. Kapoor V. K, Gupta S. C, Fundamental of Mathematical Statistics, S Chand & Sons, Delhi, 2008 4. Grewal P. S. Methods of Statistical Analysis, Sterling Publishers, 1990 5. Mukhopadyay P., An Introduction to the theory of Probability, World Scientific Publishing Company,2011 1. Mukhopadhyay P. An Introduction to the Theory of Probability, World Scientific Publishing Company, 2011. 2. Grewal P. S, Methods of Statistical Analysis, Sterling Publishers,

1990
3. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand and Sons
4. Agarwal B. L, Basic Statistics, New Age International P Ltd. Delhi, 2015

Format of Question Paper:

Internal Continuous Assessment: (20 marks)

Assignment/viva Quizzes, Class Tests, presentation, project, role play, creative writing, assignment etc.(at least 3)	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