As Per NEP 2020

University of Mumbai

Syllabus for Basket of SEC/VSC for Commerce Faculty	
Board of Studies in Mathematics	
UG First Year Programme	
Semester	I
Title of Paper	Credits
I) **Practical Statistics for Commerce I (SEC/VSC)**	2
From the Academic Year	**2024-25**

Name of the Course: Practical Statistics for Commerce – I

Sr. No.	Heading	Particulars
1	**Description the course:** **Including but not limited to:**	This course provides a comprehensive exploration of fundamental statistical concepts and decision-making techniques essential for data analysis and problem-solving. It delves into Measures of Central Tendency, encompassing discrete and continuous random variables. Additionally, it covers Measures of Dispersion to understand and interpret data variability effectively. It addresses decision-making analysis and Decision Trees. Through theoretical foundations and practical examples, this course equips students with the analytical skills necessary to make informed decisions in various contexts, empowering them to analyze data effectively and navigate decision-making scenarios with confidence.
2	**Vertical:**	SEC/VSC
3	**Type:**	Practical
4	**Credits:**	2 credits (1 credit = 15 Hours for Theory or 30 Hours of Practical work in a semester)
5	**Hours Allotted:**	60 Hours
6	**Marks Allotted:**	50 Marks
7	**Course Objectives (CO):** This course introduces students to fundamental concepts in data analysis. They will learn about decision-making situations, key components like decision makers, courses of action, and states of nature. By the end of the course, students will possess a solid foundation in data analysis and decision theory, enabling them to make informed decisions and analyze complex data sets effectively. CO1: To familiarize students with different measures of central tendency such as mean, median, and mode, and their calculation methods for both raw and grouped data, and concepts from decision theory. CO2: To provide students with an understanding of measures of dispersion, including range, coefficient of range, variance, and standard deviation, and their significance in analyzing data variability.	

	CO3: To introduce decision-making techniques under uncertainty, such as Maximin, Maximax, and Laplace criteria, through simple examples. CO4: To explain decision-making under risk using the Expected Monetary Value (EMV) approach, decision trees, and the concept of Expected Opportunity Loss (EOL).
8	**Course Outcomes (OC):** After completion of the course, students will be able to OC1: understand the concept of central tendency, measures of dispersion and be able to calculate mean, median, mode, range, variance, and standard deviation for raw and grouped data. OC2: learn to compute measures of central tendency for both discrete and continuous random variables. OC3: analyze data variability using measures of dispersion. OC4: identify decision-making situations, courses of action, and states of nature. OC5: construct pay-off matrices and use them for decision-making skills under uncertainty using techniques like Maximin, Maximax, Expected Monetary Value (EMV), Expected Opportunity Loss (EOL) and Laplace criteria.
9	**Modules:-** **Module 1: Measures of Central Tendency and Dispersion** 1. Concept of Measures of Central Tendency. The basic measures of central tendency, such as Mean, Median and Mode, for raw data. - Practical based on finding Mean of the raw data - Practical based on finding Median of the raw data - Practical based on finding Mode of the raw data 2. Grouped Data and measures of central tendency for grouped data for discrete random variable. - Practical based on finding Mean of the grouped data for a discrete variable - Practical based on finding Median of the grouped data for a discrete variable - Practical based on finding Mode of the grouped data for a discrete variable 3. Mean, Median and Mode for Continuous random variable - Practical based on finding Mean of the grouped data for a continuous variable - Practical based on finding Median of the grouped data for a continuous variable - Practical based on finding Mode of the grouped data for a continuous variable 4. Measures of dispersion, such as Range, Coefficient of Range, Variance and Standard Deviation. - Practical based on finding Range and coefficient of Range of the data - Practical based on finding Variance and Standard Deviation of the data **Students are encouraged to use excel to solve practical problems.**
	Module 2: Decision theory 1. Decision making situation; Decision maker, Courses of Action, States of Nature Pay-off and Pay-off matrix - Practical based on Courses of Action, States of Nature (Case-study type problems may be given, and the learners will be expected to differentiate between Courses-of-Action and States-of-Nature). - Practical based on Pay-off and Pay-off matrix (Case-study type problems may be given, and the learners will be expected to obtain pay-offs and construct pay-off matrix) 2. Decision making under Uncertainty: Maximin, Maximax and Laplace criteria,

simple examples to find optimum decision.
- Practical based on Decision making using Maximin Criteria
- Practical based on Decision making using Maximax Criteria
- Practical based on Decision making using Laplace Criteria
- Practical based on Decision making under different criteria.

3. Decision making under Risk Expected Monetary Value (EMV), Decision tree, simple examples based on EMV and EOL
- Practical based on EMV
- Practical based on creation of Opportunity Loss (Regret) Table
- Practical based on EOL
- Practical based on constructing of Decision Tree

10	**Text Books**
	1. Fundamentals of Mathematical Statistics,12th Edition, S. C. Gupta and V. K. Kapoor, Sultan Chand & Sons, 2020.
	2. Statistics for Business and Economics, 11th Edition, David R. Anderson, Dennis J. Sweeney and Thomas A. Williams, Cengage Learning, 2011.
	3. Introductory Statistics, 8th Edition, Prem S. Mann, John Wiley & Sons Inc., 2013.
11	**Reference Books**
	1. A First Course in Statistics, 12th Edition, James McClave and Terry Sincich, Pearson Education Limited, 2018.
	2. Introductory Statistics, Barbara Illowsky, Susan Dean and Laurel Chiappetta, OpenStax, 2013.

<table>
<tr><td colspan="2" align="center"><u>Scheme of the Examination</u></td></tr>
<tr><td colspan="2">The performance of the learners shall be evaluated into two parts.
• Internal Continuous Assessment of 20 marks for each paper.
• Semester End Examination of 30 marks for each paper.
• Separate head of passing is required for internal and semester end examination.</td></tr>
<tr><td>12</td><td>Internal Continuous Assessment: 40%
Semester End Examination: 60%</td></tr>
<tr><td>13</td><td>Continuous Evaluation through: Quizzes, Class Tests, presentation, project, role play, creative writing, assignment etc.
(at least 3)

Mid semester practical examination of 20 marks will be conducted on covered syllabus (at least 50% of total syllabus) of one hour duration as per the following pattern.</td></tr>
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Sr. No.	Title	Marks
1.	Quiz comprising of MCQs (Attempt any 5 out of 8) (Online/Offline)	05
2.	Class Test comprising of Problems/ Programs (Attempt any 2 out of 4)	10
3.	Viva	05

14 | **Format of Question Paper:**

The performance of the learners shall be evaluated into two parts.
- Internal Continuous Assessment of 20 marks.
- Semester End Examination of 30 marks.
- Separate head of passing is required for internal, and semester end practical examination.

Semester End Practical Examination (30 marks):

Semester end practical examination of 30 marks **on entire syllabus** will be conducted of three hours duration as per the following pattern.

Sr. No.	Title	Marks
1.	Problems/ Programs (Attempt any 5 out of 8)	25 Marks
2.	Journal	05 Marks

The students are required to perform 75% of the Practical for the journal to be duly certified. The students are required to present a duly certified journal for appearing at the practical examination, failing which they will not be allowed to appear for the examination.

Sign of the BOS Chairman
Dr. Bhausaheb S Desale
The Chairman, Board of Studies in Mathematics

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