COURSEPLAN

NAME OF THE DEPARTMENT: MATHEMATICS

NAME OF THE FACULTY: Dr. R.C.L Das

Prof. Shekhar Suman

Dr. Kandarp Vidyasagar

ACADEMIC SESSION: 2021-2024

YEAR: 2023

PROGRAMME: B.Sc.

SEMESTER: 5

COURSE TYPE: Core

COURSE: Probability and Statistics

COURSE CODE: DSE-2

TOTAL CREDIT: 6 (5+1)

PROGRAMME OUTCOMES (POs):

Student will be able:

PO1: Develop in-depth knowledge of Probability and Statistics and several other branches of mathematics. This also leads to study of related areas like computer science and statistics.

PO2: Analyze intrinsic beauty which can be utilized for solving real life problems through the use of mathematical modeling, cryptography and coding.

PO3: Apply knowledge of mathematical science in understanding and skills to identify the difficult/unsolved problems in mathematics. Realize the given scientific data critically and systematically and to do research so that to get the ability to draw the objective conclusions.

PO4: Understand logically question assertions, to recognize patterns and to distinguish between essential and irrelevant aspects of problems. They also share ideas and insights while seeking and benefitting from knowledge and insight of others. This helps them to learn behave responsibly in a rapidly changing interdependent society.

PO5: This program will also help students to enhance their employability for government jobs, jobs in banking, insurance and investment sectors, data analyst jobs and jobs in various other public and private enterprises.

PO6: Design solutions for complex scientific problems and design processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, legal, constitutional and environmental considerations.

PO7: Demonstrate fundamental systematic knowledge of mathematics and its applications in engineering, science, technology and mathematical sciences. It should also enhance the subject specific knowledge and help in creating jobs in various sectors.

PO8: Demonstrate knowledge and understanding of the scientific principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO9: Communicate effectively on complex science activities with the science community and the society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO10: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of scientific development, technological advancement and global changes.

PO11: Use research-based knowledge and research-based methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

helps students in building a solid foundation for further higher studies and research in Mathematics.

CO2: Competency in Skills: The skills and knowledge gained in this course leads to proficiency in analytical reasoning, critical understanding, analysis and synthesis in order to solve theoretical and practical problems. This can orient students towards applications of mathematics in other disciplines and moreover, can also be utilized in modeling and solving real life problems.

CO3: Problem Solving: Students undergoing this course learn to logically question assertions, to recognize patterns and to distinguish between essential and irrelevant aspects of problems.

CO4: Interdisciplinary and Research Skills: Students completing this course will be able to present mathematics clearly and precisely, make vague ideas precise by formulating them in the language of mathematics, describe mathematical ideas from multiple perspectives and explain fundamental concepts of mathematics to non-mathematicians.

CO5: Proficiency in Employments: This course will help students to enhance their employability for Government jobs, jobs in banking, insurance and investment sectors, data analysis jobs, and jobs in various other public and private enterprises.

A. CORRELATION BETWEEN POs AND COs

POs\Cos	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PO 13	PO 14	PSO 1	PSO 2	PSO 3
CO1	3	2	3	-	1	2	2	-	1	-	-	2	2	2	3	-	3
CO2	3	2	2	-	2	2	3	2	1	2	3	3	3	3	3	3	3
CO3	-	-	2	2	-	2	3	-	-	1	2	-	2	-	2	2	-
CO4	3	-	-	2	-	-	2	1	2	1	-	2	-	1	3	3	-
CO5	3	2	1	-	2	1	2	-	1	-	2	2	2	-	2	3	2

1. Weak   2. Moderate   3. Strong

COURSE TEACHING AND LEARNING ACTIVITIES

A. **PEDAGOGY**
   i. **Whiteboard**
   ii. **PPT**
   iii. **Zoom, Google meet**

B. COURSE DELIVERY PLAN:

UNIT	TOPIC/SUBTOPIC	LECTURE REQUIRED	CO ADDRESSED
1	Introduction to random variables	6	CO1
2	Cumulative distribution function (c.d.f.), probability mass/density functions, joint p.d.f., joint p.m.f	6	CO1
3	Marginal and conditional distributions, joint c.d.f .and its properties	6	CO2, CO1
4	Mathematical expectations, moments	7	CO3
5	Moment generating function: limitations and properties, characteristic function.	8	CO3, CO4
6	Discrete distributions: uniform, binomial & Poisson	6	CO4
7	Continuous distributions: uniform and normal	7	CO4
8	Properties of a Random Sample	7	CO5
9	Basic concepts of Random Sample, convergence in probability	7	CO5
10	Sure convergence, convergence in distribution	8	CO5
11	Order statistics and their distributions	7	CO5

C. SUGGESTED READINGS
   a. TEXT BOOKS:
1. Fundamentals of Mathematical Statistics – S.C Gupta & V.K Kapoor
2. Mathematical Statistics by J.N Kapoor and H.C Saxena

b. REFERENCE BOOKS

1. Robert V.Hogg, Joseph W.Mc Kean and Allen T.Craig, Introduction to Mathematical Statistics, Pearson Education, Asia, 2007.
2. Irwin Miller and Marylees Miller, John E.Freund, Mathematical Statistics with Applications, 7thEd., Pearson Education, Asia, 2006.

   c. VIDEO RESOURCE

1. https://archive.nptel.ac.in/courses/111/102/111102134/

WEB RESOURCES:-

1. https://en.wikipedia.org/wiki/Probability_theory

2. https://www.britannica.com/science/probability-theory

E-RESOURCES

1. https://mu.ac.in/wp-content/uploads/2021/10/probability-theory.pdf