



हिमाचल प्रदेश केंद्रीय विश्वविद्यालय Central University of Himachal Pradesh

(Established under Central Universities Act 2009)

शाहपुर परिसर, शाहपुर, जिला काँगड़ा (हि.प्र.) - 176206

Shahpur Parisar, Shahpur, Distt. Kangra (HP) - 176206

Website: www.cuhimachal.ac.in



University wide Interdisciplinary Courses (02) Credits for Course Basket

Course Code: MTH-413

Course Name: Probability Theory

Course Credit: 02

Course Instructor: Dr. Pankaj Kumar S/O Late Sh. Maniram

Credits Equivalent: (One credit is equivalent to 10 hours of lectures / organized classroom

activity / contact hours; 5 hours of laboratory work / practical / field work / Tutorial / teacher-led activity and 15 hours of other workload such as independent individual/ group work; obligatory/ optional work placement; literature survey/ library work; data collection/ field work; writing of papers/ projects/dissertation/thesis; seminars, etc.)

Course Objective: The purpose of this course is to acquaint the students with basics of theory of probability.

Course Outcomes:

After completing the course satisfactorily, a student will be able:

CO¹ To calculate probabilities by applying probability laws and theoretical results.

CO² To understand the axiomatic formulation of modern Probability Theory.

CO³ To understand the Conditional Probability including the concept of Bayes' Theorem.

CO⁴ To characterize probability models and function of random variables based on single & multiples random variables.

Attendance Requirements:

Students are expected to attend all lectures in order to be able to fully benefit from the course. A minimum of 75% attendance is a must failing which a student may not be permitted to appear in examination.

Evaluation Criteria:

1. Mid Term Examination: 20
2. End Term Examination: 40
3. Continuous Internal Assessment: 20

Unit I: Classical Approach to Probability: Random Experiment an Events, Exhaustive Events, Favorable Events, Mutually Exclusive Events, Equally Likely Events, Classical Theory of Probability, Theorem of Total Probability, Compound Events, Theorem of Compound Events. (10 Hours)

Practicum

- Solving the Exercises of the selected Chapters
- Implementation on the selected real world problems
- Performing simulations for the pattern of solutions

Unit II: Classical Approach to Probability: Set Theoretic Concepts, Function, Algebra and Sigma- Algebra, Sample Space, Events, Events Space, Probability Function, Probability Space, Conditional Probability, Independent Events, Bayes Theorem, Multiple Rule. Distribution function and Expectation. (10 Hours)

Reference Books:

1. Miller, I. and Miller, Marylees. John E. Freund's :Mathematical Statistics with Application, 7th ed, New Jersey: Prentice Hall, 2010.
2. Gupta S. C., Kapoor V. K.: Fundamentals of Mathematical Statistics, 12th Edition, Sultan Chand and Sons, 2020.

Course Articulation Matrix MTH-408- Probability Theory

Course Outcomes	Programme Outcomes 1	Programme Outcomes 2	Programme Outcomes 3	Programme Outcomes 4		Programme Specific Outcomes 1	Programme Specific Outcomes 2
CO1	2	2	2	2		2	2
CO2	2	2	3	3		1	2
CO3	1	3	2	2		2	2
CO4	2	1	2	3		2	1

1. Partially Related
2. Moderately Related
3. Highly Related