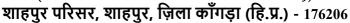


हिमाचल प्रदेश केंद्रीय विश्वविद्यालय

Central University of Himachal Pradesh

(Established under Central Universities Act 2009)



Shahpur Parisar, Shahpur, Distt. Kangra (HP) - 176206 Website: <u>www.cuhimachal.ac.in</u>



INTERDISCIPLINARY COURSES OFFERED BY THE SRINIVASA RAMANUJAN DEPARTMENT OF MATHEMATICS

Monsoon Semester 2025

Sr. No.	Course Name	Course Code	Credit
1.	Probability Theory	MTH 413	02
2.	Elementary Number Theory	IAM 415	02



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

Website: www.cuhimachal.ac.in



Course Code: MTH 413

Credits: 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.)

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:

- Mid Term Examination: 20% 1.
- 2. End Term Examination: 60%
- Continuous Internal Assessment: 20%. i.e. 20 marks out of 100 3.

Course Outcomes

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

- To calculate probabilities by applying probability laws and theoretical results.
- To understand the axiomatic formulation of modern Probability Theory.
- To understand the Conditional Probability including the concept of Bayes' Theorem.
- To characterize probability models and function of random variables based on single & multiples random variables.

Learning Outcomes

The deliverables Learning Outcomes of this paper with students are following:

- Ability to distinguish between random and non-random experiments.
- To calculate probabilities by applying probability laws and theoretical results.
- Gain knowledge to conceptualise the probabilities of events including frequentist and axiomatic approach.
- Can explain the conditional probability including the concept of Bayes' Theorem,
- Will possess the knowledge related to discrete and continuous random variable and its probability distribution including expectations.

Unit I

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

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 HRS)

Practicum

- Solving the Exercises of the selected Chapters
- Implementation on the selected real world problems



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• Performing simulations for the pattern of solutions

General Practicum:

- i. Class Room Presentation
- ii. Model/Chart/PowerPoint based presentations
- iii. Assignment/ Write Up/Creative work
- iv. Books/Journals Readings
- v. Tutorials/PBL

Reference Books:

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