Himachal Pradesh University
Summer Hill, Shimla-171005

Syllabus and Scheme of Examination

For

Three Year B. A./ B.Sc./ with major in Mathematics
Four Year B. A./ B. Sc. (Hons./ Hons with research) with major/ and minor in Mathematics

under the

National Education Policy 2020

w.e.f.

Academic Session 2025 -26 onwards

HIMACHAL PRADESH UNIVERSITY
B.Sc. First Year Syllabus and Examination Scheme
First Semester

Course Code	MDC-MATH-112
Credit	3
Name of the Course	Mathematics for Competitive Examinations
Type of the Course	Multidisciplinary Course (MDC 1)
Number of hours required for this course	45 hrs.
Attendance-05 Marks Class Test-10 Marks Assignments & Presentations-10 Marks	Max. Marks:25
Semester Term End Examination	Max Marks: 50 Maximum Time: 2 hrs.
Lectures to be Delivered (One Hour Each)	45

Instructions

1. **Instructions for paper setter:** The question paper will consist of four parts A, B, C and D of 50 marks and the examiner shall set 7 questions in all. Two questions will be set from each section I, II, and III of the syllabus and each question will carry 12 marks. Section D will be compulsory and will have 10 short answer type questions from all the sections (I, II, III) of the syllabus each of two marks.
2. **Instructions for Candidates:** Candidates are required to attempt four questions in all. Section D is Compulsory in which students should attempt 7 questions in total whereas they are required to attempt one question from each Section A, B and C in the question paper.

MDC 1: Mathematics for Competitive Examinations

Course Objectives: After thorough learning of the course, students will be able to

- Have an idea of concepts of mathematics with emphasis on analytical ability and computational skill required in competitive examinations.
- Understand various language structures.
- Develop the understanding of various principles involved in solving mathematical problems thereby reducing the time taken for performing job functions.

Course Learning Outcomes: By the end of the course, students will be able to

- Learn the basic concepts of Mathematics needed for most competitive exams and can solve the mathematics part of competitive examinations easily.
- Communicate quantitative and logical reasoning in multiple forms.
- Learning the problem-solving skills.
- Develop a problem-solving attitude.

Section I (15 hrs)

Numbers, averages, square root, cube root, LCM and HCF, Ratio and proportions.

Section II (15 hrs)

Percentages - Profit and loss. Problems of ages.

Section III (15 hrs)

Time and work – Time and distance, Simple interest - Compound interest.

Recommended Books:

1. R.S. Agarwal, Content and treatment as in the book Quantitative Aptitude, S. Chand & Co, New Delhi, 2015, (Chapter 1: §§ 3 to 29, Chapter 2: §§ 30 to 45, Chapter 5: §§ 117 to 138, Chapter 6: §§ 139 to 160, Chapter 8: §§ 182 to 194, Chapter 12: §§ 294 to 310, Chapter 10: §§ 208 to 250, Chapter 11: §§ 251 to 293, Chapter 15: §§ 341 to 370, Chapter 17: §§ 384 to 404, Chapter 21: §§ 445 to 465, Chapter 22: §§ 466 to 486).
2. Rajesh Verma, Fast track objective Arithmetic, Arihant publications (India) ltd. (Chapter 1,3,5,10,11,12,14,15,17,21,22,25).

HIMACHAL PRADESH UNIVERSITY
B.Sc. First Year Syllabus and Examination Scheme
Second Semester

Course Code	MDC-MATH-122
Credits	3
Name of the Course	Probability and Statistics
Type of the Course	Multidisciplinary Course (MDC 2)
Number of hours required for this course	45 hrs.
Attendance-05 Marks Class Test-10 Marks Assignments & Presentations-10 Marks	Max. Marks:25
Semester Term End Examination	Max Marks: 50 Maximum Time: 2 hrs.
Lectures to be Delivered (One Hour Each)	45

Instructions

1. **Instructions for paper setter:** The question paper will consist of four Sections A, B, C and D of 50 marks and examiner shall set 7 questions in all. Two questions will be set from each section I, II, and III of the syllabus and each question will carry 12 marks. Section D will be compulsory and will have 10 short answer type questions from all the sections (I, II, III) of the syllabus each of two marks.
2. **Instructions for Candidates:** Candidates are required to attempt four questions in all. Section D is Compulsory in which students should attempt 7 questions in total whereas they are required to attempt one question from each Section A, B and C in the question paper.

MDC 2: Probability and Statistics

Course Objectives: The main objectives of the course are

- To understand the basic concepts of Statistics, its scope and importance in various fields.
- To master basic techniques for data summary and data presentation.
- To describe data with measures of central tendency and measures of dispersion.
- To distinguish between random and non-random experiments.
- To conceptualize the probabilities of events including frequentist and axiomatic approach.
- To learn the notion of conditional probability including the concept of Independent events.

Learning Outcomes: After the completion of course, the students will have

- The knowledge of the basic concepts of Statistics, its scope and importance in various fields.
- The ability to master basic techniques for data summary and data presentation.
- The knowledge to describe data with measures of central tendency and measures of dispersion.
- The knowledge of basic concepts of probability and the ability to understand conditional probability and independent events.

Section-I (15 hrs.)

Frequency distribution, Frequency polygon, Histogram, Measures of Central tendency, Arithmetic Mean, Median, Mode, Relationship among measures of central tendency and their limitations.

Section-II (15 hrs.)

Dispersion, Range, Quartile deviation, Mean deviation, Standard deviation and mean square deviation, Coefficients of dispersion, Moments, Skewness, Kurtosis.

Section -III (15 hrs.)

Introduction to probability, Basic terminology, Classical probability, Theorems on probability, Conditional probability, Dependent and Independent Events, Multiplication theorem, Law of total probability and Baye's theorem.

Recommended Books:

1. Gupta S. C. and Kapoor V. K., Fundamentals of Mathematical Statistics, 11th Edition, Sultan Chand & Sons, 2002. (Chapter 2, Chapter 3 and 4.1 of Chapter 4)
2. Rohtagi V. K. and Ehsanes A. K. Md., *An Introduction to Mathematical Statistics, John Wiley & Sons,* 2015.
3. Robert V. Hogg, Joseph W. McKean and Allen T. Craig, *Introduction to Mathematical Statistics*, Pearson Education, Asia, 2007.
4. Irwin Miller and Marylees Miller, John E. Freund, *Mathematical Statistics with Application,*7th Ed., Pearson Education, Asia, 2006.