



Pradesh-176215

Central University of Himachal Pradesh

(ESTABLISHED UNDER CENTRAL UNIVERSITIES ACT 2009)

Dharamshala, Himachal



NAAC Criterion-I

Key Indicator – 1.3.2

**Brochure and course content or syllabus
along with course outcome of value-added
courses offered**

1.3.2 Evidences



**Srinivasa Ramanujan Department of Mathematics
Central University of Himachal Pradesh, Dharamshala,
Kangra**



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Srinivasa Ramanujan Department of Mathematics

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To whom it may concern

The detailed value added courses offered (year-wise) by the Srinivasa Ramanujan Department of Mathematics are as follows:

Name of the value added courses offered (with 30 or more contact hours)	Course Code (if any)	Year of offering	Duration of the course	Number of students enrolled in the year	Number of Students completing the course in the year
2018-19					
Vedic Mathematics	IAM 412	2018	30 hours	85	85
2019-20					
Introduction to Mathematical Statistics	MTH527	2019	30 hours	36	36
Vedic Mathematics	IAM 412	2019	30 hours	44	44
2020-21					
Vedic Mathematics	IAM 412	2020	30 hours	32	32
Basics of Propositional Logic	MTH 529	2021	30 hours	30	30
Introduction to Rigorous and Precise Thinking	MTH 528	2021	30 hours	62	62


विभागाध्यक्ष, श्रीनिवासा रामानुजन गणित विभाग
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हिमाचल प्रदेश केन्द्रीय विश्वविद्यालय
Central University of Himachal Pradesh
अस्थायी शैक्षणिक खण्ड / Temporary Academic Block
शाहपुर, काँगड़ा (हि.प्र.)/Shahpur, Kangra (H.P.)-176206

Course Contents along with Course Outcomes:

Course Code: IAM 412

Course Name: Vedic Mathematics

Course credit: 02

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 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:60%
3. Continuous Internal Assessment: 20%. i.e. 20 marks out of100

Course Outcomes: On completion of the course, the students will be able:

- To understand the idea of different vedic sutras and sub-sutras.
- To apply 16 sutras and 13 sub-sutras.

Learning Outcomes

The deliverables and learning outcomes of this paper for students are as follows:

- Can explain the idea of sixteen sutras of Vedic Tradition.
- Can also explain the idea of sub-sutras of Vedic Tradition.
- Can take quick decisions through the use of Sutras and their corollaries.

Attendance Requirements:

Students are expected to attend all lectures in order 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 an examination.

Evaluation Criteria:

1. Mid Term Examination: 20%
2. End Term Examination: 60%
3. Continuous Internal Assessment: 20%

Course Contents:

Unit I: The 16 Sutras: Ekadhikina Purvena, Nikhilam Navatashcaramam Dashatah, Urdhva-Tiryagbyham, Paraavartya Yojayet, Shunyam Saamyasamuccaye, (Anurupye) Shunyamanyat, Sankalana-vyavakalanabhyam, Puranapuranyam, Chalana-Kalanabyham, Yaavadunam, Vyashtisamanstih, Shesanyankena Chara. ramena, Sopaantyadvayamantyam, Ekanyunena Purvena, Gunitasamuchyah, Gunakasamuchyah **(10 HRS)**

Practicum

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

Unit II: Corollary: Anurupyena, Sisyate Sesasamjnah, Adyamadyenanyamantyena, Kevalaih Saptakam Gunyat, Vestanam, Yavadunam Tavadunam, Yavadunam Tavadunikritya Varga Yojayet, Antyayordashake'pi, Antyayoreva, Samuccayagunitah, Lopanasthapanabhyam, Vilokanam, Gunitasamuccayah Samuccayagunitah, Dhvajanka, Dwandwa Yoga, Adyam Antyam Madhyam. **(10 HRS)**

Practicum

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

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

Essential Reading: Bharati Krishna Tirtha, Vedic Mathematics, Motilal Banarsidass, New Delhi (2001).

Course Code: MTH 527

Course Name: Introduction to Mathematical Statistics

Credits: 02

Course Contents:

Unit-I:

The Theory of Probability: Mathematical or Classical Definition of Probability, Limitations of Mathematical Probability, Statistical or Empirical Definition of Probability and its Limitations, Algebra of Sets, Limits of Sequence of Sets, Classes of Sets, Axiomatic Approach to Probability, Basic Theorems on Probability, Conditional Probability, Independence of Events, Pairwise Independence, Mutual Independence, Extended Axiom of Addition and Continuity. Bayes Theorem.

Unit-II:

Random Variables and Mathematical Expectation: Random Variables, the Distribution Function of a Random Variable, and its Properties Discrete Random Variable, Probability Mass Function. Continuous Random Variable, Probability Density Function. mathematical expectation of a random variable and its important properties, variance and covariance.

Prescribed Text Book:

- S.C Gupta and V.K. Kapoor. "Fundamentals of Mathematical Statistics", S. Chand & Sons.

Suggested Additional Reading:

Hogg and Craig, "Introduction to Mathematical Statistics," McGraw Hill.

Course Code: MTH 528

Course Name: Introduction to Rigorous and Precise Thinking

Credits: 02

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 Objectives:

The objectives of this course are:

- To understand what is mathematics and its purpose
- To think for the development of Mathematics
- To know about why we need to learn about Mathematics
- To precise about Mathematical statements
- To perform different types of proofs

Course Outcomes:

After successful completion of the course, the student will be able:

CO¹ Explain different definitions of Mathematics

CO² Explain the basic ideas for the development of Mathematics

CO³ Explain logical combinators

CO⁴ To possess the knowledge to approach for proofs of Mathematical statements

Attendance Requirements:

Students are expected to attend all lectures in order 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: 60
3. Continuous Internal Assessment: 20

Course Contents:

UNIT-I: Rigorous Thinking, Types of Thinking, procedure of thinking, Getting precise about language, the logical combinators, Implication, Quantifiers.
(10 Hours)

UNIT-II: Rigorous Mathematical Thinking, Computational Thinking, Reasoning, Logics, Arguments, Predicate, Quantifier, assertion and reason. Language and Grammar.
(10 Hours)

Prescribed text book:

Keith Devlin, Introduction to Mathematical Thinking, Publisher: Keith Devlin, 331 Poe St, Unit 4, Palo Alto, CA 94301, USA

Course Articulation Matrix of MTH 528- Introduction to Rigorous and Precise Thinking

Course Outcomes	Programme Outcomes 1	Programme Outcomes 2	Programme Outcomes 3	Programme Outcomes 4	Programme Specific Outcomes 1	Programme Specific Outcomes 2
CO ¹	3	3	2	1	3	3
CO ²	3	3	2	1	3	2
CO ³	3	3	2	1	3	2
CO ⁴	3	3	2	2	3	3

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

Course Code: MTH 529

Course Name: Basics of Propositional Logic

Course Objective: The purpose of this course is to develop a rational thinking in statements/decision making/ arguments.

Course Outcome: Students should be able to

- State the converse, inverse, contrapositive and negation of a conditional statements including quantified statements
- Construct the truth tables, and interpret the results
- Write different types of proofs.

Credits Equivalent:02 (One credit is equivalent to 10 hours of lectures/organised 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 fully benefit from the course. A minimum of 75% attendance is a must, failing which a student may not be permitted to appear in an examination.

Evaluation Criteria:

Mid Term Examination:20%

End Term Examination:60%

Continuous Internal Assessment: 20%.

Course Contents:

Unit-I: Set and Proposition, Finite and Infinite set, Mathematical Induction, Principle of Inclusion and Exclusion, Multisets, Propositions, Logical Connectives, Conditional and Biconditional, Well-Formed formulas, Tautologies.

Unit-II: Logical Equivalence, Theory of Inference for Statement Calculus, Validity using Truth Tables, Rules of Inference, Consistency of Premises, Predicate Calculus, The Statement Function, Variables and Quantifier, Predicate Formula, Free and Bound variable, The Universe of Discourse, Inference Theory of Predicate Calculus, Valid formula and Equivalences, Theory of Inference for Predicate Calculus, Formulas involving more than one Qualifier, Euclidean Algorithms.

Prescribed Text Book:

1. C. L. Liu, “Elements of Discrete Mathematics”, McGraw Hill publication.

Course Articulation Matrix of MTH 529- Basics of Propositional Logic

Course Outcomes	Programme Outcomes 1	Programme Outcomes 2	Programme Outcomes 3	Programme Outcomes 4	Programme Specific Outcomes 1	Programme Specific Outcomes 2
CO1	3	3	2	1	3	3

CO ²	3	3	2	1	3	2
CO ³	3	3	2	1	3	2
CO ⁴	3	3	2	2	3	3

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