



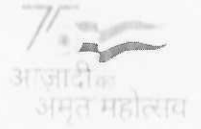
हिमाचल प्रदेश केंद्रीय विश्वविद्यालय
Central University of Himachal Pradesh

(Established under Central Universities Act 2009)

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

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

Website: www.cuhimachal.ac.in



File No. MTH/1-1/PG/CUIHP/22/1211-1218

Dated: 31.03.2023

List of the Inter-Disciplinary Courses offered by the Srinivasa Ramanujan
Department of Mathematics, for the 2nd semester, during Spring semester, 2023:-

Sr. No.	Course Name	Course Code	Credits	Name of Faculty Member
IDC Courses (02 Credits)				
1	Vedic Mathematics	IAM 412	02	Dr. Pankaj Kumar S/o Lt. Sh. Maniram
2	Partial Differential Equation and Integral Equations	MTH 408	02	Dr. Krati Kumar


Head,

Srinivasa Ramanujan Department of Mathematics

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Head,

Srinivasa Ramanujan Department of Mathematics



**Course Contents of Interdisciplinary Courses offered by the Srinivasa Ramanujan
Department of Mathematics**

Spring Semester 2023

Course Name: Partial Differential Equation and Integral Equations

Course Code: MTH 408

Credits: 02

Course Instructor: Dr. Kranti Kumar

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 prime objective of this course is to provide the basic knowledge of partial differential equations and integral equations by focussing at the various physical aspects of the equations through the different solution schemes/ techniques.

Course Outcomes:

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

CO1 To explain about the Linear and Non Linear partial differential equations (of particular order and degree) and their formation along with their solution.

CO2 To know about Lagrange's method, Charpit's method along with their distinct approach to solve the Partial differential equations.

CO3 To explain about the basic integral equations, especially some special kind of integral equations and their solutions.

CO4 To convert the ordinary differential equations (of specific order and degree) into their respective integral equations.

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:60
3. Continuous Internal Assessment: 20.



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Course Contents:

Unit I: Origin of partial differential equations, Linear partial differential equations of order one: Lagrange's method, Non linear partial differential equations of order one: Charpit's method, Homogeneous linear partial differential equations with constant coefficients. **(10 Hrs)**

Practicum

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

UNIT-II: Integral Equations: Preliminary concepts, Conversion of ordinary differential equations into integral equations, Homogeneous Fredholm Integral equations of the second kind with separable (degenerate) kernels, Fredholm Integral equations of the second kind with separable (degenerate) kernels. **(10 Hrs)**

Practicum

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

General Practicum:

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

Essential Readings:

1. M.D. Raisinghania (2013). Ordinary and Partial Differential Equations, Eighteenth Edition, S. Chand.
2. M.D. Raisinghania (2013). Integral equations and Boundary value problems, Sixth Edition, S. Chand.

Suggested Additional Readings:

1. A.D. Polyanin, A.V. Manzhirov. Handbook of Integral equations, Second Edition, Chapman & Hall/ CRC.



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Course Code: IAM 412

Course Name: Vedic Mathematics

Course credit: 02

Course Instructor: Dr. Pankaj Kumar S/o Lt. 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:

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

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 Learning Outcomes of this paper with students are following:

- 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 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.



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Evaluation Criteria:

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

Course Contents:

Unit I: The 16 Sutras: Ek adhikina Purvena, Nikhilam Navatashcaramam Dashatah, Urdhva-Tiryagbyham, ParaavartyaYojayet, Shunyam Saamyasamuccaye, (Anurupye) Shunyamanyat, Sankalana-vyavakalanabhyam, Puranapurabyham, Chalana-Kalanabyham, Yaavadunam, Vyashtisamanstih, ShesanyankenaCharamena, 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 Sesamjnah, Adyamadyenantyamantyena, Kevalaih Saptakam Gonyat, 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
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- iii. Assignment/ Write Up/Creative work
- iv. Books/Journals Readings
- v. Tutorials/PBL

Essential Reading:

1. Bharati Krishna Tirtha, Vedic Mathematics, Motilal Banarsidass, New Delhi, (2001).