



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



आज़ादी का
अमृत महोत्सव

File No.: MTH/1-1/PG/CUHP/21/295-299

Dated: 12.11.2021

List of Interdisciplinary Courses offered by the Srinivasa Ramanujan Department of Mathematics University-wide for Monsoon Semester 2021:

Sr. No.	Course Name	Course Code	Credits	Name of the Faculty Member
1.	Ordinary Differential Equations	MTH 401	02	Dr. Pankaj Kumar S/o Sh. Krishan Singh
2.	Numerical Analysis	IAM 403	02	Prof. Rakesh Kumar

Head,
Srinivasa Ramanujan Department of Mathematics

Copy to:

1. Notice Board.
2. The System Analyst, Central University of Himachal Pradesh for uploading on the University Website.
3. The Dean, School of Mathematics, Computers and Information Sciences, CUHP, Shahpur Parisar, for information.
4. The Controller of Examinations, Central University of Himachal Pradesh, Dharamshala, for information.
5. The Chairman, National Education Policy 2020, Central University of Himachal Pradesh, for information and necessary action.

Head,
Srinivasa Ramanujan Department of Mathematics



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

Course Name: Ordinary Differential Equations

Course Code: MTH-401

Credits: 02

Course Objective: The prime aim of this course is to provide the interdisciplinary relevance of ordinary differential equations by focussing at the various physical aspects of the equations through the different solution schemes.

Course Outcomes

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

- To analyse the real world problems and transform them into the corresponding mathematical form
- To understand the fundamental concepts of differential equations and qualitative interpretation of solutions
- To get familiar with some pre-existing distinct techniques/methods of differential equations to solve different kinds of differential equations.
- To understand and apply the series solution approach to various types of problems encountered in differential equations.

Course Contents:

UNIT I: First order differential equations, existence and uniqueness, higher order linear differential equations, homogeneous and non-homogeneous differential equations with constant coefficients, Wronskian, fundamental solutions, variation of parameters, method of reduction of order, method of undetermined coefficients. **(Chapter - 2, 3 and 4)** **UNIT-II:** Series solutions of linear equations: power series, series solutions near an ordinary point, regular singular points, Euler equations, series solutions near regular singular point, Bessel's equation.

(Chapter – 5)

Prescribed Text Book:

1. W.E. Boyace and R.C. Diprima (2013). Elementary Differential Equations and Boundary Value Problems, Ninth Edition, Wiley.

Suggested Additional Readings:

1. Fred Brauer, John A. Nohel (1989). The Qualitative Theory of Ordinary Differential Equations, Dover Publications, INC, New York.
2. S.L. Ross (1984). Differential Equations. Third Edition. John Wiley & Sons Inc.



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



Course Name: Numerical Analysis

Course Code: IAM 403

Credits: 02

Course Objective: The purpose of this course is to develop the basic understanding of numerical approximations and algorithms which are necessary for solving real world problems in Science, Engineering and Technology.

Course Outcomes

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

- To interpolate and approximate functions
- To perform numerical differential and integration
- To apply basic numerical algorithms
- To perform error analysis

Course Contents:

Unit I: Lagrange and Newton interpolations, interpolations using finite differences, Hermite interpolation, piecewise and spline interpolation, Polynomial approximation: least square approximation, orthogonal polynomials, uniform approximation, rational approximation.

Unit II: Numerical Differentiation and Integration: methods based on interpolation, methods based on undetermined coefficients, composite integration methods, Romberg integration.

Unit III: Initial and Boundary value problems: Taylor's series method, Runge-Kutta methods, shooting method.

Prescribed Text Books:

1. M.K. Jain, S. R. K. Iyengar and R. K. Jain: Numerical Methods, 6th Edition. New Age International (P) Limited, Publishers, New Delhi.

Suggested Additional Readings:

1. S. S. Sastri; Introductory Methods of Numerical Analysis, PHI Learning Pvt. Ltd., 2005.
2. S.C. Chapra: Applied Numerical Methods with MATLAB, McGraw Hill, 2012.