

हिमाचल प्रदेश केंद्रीय विश्वविद्यालय

Central University of Himachal Pradesh

(Accredited by NAAC with 'A+' Grade with CGPA of 3.42)



(श्रीनिवास रामानुजन गणित विभाग)

(Srinivasa Ramanujan Department of Mathematics)

Course Name: Numerical Analysis Course Code: IAM 403 Credits: 02 Course Instructor: Dr. Pankaj Kumar S/O Sh. Krishan Singh

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.