Department of Mathematics and Computing
IIT(ISM) Dhanbad
Lecture Plan

Date: 21/02/2023

Semester Winter		**II-B.Tech. (Common)**	**Session 2022-2023**			
Course Type	**Course Code**	**Name of Course**	**L**	**T**	**P**	**Credit**
IC	**MCI103**	**Numerical Methods (Modular)**	2	2	0	7

Course Objective

The objective of the course is to provide basic knowledge of numerical methods to solve mathematical problems arising in Engineering and Science which cannot be solved by analytical methods.

Learning Outcomes

Upon successful completion of this course, students will:

- get knowledge to solve linear system of equations.
- be able to understand interpolation, numerical differentiation and integration.
- be able to solve differential equations numerically.

Unit No.	**Topics to be Covered**	**Lecture Hours**	**Learning Outcome**
1	Numerical solution of system of linear algebraic equations (Gaussian Elimination Method, Gauss Jordan Method, Crout's Triangularization Method, Jacobi method, Gauss–Seidel method).	3	This unit will help student in finding numerical solution of system of linear algebraic equations
2	Interpolation (Newton- Gregory forward and backward formula, Lagrange's interpolation).	3	Be able to perform interpolation of given data
3	Numerical differentiation (Newton forward and Backward formula), Numerical integration (Trapezoidal rule, Simpson's 1/3 rule, Simpson's 3/8 rule).	3	Be able to understand numerical differentiation and numerical integration
4	Numerical solution of first order ordinary differential equations (Taylor series method, Euler's method, Modified Euler's method, Runge-Kutta Method), Numerical solution of partial differential equation by finite difference method.	4	Be able understand numerical methods for solving ordinary and partial differential equations

Text Books:

- Gerald C.F. and Wheatley P.O. Applied Numerical Analysis, 7th Edition. Pearson, 2007.
- Jain M.K., Iyengar S.R.K. and Jain R.K. Numerical Methods for Scientific and Engineering Computation. New Age International Publications, 2012.

Reference Books:

- Grewal B.S. Numerical Methods in Engineering & Science (with Programs in C, C++ & MATLAB). Khanna Publications 2014.
- Sastry S.S. Introductory Methods of Numerical Analysis. PHI Publications, 2013.

Note: Quiz Date: 4th April 2023; Marks: 30
Time: 7:00-7:30 pm; Questions type: MCQ

(S. Gupta) (M.K. Singh) (K. Ramanababu)