



Yogoda Satsanga Mahavidyalaya

JAGANNATHPUR, DHURWA, RANCHI – 834004

Email address: ysmranchi4@gmail.com

(NAAC Accredited, Grade: B++, CGPA: 2.89)

COURSE PLAN

NAME OF THE DEPARTMENT: Computer Application

NAME OF THE FACULTY: Goutam Sanyal

ACADEMIC SESSION: 2023-24

YEAR: 2024

PROGRAMME: Computer Application

SEMESTER: VI

COURSE TYPE: DSE

COURSE NAME: Numerical Method

COURSE CODE: DSE3

TOTAL CREDIT: 6



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PROGRAMME OUTCOMES (PO):

PO1: Scientific & Computational Knowledge: - Apply the information on scientific & computational ideas, software engineering and innovation basics.

PO2: Problem Analysis, Design & Implementation: - Identify, formulate and analyze real world problem. Design solution for Software, Hardware & Networking problems and implementation using Software & Network tools.

PO3: Modern tool usage: - Ability to select modern computing tools, skills and techniques necessary for innovative software solutions.

PO4: Project Management: -Comprehend Software Engineering and Technology standards and apply these to prepare own project and system as a part and pioneer in a group.

PO5: Career Development & Entrepreneurship: Classify opportunities, private enterprise dream and use of original thoughts to build worth and means for the betterment of the human being and the world.

PO6: Communication: Communicate effectively on computational & information Technology activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO7: Ethics: Ability to apply and commit professional Ethics, cyber regulations & control on software piracy in a global economic environment.

PO8: Preparing students for future aspects: Building and improving their creativity, social awareness, and general knowledge.

PO9: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological changes.

PROGRAMME SPECIFIC OUTCOMES (PSO):

PSO1: An ability to apply technical comprehension in varied areas of Computer Applications and experience a conducive environment in cultivating skills for thriving career and higher studies.

PSO2: Understand the concept of Programing logic, Web designing logic, Signal processing, Image processing, Mobile Applications, Multimedia Media.

PSO3: Develop competencies in various disciplines of technologies such as Server-side Web applications, computer networking, software engineering, database concepts and programming



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A. COURSE OUTCOMES (COs):

CO1	Understanding floating point system and applying to minimize error in numerical computation
CO2	Analyse different method to solve transcendental equation and linear equation
CO3	Understanding to solve differential, integration and differential equation
CO4	apply finite difference to create different expression
CO5	Understand and apply interpolation

COURSE TEACHING AND LEARNING ACTIVITIES

A. PEDAGOGY

- i. Whiteboard ✓
- ii. Flipped Class ✓
- iii. PPT ✓

B. COURSE COMPLETION PLAN

UNIT	NO. OF LECTURES		TEST	QUIZ	ASSIGNMENT
	THEORY	PRACTICAL/TUTORIAL			
1	6	2	2		2
2	10	2			2
3	10	4			2
4	9	3			1
5	10	2			1
6	5	2			1
7	10	2			1

B. COURSE DELIVERY PLAN:



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UNIT	TOPIC/SUBTOPIC	LECTURE REQUIRED	CO ADDRESSED	ASSIGNMENT /TEST/QUIZ
1	Floating point representation and computer arithmetic, Significant digits, Errors: Round-off error, Local truncation error, Global truncation error, Order of a method, Convergence and terminal conditions, Efficient computations	6	1	2
2	Bisection method, Secant method, Regula-Falsi method, Newton-Raphson method, Newton's method for solving nonlinear systems	6	2	2
3	Gauss elimination method (with row pivoting) and Gauss-Jordan method, Gauss Thomas method for tridiagonal systems, Iterative methods: Jacobi and Gauss-Seidel iterative methods	6	3	2
4	Interpolation: Lagrange's form and Newton's form, Finite difference operators, Gregory Newton forward and backward differences Interpolation	9	4,5	1
5	Piecewise polynomial interpolation: Linear interpolation, Cubic spline interpolation (only method), Numerical differentiation: First derivatives and second order derivatives, Richardson extrapolation	10	4,5	1
6	Numerical integration: Trapezoid rule, Simpson's rule (only method), Newton-Cotes open formulas	5	2	1
7	Modified Euler's methods: Heun method and Mid-point method, Runge-Kutta second methods: Heun method without iteration, Mid-point method and Ralston's method Classical 4 th order Runge-Kutta method, Finite difference method for linear ODE	10	2	1



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C. COURSE OUTCOME ASSESSMENT PLAN

a. DIRECT ASSESSMENT

(Please tick the appropriate column)

COURSE OUTCOME	ASSESSMENT			REMARKS
	QUIZ	TEST	MID SEMESTER	
CO1	Nonlinear Equation	√	√	
CO2	Linear equation	√	√	
CO3	Integration	√	√	
CO4	Interpolation	√	√	
CO5	Differential Equation	√	√	

b. INDIRECT ASSESSMENT (STUDENT SURVEY)

Rate the following aspects of course outcomes. Use the scale 1-3

S. No	Course Outcome	1	2	3
1.	CO1	√		
2.	CO2	√		
3.	CO3		√	
4.	CO4		√	
5.	CO5			√
6.	CO6			√

1. Average
2. Good
3. Very Good

D. SUGGESTED READINGS

a. TEXT BOOKS

S.S shastri, Introductory Method of Numerical Analysis, PHI

b. REFERENCE BOOKS

Laurence V. Fausett, Applied Numerical Analysis, Using MATLAB, Pearson, 2/e (2012)

M.K. Jain, S.R.K. Iyengar and R.K. Jain, Numerical Methods for Scientific and Engineering Computation, New Age International Publisher, 6/e (2012)



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Steven C Chapra, Applied Numerical Methods with MATLAB for Engineers and Scientists, TataMcGraw Hill, 2/e (2010)

- c. **VIDEO RESOURCE :NPTEL**
- d. **WEB RESOURCES: Research Gate, Techbook.com**
- e. **E-RESOURCES: Tutorial Point, Geeks For Geeks**