STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

Course Schedule: November 2023 - April 2024

Department **:** Mathematics

Name/s of the Faculty **:** Dr. Amalore Arumica & Dr. P. Subbulakshmi

Course Title **:** Numerical Methods with Programs in C

Course Code **:** 19MT/ME/NM45

Shift II

Week & No. of hours	Units & Topics	Teaching Methodology	Text & References	Method of Evaluation
Nov 22 – 23, 2023 (Day Order 1 & 2) 2 hours	**Unit 3 Numerical Differentiation** 3.1 Values of the Derivatives of *y* based on Newton's Forward Interpolation Formulae	Lecture Problem Solving	Veerarajan T. and Ramachandran T., *Numerical Methods*, New Delhi: McGraw Hill, 2019.	Questioning
Nov 24-30, 2023 (Day Order 1 to 6) 1 + 3 hours 1 + 1 hour	**Unit 2 Finite Differences** 2.1 Forward Differences **Unit 3 Numerical Differentiation** 3.1 Values of the Derivatives of *y* based on Newton's Backward Interpolation Formulae, Stirling's Formula **Practical** 2.7 C program to Interpolate and Extrapolate using the given pairs of values of x and y by Newton's Forward and Backward Interpolation Formulae 3.3 C program to find the Derivative at the Initial Point of a Tabulated Function by Newton Forward Interpolation Formula	Lecture Problem Solving Programming	Veerarajan T. and Ramachandran T., *Numerical Methods*, New Delhi: McGraw Hill, 2019.	Questioning

Dec 1-7, 2023 (Day Order 1 to 6) 1 + 3 hours 1 + 1 hour	**Unit 2 Finite Differences** 2.1 Forward Differences **Unit 3 Numerical Differentiation** 3.1 Stirling's Formula 3.2 Second Order Derivatives of *f(x)* using Newton's Formulae **Practical** 2.7 C program to Interpolate and Extrapolate using the given pairs of values of x and y by Newton's Forward and Backward Interpolation Formulae 3.3 C program to find the Derivative at the Initial Point of a Tabulated Function by Newton Forward Interpolation Formula	Lecture Problem Solving Programming	Veerarajan T. and Ramachandran T., *Numerical Methods,* New Delhi: McGraw Hill, 2019.	Third Component Test (Basics of C Programming [10 marks]
Dec 8-9, 2023 (Day Order 1, 3) 1 hour 1 hour	**Unit 3 Numerical Differentiation** 3.2 Maximum and Minimum Value of *f(x)* **Practical** 3.3 C program to find the Derivative at the Initial Point of a Tabulated Function by Newton Backward Interpolation Formula	Lecture Problem Solving Programming	Veerarajan T. and Ramachandran T., *Numerical Methods,* New Delhi: McGraw Hill, 2019.	Quiz
Dec 11-15, 2023 (Day Order 2 to 6) 1 + 2 hours 1 + 1 hour	**Unit 2 Finite Differences** 2.2 Backward Differences **Unit 3 Numerical Differentiation** 3.2 Maximum and Minimum Value of *f(x)* **Practical** 2.8 C program to Interpolate using the given pairs of values of x and y by Stirling's Central Difference Interpolation Formula 3.3 C program to find the Derivative at the Initial Point of a Tabulated Function by Newton Backward Interpolation Formula	Lecture Flipped Classroom Programming	Veerarajan T. and Ramachandran T., *Numerical Methods,* New Delhi: McGraw Hill, 2019.	Questioning

Dec 16 – 22, 2023 (Day Order 1 to 6) 1 + 3 hours 1 + 1 hour	**Unit 2 Finite Differences** 2.2 Backward Differences **Unit 4 Numerical Integration** 4.1 Newton Cote's Quadrature Formula **Practical** 2.8 C program to Interpolate using the given pairs of values of x and y by Stirling's Central Difference Interpolation Formula 4.5 C program to Evaluate $\int_a^b f(x)dx$ numerically using Simpson's rule	Lecture Problem Solving Programming	Veerarajan T. and Ramachandran T., *Numerical Methods,* New Delhi: McGraw Hill, 2019.	Third Component Test (Problem Solving) [20 marks]
Jan 3 – 6, 2024 (Day Order 1 to 4) 2 hours 1 + 1 hour	**Unit 4 Numerical Integration** 4.2 Trapezoidal Rule **Practical** 4.5 C program to Evaluate $\int_a^b f(x)dx$ numerically using Simpson's rule	Lecture Problem Solving Programming	Veerarajan T. and Ramachandran T., *Numerical Methods,* New Delhi: McGraw Hill, 2019.	Slip Test
Jan 8 – 12, 2024	**C.A. Test – I**			
Jan 13, 2024 (Day Order 1) 1 hour	**Unit 4 Numerical Integration** 4.2 Trapezoidal Rule	Lecture Problem Solving	Veerarajan T. and Ramachandran T., *Numerical Methods,* New Delhi: McGraw Hill, 2019.	Questioning
Jan 18 -20, 2024 (Day Order 4 to 6) 1 + 1 hour 1 hour	**Unit 2 Finite Differences** 2.3 Central Differences **Unit 4 Numerical Integration** 4.3 Simpson's One Third Rule	Lecture Problem Solving Programming	Veerarajan T. and Ramachandran T., *Numerical Methods,* New Delhi: McGraw Hill, 2019.	Questioning
Jan 22-29, 2024 (Day Order 1 to 6) 1 + 3 hours 1 + 1 hour	**Unit 2 Finite Differences** 2.3 Central Differences **Unit 4 Numerical Integration** 4.3 Simpson's One Third Rule 4.4 Simpson's Three Eighth Rule **Practical** 2.9 C program to Interpolate y using the given pairs of values of x and y by Lagrange's Interpolation Formula 4.5 C program to Evaluate $\int_a^b f(x)dx$ numerically using Simpson's rule	Lecture Problem Solving Programming	Veerarajan T. and Ramachandran T., *Numerical Methods,* New Delhi: McGraw Hill, 2019.	Quiz

Jan 30 – Feb 2, 2024 (Day Order 1 to 4) 2 hours 1 + 1 hour	**Unit 5** **Application** 5.1 Numerical Solution to Ordinary Differential Equations **Practical** 2.9 C program to Interpolate y using the given pairs of values of x and y by Lagrange's Interpolation Formula 5.4 C program to Solve the Differential Equation $\frac{dy}{dx} = f(x, y)$; $y(x_0) = y_0$ at the Pivotal Points by Euler's Method	Lecture Problem Solving Programming	Veerarajan T. and Ramachandran T., *Numerical Methods*, New Delhi: McGraw Hill, 2019.	Questioning
Feb 3, 2024 (Day Order 2) 1 hour	**Unit 5** **Application** 5.1 Numerical Solution to Ordinary Differential Equations	Lecture Problem Solving Programming	Veerarajan T. and Ramachandran T., *Numerical Methods*, New Delhi: McGraw Hill, 2019.	Questioning
Feb 5- 6, 2024 (Day Order 5 to 6) 1 + 1 hour	**Unit 2 Finite Differences** 2.4 Gregory-Newton's Forward and Backward Interpolation Formulae **Unit 5** **Application** 5.1 Numerical Solution to Ordinary Differential Equations	Lecture Problem Solving	Veerarajan T. and Ramachandran T., *Numerical Methods*, New Delhi: McGraw Hill, 2019.	Questioning
Feb 7 – 14, 2024 (Day Order 1 to 6) 1 + 3 hours 1 + 1 hour	**Unit 2 Finite Differences** 2.4 Gregory-Newton's Forward and Backward Interpolation Formulae **Unit 5 Application** 5.2 Euler's Method **Practical** 1.5 C program to find the Smallest Positive Root / the Largest Negative Root of the equation f(x) = 0 by using the Bisection Method and Newton Raphson Method 5.4 C program to Solve the Differential Equation $\frac{dy}{dx} = f(x, y)$; $y(x_0) = y_0$ at the Pivotal Points by Euler's Method	Lecture Problem Solving Programming	Veerarajan T. and Ramachandran T., *Numerical Methods*, New Delhi: McGraw Hill, 2019.	Questioning

Feb 15 – 22, 2024 (Day Order 1 to 6) 1 + 3 hours 1 + 1 hour	**Interpolation with Equal Intervals** 2.5 Central Difference Interpolation Formulae – Gauss Forward and Backward Interpolation Formulae, Stirling's Interpolation Formula **Unit 5 Application** 5.3 Runge Kutta Method **Practical** 1.5 C program to find the Smallest Positive Root / the Largest Negative Root of the equation f(x) = 0 by using the Bisection Method and Newton Raphson Method 5.4 C program to Solve the Differential Equation $\frac{dy}{dx} = f(x, y)$; $y(x_0) = y_0$ at the Pivotal Points by Euler's Method	Lecture Problem Solving Programming	Veerarajan T. and Ramachandran T., *Numerical Methods*, New Delhi: McGraw Hill, 2019.	Slip Test
Feb 23 – 24, 2024 (Day Order 1 & 5) 1 + 2 hours 1 + 1 hour	**Unit 2** **Interpolation with Equal Intervals** 2.5 Central Difference Interpolation Formulae – Gauss Forward and Backward Interpolation Formulae, Stirling's Interpolation Formula **Unit 1 Numerical Solutions of Algebraic and Transcendental Equations** 1.1Bolzano's Bisection Method **Practical** 1.6 C program to solve a System of Linear Algebraic Equations using Gauss Jacobi's Iteration Method and Gauss Siedel Method 5.5 C program to Solve Simultaneous Differential Equations $\frac{dy}{dx} = f(x, y, z)$; $\frac{dz}{dx} = g(x, y, z)$; $y(x_0) = y_0$; $z(x_0) = z_0$ at the specified pivotal points by using Runge Kutta Method of the Fourth Order	Lecture Problem Solving Programming	Veerarajan T. and Ramachandran T., *Numerical Methods*, New Delhi: McGraw Hill, 2019.	Quiz

Feb 26 – Mar 1, 2024 (Day Order 2 to 6) 1 + 2 hours 1 + 1 hour	**Unit 2 Interpolation with Unequal Intervals** 2.6 Lagrange's Interpolation Formula for Unequal Intervals **Unit 1 Numerical Solutions of Algebraic and Transcendental Equations** 1.1 Bolzano's Bisection Method **Practical** 1.6 C program to solve a System of Linear Algebraic Equations using Gauss Jacobi's Iteration Method and Gauss Siedel Method 5.5 C program to Solve Simultaneous Differential Equations $\frac{dy}{dx} = f(x, y, z)$; $\frac{dz}{dx} = g(x, y, z)$; $y(x_0) = y_0$; $z(x_0) = z_0$ at the specified pivotal points by using Runge Kutta Method of the Fourth Order	Lecture Problem Solving Programming	Veerarajan T. and Ramachandran T., *Numerical Methods,* New Delhi: McGraw Hill, 2019.	Questioning
Mar 2, 2024 (Day Order 1) 1 hour	**Unit 2 Interpolation with Unequal Intervals** 2.6 Lagrange's Interpolation Formula for Unequal Intervals **Unit 1 Numerical Solutions of Algebraic and Transcendental Equations** 1.2 Newton Raphson Method	Lecture Problem Solving Programming	Veerarajan T. and Ramachandran T., *Numerical Methods,* New Delhi: McGraw Hill, 2019.	Questioning
Mar 4 –8, 2024	**C.A. Test – II**			
Mar 9 – 16, 2024 (Day 6 & Day Order 1 to 6) 1 + 4 hours 1 + 1 hour	**Unit1 Iterative Methods of Solving Simultaneous Equations** 1.2 Newton Raphson Method 1.3 Jacobi's Method 1.4 Gauss Seidel Iteration Method **Practical** 1.6 C program to solve a System of Linear Algebraic Equations using Gauss Jacobi's Iteration Method and Gauss Siedel Method 5.5 C program to Solve Simultaneous Differential Equations $\frac{dy}{dx} = f(x, y, z)$; $\frac{dz}{dx} = g(x, y, z)$; $y(x_0) = y_0$; $z(x_0) = z_0$ at the specified pivotal points by using Runge Kutta Method of the Fourth Order	Lecture Problem Solving Programming	Veerarajan T. and Ramachandran T., *Numerical Methods,* New Delhi: McGraw Hill, 2019.	Third Component Test (Programming) [20 marks]

Mar 18 - 19, 2024 (Day Order 2 to 3) 1 hour 1 hour	Revision		Veerarajan T. and Ramachandran T., *Numerical Methods,* New Delhi: McGraw Hill, 2019.	Slip Test
Mar 20-22, 2024 (Day Order 4 to 6) 1 + 1 hour 1 hour	**REVISION**			