**Department of Physical Science**

**Faculty of Applied Science**

**University of Vavuniya**

Course Schedule

Academic Year 2023 – Second Semester – 2024/2025

1. Degree Programme: Bachelor of Science in Applied Mathematics and Computing
2. Course Code: CSC2234(p)
3. Course Title: Numerical Computing (P)
4. Learning Outcomes: At the end of the module, Students should be able to,

* **Understand the fundamental concepts of numerical computing and their applications.**
* **Analyze and quantify errors in numerical computations.**
* **Implement numerical methods for root finding, interpolation, differentiation, and integration.**
* **Solve linear systems using numerical techniques.**
* **Apply numerical methods to solve ordinary differential equations.**
* **Develop and implement algorithms using mathematical software.**
* **Evaluate the efficiency and accuracy of numerical methods in practical scenarios.**

1. Number of credits: Practical:01
2. Duration (Hours): Practical:30 hours
3. Tentative course schedule with effect from 10.03.2025:

7.1. Practical (if applicable)

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| **Week No** | **Date** | **Practical to be conducted** | **Due date for Tutorials/ Assessments** |
| 1 | Week1 | * Introduction to MATLAB and matrix function |  |
| 2 | Week2 | * Bisection Method * Fixed-Point Iteration * Aiken’s Δ² Process * Order of Convergence |  |
| 3 | Week3 | * Secant Method * False-Position Method |  |
| 4 | Week4 | * Newton-Raphson Method * Practical Exercise |  |
| 5 | Week5 | * ICAE 01 | Tutorial 01 |
| 6 | Week6 | * **Mid-Semester Vacation** |  |
| 7 | Week7 | * Interpolation * Numerical Differentiation |  |
| 8 | Week8 | * Numerical Differentiation * **Numerical Integration** |  |
| 9 | Week9 | * Back substitution Method * Forward Substitution Method * Gaussian Elimination |  |
| 10 | Week10 | * Gaussian Elimination * LU Decomposition method |  |
| 11 | Week11 | * ICA02 | Tutorial 02 |
| 12 | Week12 | * Cholesky method * Jacobi method |  |
| 13 | Week13 | * Gauss-Seidel Method * Successive Over relaxation method (SOR) |  |
| 14 | Week14 | * Solution of Ordinary Differential Equations |  |
| 15 | Week15 | * ICA03 |  |
|  |  | **Semester End** |  |

1. List of References:

[1] S. Kanaganathan, Fundamentals of Numerical Computing, 2009.

[2] J. Stoer and R. Bulirsch, Introduction to Numerical Analysis, Springer, 3rd edition, 2010.

[3] K. Atkinson and W. Han, Elementary numerical analysis, Wiley, 3rd edition, 2003.

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Lecturer-in-charge Practical-in-charge

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Head

Department of Physical Science