Module Syllabus: Engineering Mathematics I

1. Module Information

- **Module Name:** Engineering Mathematics I
- **Module Code:** MTH61204
- **Credit Value:** 4 Credits
- **Prerequisites:** N/A
- **Department:** School of Engineering

2. Synopsis

This module provides students with basic knowledge of applied engineering mathematics used in most engineering design applications. The course utilizes software for solving engineering problems and supports the simulation pillar of IR4.0. Key topics covered include:

- **Advanced Functions:** Hyperbolic functions and complex numbers.
- **Linear Algebra:** Matrix theory.
- **Calculus:** Partial differentiation and integration techniques.
- **Modelling:** Mathematical model development.

3. Learning Outcomes

Upon completion of this module, students should be able to:

1. **Differentiation:** Solve partial differentiation problems using a solver program.
2. **Analysis:** Analyse engineering problems using knowledge of hyperbolic functions, complex numbers, and matrices.
3. **Application:** Apply differentiation and integration techniques to solve engineering problems.
4. **Modelling:** Create and solve simple mathematical models of physical systems.

4. Teaching & Learning Approach

The module adopts guided learning, self-directed learning, and problem-based learning approaches.

- **Delivery:** A blended learning approach is used, including face-to-face lectures, online synchronous/asynchronous learning, and tutorials.
- **Platform:** Asynchronous learning materials and activities are managed via the online learning platform (Moodle/TIMES).
- **Support:** Consultation hours are allotted for those in need.

5. Assessment Breakdown

Assessments include a mix of individual and group coursework, a test, and a final exam.

Assessment Task	Weight	Description	Learning Outcomes
Test	**10%**	**Written Test:** Solves questions regarding hyperbolic functions and complex numbers (Max 3 questions).	LO2
Assignment 1	**20%**	**Individual Submission:** Students apply partial differentiation knowledge to solve a case study using a solver program.	LO1

Assignment 2	**20%**	**Group Work (Video):** Students work in groups to demonstrate the application of differentiation and integration in solving engineering problems via a video submission.	LO3
Assignment 3	**20%**	**Group Work:** Students work in groups to solve an engineering problem involving the mathematical modelling of a physical system.	LO4
Final Exam	**30%**	**Written Exam:** A 3-hour examination covering three levels of difficulty: basic knowledge (Level 1), technique application (Level 2), and critical thinking/modelling (Level 3).	LO2, LO3, LO4