# Module Syllabus: Engineering Mathematics II

## 1. Module Information

- **Module Name:** Engineering Mathematics II

- **Module Code:** MTH6130A

- **Credit Value:** 4 Credits

- **Prerequisites:** MTH6120A - Engineering Mathematics I

- **Department:** School of Engineering

## 2. Synopsis

This module expands on applied mathematics with a focus on numerical functions, operators, and differential equations. It integrates statistics, probability, and software usage to solve engineering challenges.

- **Modelling:** Mathematical modelling using differential equations to solve engineering problems.

- **Transformation:** System representation between time and complex frequency domains, including its analysis and solution.

- **Data Analysis:** Application of statistics and probability.

## 3. Learning Outcomes

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

1. **Numerical Methods:** Apply statistic and numerical methods in solving engineering problems.

2. **Differential Equations:** Create and solve mathematical models of physical systems using differential equations.

3. **Frequency Domain:** Formulate physical systems in the frequency domain.

4. **Software Tools:** Solve engineering problems using analysis toolpak.

## 4. Teaching & Learning Approach

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

- **Instruction:** Concepts of statistics, numerical methods, and Ordinary Differential Equations (ODEs) are introduced in lectures, while tutors guide students in applying this knowledge during tutorials.

- **Platform:** Moodle (TIMES) is the main platform for all asynchronous online learning and activities.

## 5. Assessment Breakdown

Assessments include a mid-semester test, three assignments, and a final examination.

| Assessment Task | Weight | Description | Learning Outcomes |
|---|---|---|---|
| **Test** | 10% | **Written Test:** Students solve questions related to statistics and ordinary differential equations (Max 3 questions). | LO1, LO2 |
| **Assignment 1** | 20% | **Video Demonstration:** Each student produces a video demonstrating their understanding of ordinary differential equations in solving engineering problems. | LO2 |

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| **Assignment 2** | 20% | **Case Study:** Students work in groups to solve a case study using analysis toolpak and compare the generated results with manual calculations. | LO4 |
| **Assignment 3** | 20% | **Group Assignment:** Students apply their knowledge of Laplace transforms and Fourier Series to solve problems for physical systems. | LO3 |
| **Final Exam** | 30% | **Written Exam:** A comprehensive exam covering statistics, numerical methods, ODEs, Laplace transforms, and Fourier series. | LO1, LO2, LO3 |