

# MTH319 Mathematical Methods I

**Level:** 3

**Credit Units:** 5 Credit Units

**Language:** ENGLISH

**Presentation Pattern:** EVERY JULY

## **Synopsis:**

MTH319 Mathematical Methods I will introduce students to the mathematical foundations for solutions to engineering problems. The course will be driven from the engineering systems perspective and expose students to methodology to identify appropriate simplifications in system modelling that lead to simplified mathematical description from a more comprehensive one.

## **Topics:**

- Linear Systems of Equations
- Gaussian Elimination
- Linear Independence
- Rank of a Matrix
- Vector Space
- Determinants
- Inverse of a Matrix
- Eigenvalues and Eigenvectors
- Modelling and first order differential equations
- Modelling and second order differential equations
- Linear systems of differential equations
- Stability and linear classification

## **Textbooks:**

Merle C. Potter, Jack L. Lessing and Edward F. Aboufadel: Advanced Engineering Mathematics (Access Code Card) Springer  
ISBN-13: 9783030170684

**Learning Outcome:**

- Determine the solutions of an initial value problem.
- Show the validity of given mathematical statements.
- Calculate a basis of a given subspace.
- Solve system of linear equations or differential equations.
- Compute the eigenvalues and eigenvectors of a given square matrix.
- Sketch solutions of a given differential equation.

**Assessment Strategies - Regular Semester (Evening Class):**

<b>Components</b>	<b>Description</b>	<b>Weightage Allocation (%)</b>
Overall Continuous Assessment	COMPUTER MARKED ASSIGNMENT 1	10
	TUTOR-MARKED ASSIGNMENT 1	20
Overall Examinable Components	Written Exam	70
<b>Total</b>		<b>100</b>

\*The information listed is subject to review and change.