# AMA103: Foundation Mathematics I for Science and Engineering

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>AMA103</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level</td>
<td>1</td>
</tr>
<tr>
<td>Contact Hours</td>
<td>Lect:28 Tut:14</td>
</tr>
<tr>
<td>Student Effort Hours</td>
<td>120</td>
</tr>
<tr>
<td>Assessment Method</td>
<td>Coursework 40% Examination 60%</td>
</tr>
<tr>
<td>Credit Value</td>
<td>3</td>
</tr>
<tr>
<td>Pre-requisites</td>
<td>Nil</td>
</tr>
<tr>
<td>Co-requisites</td>
<td>Nil</td>
</tr>
<tr>
<td>Exclusions</td>
<td>Nil</td>
</tr>
<tr>
<td>Subject Leader/ Lecturer/Dept.</td>
<td>AMA</td>
</tr>
</tbody>
</table>

## Subject Aim:

This subject is intended to:
1. This is a subject to provide the students with a solid foundation in Differential and Integral Calculus. It is essential for all Undergraduate students of Engineering or Science. The emphasis will be on application of mathematical methods to solving basic engineering science problems.

## Learning Outcomes:

Students will demonstrate their ability to:-
1. understand the concept of functions and inverse functions;
2. use mathematical induction in various contexts;
3. understand the algebra and geometry of complex numbers and apply complex numbers to solve science and engineering problems;
4. apply mathematical reasoning to analyse essential features of different mathematical problems such as differentiation and integration;
5. apply appropriate mathematical techniques to model and solve problems in science and engineering;
6. extend their knowledge of mathematical techniques and adapt known solutions in different situations;
7. undertake continuous learning.

## Syllabus Content:

1. Basic concepts
   - Mathematical Induction; Functions and inverse functions; Elementary functions, trigonometric functions; Complex numbers; De Moivre’s Theorem; Roots of a complex number.
2. Differential calculus
   - Limits and continuity; Derivatives; Techniques of differentiation; Mean value Theorem; Higher derivatives; Maxima and minima; Curve sketching.
3. Integral Calculus:
   - Definite and indefinite integrals; Fundamental Theorem of Calculus; Techniques of integration; Taylor’s Theorem; Applications in geometry, physics and engineering.

## Learning and Teaching Approach

The lectures aim to provide the students with an integrated knowledge required for the understanding and application of mathematical concepts and techniques. To develop students’ ability for logical thinking and effective communication, tutorial and presentation sessions will be held.

## Assessment

Continuous Assessment: 40%
Examination: 60%
Total: 100%

To ensure that students learn and reflect continuously. Continuous Assessment is an important element. The continuous assessment comprises of assignments, in-class quizzes and tests. The assignments are used to assist the students to reflect and review on their progress. The end-of-semester examination is used to assess the knowledge acquired by the students and their ability to apply and extend such knowledge.

## Reading List:
