EN6907 Mathematics for Engineers 1

Course Aim
The course is designed to give students detailed knowledge and understanding of a wide range of applications of mathematics in engineering.

Short Title
Faculty
Polytechnic Level
Credits
Pre-requisites
Co-requisites
Anti-requisites

Version
Effective From
Indicative NQF Level
Student Contact hrs
Self-directed hrs
Other directed hrs
Total learning hrs

Learning Outcomes
On successful completion of this course, students will be able to:
1. Solve advanced applications of linear systems
2. Apply trigonometry to solve engineering problems
3. Apply principles of exponential and logarithmic growth and decay
4. Apply various differentiation and Integration methods to routine engineering problems
5. Solve first order differential equations for engineering applications
6. Apply numerical methods for solving integration problems in engineering
7. Demonstrate an understanding of the concepts of complex numbers in engineering

Topics / Content
- Simultaneous Equations
- Solution of simultaneous equations using matrix approach
- Trigonometric Functions of Real Numbers and Angles
- Exponential and Logarithmic Functions
- Differentiation
- Integration
- First order Differential equations
- Complex Numbers

Learning and Teaching Strategies
Underpinning knowledge will be attained through directed tutorial sessions which will be supported by PBL based worksheets, independent homework and consolidated by tests. Practical knowledge and applications will be achieved through completion of two main practical PBL project-assignments within a team, allowing students to obtain the skills necessary to acquire data analysis and interpret results. Students will also be given the opportunity to discuss their work in detail.
PBL is introduced in this course as for many students it will be their first encounter with this type of learning experience. This course primarily covers fundamental mathematical theory which students will later use for engineering applications.

Completion Requirements
To obtain a Pass grade, a student must achieve a minimum of 60% aggregated over all assessments.
<table>
<thead>
<tr>
<th>Assessment</th>
<th>Assessment Task Description</th>
<th>Weight (%)</th>
<th>Must Pass (Y/N)</th>
<th>Learning Outcomes Assessed</th>
<th>Form of Assessment Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tests:</td>
<td>Tests will demonstrate relevant underpinning knowledge gained and provide consolidation across the content range.</td>
<td>30%</td>
<td>N</td>
<td>1,2,3,4,5,6,7</td>
<td>Examination (unseen)</td>
</tr>
<tr>
<td>Assignments:</td>
<td>A practical problem based project-assignments aimed at consolidation of the course content-topics and train students to work as a team.</td>
<td>20%</td>
<td>N</td>
<td>1,2,3,4,5,6,7</td>
<td>Practical project</td>
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<tr>
<td>Final Examination:</td>
<td>A practical problem based project-assignments aimed at consolidation of the course content-topics and train students to work as a team.</td>
<td>50%</td>
<td>N</td>
<td>1,2,3,4,5,6,7</td>
<td>Examination (unseen)</td>
</tr>
</tbody>
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**Assessment Method**: Achievement