Module Description

This module will provide the student with knowledge of electromechanical components that are used in industrial automated applications. Components in the areas of pneumatics, hydraulics, motors, drive systems, levers and linkages. The student will have a strong understanding of the operation, construction and uses of these components.

Learning Outcomes

On completion of this module the learner will/should be able to:

1. Describe the industrial uses, feasibility and cost effectiveness of types of mechanical systems
2. Examine motors to show the construction, operation and applications of each
3. Illustrate and discuss mechanical systems components technology and anatomy
4. Inspect drive systems to show the construction, operation and applications of each
5. Analyse sensors to show the construction, operation and applications of each
6. Integrate sensors/actuators

Indicative Syllabus

- Pneumatics/Hydraulics - actuators, valves and flow controls
- Motors – DC motors, AC motors, Stepper motors and Servo motors
- Drive systems
  - gear systems (spur gears, helical gears, bevel gears, worm gears)
  - rack and pinion
  - ball and roller screws
  - pulley drives
  - indexers
  - bearings and couplings.
- Cam Systems
- Gearboxes
- Levers and linkages
- Sensors – roller switches, proximity switches, safety gates, light curtains and safety mats

Teaching and Learning Strategy

The module is divided into theory and practical sessions.

In the theory elements, students learn the fundamentals of mechanical systems. Theory elements are delivered through lecture based and online classes which the student must engage through participation in peer learning teaching techniques, observation techniques, peer reviews, active learning strategies, student centred learning discussions, and use of online learning technologies.

In the practical elements, students learn the basic construction, operation and design of various mechanical system components. Practical
elements include:
- Structured workshops
- Hands-on, interactive workshops on practical elements which including working as an individual, group work, case study exercises and problem-based and design-led teaching and learning.

Independent Study: Study of provided module material with the primary goal to develop understanding of the module content via self centred learning. In addition to the weekly lectures/tutorials/labs, it is expected that students will also have to invest approximately 50 to 75 hours of independent study for completion of this module.

**Assessment Strategy**

A blend of final written examination and continuous assessment, both individual and group format. In class quizzes to evaluate learning throughout the semester.

**Repeat Assessment Strategies**

A repeat exam will be available which will cover the percentage of marks obtained in the summer terminal exam. The marks obtained in the coursework throughout the year cannot be repeated via a repeat autumn examination and thus will be carried forward from the previous attempt.

**Indicative Coursework and Continuous Assessment:**

<table>
<thead>
<tr>
<th>Form</th>
<th>Title</th>
<th>Percent</th>
<th>Week (Indicative)</th>
<th>Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignment</td>
<td>Class Assessment Midterm Assessment</td>
<td>20 %</td>
<td>OnGoing</td>
<td>1,2,3,4,5,6</td>
</tr>
<tr>
<td>Practical Evaluation</td>
<td>Practical</td>
<td>20 %</td>
<td>OnGoing</td>
<td>2,4,5</td>
</tr>
<tr>
<td>Closed Book Exam</td>
<td>Final Exam</td>
<td>60 %</td>
<td>End of Term</td>
<td>1,2,3,4,5,6</td>
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**Blended Delivery Mode Average Weekly Workload:**

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Location</th>
<th>Hours</th>
<th>Frequency</th>
<th>Weekly Avg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practical</td>
<td>Practical Lab</td>
<td>Laboratory</td>
<td>1</td>
<td>Weekly</td>
<td>1.00</td>
</tr>
<tr>
<td>Lecture</td>
<td>Lecture</td>
<td>Online</td>
<td>1</td>
<td>Weekly</td>
<td>1.00</td>
</tr>
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**Programme Membership**

GA_EAURG_B07 202000 Bachelor of Engineering in Automation & Robotics