**Full Title** Automation 2 (TK)

**Status** Uploaded to Banner  
**Start Term** 2019  
**NFQ Level** 06  
**ECTS Credits** 10  
**Module Code** ELEC06013  
**Duration** Stage - (26 Weeks)  
**Grading Mode** Numeric  
**Department** Electronic & Electrical Eng

**Module Author** Alan Hannon  
**Co Authors** Carine Gachon

### Module Description

This module will provide the student with knowledge of electromechanical schematics symbols and drawings. The student will be able to read/create schematic diagrams for circuits such as pneumatic, hydraulic, electrical, electro-pneumatics, electro-hydraulics and PLCs. Using simulation software, the student will be able to analyse and optimise their circuit design.

This module will also provide the student with knowledge of PLC theory, uses and advantages/disadvantages. Using software and hardware the students will analyse gate logic, boolean algebra and truth tables.

### Learning Outcomes

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

1. Demonstrate competence in standards used in schematic symbols and drawing layouts
2. Construct schematic diagrams for basic industrial automated applications using the correct standards in pneumatic, hydraulic, electrical, electro-pneumatics, electro-hydraulics areas
3. Simulate circuits to verify operation.
4. Analysis circuit design for faults and errors
5. Optimise circuit design
6. Describe the industrial uses, feasibility and advantages/disadvantages of a PLC.
7. Describe PLC technology using the correct terminology
8. Construct ladder logic programmes using Boolean Logic, IOs, timers, counters, sequencing

### Indicative Syllabus

- Standards in schematic symbols/drawings (ISO)
- Schematic generation of pneumatic, hydraulic, electrical, electro-pneumatics, electro-hydraulics using automation studio.
- Analyse and optimise of circuit design. Valve design and selection, forces, flow rate, pressures, current, voltages
- Construct ladder logic programmes using Boolean Logic, truth tables, timers, counters, sequencing

### Teaching and Learning Strategy

The module is divided into theory and practical sessions.

In the theory elements, students learn the fundamentals of schematic symbols, diagrams and PLC's. Theory elements are delivered through lecture based 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 to design and simulate basic electrical/electro-pneumatic schematic circuits. Also in the practical elements, the students construct ladder logic programmes using Boolean Logic, truth tables, timers, counters, sequencing. Practical elements include:

- Structured workshops on software
- 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.

### Assessment Strategy

The knowledge the learner obtains will be assessed via a combination of formal exams/quizzes and in class based computer/practical assessments. The practical assessments are designed to develop the engineering problem solving skills of the learner through both problem and project based learning. Formal labs assess both software and practical elements of the module. Software programs are submitted and practical evaluation of relevant circuits are completed.

### Repeat Assessment Strategies

A repeat exam will be available in autumn which will cover the percentage of marks obtained in the final assessment. 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>
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<tbody>
<tr>
<td>Assessment</td>
<td>Exam type assessment</td>
<td>40 %</td>
<td>End of Term</td>
<td>1,2,3,4,5,6,7,8</td>
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<tr>
<td>Assignment</td>
<td>Quizzes</td>
<td>30 %</td>
<td>OnGoing</td>
<td>1,2,6,7</td>
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<tr>
<td>Practical Evaluation</td>
<td>Labs</td>
<td>30 %</td>
<td>OnGoing</td>
<td>2,3,4,5,8</td>
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### Blended Delivery Mode Average Weekly Workload:

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<th>Type</th>
<th>Description</th>
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<tbody>
<tr>
<td>Practical</td>
<td>GMIT Lab</td>
<td>Laboratory</td>
<td>4</td>
<td>Weekly</td>
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### Required Reading Book List


### Programme Membership

GA_EAURG_B07 202000 Bachelor of Engineering in Automation & Robotics
GA_EAURG_C06 202000 Higher Certificate in Engineering in Automation & Robotics