Module Description

This module is based on the theory of cognitive apprenticeship. In order to become engineers in the field of automation students need to learn about manufacturing processes and culture. In this module students are immersed in their company as an operator or trainee technician. They reflect on the culture, learn about manufacturing processes and attend around 80 hr of automation training which will allow them to operate a robotic arm and wire a PLC in a safe manner.

Learning Outcomes

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

1. Comply with company’s procedures and policies, and describe the company’s ethical guidelines relating to the workplace, customers and the environment.

2. Operate a robotic arm in a safe manner.

3. Wire and troubleshoot a Programmable Logic Controller using best practice.

4. Describe and explain manufacturing processes available in the work place.

5. Undertake a basic technical project demonstrating a skill acquired in their training.

6. Integrate in the company work place, communicating and contributing as an individual and team member, and describe the company’s organisational structure.

7. Reflect on their experiential learning.

Indicative Syllabus

The employer will train the student on:

Company procedures

Relevant manufacturing processes

Health & Safety

The company will organise approved formal training in basic robotic and basic PLC wiring and programming. Indicative content:

PLC

1. PLC and control systems introduction
2. PLC Hardware Components list and description
3. Wiring of the PLC hardware and field devices
4. Software environment for programming PLC
5. Ladder language for programming of PLC
6. PLC troubleshooting using the software environment

Robotic
1. Safety rules by working with robot
2. Basic functions and parts of robot
3. Starting up
4. Manual Jogging the robot in different Jog modes
5. Operation and use of Teach Pendant
6. Program selection and run
7. Robot frame settings (tool, user)
8. Robot programming instructions
9. Program creation, tests
10. Data backup and restore

The company will allow students 4 hr/ week, as well as some technical support, to work on their technical project.

### Teaching and Learning Strategy

The industry module’s learning strategy is centred around the Cognitive apprenticeship Theory framework, with the Industry supervisor providing modelling, coaching and scaffolding for the student. The student will learn best practice in robotics as well as PLC wiring and troubleshooting by attending a formal approved training. They will develop the skills learnt in the training through a project and the production of a short video.

The GMIT supervisor will organise a 4hr workshop every September where both students and industry supervisors will be introduced to the programme and the responsibility of both students and industry supervisor. The industry module will be discussed and the type of projects expected for the industry module will be explored.

At the beginning of semester 2, the GMIT supervisor will conduct a 4hr workshop to train the industry supervisor in mentoring students. Students, Industry supervisor and GMIT supervisor will then meet and agree a learning plan for the industry module. This will include the Company Certified Automation training to be attended, the type of work done for the employer, the project to be conducted and indicative weekly schedule of work to allow time to complete the project work. The industry supervisor will be expected to support the student in its project work.

### Assessment Strategy

Attendance at around 80 hr training in Company Certified Automation is mandatory in this module. The learning outcome of training will be assessed through a video and the production of an artefact. The module will be failed unless the student can provide evidence of attendance to the training programme as agreed with their Academic supervisor.

The module will be marked on the following assessment submissions:

- Reflective logbook assessed by the academic supervisor.
- Manufacturing Process study.
- A technical project where they produce a basic automated artefact agreed with their academic supervisor.
- Skill demonstration through a video demonstrating the safe operation of a robotic arm

#### Reflective Logbook

In order to facilitate this process, students will be expected to complete a weekly online reflective logbook. One of their academic supervisor’s responsibilities will be to review their first two entries in the Logbook and give them feedback on where and how to incorporate reflection. The students will be expected to make a minimum of 13 entries in their logbook. The academic supervisor will mark 5 of the entries at random. The basis for the reflection being:

- How they meet the learning outcomes of the module
- What challenges they have encountered

The academic supervisor will assess the level of reflection achieved in the Logbook using a rubric.

#### Manufacturing Process Study

The student completes a report detailing the process followed by one or more products in the company. The student should be directly exposed to automated manufacturing engineering processes which they will describe in details in their report. The student, supervisor and mentor will be provided with a Process Study Description Document outlining the nature of the report. It will include formatting guidelines, marking scheme, and the required chapters.

#### Technical Project

The project will be specified by the student and the Industry Supervisor before the end of semester 2, and a Project specification drawn up. This will then be reviewed by the GMIT Project Supervisor, and once approved, the student is expected to be ready to start the project as early as possible into the Industry Block.

The scope of this project will be limited to a single operation. The output will be the production of an artefact that the student will demonstrate to their industry mentor and academic supervisor.

#### Skill demonstration
The student should produce a video demonstrating the safe operation of a robotic arm.

**Repeat Assessment Strategies**

The repeat opportunity will be reviewed by the programme board on an individual basis. The process study, reflective logbook and project work could be resubmitted, but the programme board will decide if all or only some of the assessments should be resubmitted. If the module is failed due to a lack of attendance at the training, then the student should take the training at the next opportunity and resubmit the project work.

**Indicative Coursework and Continuous Assessment:**

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<th>Title</th>
<th>Percent</th>
<th>Week (Indicative)</th>
<th>Learning Outcomes</th>
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<td>20 %</td>
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<td>Written Report</td>
<td>Process Study</td>
<td>30 %</td>
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<td>4</td>
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<td>Project</td>
<td>Technical Project</td>
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**Blended Delivery Mode Average Weekly Workload:**

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**Recommended Reading Book List**


**Literary Resources**

Industry-specific reading.

The Book List from each module will apply to this Industry Module.

**Online Resources**

Industry-specific website.

GMIT Moodle support learning system.

**Programme Membership**

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