

Diploma in Electrical Engineering with Robotics

Module Outlines

Fundamentals of Programming

The module introduces the techniques and concepts of programming using the high-level programming language C, that is indispensable for all engineering professionals. Participants are taught problem-solving skills using a top-down, structured approach. The disciplines learnt are generally applicable to any programming platform.

Electrical and Electronic Principles 1

This is the first part of a two-part module providing a basic understanding of Electrical and Electronic Engineering at the Diploma level.

Engineering Mathematics 1

This module covers the parts of algebra which are fundamental to all of mathematics and its applications in Science and Engineering. This module altogether with Engineering Mathematics 2 is designed to cover the range of basic and essential mathematical topics of importance to students studying Engineering at Diploma and year one undergraduate level.

Electrical and Electronic Principles 2

This module is to provide an understanding of electrical fundamentals as well as analogue electronic devices and circuits in the scope of Electrical and Electronic Engineering at the Diploma level.

Engineering Mathematics 2

This module continues the knowledge gained in Engineering Mathematics 1 with the more advanced topics of differentiation, integration, differential equations and their applications in many areas of engineering. This module will provide a solid theoretical base for the more applied side of Engineering Mathematics to be seen in year two and beyond of undergraduate engineering studies.

Digital Systems and Computing Architecture

This module introduces students to the fundamentals of Digital Systems, Digital Electronics, and Computing Architecture. Topics include number systems, binary arithmetic, Boolean logic, digital circuits, and CPU architecture. Students will explore how digital systems represent and process data, and how components like memory and I/O interact with software.

The module also covers assembly language programming, finite state machines, and interfacing with the analog world. Practical exercises will help students understand the role of Digital Electronics in system design.

By the end of the module, students will have a strong foundation in digital systems and computing architecture, preparing them for further studies in computer science, engineering, and digital electronics.

Academic Reading and Writing 2

There has been a need to continually improve the English quality of our students and provide them constant support at their diploma levels. This module is designed for students who are enrolled in diploma programmes to work intensively on their reading and writing skills.

This is a more intensive module that will develop better reading and writing skills as they are the keys to understanding their subjects and effectively engage in class activities. These classes will address a variety of key demands of writing and reading assignments on their courses, focusing on both academic and language skills and the ability to write. The module is taught in a blended learning environment where students will have the opportunity to experiment and learn in both online and face-to-face lessons.

Robotics Principles

This module serves as an introduction to Robotics for students. Topics covered encompass established terminology, system specifications based on task demands, key metrics for assessing robot performance (such as payload, repeatability, accuracy, Degrees of Freedom), and an exploration of various configurations, structures, and architectures of mobile robots and robot manipulators.

It aims to equip students with knowledge and comprehension of fundamental principles underlying commonly employed robot actuators, sensors, and peripherals. Additionally, it aims to foster an understanding of the fundamental principles governing sequential and continuous control of robots, along with programming techniques for executing typical robot tasks and functions.

Robotics Design Project

Through this module, students will learn how to design, construct, and implement a small mobile robotic system, integrating hardware, electronics, and software.

Emphasis is placed on time management, health and safety practices, environmental awareness, and effective communication through reports and presentations, fostering essential engineering and project management skills.