BACHELOR OF ENGINEERING (HONS) ELECTRICAL AND ELECTRONIC ENGINEERING

Awarded by Northumbria University (UK)

Programme Objectives

The programme aims:

- To produce graduates of Electrical and Electronic Engineering with the necessary skills and attributes to take roles within industry as Professional Engineers, and provide the educational basis to facilitate progression to Chartered Status
- To produce graduates who can apply fundamental principles and techniques to produce creative and innovative solutions to engineering problems
- To equip students with an awareness of engineering in the wider economic, social and environment content
- To provide wide opportunities for access, consistent with Professional Body requirements

It is anticipated that students graduating from this programme will be able to take up a range of engineering roles and make immediate and valuable contributions to engineering businesses.

Programme Structure

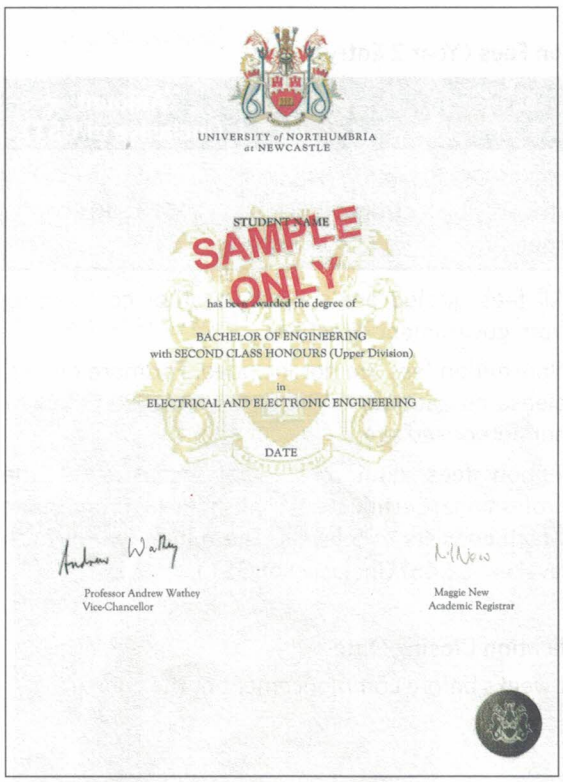
Course Duration

Year 1 Entry	
Full-time	28 months
Year 2 Entry	
Full-time	16 months

Assessment Methods

The modules will be assessed either by coursework, examinations or a combination of both appropriate to the module objectives.

Sample Certificate



Programme Modules

Year 1	Year 2	Year 3
Computer Programming	Analogue Electronics and Instrumentation	**CORE MODULES:** • Design and Manufacturing Analysis • Digital Signal Processing Systems • Individual Engineering Project
Digital Electronics and Communications	C Programmming and Digital Systems	
Electrical and Electronic Principles	Communications Systems	
Fundamentals of Energy Systems	Power Machines and Renewable Energy	
Research, Analysis and Presentation	Engineering Product Development	**OPTION A:** • Power Systems • Industrial Instrumentation and Modern Control Systems
Engineering Mathematics	Advanced Engineering Mathematics	**OPTION B:** • Embedded Systems • Digital System Design and Implementation

Fees

Application Fee

Applicants are required to pay a non-refundable application fee of S$321.00 (inclusive of GST).

Tuition Fees (Year 1 Entry)

	Amount (inclusive of GST)
Bachelor of Engineering (Hons) Electrical and Electronic Engineering	S$41,730.00

Tuition Fees (Year 2 Entry)

	Amount (inclusive of GST)
Bachelor of Engineering (Hons) Electrical and Electronic Engineering	S$28,890.00

- All fees quoted are subject to other cost arising from government directives.
- Non-tuition fees are not included. For more details, please contact our MDIS Representative Office or our authorised agents in your country.
- Tuition fees quoted are not inclusive of the Professional Certificate in English (PCIE) programme which consists of 5 levels. The tuition fee for each level is S$2,461 (inclusive of GST).

Application Closing Date

Eight weeks before commencement of the course.

Entry Requirements

Applicants must be of age 18 and above, and possess one of the following:

- International Baccalaureate Diploma with minimum 27 points including Mathematics and an analytical Science subject at higher level

Malaysia

- Malaysian Higher School Certificate (STPM) with Mathematics and Science subjects at least B, B, C
- Diploma in relevant Engineering discipline accredited by Malaysian Qualification Agency (MQA)

India

- Higher Secondary School Certificates (HSSC Year 12), Central Board of Secondary Education (CBSE) or Indian Certificate of Secondary Education (ICSE) overall score at least 65%
- Diploma in relevant Engineering discipline

Pakistan

- Higher Secondary School Certificates (HSSC Year 12) with at least 75% or more in Senior High School Certificate
- Diploma in relevant Engineering discipline with 54.5% or 2.5CB from Bachelor's degree if studied for between 2 and 3 years

Vietnam

- Tot Nghiep Pho Thong Trung Hoc (Year 12) minimum 8.0

Korea

- Junior College Diploma/Associate Degree with C+/2.5/75*79%

Russia

- Certificate of Secondary Education and an acceptable grade from a recognised Foundation programme (i.e. Average of 4 in Certificate of Secondary Education and all Bs in Foundation Programme)

Other recognised equivalent may be assessed by the University on a case-by-case basis.

Advanced Standing

Advanced standing for Year 2 will be considered for:

Malaysia

- Diploma in relevant Engineering discipline accreditated by MQA with minimum CGPA 3.0

India

- Diploma in relevant Engineering discipline - Students who have completed Std. 12 and who have also obtained a three year Diploma in Electrical / Electronic Engineering

Pakistan

- Diploma in relevant Engineering discipline (54.5% or 2.5CB from Bachelor's degree if period of study is between 3 and 4 years)

Other recognised equivalent may be assessed by the University on a case-by-case basis.

English Language Requirement

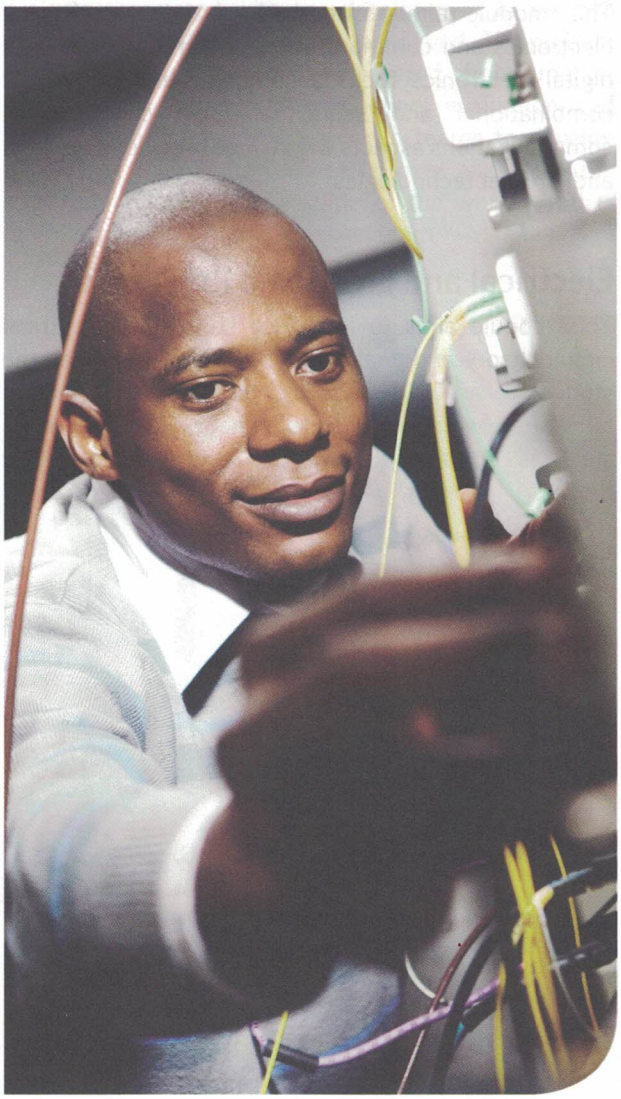
Applicants are required to possess at least one of the following:

- Minimum C6 pass in English Language (EL1) and Elementary Mathematics at GCE 'O' Level or equivalent
- A British Council International English Language Testing System (IELTS) score of 5.5 (or above) with a minimum score in each component of Reading, Writing, Listening and Speaking of 5.5
- Pearson Academic score of 51 (or above) with a minimum score in each component of Reading, Writing, Listening and Speaking of 51
- Pass and complete MDIS Professional Certificate in English
- Recognised equivalent

Career Opportunities

Graduates work in electrical power and energy, telecommunication, automotive, aeronautical, marine and civil electrical engineering industries. Demand for graduates within this discipline currently exceeds the supply. This degree can apply to a wide variety of sectors that use electronic systems and machines, including medical, military and public sector. Students who complete this course are well on the way to becoming a fully Chartered Engineer.

- Aerospace engineer
- Broadcast engineer
- Control and instrumentation engineer
- Electrical engineer
- Electronics engineer
- IT consultant
- Network engineer
- Systems analyst



Module Descriptions

Year 1

Computer Programming

This module aims to provide student with the ability to develop a C programme from a given specification. This is achieved through the use of structured programme development using Pseudo code and C programming methodology. The student will learn how to produce a programme in C and how to write C programmes to perform a number of Engineering tasks using arrays and character arrays, amongst others, to solve specific engineering problems. In addition to this the student will, in semester two, learn how to produce C programmes to execute on a microcontroller that can control hardware and perform engineering applications such as to control traffic lights, develop a home alarm system, and measure distance, to name a few examples.

Digital Electronics and Communications

This module aims to introduce student to digital electronics and communication systems. In particular, digital electronics focuses on logic gates and basic combinational and sequential logic circuits. The communications aspects will include telephone systems and internet technologies.

Electrical and Electronic Principles

This module aims to introduce student to electrical circuit theory and analogue electronics. It enables the student to analyse basic DC and AC circuits and to familiarise with fundamental electronic components such as operational amplifiers and semiconductor diodes.

Fundamentals of Energy Systems

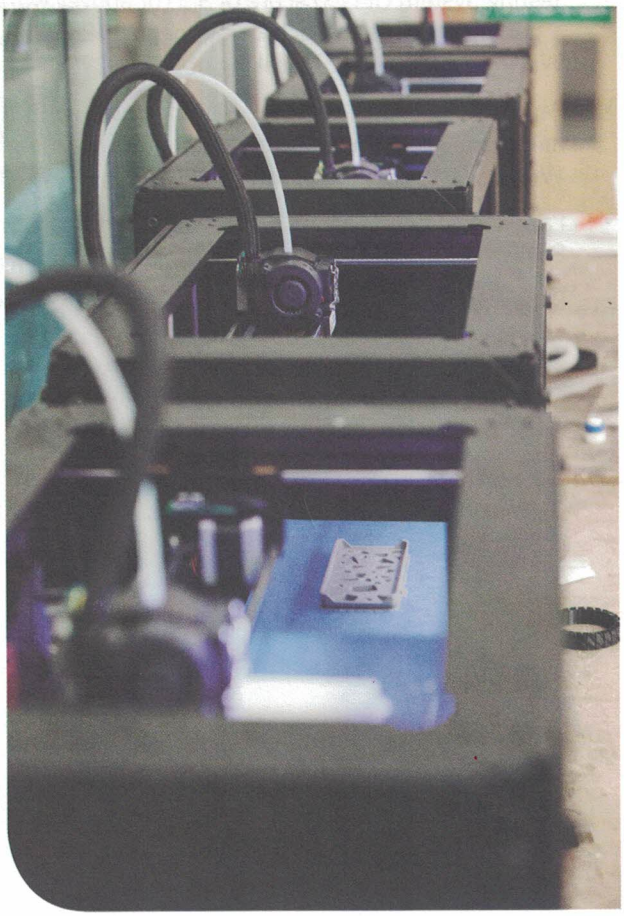
This module introduces student to the fundamental concepts of energy and power. The underlying electrical engineering, physics and mathematics are illustrated using examples from electricity generation, distribution and storage. Emphasis is given to sources of sustainable energy amidst current concerns about climate change, finite natural resources and energy security.

Research, Analysis and Presentation

This module aims to introduce student to gathering research data from either laboratory or reference material, analysing the acquired data in an appropriate manner and then presenting the key findings.

Engineering Mathematics

The module provides a first level course in engineering mathematics. Fundamentals of algebra, trigonometry and calculus are reviewed. The student's knowledge of calculus is extended and complex numbers, matrices, vectors and differential equations are studied.



Year 2

Advanced Engineering Mathematics

This module is designed to provide student with a basic course in Laplace Transforms, their use in solving ordinary differential equations arising from physical problems, and their use in describing the behaviour of simple control systems. Student will be introduced to the concept of harmonic components of a periodic waveform and be shown how this is useful in matching general solutions of partial differential equations to particular boundary or initial conditions. The solution of systems of linear ordinary differential equations using matrix methods will also be considered.

Analogue Electronics and Instrumentation

The sensor systems instrumentation needed to measure a variety of different measurands (for example temperature, pressure and lux level) will be covered, with a view to both the sensors and the signals they produce. Amplifiers and signal conditioning devices that convert the sensor output into usable signals for typical process control platforms will be covered. Operational amplifiers will be used extensively in the module, leading up to an understanding of discrete electronic transistor design. CAD tools will be used to enhance student understanding of instrumentation systems and circuit design, operation and testing (for example Labview and OrCAD).

C Programming and Digital Systems

This module aims to further develop the fundamental digital and C programming knowledge and design concepts established in Year 1. This will involve the design of digital decoder and multiplexers, synchronous counters and an introduction to Finite State Machines (FSM). These are covered with the intent of using a Hardware Description Language (HDL) and associated CAD tools to enhance student understanding of circuit design, operation and testing. The C programming language will be used to programme a microcontroller to perform hardware control as an alternative to using digital hardware. CAD tools will be used to develop and simulate the C programmes, as well as the programming of a microcontroller to implement given specifications. In this way the student will learn how modern electronic systems can be programmed for both hardware and software based solutions to meet a range of applications.

Communications Systems

This module aims to show the methods used in modern communications. It examines the technology for the communication of digital data networks and introduces practical aspects of high speed transmission links using optical fibres.

Power Machines and Renewable Energy

This module aims to develop student's knowledge of the principles of the operation of electrical machinery, power electronics, power systems, renewable energy and considers the interaction between this.

Engineering Product Development

The module aims to equip student with the knowledge and skills necessary to design, implement and manage projects associated with the development of modern electrical products within a global context. The product development cycle will be covered from market identification through to production, evaluation and presentation. Students will work in teams to develop an electrical product. Each team may also have the opportunity to outsource some of the work to other teams to simulate a global design team.

Year 3

Core Modules

Individual Engineering Project

The module aims to provide student, as an individual, an opportunity to carry out an extended study in a specific application of electrical and electronic techniques. The module also aims to enable the student to develop their analytical, practical and communication skills.

Design and Manufacturing Analysis

The module is structured to provide student with the opportunity to develop design analysis skills in the preparation of electronic circuit designs using Monticarlo and worst case analysis. Moreover, broad coverage of issues addressing key electronic manufacturing, manufacturing yield predictions, electronic systems reliability and availability and electronic waste management are covered. Student's knowledge of practical aspects of electronic manufacture will be extended with emphasis on the characteristics of counterfeit electronic identification, environmental legislations and lean manufacturing practice.

Digital Signal Processing Systems

This module aims to make use of the knowledge and analytic skills developed throughout the course to design modern digital signal processing systems. This module will introduce the concepts of digital signals, systems and filter designs. Additionally this module aims to provide students with practical experience of designing and realising real-time digital signal processing algorithms. Student will use a CAE package to support theoretical considerations of the systems design process to make performance predictions. A hardware DSP environment with supporting assembly and debugging software will be used to produce real-time implementation of the FIR/IIR filter algorithm being studied.

Option A

Power Systems

This module aims to study the components and operation of modern power systems, highlighting the principles of operation, design, and economics of power generation, frequency and voltage control, quality of supply, performance limits and protection from abnormal conditions.

Industrial Instrumentation and Modern Control Systems

This module aims to provide advanced understanding in industrial instrumentation and modern control design techniques using namely, the state-space. Upon completion of the module, student will be able to design instrumentation and control systems, and, implement and evaluate them using computer aided design packages.

Option B

Embedded Systems

This module aims to develop the application of microcontrollers in embedded systems. A number of commercially available microcontrollers are considered in terms of hardware and software capabilities. An appropriate IDE (Integrated Development Environment) will be used to design, develop, simulate, build and test a complete embedded system to a given specification.

Digital System Design and Implementation

The module aims to show student how to design and implement digital systems using a range of powerful techniques and tools, such as Finite State Machine (FSMs) and programmable logic. A central theme of the module is the use of a Hardware Description Language, and how it can be used to capture and describe a digital design at a variety of abstraction levels. Practical sessions involving the use of industry standard simulation, synthesis and implementation software will be used to provide experience of the complete digital system flow, from concept to realisation.

This module also aims to develop an understanding of practical design and implementation issues, such as testing and 'Design-for-Test'. These and other topics will be reinforced by the use of real-world case examples and designs. The commercial issues surrounding digital system realisation using a variety of technologies will be explored, with emphasis on Programmable Logic.