Electrical and Electronic Engineering

Final award	BEng (Hons)
Intermediate awards available	Cert HE, Dip HE
UCAS code	H600
Details of professional body accreditation	Single Honours programme has accreditation status from the Institution of Engineering and Technology (IET)
Relevant QAA Benchmark statements	Engineering
Date specification last updated	June 2013

Alternative locations for studying this programme

Location	Which elements?	Taught by UEL staff	Taught by local staff	Method of Delivery
Stamford College, Malaysia (Not accredited by the IET) (No Longer Recruiting)	Entire Programme	No	Yes	Full-Time
Linton Education Group, Malaysia (Not accredited by the IET)	Entire Programme	No	Yes	Full-Time

Profile

The summary - UCAS programme profile

BANNER BOX:

The BEng (Hons) Electrical and Electronic Engineering programme is a popular programme that benefits from links with many major employers. This is helpful for placements and Industrially based final year projects.

ENTRY REQUIREMENTS

GCE Advanced level or equivalent, including Mathematics and a Science subject. A minimum UCAS tariff of 240 is required at A level or a BTEC/EDEXEL national qualification in a cognate subject with 7 merits at level III including mathematics and an appropriate analytical subject. Applicants from recognised foundation year programmes may also apply.

Applicants from mature students will be considered on merit and all applicants will be interviewed. Those who do not meet the specified entry criteria may be accepted on the

extended degree programmes which will prepare students for year 1 of their programme. Entry will be determined on qualifications and experience.

In the case of applicants whose first language is not English, then an overall IELTS score of 6.0 (or equivalent) is required together with a minimum of 6.0 for Writing and Speaking and 5.5 for Reading and Listening.

ABOUT THE PROGRAMME

What is Electrical and Electronic Engineering?

Electrical and electronics engineering is at the heart of modern industries, power systems, control plants and communications systems. Students that are awarded a BEng (Hons) Electrical and Electronic Engineering degree will be able to work in a very wide variety of disciplines. These include areas such as broadcasting industry, data transmission, computer networking, telephone systems, industrial process plants, car manufacturers, aerospace industry, electric power industry, general manufacturing industry, electricity supply, electric machines and electric drives manufacture, power eletronic systems, embedded systems and microprocessor systems design.

Electrical and Electronic Engineering at UEL

The Electrical and Electronic Engineering programme at UEL have proved to be popular for many years. We have developed programmes that are current and will give you the opportunity to develop your understanding and skills. With very good facilities for laboratory and practical work you will be able to reinforce the theories and practices learnt in the classroom via 'hands on' experience. Our programme offer you the opportunity to study the fundamental knowledge and theories required by Electrical and Electronic Engineers and apply these to the practical work environment.

Programme structure

Study is based on three years full-time or four years sandwich programme. Students who Do not have the entry requirement for this programme can benefit from an extended four-year full-time programme. The sandwich option requires an industrial placement year between years two and three. The programme is modular and is based on core studies supported by a number of optional modules in the final year. There are six modules of study each year.

Learning environment

The programme benefits from access to purpose built laboratories and computer suites for use by students studying Electrical/Electronics based programmes. Teaching is delivered through formal lectures, tutorials, and laboratory sessions. Lectures are supported by course notes and material uploaded to UEL virtual learning environment that allow you to concentrate on the lecture and to aid independent study. Group work is encouraged and is used to good effect during the second year module Employability Skills and Group Design.

Assessment

Assessment varies from module to module but it has been updated to meet UEL new assessment tariff. Assessment may include time constrained assessments (end of module examinations or on-line tests), coursework, individual and group project work, laboratory reports and tests of competence in theoretical and practical sessions.

Work experience/placement opportunities

The School of Computing, Information Technology and Engineering (CITE) at UEL has strong links with industry and in conjunction with the careers office hosts a number of visits at which informal interviews for full and part-time employment opportunities take place. We have an industrial placement officer who will assist in making applications.

Project work

Project work is an important feature of this programme. Throughout your studies you will undertake small projects as part of the module assessment. During the final year of the programme you will be required to complete independent research of research and study of a technical subject in the form of a project. This project will be supervised by a member of the academic staff with an interest in the subject and will normally include laboratory work or the analysis of a specific engineering problem. The project often requires students to take an idea through to a working model. The project constitute one third of the final year of the programme.

Added value

The programme allows students to obtain either a good job, or to gain entry to an MSc, PGCE or Mphil/PhD programmes. The programme will also be of benefit by contributing to students' transferable skills and encouraging students to learn how to study and embark on continuous self learning pattern. During the final year project, students demonstrate that they can take an idea through design and development to produce a functional solution to a given problem. The degree awarded for those graduates who achieve a miniumum of 2:2 award and pass the project at the first attempt is accredited by the Institution of Engineering and Technology (IET).

IS THIS THE PROGRAMME FOR ME?

If you are interested in...

- Design
- Management
- Electronics
- Computing
- Control or Power or Communications Engineering
- Problem solving

If you enjoy...

- Design and construction of electrical/electronic circuits
- Mathematics
- Science

- Physics
- Information technology

If you want...

A traditional degree with a real practical emphasis geared to meet the needs of employers and the opportunity to study a broad range of subjects including power or control or communications engineering.

Your future career

Career opportunities are available in civil and military electrical/electronic engineering, the manufacture of a wide variety of products plus IT and computer or microprocessor-based activities. Graduates have also successfully undertaken careers in business, management, marketing and finance.

How we support you

The School prides itself on its student support systems. We operate an open door policy with students encouraged to consult with their tutors. Personal Tutors and Programme Tutors will monitor your progress and provide assistance and advice with academic and personal problems. We are pleased for students to consult whichever tutor they are comfortable talking to.

The school facilities include dedicated computer laboratories and equipment that you are free to use whenever it is not being used for a class. Each laboratory has a Laboratory Technician permanently on hand to help. All formal laboratory classes are supported by academics.

Employer links are maintained through our industrial Liaison Group and employers are invited to attend the University to talk to students about careers in engineering. Key local engineering employers judge an annual competition to student presentation skills. This is an optional presentation for our final year students.

Bonus factors

Electrical/Electronic Engineering is studied at the Dockland's Campus. Transport links are available via bus or tube linking Central London and major airports.

Our external examiner system provides a continuous check on the quality of our programmes and is also used to provide feedback to final year project students. Industrial links and the work of our industrial liaison panel maintains the currency of our programmes and thereby the employment and career paths of our engineering students.

Outcomes

Programme aims and learning outcomes

What is this programme designed to achieve?

These aims and learning outcomes comply with UK-SPEC which is the standard for recognition of professional engineers in the UK and is published by ECUK on behalf of the Engineering profession. The learning outcomes emphasized by UK-SPEC are categorised under the following generic headings: Underpinning sciences and mathematics, engineering analysis, design, economic, social and environmental context and engineering practice. These are mapped to UEL learning outcomes which are categorised under different headings: knowledge, thinking skills, subject-based practical skills and skills for life and work (general skills).

Our aim is to assist you to become competent engineer with the knowledge, understanding and skills required for a professional career in electrical/electronic engineering in industry or research. When awarded BEng (Hons) Electrical/Electronic engineering you will be able to work in a very wide variety of disciplines. These include areas such as broadcasting industry, data transmission, computer networking, telephone systems, industrial process plants, car manufacturers, aerospace industry, electric power industry, general manufacturing industry, electricity supply, electric machines and electric drives manufacturers, power electronics manufacturers and users, Printed circuit board design and embedded systems and microprocessors systems design and programming. Graduates could also diversify and work in areas such as banking and IT companies. We have divided this aim into a number of subsections in order to give additional focus.

This programme is designed to give you the opportunity to:

- Educate electrical/electronic engineering students to be competent engineers in design, analysis and electrical/electronic engineering practice underpinned by science and mathematics
- Promote an active interest in electrical/electronic engineering and encourage students to respond to changes and developments within their profession
- Provide knowledge and understanding of current theories and developments in electrical/electronic engineering
- Enhance students' understanding of the engineering management processes relevant to electrical/electronic engineering
- Provide students with an understanding the importance of professionalism, engineering ethics and problem solving techniques
- Provide students with an awareness of economic, social and environmental issues facing electrical/electronic engineers
- Allow progression in career and educational development giving opportunities to study for a graduate masters degree

What will you learn?

Knowledge

- Knowledge and understanding of electrical and electronic principles, control theories, electrical systems, communication techniques, computing techniques, analogue and digital circuit design, microprocessor systems, software engineering, embedded systems and IC design and digital signal processing underpinned by mathematics and science
- Substantial knowledge and understanding in two mixed disciplines of communications, control or power engineering

- Wide knowledge of analytical, mathematical and IT problem-solving
- Ability to design and construct a coherent testing project using established techniques

Thinking skills

- Application of critical thinking to a variety of problems
- Application of knowledge and skills to a variety of complex electrical/electronic problems

Subject-Based Practical skills

- Ability to use of information technology as a problem solving tool
- Ability to use laboratory equipment and instrumentation to complete various laboratory experiments and to critically analyse data

Skills for life and work (general skills)

- Ability to communicate information effectively to a wide range of audience
- Application of problem-solving techniques to a variety of problems
- Ability of time management and ability to plan and manage projects
- Ability to initiate design, analysis and development in response to original problems
- Ability to obtain information effectively, to think creatively and imaginatively
- Ability to co-operate with your peers and other professionals and to instigate application of acquired knowledge in real world scenarios
- Ability for learning and developing scholarly concern for accuracy and awareness of economic, social, environmental and ethical issues
- Ability for competitiveness and high academic achievement

Structure

The programme structure

Introduction

All programmes are credit-rated to help you to understand the amount and level of study that is needed.

One credit is equal to 10 hours of directed study time (this includes everything you do e.g. lecture, seminar and private study).

Credits are assigned to one of 5 levels:

- 0 - equivalent in standard to GCE 'A' level and is intended to prepare students for year one of an undergraduate degree programme
- 1 - equivalent in standard to the first year of a full-time undergraduate degree programme
- 2 - equivalent in standard to the second year of a full-time undergraduate degree programme

- 3 - equivalent in standard to the third year of a full-time undergraduate degree programme
- M - equivalent in standard to a Masters degree

Credit rating

The overall credit-rating of this programme is 360 credits.

Typical duration

The expected duration of this programme is 3-years when attended in full-time mode or 4-years in part-time mode from an entry level equivalent to Higher National Diploma.. It is possible to move from a full-time mode of study to a part-time mode of study and vice-versa, to accommodate any external factors such as financial constraints or domestic commitments. Many of our students make use of this flexibility and this may impact on the overall duration of their study period.

How the teaching year is divided

The teaching year begins in September and ends in June but some programmes also allow students to join at the start of Semester B, in February. A student, normally registering for 6 modules in one year (3 modules in each Semester) would do so in a full-time attendance mode of study and a student registering for up to 4 modules in one year (2 modules in each Semester) would do so in part-time attendance mode of study.

What you will study when

This programme is part of a modular degree scheme. A student registered in a full-time attendance mode will take six 20 credit modules per year. An honours degree student will complete six modules at level one, six at level 2 and six at level 3.

It is possible to bring together modules from one field with modules from another to produce a combined programme. Subjects are offered in a variety of combinations:

- Single - 120 credits at levels one, two and three
- Major - 80 credits at levels one, two and three

Modules are defined as:

- Core - Must be taken
- Option - Select from a range of identified modules within the field
- University wide option - Select from a wide range of University wide options

The following are the core and optional requirements for the single and major routes for this programme. For a single honours programmes students should take all the core modules listed with a choice of options in the final year. Students wishing to pursue a combined honours route must take this as a major pathway only.

LEVEL	Module Code	TITLE	SKILLS MODULES	CREDITS	STATUS SINGLE	STATUS MAJOR

1	EE1002	Circuit Theory		20	Core	Core
1	EE1008	Digital Electronics		20	Core	Core
1	EE1001	Skills for Academic Learning	Yes	20	Core	Core
1	EE1005	Mathematics I		20	Core	Core
1	EE1003	Engineering Computing		20	Core	UEL Wide Option
1	EE1007	Engineering Science and applications		20	Core	UEL Wide Option
2	EE2005	Control and Electrical Systems		20	Core	Core
2	EE2002	Analogue and Digital Communications		20	Core	UEL Wide Option
2	EE2003	Software Engineering and Microprocessors		20	Core	UEL Wide Option
2	EE2009	Analogue Electronics		20	Core	Core
2	EE2001	Mathematics II		20	Core	Core
2	EE2004	Employability Skills and Group Design	Yes	20	Core	Core
3	EE3008	Project and Research Skills	Yes	40	Core	Core
3	EE3003	Embedded Systems And IC Design		20	Core	Core
3	EE3002	Digital Signal Processing		20	Core	Core
3	EE3011	Control Applications		20	Option	UEL Wide Option
3	EE3005	Control Systems Design		20	Option	UEL Wide Option
3	EE3007	Communications Circuits		20	Option	UEL Wide Option
3	EE3006	Computer Networks and Data Communications		20	Option	UEL Wide Option
3	EE3009	Power Electronics		20	Option	UEL Wide Option

| 3 | EE3010 Electrical Machines | 20 | Option | UEL Wide Option |

Requirements for gaining an award

In order to gain an **honours** degree you will need to obtain 360 credits including:

- A minimum of 120 credits at level one or higher
- A minimum of 120 credits at level two or higher
- A minimum of 120 credits at level three or higher

In order to gain an **ordinary degree** you will need to obtain a minimum of 300 credits including:

- A minimum of 120 credits at level one or higher
- A minimum of 120 credits at level two or higher
- A minimum of 60 credits at level three or higher

In order to gain a **Diploma of Higher Education** you will need to obtain at least 240 credits including a minimum of 120 credits at level one or higher and 120 credits at level two or higher

In order to gain a **Certificate of Higher Education** you will need to obtain 120 credits at level one or higher.

In order to gain an Associate Certificate you will need to obtain a minimum if 20 credits at level one or higher.

In order to gain a Foundation Degree you will need to obtain a minimum of 240 credits including:

- A minimum of 120 credits at level one or higher
- A minimum of 120 credits at level two or higher

(A foundation degree is linked to a named Honours degree onto which a student may progress after successful completion of the Foundation degree.)

Degree Classification – Combined Honours Award

Where a student is eligible for an Honours degree, and has gained a minimum of 240 UEL credits at level 2 or level 3 on the programme, including a minimum of 120 UEL credits at level 3, the award classification is determined by calculating:

$$\text{The arithmetic mean of the best 100 credits at level 3} \times 2/3 + \text{The arithmetic mean of the next best 100 credits at levels 2 and/or 3} \times 1/3$$

and applying the mark obtained as a percentage, with all decimals points rounded up to the nearest whole number, to the following classification

70% - 100% First Class Honours

60% - 69%   Second Class Honours, First Division

50% - 59%   Second Class Honours, Second Division

40% - 49%   Third Class Honours

0% - 39%   Not passed

Degree Classification – Single Honours Award

Where a student is eligible for an Honours degree, and has gained a minimum of 240 UEL credits at level 2 or level 3 on the programme, including a minimum of 120 UEL credits at level 3, the award classification is determined by calculating:

$$\left(\frac{\text{The arithmetic mean of the best 100 credits at level 3}}{}\right) \times 2/3 + \left(\frac{\text{The arithmetic mean of the remaining credits at levels 2 and/or 3}}{}\right) \times 1/3$$

and applying the mark obtained as a percentage, with all decimals points rounded up to the nearest whole number, to the following classification

70% - 100% First Class Honours

60% - 69%   Second Class Honours, First Division

50% - 59%   Second Class Honours, Second Division

40% - 49%   Third Class Honours

0% - 39%   Not passed

Assessment

Teaching, learning and assessment

Teaching and learning

The key teaching and learning methods used are listed below:

Knowledge is developed through

- Lectures and tutorials
- Assignments
- Projects
- Use of IT and VLE

Thinking skills are developed through

- Analytical assessment of data
- Critical assessment of information
- Problem-solving practical applications

Practical skills are developed through

- Laboratories and experimental work
- Computer-based modelling, simulation and analysis

Skills for life and work (general skills) are developed through

- Interactive communication exercises
- Individual and group activities

Assessment

The following assessment methods are used:

Knowledge is assessed by

- Time constrained examinations or online tests
- Laboratory exercises
- Assignments
- Project work which include a viva

Thinking skills are assessed by

- Approach to solving problems
- Analysis of alternative solutions
- Practical solutions to complex tasks

Practical skills are assessed by

- Laboratory Reports and Experimental assessment
- Group work
- Application to practical problem-solving

Skills for life and work (general skills) are assessed by

- Oral Presentations
- Written communication exercises
- Problem solving and design work

Quality

How we assure the quality of this programme

Before this programme started

Before the programme started, the following was checked:

- there would be enough qualified staff to teach the programme;
- adequate resources would be in place;
- the overall aims and objectives were appropriate;
- the content of the programme met national benchmark requirements;

- the programme met any professional/statutory body requirements;
- the proposal met other internal quality criteria covering a range of issues such as admissions policy, teaching, learning and assessment strategy and student support mechanisms.

This is done through a process of programme approval which involves consulting academic experts including some subject specialists from other institutions.

How we monitor the quality of this programme

The quality of this programme is monitored each year through evaluating:

- external examiner reports (considering quality and standards);
- statistical information (considering issues such as the pass rate);
- student feedback.

Drawing on this and other information, programme teams undertake the annual Review and Enhancement Process which is co-ordinated at School level and includes student participation. The process is monitored by the Quality and Standards Committee.

Once every six years an in-depth review of the whole field is undertaken by a panel that includes at least two external subject specialists. The panel considers documents, looks at student work, speaks to current and former students and speaks to staff before drawing its conclusions. The result is a report highlighting good practice and identifying areas where action is needed.

The role of the programme committee

This programme has a programme committee comprising all relevant teaching staff, student representatives and others who make a contribution towards the effective operation of the programme (e.g. library/technician staff). The committee has responsibilities for the quality of the programme. It provides input into the operation of the Review and Enhancement Process and proposes changes to improve quality. The programme committee plays a critical role in the quality assurance procedures.

The role of external examiners

The standard of this programme is monitored by at least one external examiner. External examiners have two primary responsibilities:

- To ensure the standard of the programme
- To ensure that justice is done to individual students

External examiners fulfil these responsibilities in a variety of ways including:

- Approving exam papers/assignments
- Attending assessment boards
- Reviewing samples of student work and moderating marks
- Ensuring that regulations are followed

- Providing feedback through an annual report that enables us to make improvements for the future

Listening to the views of students

The following methods for gaining student feedback are used on this programme:

- Module evaluations
- Student representation on programme committees (meeting 62 times per year)
- Field feedback information analysis for programme and module evaluation

Students are notified of the action taken through:

- Circulating the Minutes of the programme committee
- Providing details on the programme noticeboard and/or VLE
- Review of actions at each meeting

Listening to the views of others

The following methods are used for gaining the views of other interested parties:

- Feedback from external examiners
- Industrial Liaison committee
- Information from professional bodies

Further Information

Where you can find further information

Further information about this programme is available from:

- The UEL web site
- The student handbook
- Module study guides
- UEL Manual of Regulations and Policies
- UEL Quality Manual
- Regulations for the Academic Framework
- UEL Guide to Undergraduate Programmes
- School of Computing & Technology web pages