University of the West of England
BRISTOL

ACADEMIC SERVICES

PROGRAMME SPECIFICATION

Part 1: Basic Data			
Awarding Institution	University of the West of England, Bristol		
Teaching Institution	Northshore College of Business & Technology, Sri Lanka		
Delivery Location	Colombo, Sri Lanka		
Study abroad / Exchange / Credit recognition			
Faculty responsible for programme	Faculty of Environment &Technology		
Department responsible for programme	Department of Engineering Design and Mathematics		
Modular Scheme Title	FET UG Modular Scheme		
Professional Statutory or Regulatory Body Links	NCBT will seek professional accreditation for the programme from Institute of Engineers, Sri Lanka (IESL) following approval.		
Highest Award Title	MEng Electrical and Electronic Engineering (Electronic) MEng Electrical and Electronic Engineering(Electrical)		
Default Award Title	BEng (Hons) Electrical and Electronic Engineering (Electronic) BEng (Hons) Electrical and Electronic Engineering (Electrical)		
Fall-back Award Title	N/A		
Interim Award Titles	CertHE Electrical & Electronic Engineering DipHE Electrical & Electronic Engineering BEng Electrical & Electronic Engineering BEng(Hons) Electrical & Electronic Engineering		
UWE Progression Route			
Mode(s) of Delivery	Full-time, Sandwich		
Codes	**UCAS:** **ISIS2: HH5P**	**UCAS:** **ISIS2:**	
Relevant QAA Subject Benchmark Statements			
First CAP Approval Date		Valid from	
Revision CAP Approval Date	July 2015 v1.2 Nov 2015 v1.3	Revised with effect from	September 2015 v1.2 January 2016 v1.3
Version	1.3		
Review Date	September 2018		

Part 2: Educational Aims of the Programme

The educational aims of the programme are to provide graduates with

- the balance of theoretical and practical understanding needed to meet the demands of the engineering industry for engineering practitioners, and in particular to meet the requirements for professional accreditation in partial fulfilment of CEng.
- a broad and deep understanding of the discipline in conjunction with a detailed understanding of their chosen specialism of either electrical or electronic engineering.
- a wide range of expertise and experience relevant to the electronics and/or electrical industry
- an awareness and understanding the impact of the discipline on the environment and the potential for creating future sustainable technologies
- an understanding of the business environment of a professional engineer.

Programme requirements for the purposes of the Higher Education Achievement Record (HEAR)

The MEng Electrical and Electronic Engineering programme requires students to develop the essential skills in analysis of the behaviour of complex electronic, digital electronic or electrical systems, design, fundamental principles governing the behaviour of electronic or electrical systems and of the related mathematics and management of Electrical or Electronic Engineering infrastructure.

The programme covers a range of disciplines such as digital and analogue circuit design, power electronics, control systems, signal processing and project management. A number of developments have occurred in both electrical and electronic engineering in recent times. Although, signals are analogue in nature, most electrical or electronic designs involve conversion to digital format as soon as possible and processing by microprocessor or digital integrated circuit. In recognition of this, this programme allows students to develop expertise particularly in system design, microprocessor hardware/software design and simulation and modelling techniques. For the Electrical Engineering pathway, students gain competence in modern power generation and distribution systems

A successful graduate is therefore expected to have a broad knowledge and understanding of engineering theory, practices and application and have the ability to use advanced techniques of analysis, synthesis and implementation in the field of electronic engineering or electrical engineering.

In addition, the programme requires graduates to demonstrate a capacity for innovative and creative design and be able to draw on knowledge of the fundamental principles and proven systems to further develop existing systems and to generate new systems which meet required specifications.

Graduates are also expected to be provide leadership, communicate clearly, concisely and persuasively with individuals and groups, using a professional standard of English, both orally and in writing.

Part 3: Learning Outcomes of the Programme

The award route provides opportunities for students to develop and demonstrate knowledge and understanding, qualities, skills and other attributes in the following areas:

A. Knowledge and Understanding (subject specific)

1. Scientific principles and methodology necessary to underpin electrical and electronic engineering and to enable appreciation of its scientific and engineering context in support of future developments and technologies.
2. Mathematical principles necessary to underpin electrical and electronic engineering and mathematical methods, tools and notations used in the analysis and solution of electrical and electronic engineering problems, number systems and their applications.
3. The range of applicability of abstract models of electronic components and their fundamental limitations in linear and non-linear circuit applications.
4. Electronic components, digital circuits and logic families and an ability to characterise them; ability to use combinatorial and sequential logic circuits; basic computer structure (microcomputer and dsp) their use in real-time applications. Ability to use hdl systems and techniques (electronic pathway).
5. System-on-chip design methodologies and their application to the top-down design of electronic systems (electronic pathway).
6. The design, application and utilization of electrical and electronic equipment with emphasis on a systems approach to real world problems and applications (electrical pathway)
7. The design of power generation and distribution systems and the impact of renewable energy sources on such systems (electrical pathway)
8. The commercial, ethical, economic and legal context of engineering processes, including sustainable development, risk management, health and safety and environmental legislation.
9. Management and business practices, and their limitations, and how these may be applied appropriately.

B. Intellectual Skills (generic)

1. Demonstrate and understand the need for a high level of professional and ethical conduct in engineering.
2. The ability to investigate and define a problem and identify constraints including environmental and sustainability limitations, health and safety and risk assessment issues.
3. Critically review available literature relevant to the subject discipline.
4. Demonstrate independent thinking in the design and development of solutions to real-world problems.
5. The ability to select and apply appropriate computer-based methods for modelling and analysing problems in fields relating to the design, manufacture and control of electrical and electronic components and systems.
6. The ability to understand issues relating to the marketing of products and the management processes associated with their design and manufacture.
7. The ability to use fundamental knowledge to investigate new and emerging technologies;
8. Wide knowledge and comprehensive understanding of design processes and methodologies and the ability to apply and adapt them in unfamiliar situations
9. The ability to make general evaluations of commercial risks through some understanding of the basis of such risks

C. Subject/Professional/Practical Skills (subject specific)

1. Select, apply and challenge appropriate quantitative methods and computer software tools for the evaluation, analysis and solution of electrical or electronic engineering problems and situations.
2. Apply experimental methods in the laboratory relating to engineering design, manufacture and test.
3. Use relevant design, test and measurement equipment.
4. Execute and manage multi-disciplinary projects.
5. Undertake practical testing of design ideas through laboratory work or simulation with technical analysis and critical evaluation of results.
6. Apply engineering techniques taking account of environmental, industrial and commercial constraints
7. Work with technical uncertainty
8. Show an understanding of appropriate codes of practice and industry standards including an awareness of quality issues.

D. Transferable Skills and other attributes (generic)

1. To communicate using professional standards of English, both orally and in writing, including, for instance, the results of technical investigations, to peers and/or to “problem owners”.
2. To manage his or her own time; to meet deadlines;
3. To work with others, being aware of the benefits and problems which teamwork can bring, having gained insights into the problems of team-based systems development.
4. To use software in the context of problem-solving investigations, and to interpret findings
5. To express problems in appropriate notations.
6. To gain experience of, and to develop skills in, learning independently of structured class work, including the use of on-line facilities to further self-study.
7. To read and to use literature sources appropriate to the discipline to support learning activities.
8. Demonstrate team leadership abilities.

Becoming an electrical and electronic engineer involves developing skills to solve wide range of problems relating to power generation, communication, healthcare and the environment. The department’s academic curriculum is therefore strongly focused on designed to meet these sustainable issues that consider these issues and develop awareness skills are highlighted in **bold green** in the matrix that follows.

Core Modules ***Learning Outcomes:***	UFMFJ9-30-1	UFMFF8-30-1	UFMFCA-15-1	UFMFN7-15-1	UFMFP8-15-1	**UFMFVA-15-1**	UFMFHA-15-2	UFMFL9-15-2	UFMFV7-15-2	UFMFMA-15-2	**UFMFY8-30-3**	UFMFW7-15-3	UFMFDE-15-3	**UFMFV8-15-3**	**UFMERY-30-M**	**UFMFXC-15-M**	UFMFTG-30-M
A) Knowledge and understanding of:																	
A1		X	X		X	X			X	X	X	X	X	X	X	X	
A2	X	X	X	X	X	X		X	X	X	X	X	X		X	X	
A3			X		X				X		X	X	X		X	X	
A4		X	X								X		X	X	X	X	
A5		X	X								X		X	X	X	X	
A6	X		X		X				X	X	X	X	X		X	X	
A7									X		X	X	X		X	X	
A8							X				X			X	X	X	X
A9														X	X	X	X
(B) Intellectual Skills																	
B1					X		X				X			X	X	X	X
B2	X		X		X		X		X		X	X	X	X	X	X	X
B3	X		X	X	X				X	X	X	X	X	X	X	X	X
B4	X		X	X	X	X			X	X	X	X	X	X	X	X	X
B5	X	X	X	X	X				X	X	X	X	X	X	X	X	
B6														X	X	X	X
B7	X	X	X						X	X	X	X	X	X	X	X	
B8	X	X	X	X					X	X	X	X	X	X	X	X	
B9															X	X	X

Learning Outcomes:	UFMFJ9-30-1	UFMFF8-30-1	UFMFCA-15-1	UFMFN7-15-1	UFMFP8-15-1	UFMFVA-15-1	UFMFHA-15-2	UFMFL9-15-2	UFMFV7-15-2	UFMFMA-15-2	UFMFY8-30-3	UFMFW7-15-3	UFMFDE-15-3	UFMFV8-15-3	UFMERY-30-M	UFMFXC-15-M	UFMFTG-30-M
(C)Subject / Professional / Practical Skills																	
C1	X	X	X		X	X		X	X		X	X	X	X	X	X	
C2		X	X	X	X	X			X	X	X		X		X	X	
C3			X		X	X			X	X	X		X	X	X	X	
C4							X		X		X		X	X	X	X	
C5	X	X	X		X	X		X	X	X	X	X	X	X	X	X	
C6							X		X	X	X		X	X	X	X	
C7		X	X						X	X	X	X		X	X	X	
C8			X	X			X		X		X	X		X	X	X	X
(D) Transferable skills and other attributes																	
D1			X	X	X		X		X	X	X	X	X	X	X	X	X
D2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
D3					X		X		X					X		X	
D4	X	X	X		X	X			X	X	X	X	X	X	X	X	X
D5	X	X	X	X		X		X	X	X	X	X		X	X	X	X
D6	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X
D7		X	X	X	X	X			X	X	X	X	X	X	X	X	X
D8					X		X		X					X		X	

Part 4: Student Learning and Student Support

Teaching and learning strategies to enable learning outcomes to be achieved and demonstrated

The programme learning outcomes are delivered through an appropriate mix of lecture, tutorial and practical lab-based sessions supported by directed independent learning. Throughout the delivery, fundamental engineering principles are explored and consolidated through practical lab-based learning. The development of design and modelling skills is embedded in a number of modules at each level. Group work activities and projects are used to add to the development of academic knowledge with the aim of producing well-rounded individuals who understand the demands of the professional environment the will enter as graduates. At appropriate stages of the programme industrial experts are brought in to lead sessions. The programme provides the opportunity of workbased learning through the optional placement year.

At NCBT, Colombo there is a policy for a minimum average requirement of 18hours/week contact time over the course of the full undergraduate programme. This contact time encompasses a range of activities as described below. In addition, a range of other learning activities will be embedded within the programme which, together with the contact time, will enable learning outcomes to be achieved and demonstrated.

Scheduled learning includes lectures, seminars, tutorials, project supervision, demonstration, practical classes and workshops; fieldwork; external visits; work based learning; supervised time in studio/workshop. In addition, all MEng candidates are expected to participate in a resident survey camp.

Independent learning: includes hours engaged with essential reading, case study preparation, assignment preparation and completion etc.

Part 4: Student Learning and Student Support

Placement learning: includes optional placement year at the end of Level 2 (only for candidates who are enrolled in the sandwich programme). All MEng candidates who are not enrolled in the sandwich programme are expected to undergo a minimum of 24 weeks of industrial training before the completion of the programme.

Description of the teaching resources provided for students

- Through provision of specialised Electrical and Electronic laboratories equipped with the latest apparatus and equipment.
- Through provision of frequently available, computer laboratories that provide access to a wealth of knowledge through the Internet.

Description of any Distinctive Features

Academic Support
Academic advice and support is the responsibility of those delivering the individual modules. Academic staff are expected to be available outside normal timetabled hours, either by appointment or during published "surgery" hours, in order to offer advice and guidance on matters relating to the material being taught and on its assessment.

Developing graduate skills
In year 1, students have group activities under career development program (CDP) with their Academic tutors to introduce reflection on graduate skills and career aspirations. Year 2 provides extensive opportunities toward placement and career planning, including sessions from university careers and placements team and from industrial recruitment personnel toward application and CV writing, and good interview techniques. In Years 3 and 4 students engage with developing their graduate skills through project work and their project supervisor.

Technology Enhanced Learning
All modules on the programme are available via the university's Virtual Learning Environment – LMS (Learning management system www.northshore.lk). Recordings of some lectures (audio and/or video) are made available after classes via the university's Virtual Learning Environment with the supportive lecture notes.

Part 5: Assessment

Approved to University Regulations and Procedures

With the following variant:
The degree classification for the 360 credit honours degrees BEng (Hons) Electrical and Electronic Engineering, BEng (Hons) Electronic Engineering, BEng Robotics and BEng Electronics and Computer Engineering (or 480 credit honours degree with an integrated foundation year) is based upon all the marks achieved at level 3 and all the marks achieved at level 2. Marks achieved for level 3 credits are weighted three times the value of the marks for the level 2 credits (Paper AB16/05/07).

Assessment Strategy

The programme learning outcomes are achieved by using a range of assessment techniques across the modules at different levels. The programme requires the application of fundamental concepts and theory, often expressed in mathematical language to practical engineering situations. The assessment strategy reflects this requirement with coursework assignments used to allow students to develop understanding of concepts and explore their understanding through task according to level, practical examinations that ensure that these concepts can be applied with an appropriate level of reflection and traditional examinations where theory and application can be combined under controlled conditions. Group work activities and projects are used to develop a wider range of skills such as team work, project work and research methodology. Students are encouraged to communicate concepts and findings through reports and presentations.

Part 5: Assessment
The mixture of examination/practical/coursework tasks reflects the broad and specific aims/objectives of the programme to introduce key concepts and domain knowledge and to develop skills in the selection and application of relevant tools and methods.

Part 6: Programme Structure

This structure diagram demonstrates the student journey from Entry through to Graduation for a typical **full time student**, including: level and credit requirements, interim award requirements, module diet, including compulsory and optional modules

ENTRY

Year 1

Compulsory Modules	Optional Modules	Interim Awards
• UFMFJ9-30-1 Engineering Mathematics • UFMFF8-30-1 C Programming • UFMFN7-15-1 Practical Electronics • UFMFCA-15-1 Digital Principles • UFMFP8-15-1 Electrical & Electronic Principles A • UFMFVA-15-1 Electrical & Electronic Principles B	None	Certificate of Higher Education Electrical & Electronic Engineering 120 credits where not less than 100 credits are at level 1 or above.

Year 2

Compulsory Modules	Optional Modules	Interim Awards
• UFMFHA-15-2 Project Management • UFMFL9-15-2 Mathematics for Signal and Control • UFMFV7-15-2 Control • UFMFMA-15-2 Signal Processing and Circuits	**Choose 60 credits from:** • UFMFQ8-30-2 Electrical Technology • UFMFRJ-15-2 Power Systems Fundamentals • UFMFJ8-15-2 Drives and Motions • UFMFKA-30-2 Group Fab and Lab • UFMFE8-30-2 Digital Design	Diploma of Higher Education Electrical & Electronic Engineering A total of 240 credits are required with at least 100 credits at Level 2 or above and 120 credits at level 1 or above.

Year Out: Students may spend an optional year in a relevant industry. These students will be enrolled on **UFMF89-15-3 Industrial Placement**. All students are encouraged to take this option. Students who do not take a placement must take **UFMFM7-15-3 Business Environment**.

Year 3

Compulsory Modules	Optional Modules	Interim Awards
• UFMFY8-30-3 Individual Project (Type A) • UFMFW7-15-3 Control Systems Design • UFMFDE-15-3 Power Electronics • UFMFV8-15-3 Group Design & Integration Project	**Choose 30 credits from :** • UFMFRA-15-3 Energy Technologies • UFMFAA-15-3 Power Systems Analysis • UFMFH8-15-3 Digital Signal Processing • UFMFS7-15-3 Communications	BEng Electrical & Electronic Engineering (exit award) (300 credits where a minimum of 60 credits at Level 3 or above and a further 100 credits at Level 2 or above and 280 credits at Level 1 or above) BEng(Hons) Electrical & Electronic Engineering

	Compulsory Modules	Optional Modules	Interim Awards
Year 4	• UFMERY-30-M MEng Individual Project part B • UFMFXC-15-M Masters Group Project • UFMFTG-30-M Engineering Management	**45 credits from :** **Electronic pathway** (for Electronic students only)**:** • UFMF9D-15-M Wireless and Mobile Communications • UFME7G-15-M System Design Using HDL • UFMF3E-15-M Wireless Sensor Networks **Electrical pathway** (for Electrical students only)**:** • UFMF3A-15-M Power Electronics • UFMFFJ-15-M Modern Power systems • UFMFEJ-15-M Modelling and Simulation	**Default Award:** BEng Hons EEE(Electronics) BEng Hons EEE(Electrical) Credit requirements 360 credits to include at least • 120 at level 3 • 120 at level 2 **Target/highest** MEng EEE(Electronics) MEng EEE(Electrical) Credit requirements 480 credits to include at least • 320 at level2 or greater, • 220 at level 3 or greater, • 120 at level M

GRADUATION

Part 7: Entry Requirements

The University's Standard Entry Requirements apply with the following additions:

All applicants for entry to Level 1 of the full time programme must have

- A-level (UK or Sri Lanka) in Mathematics grade C or above or equivalent.
- at least 240 UCAS tariff points from UK A-levels or three passes from Sri Lanka G.C.E A-levels not including General Studies.
- satisfy the 'UK-SPEC' requirements for CEng accredited programmes.

Candidates will be admitted to Level 2 with,

- Higher National Diploma (HND) in Electrical/Electronic Engineering (or equivalent)

Candidates will be admitted to Level 2.2 with,

- National Diploma in Technology (NDT) in Electrical/Electronic Engineering offered by University of Moratuwa, Sri Lanka
- National Diploma in Engineering Studies (NDES) in Electrical/Electronic Engineering offered by Institute of Engineering Technology, Sri Lanka.
- Higher National Diploma in Engineering (HNDE) in Electrical/Electronic Engineering offered by Sri Lanka Institute of Advanced Technological Education, Sri Lanka.
- Diploma in Technology in Electrical/Electronic Engineering offered by Open University of Sri Lanka.

Tariff points as appropriate for the year of entry - up to date requirements are available through the courses database.

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Part 8: Reference Points and Benchmarks

Description of ***how*** the following reference points and benchmarks have been used in the design of the programme:

The programme has been designed with regular input from employers through the department's industrial advisory board, our regular contact with employers in our knowledge exchange activities, by our interaction with the Institute of Engineering and Technology (IET) and by reference to benchmark statements in Engineering (QAA).

The design of the programme is consistent with the University's strategic priorities with respect to Teaching and Learning and Ready and Able Graduates. A range of assessment methods are used that provide regular feedback to students. Use also made of conventional and practical examinations as appropriate.

We are acutely conscious of the professional requirements and demands of graduate engineers and the programme provides undergraduate students with the opportunity to gain experience or research the work-place environment. Professional skills of team working, report writing and communication are developed through the different levels. Students are made aware of the strong ethical code of conduct that is expected of graduate engineers and through the level 3 and level M modules students are encouraged to become reflective practitioners. It is clearly essential that Electrical and Electronical Engineering graduates are made aware of the environmental impact of their subject with its study of electrical technologies, energy, design of motors and power networks.

This programme is delivered at Northshore College of Business & Technology. The course team has excellent links with local employers who will continue to advise the course team on the content and structure of the programme through an Industrial Advisory Board. The programme is underpinned by staff consultancy, professional practice and research and will be assessed for accreditation by Institute of Engineers, Sri Lanka (IESL).

What methods have been used in the development of this programme to evaluate and improve the quality and standards of learning? This could include consideration of stakeholder feedback from, for example current students, graduates and employers.

As stated earlier the development of this programme has been informed by regular input from employers at an annually held industrial advisory board and the regular contact with industrial partners through knowledge exchange activities. We are conscious of the professional requirements of an engineering graduate and have developed the content and assessment to support the development of undergraduates from entry to the programme through to graduation.

This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. More detailed information on the learning outcomes, content and teaching, learning and assessment methods of individual modules can be found in module specifications, available on the University's website.