

## PROGRAMME SPECIFICATION



1	<b>Awarding Institution</b>	Newcastle University
2	<b>Teaching Institution</b>	Newcastle University
3	<b>Final Award</b>	BEng (Honours)
4	<b>Programme Title</b>	Electrical Power Engineering
5	<b>UCAS/Programme Code</b>	1214U
6	<b>Programme Accreditation</b>	N/A
7	<b>QAA Subject Benchmark(s)</b>	Engineering
8	<b>FHEQ Level</b>	6
9	<b>Last updated</b>	May 2014

### 10 Programme Aims

This degree programme is designed to enable students to further their Diploma-level or similar qualifications of relevant Accredited Prior Learning to a Bachelor of Engineering (Honours) Degree.

Programme Aims:

- To provide opportunities for students to undertake a broad-based education in electrical power engineering and to acquire appropriate knowledge and understanding, of engineering and key skills,
- To produce graduates who will be equipped to enter employment in industry, the professions or public service, or to follow a postgraduate route into research, industry or academia, or apply the skills learnt in a range of areas other than engineering,
- To produce graduates who will meet the accreditation requirements of the Institution of Engineering and Technology, subject to the completion of matching studies,
- To provide a qualification which meets the UK's FHEQ at Honours level of the National Qualifications Framework and meets the requirements of the National Subject Benchmarks in Engineering.

### 11 Learning Outcomes

The programme provides opportunities for students to develop and demonstrate knowledge and understanding, qualities, skills and other attributes in the following areas. The programme outcomes have references to the benchmark statements for Engineering.

#### Knowledge and Understanding

On completing the programme students should have appropriate knowledge and understanding of:

- A1: Basic mathematics, science and technologies relevant to electrical power engineering (E).  
A2: The fundamental concepts, principles and theories of electrical power engineering (E).  
A3: Business and management techniques relevant to engineering and the management of engineering projects (E).  
A4: Detailed knowledge and understanding of the essential facts, concepts, principles and theories relevant to various specialisations within electrical power engineering (E).  
A5: The application of IT principles and tools as appropriate to the role of an electrical power engineer (E).  
A6: The components and materials used by electrical power engineers (E).

**Teaching and Learning Methods**

Acquisition of A1, A2 and A5 is through a combination of lectures, tutorials, example classes, laboratory experiments, coursework and projects in Year 1.

Acquisition of A5 is also through simulation exercises.

Acquisition of A3 is through a combination of lectures, supervisions, coursework and projects in both years of the programme.

Acquisition of A4 is through a combination of lectures, laboratory experiments, coursework and projects in Year 2.

Acquisition of A6 is through lectures, laboratory experiments, tutorials and project work throughout the programme.

Throughout the course the learner is encouraged to undertake independent reading both to supplement and consolidate what is being taught and learnt and to broaden their individual knowledge and understanding of the subject.

**Assessment Strategy**

Testing the knowledge base is done through a combination of unseen written examinations and assessed coursework in the form of laboratory reports, case studies, problem solving exercises, coursework reports and project reports and presentations.

**Intellectual Skills**

On completing the programme students should be able to:

B1: Plan, conduct and report a programme of investigative work.

B2: Analyse electrical and electronic systems (E).

B3: Design a circuit or system to meet a specification (E).

B4: Be creative in the solution of problems and in the development of designs (E).

B5: Evaluate designs and consider improvements (E).

B6: Integrate and evaluate information and data from a variety of sources (E).

B7: Determine the appropriate mathematical tools for the solution of problems in electrical and electronic engineering (E).

B8: Determine the correct model to use in the analysis of an electrical and electronic engineering circuits system (E).

B9: Determine the correct computer techniques to use for the analysis of electrical and electronic engineering problems and synthesis of circuits and systems (E).

**Teaching and Learning Methods**

Intellectual skills are developed through the teaching and learning programme outlined above (and in section 11).

Analysis and problem solving skills are further developed through example classes, tutorials, coursework and project work.

Experimental, research and design skills are further developed through coursework activities, laboratory experiments, and projects. Creative and design skills are developed through design and project work.

**Assessment Strategy**

Analysis and problem solving skills are assessed through written examinations and coursework and through project work, which appears throughout the course.

Experimental, research and design skills are assessed through laboratory experiment reports, assignments and project reports, presentations and written examinations.

Creative and design skills are assessed through coursework, written examinations and project work.

Practical Skills
<p>On completing the programme students should be able to:</p> <p>C1: Execute safely a series of experiments (E).  C2: Use laboratory equipment to generate data and monitor the performance of circuits and systems (E).  C3: Analyse experimental or computational results and determine their strength and validity (E).  C4: Prepare technical reports.  C5: Give technical presentations.  C6: Use the scientific literature effectively (E).  C7: Take notes effectively.  C8: Use computational tools and packages (E).  C9: Apply the appropriate mathematical tools for the solution of problems in electrical and electronic engineering (E).  C10: Apply the correct model to use in the analysis of an electrical and electronic engineering circuits system (E).  C11: Apply the correct computer techniques to use for the analysis of electrical and electronic engineering problems and synthesis of circuits and systems. (E).  C12: Apply project management techniques to the organisation of small projects (E).  C13: Design circuits and systems (E).</p>
Teaching and Learning Methods
<p>Practical skills are developed through the teaching and learning programme outlined above (and in section 11).  Skills (C1-C4) are developed through laboratory experiments and project work.  Skills (C4-C7, C9) are taught through practice throughout the course.  In terms of general computational skills, skill C8 is taught through classes in Year 1, specialist packages are introduced in particular courses.</p>
Assessment Strategy
<p>Assessment of skills (C1-C6) is through observed laboratory work, laboratory and project report writing and assessed presentations and demonstrations. Skill C8 is assessed directly by assignment and by written examination and by integration into project and laboratory work. Skill C9 is assessed through project work and through extended coursework. Skills (C10-C13) are assessed through written examination, assignments and project work</p>
Transferable/Key Skills
<p>On completing the programme students should be able to:</p> <p>D1: Communicate effectively in writing, verbally and graphically (E).  D2: Give oral presentations using a variety of visual aids (E).  D3: Be able to organise data (E).  D4: Apply mathematical skills (E).  D5: Work as a member of a team to closely specified goals (E).  D6: Use information and communications technology (E).  D7: Manage resources and time (E).  D8: Learn independently in familiar and unfamiliar situations with open-mindedness and in the spirit of critical enquiry (E).  D9: Learn effectively for the purpose of continuing professional development and in a wider context throughout their career (E).</p>

### **Teaching and Learning Methods**

Transferable skills are developed through the teaching and learning programme outlined above (and in section 11).

Skills D1, D2 and D7 are taught through classes and reinforced through feedback from laboratory and project reports and presentations.

Skill D3 is taught through laboratory work.

Skill D4 is integrated into the majority of the course.

Skill D5 is taught as part of group project activities in Year 1.

Skills D6 and D7 are taught through courses in Year 1 and through feedback related to laboratory and project work.

Skills D8 and D9 are inculcated throughout the course.

### **Assessment Strategy**

Skills D1 and D3 are assessed through coursework, laboratory and project reports.

Skill D2 is assessed through presentations.

Skill D4 is assessed throughout the course.

Skill D5 is assessed as part of the group project activities in Year 1.

Skill D8 is assessed as part of specialist modules and through integration in other activities.

Other skills are not directly assessed.

## **12 Programme Curriculum, Structure and Features**

### **Basic structure of the programme**

This is a 2 year full-time programme. In each academic year students are required to take 120 credits, with a 60 credit split per semester. Students must complete 240 credits for the award of the BEng (Honours) degree.

Year 1: Reinforces the fundamentals of Electrical Engineering that would have been gained during Diploma courses as well as developing deeper knowledge in the following areas:

Automatic Control, Electrical Systems, Digital Electronics, Analogue Electronics, Random Signals and Processes, Electromagnetic Fields and Waves, Computer Systems and Microprocessors, Signals and Communications and Project and Professional issues.

During the summer of Year 1 students are required to start work towards their final year project while in Newcastle as part of the Overseas Immersion Programme.

Year 2: Includes modules covering the following areas:

State Space Analysis and Controller Design, Electrical Machines and Generators, Power Electronics, Generation, Transmission and Distribution, Renewable Energy Systems, Thermofluid Dynamics, High Voltage Technology. Year 2 also includes a final year project which addresses many of the learning outcomes.

### **Key features of the programme (including what makes the programme distinctive)**

This programme is specifically designed for those candidates who have successfully completed a Diploma in Electrical Engineering or relevant subject at any Polytechnic in Singapore.

Progression from Year 1 to Year 2 and the award of the final degree are subject to the University Undergraduate Progress Regulations and Undergraduate Examination Conventions.

This programme is delivered by Newcastle University in collaboration with the Singapore Institute of Technology, at the Nanyang Polytechnic campus in Singapore.

The quality and standards of the delivery in Singapore will be the same as our other undergraduate degree programmes offered by the School at Newcastle University. Successful candidates will be awarded a BEng degree from Newcastle University.

After successful completion of Year 1 in Singapore, students should attend an immersion programme (OIP) delivered at Newcastle University campus during the UK summer vacation over a short period of 3-5 weeks. The objectives of the OIP are to embed and develop academic skills and information literacy demanded for high-level performance at Honours degree level (and in particular the individual Final Year Project) focussed around the Newcastle University Graduate Skills Framework.

**Programme regulations (link to on-line version)**

<http://www.ncl.ac.uk/regulations/programme/>

**13 Criteria for admission**

*Entry qualifications*

The degree programme is designed for students who hold a Diploma in Electrical Engineering or equivalent qualification from any of the Polytechnics in Singapore (IEng- and EngTech-type at FHEQ Level 4 or higher).

The GPA entrance requirement for Year 1 entry onto this degree programme is 3.0 and above. This is in-line with our entry requirement for direct entry into Stage 2 of our Electrical Engineering Undergraduate degree programmes delivered in Newcastle.

*Admissions policy/selection tools*

The admissions procedure will be carried out by the Singapore Institute of Technology in collaboration with the Undergraduate Admissions team at Newcastle University and selectors within the School of Electrical and Electronic Engineering.

*Level of English Language capability*

Singapore Diploma graduates, having studied in an English academic medium prior to entry, are exempted from English requirements. The selectors for the Electrical Power Engineering programme, will closely monitor the English quality by various means ('O' level, diploma modules, interview, personal statement etc) to identify weaker candidates. Remedial actions may be taken for these applicants. Other applicants, whose first language is not English, would be required to demonstrate achievement of IELTS 6.5 (or equivalent).

**14 Support for Student Learning**

The Student Services portal provides links to key services and other information and is available at: <http://www.ncl.ac.uk/students/>

*Induction*

During the first week of the first semester students attend an induction programme. New students will be given a general introduction to University life and the University's principle support services and general information about the School and their programme, as described in the Degree Programme Handbook. New and continuing students will be given detailed programme information and the timetable of lectures/practicals/labs/ tutorials/etc. The International Office offers an additional induction programme for overseas students.

*Study skills support*

Students will learn a range of Personal Transferable Skills, including Study Skills, as outlined in the Programme Specification. Some of this material, e.g. time management is covered in the appropriate Induction Programme. Students are explicitly tutored on their approach to both group and individual projects.

Numeracy support is available through Maths Aid and help with academic writing is available from the Writing Development Centre (further information is available from the Robinson Library).

#### *Academic and Pastoral support*

Each undergraduate and taught postgraduate student will be assigned a personal tutor.\* A personal tutor is one part of a wider network of advice and guidance available to students to support their personal and general academic development. The module leader acts as the first point of contact for subject-specific academic advice. Thereafter the Degree Programme Director or Head of School may be consulted. Issues relating to the programme may be raised at the Student-Staff Committee, and/or at the Board of Studies. Within the academic unit, students may also receive additional academic and pastoral advice from a range of other student-facing staff including degree programme directors, dissertation/project supervisors, and administrative support staff.

\*Arrangements may vary for students taking special types of provision.

The University also offers a wide range of institutional services and support upon which students can call, such as the Writing Development Centre, Careers Service and Student Wellbeing Service. This includes one-to-one counselling and guidance or group sessions / workshops on a range of topics, such as emotional issues e.g. stress and anxiety, student finance and budgeting, disability matters etc. There is specialist support available for students with dyslexia and mental health issues. Furthermore, the Student Union operates a Student Advice Centre, which can provide advocacy and support to students on a range of topics including housing, debt, legal issues etc.

#### *Support for students with disabilities*

The University's Disability Support team provides help and advice for disabled students at the University - and those thinking of coming to Newcastle. It provides individuals with: advice about the University's facilities, services and the accessibility of campus; details about the technical support available; guidance in study skills and advice on financial support arrangements; a resources room with equipment and software to assist students in their studies.

#### *Learning resources*

The University's main learning resources are provided by the Robinson and Walton Libraries (for books, journals, online resources), and Information Systems and Services, which supports campus-wide computing facilities.

All new students whose first language is not English are required to take an English Language Proficiency Test. This is administered by INTO Newcastle University Centre on behalf of Newcastle University. Where appropriate, in-session language training can be provided. The INTO Newcastle University Centre houses a range of resources which may be particularly appropriate for those interested in an Erasmus exchange.

### **15 Methods for evaluating and improving the quality and standards of teaching and learning**

#### *Module reviews*

All modules are subject to review by questionnaires which are considered by the Board of Studies. Changes to, or the introduction of new, modules are considered at the Board of Studies and/or the School Teaching and Learning Committee. Student opinion is sought at the Student-Staff Committee and/or the Board of Studies. New modules and major changes to existing modules are subject to approval by the Faculty Learning, Teaching and Student Experience Committee.

#### *Programme reviews*

The Board of Studies conducts an Annual Monitoring and Review of the degree programme and reports to Faculty Learning, Teaching and Student Experience Committee. The FLTSEC

takes an overview of all programmes within the Faculty and reports any Faculty or institutional issues to the University Learning, Teaching and Student Experience Committee.

#### *External Examiner reports*

External Examiner reports are considered by the Board of Studies. The Board responds to these reports through Faculty Learning, Teaching and Student Experience Committee. External Examiner reports are shared with institutional student representatives, through the Student-Staff Committee.

#### *Student evaluations*

All modules and stages\* are subject to review by student questionnaires. Informal student evaluation is also obtained at the Student-Staff Committee, and the Board of Studies. The National Student Survey is sent out every year to final-year undergraduate students, and consists of a set of questions seeking students' views on the quality of the learning and teaching. The results from student surveys are considered as part of the Annual Monitoring and Review of the programme and any arising actions are captured at programme and School / institutional level and reported to the appropriate body.

\*With the exception of intercalating years and the final stages of undergraduate programmes.

#### *Mechanisms for gaining student feedback*

Feedback is channelled via the Student-Staff Committee and the Board of Studies.

#### *Faculty and University Review Mechanisms*

Every six years degree programmes in each subject area undergo periodic review. This involves both the detailed consideration of a range of documentation, and a review visit by a review team (normally one day in duration) which includes an external subject specialist and a student representative. Following the review a report is produced, which forms the basis for a decision by University Learning, Teaching and Student Experience Committee on whether the programmes reviewed should be re-approved for a further six year period.

#### *Accreditation reports*

#### *Additional mechanisms*

## **16 Regulation of assessment**

#### *Pass mark*

The pass mark is 40%

#### *Course requirements*

Progression is subject to the University's Undergraduate Progress Regulations and Undergraduate Examination Conventions. In summary, students must pass, or be deemed to have passed, 120 credits at each Stage. Limited compensation up to 40 credits and down to a mark of 35% is possible at each Stage and there are re-assessment opportunities, with certain restrictions.

#### *Weighting of stages*

The marks from Year 1 and 2 will contribute to the final classification of the degree  
The weighting of marks contributing to the degree for Year 1 and 2 is 1:3.

#### *Common Marking Scheme*

The University employs a common marking scheme, which is specified in the Undergraduate Examination Conventions, namely

	<b>Modules used for degree classification (DC)</b>	<b>Modules not used for degree classification</b>
<40	Fail	Failing
40-49	Third Class	Basic

50-59	Second Class, Second Division	Good
60-69	Second Class, First Division	Very Good
70+	First Class	Excellent

*Role of the External Examiner*

An External Examiner, a distinguished member of the subject community, is appointed by Faculty Learning, Teaching and Student Experience Committee, following recommendation from the Board of Studies. The External Examiner is expected to:

- i. See and approve assessment papers
- ii. Moderate examination and coursework marking
- iii. Attend the Board of Examiners
- iv. Report to the University on the standards of the programme

In addition, information relating to the programme is provided in:

The University Prospectus: <http://www.ncl.ac.uk/undergraduate/>

The School Brochure: <http://www.ncl.ac.uk/marketing/services/print/publications/ordering/>

Degree Programme and University Regulations: <http://www.ncl.ac.uk/regulations/docs/>

The Degree Programme Handbook

Please note. This specification provides a concise summary of the main features of the programme and of the learning outcomes that a typical student might reasonably be expected to achieve if she/he takes full advantage of the learning opportunities provided. The accuracy of the information contained is reviewed by the University and may be checked by the Quality Assurance Agency for Higher Education.



## Mapping of Intended Learning Outcomes onto Curriculum/Modules

Module	Type	Intended Learning Outcomes			
		A	B	C	D
EEE2200	Compulsory	1, 2	1, 2, 4, 5, 6, 7, 8, 9	1, 2, 3, 4, 7, 8, 9, 10, 11, 13	1, 3, 4, 5, 7, 8
EEE2201	Compulsory	1, 2	1, 2, 4, 5, 6, 7, 8	1, 2, 3, 4, 7, 9, 10, 13	1, 3, 4, 5, 7, 8
EEE2202	Compulsory	1, 2, 6	1, 2, 4, 5, 6, 7, 8	1, 2, 3, 4, 7, 9, 10, 13	1, 3, 4, 5, 7, 8
EEE2203	Compulsory	1, 2, 6	1, 2, 4, 5, 6, 7, 8	1, 2, 3, 4, 7, 9, 10, 13	1, 3, 4, 5, 7, 8
EEE2204	Compulsory	1, 2	1, 4, 6, 7	4, 7, 9	1, 3, 4, 7, 8
EEE2205	Compulsory	1, 2, 6	1, 2, 4, 5, 6, 7, 8, 9	1, 2, 3, 4, 7, 8, 9, 10, 11	1, 3, 4, 5, 7, 8
EEE2206	Compulsory	1, 2, 5	1, 2, 3, 4, 5, 6, 7, 9	1, 2, 3, 4, 6, 7, 8, 9, 11, 13	1, 3, 4, 5, 6, 7, 8
EEE2207	Compulsory	3	1, 3, 4, 5, 6, 7, 8, 9	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9
EEE2208	Compulsory	1, 2, 5	1, 2, 4, 6, 7, 8, 9	1, 2, 3, 4, 6, 7, 8, 9, 10, 11	1, 3, 4, 5, 6, 7, 8
EEE3200	Compulsory	4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9	3, 6, 7, 8, 9, 10, 11, 13	1, 3, 4, 6, 7, 8, 9
EEE3201	Compulsory	4, 6	1, 2, 3, 4, 5, 6, 7, 8, 9	3, 6, 7, 8, 9, 10, 11, 13	1, 3, 4, 7, 8, 9
EEE3202	Compulsory	4, 6	1, 2, 3, 4, 5, 6, 7, 8, 9	3, 6, 7, 8, 9, 10, 11, 13	1, 3, 4, 7, 8, 9
EEE3203	Compulsory	4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9	3, 6, 7, 8, 9, 10, 11, 13	1, 3, 4, 6, 7, 8, 9
EEE3204	Compulsory	4, 6	2, 4, 5, 6, 7, 8, 9	3, 6, 7, 8, 9, 10, 11, 13	1, 3, 4, 7, 8, 9
EEE3205	Compulsory	4, 6	1, 2, 3, 4, 5, 6, 7, 8, 9	3, 4, 6, 7, 8, 9, 10, 11, 12, 13	1, 3, 4, 5, 7, 8, 9
EEE3206	Compulsory	4, 6	1, 2, 3, 4, 5, 6, 7, 8, 9	3, 6, 7, 8, 9, 10, 11, 13	1, 3, 4, 7, 8, 9
EEE3207	Compulsory	3, 4, 5, 6	1, 2, 3, 4, 5, 6, 7, 8, 9	3, 4, 5, 6, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 6, 7, 8, 9