School of Computing, Engineering and the Built Environment

Department of Electrical and Electronic Engineering

MSc Electrical Power Engineering

September 2018

Programme Specifications Proforma

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1. GENERAL INFORMATION

1.	Programme Title	MSc Electrical Power Engineering
2.	Final Award	MSc Electrical Power Engineering
3.	Exit Awards	PgD Electrical Power Engineering PgC Electrical Power Engineering
4.	Awarding Body	Glasgow Caledonian University
5.	Approval Date	28/3/2017
6.	School	Engineering and the Built Environment
7.	Host Department	Department of Engineering
8.	UCAS code	N/A
9.	PSB Involvement	Institution of Engineering and Technology (IET)
10.	Place of Delivery	Glasgow Caledonian University, Glasgow, UK
11.	Subject Benchmark Statement	QAA Subject Benchmark for Engineering (UK-SPEC)
12.	Dates of PS Preparation/Revision	Sep. 2018
13.	Mode of Delivery	Full-time, Part-time
14.	Programme Duration	1-year Full-time, 2-years Part-time

2. EDUCATIONAL AIMS OF THE PROGRAMME

2.1. Programme Philosophy

The MSc Electrical Power Engineering is designed to equip candidates with the timely skills and specialist knowledge required to significantly enhance their careers in the electrical power industry. This programme aims to develop candidates' power engineering skills via expert teaching and extensive research work conducted by staff in collaboration with industry. This will offer very exciting opportunities to understand the real challenges in future power networks and to develop innovative solutions. Moreover, during the MSc projects, students will work on topics relevant to industry problems or currently discussed in research centres.

This programme also aims to provide graduates with the ability to critically evaluate methodologies, analytical procedures and research methods in:

> Advanced power system analysis and integration of new technologies
> Advanced power electronic, HVDC and FACTS
> Condition monitoring and asset management

2.2. General Aims of the Programme

The aims of this master programme are to enable the student to acquire:

> An understanding of the operational principles and management of future power networks
> An understanding of the importance of network asset management
> An ability to analyse and design power systems problems
> Managerial, communication and information technology skills
> An ability to accommodate future technological changes
> Sufficiently wide perspective of the subject area to evaluate problem solving approaches
> Knowledge to independently conduct research work

3. INTENDED LEARNING OUTCOMES

3.1. Learning outcomes

The programme provides opportunities for students to develop and demonstrate knowledge and understanding of Electrical Power Engineering topics which they can relate to their previous educational qualifications, experience and career aspirations. The programme also develops intellectual skills, applied skills and other transferable skills. A mapping of the programme's Transferable Skills learning outcomes to the programme modules is included as Appendix A in this document. The programme provides opportunities for students to develop and demonstrate knowledge and understanding, skills, qualities and other attributes in the following areas:

3A *Knowledge and understanding*

The graduate will gain a comprehensive knowledge and understanding of the following in relation to electrical power:

A1	the facts, concepts and application of mathematics
A2	the facts, concepts, principles, theories and application of science
A3	the facts, concepts, and application of technology
A4	the concepts, and principles of design
A5	the facts, concepts, and application of IT
A6	the concepts and application of project management principles
A7	the facts, concepts and application of safety and ethics
A8	the concepts and application of quality assurance principles

3B   Practice: Applied knowledge, skills and understanding

The graduate will have the following skills:

B1	Solve complex problems related to electrical power engineering
B2	Obtain, analyse, and interpret data from complex systems and processes
B3	Critically evaluate complex systems and processes
B4	Design components, complex systems and processes
B5	Undertake research in the area of applied electrical power engineering
B6	Undertake practical testing of design ideas, either in the laboratory or though simulation, with technical analysis and critical evaluation of results.

3C   Generic cognitive skills

The graduate will have the ability to:

C1	Critical thinking and problem solving
C2	Critical analysis
C3	Self-confidence, self-discipline & self-reliance (independent working)
C4	Awareness of strengths and weaknesses
C5	Creativity, innovation & independent thinking
C6	Cognitive/intellectual skills
C7	Develop, monitor and update a plan, to reflect a changing operating environment

3D   Communication, numeracy and ICT skills

The graduate will gain/improve the following skills:

D1	Communication skills, written, oral and listening
D2	Numeracy
D3	Effective Information retrieval and research skills
D4	Computer literacy
D5	Presentation skills
D6	Information retrieval skills
D7	IT skills

3E   Autonomy, accountability and working with others

The graduate will gain/improve the following skills:

E1	Knowledge of international affairs
E2	Appreciating and desiring the need for continuing professional development
E3	Reliability, integrity, honesty and ethical awareness
E4	Entrepreneurial, independence and risk-taking
E5	Ability to prioritise tasks and time management (organising and planning work)
E6	Interpersonal skills, team working and leadership
E7	Commercial awareness
E8	Operate effectively within a group to achieve an effective engineering solution
E9	Planning, monitoring, reviewing and evaluating own learning and development
E10	Self-marketing /self-presentation skills

3.2. Delivery, Teaching, learning and assessment methods

A set of Delivery, Teaching, Learning and Assessment Methods are used to enable learning outcomes to be achieved and demonstrated at an appropriate academic standard.

Each Trimester consists of a 12-week block of teaching, in addition to induction and exam weeks, during which students will study all modules on three-week block each. Class contact will be lectures, tutorials, seminars and laboratory sessions when appropriate.   Module leaders issue module handbook detailing the module descriptor, learning outcomes, and assessment strategies adopted.   The programme is designed to accept students at both September and January intakes. All the taught modules of the programme are devised and delivered in a relatively self-contained format and there are no formal prerequisites between any taught modules.

The programme's strategy for learning has been designed to meet the overall aims of the programme as well as the specific learning outcomes expected of students. The teaching approach is student centred, practical and participative and has been designed to move away from the traditional teacher centred paradigm to a more active, student driven, independent model of learning.

In addition, each module will be supported through the managed learning environment, GCU-Learn, which provides on-line support such as: general staff and student announcements and information; course documents (in a wide range of formats); discussion board; and a virtual

classroom (real-time student support, including an electronic white board and a mechanism for real-time Q & A between tutors and students).

The tutorial and laboratory work is integrated as far as possible in order to resolve any issues the student may encounter in understanding particular technologies by referring to concrete examples of their implementation. Both tutorials and labs will be geared to provide real examples and use problem solving to help solidify the concepts and theories learned in lectures.

A range of assessment is applied within the programme, depending on the nature of the subject area. Assessments may involve a range of activities, including research, report-writing, designing and developing technical solutions.

Most of the coursework assignments involve undertaking a significant element of independent study and implementing associated practical tasks within a given deadline. Students are thus required to develop independent responsibility, plan their learning, prioritise tasks and manage their time appropriately in order to successfully complete the assignment. Also includes a presentation of their own work.

Masters Dissertation Assessment

The Master's dissertation module is a very important component of the programme and accounting for 60 credits (approximately 600 hours effort on the part of the student) and is supervised by an appropriate academic member of staff. The project is industrially relevant, ideally directly applicable to the research themes in the electrical power field, to ensure maximum benefit to the student. The underlying philosophy of the Master's dissertation is to allow each student to develop and mature educationally by identifying, studying, analysing and evaluating a substantial problem or challenging issue within the electrical power systems and its future enhancement. The Masters dissertation offers a further and critical alternative to learning within the traditional lecture/tutorial environment and consequently an alternative method for the student to demonstrate their capabilities and to achieve the key learning objectives required from the module.

3.3. Strategy for Learning (SfL)

The University Strategy for Learning 2015-2020 (SfL) is centred on a single goal. It aims to develop graduates who will be;

"Proficient in their discipline, enterprising, responsible and capable of fulfilling leadership roles in different organisational and cultural contexts"

The SfL for the MSc Electrical Power Engineering programme is fundamental to achieving the overall aims of the programme. The teaching approach is student centred, practical and participative and has been designed to move away from the traditional teacher centred paradigm to a more active, student driven, personalised engaged model of learning using state of the art technologies necessary for employability in a digital age.

Students are encouraged to take a broad view of their education and contextualise course materials to their personal objectives and the real world. A range of delivery methods are used on the programme including: lectures; group-based tutorials and seminars (both tutor and student led); group based practical (supervised and directed); problem based learning scenarios and case studies; directed study; coursework assignments (individual and group-based) and supervised projects. Online digital support media allows students to utilise alternative learning materials suitable to their personal learning style.

The strategy presents 8 Curriculum Design Principles which will be embedded into the programmes. This programme embeds these principles in the following ways.

1. Engaged learning:
   - Student Engagement in the programme starts with the induction week, and complemented with regular meeting with the programme leader and module tutors. These meetings are often student led allowing students to actively inform the programme team of any concerns or obstacles at module level.
   - The sense of belongingness begins before the student comes to GCU. Induction is carried out before the students start classes in week 1 and is carried out by members of the programme development team. The same staff members are also involved in teaching the students from the first week of Trimester A allowing a continuity of exposure to key staff in the programme. Students from the previous cohort are invited to all Induction activities to assist in delivery and engagement.

- Group working forms a large part of the student experience
- Other engagement initiatives include Student Staff Consultative Group meetings, Programme Board membership (for student representatives) and the GCU SEBE Engineering Society.
- IEEE student Branch is an area for students to engage with, GCU has established its student branch that includes two chapters.

2. **Divergent thinking**
- Students develop skills in divergent thinking and creativity in a number of modules that provides the opportunity for students to engage with open ended problems and projects both individually and in teams.

3. Flexible, Inclusive and Accessible Learning
- Applicants may be eligible for admission under the GCU Recognition for Prior Learning (RPL) Policy. Credit Transfer or Recognition for Prior Informal Learning (RPiL) can be applied for by any student. Consideration of pre- admission claims for RPL from potential students is coordinated centrally by the Student Recruitment and Admissions Service (SRAS) and will normally involve consultation with the programme leader or Associate Dean for Learning Teaching and Quality.
- Part time students can undertake the programme based on one consolidated teaching block plus two weeks for accomplishing the CWs. This shows a success in the past for other programmes and expected to do same for this programme and deemed to be in the future. Students can meet their module tutors outwith working hours on campus or via technological tools e.g. discussion board.
- All of the modules are made accessible to all through support from GCULearn, and the provision of access to industry standard support through such resources. MATLAB, MAGNET and AMTECH software have all been made available throughout the power labs, which are dedicated to SEBE students only, particularly DoE, as well as a range of other laboratories not necessarily dedicated to their use.
- The School has experience of developing and delivering programmes to a wide range of students. Based on identified needs, specific staff development, adaptation of resources and the development of learning and teaching approaches is continually taking place to ensure access to the curriculum is maximised.

- The programme team fully supports the University's vision for Equality and Diversity and is fully committed to supporting "A culture and environment which is inclusive of all sections of society and responsive to the needs of individuals. Resulting in staff, students and other stakeholders who are free from any form of discrimination in respect of all their dealings with Glasgow Caledonian University, enabling them to participate fully in all aspects of University life and make a valuable contribution to the success of the institution."

- The programme team is committed to the principles of promoting equality of opportunity through eliminating discrimination and disadvantage, and recognising the benefits of diversity. The Programme Board for the programme ensures that all potential and current staff, students and other stakeholders are treated fairly, and are not discriminated against on grounds of sex, marital status, gender reassignment, racial group, disability, sexual orientation, religion or belief, age, socio-economic background, trade union membership, family circumstances, or any other irrelevant distinction. The Programme Board will strive to create an inclusive and supportive environment for all students that values diversity and promote equality.

4. Broader and deeper Learning

- Specialist modules are giving the deeper knowledge and up-to-date research problems in electric power engineering, for example the inclusion of DC grids into the conventional AC grid, the cross-country High Voltage DC link technical challenges, etc.

- The project planning and managements is designed to broaden the candidates learning is few areas that are fundamentals to future engineers, for example, ethics, health and safety issues code of conduct, etc.

- The importance of timely, high quality and constructive formative feedback in a variety of forms is considered very important by the programme team. A number of team members are actively involved in research and scholarly activities in areas of progression, retention and feedback.

- Students are encouraged to attend specialist lectures/talks given by industry representatives. These lectures offer students the opportunity to increase their awareness of the broader context of their discipline and interact with industrial speakers.

- A variety of assessment methods are used within the modules, depending on the aims, objectives and the learning outcomes of the module. For example, some of the modules are more theoretical in nature and others are more practical or software based, while others are more discursive or presentation based. These therefore require different teaching and, learning and assessment approaches. The most common instruments of assessments used are unseen examinations and coursework assessment exercises of various types.

5. Global Learning
   - The programme is estimated to recruit international and European candidates, who are currently studying their BEng in Electrical Power Engineering at GCU or elsewhere in the UK.
   - International and European students will make the on-campus classroom is actually international class where experiences and culture exchanged between students in friendly environment.
   - Case studies based on data collected from overseas companies will be conducted and encouraged within the programme
   - The programme is approaching energy management that is international problem and can be applied anywhere.

6. Real world problem solving
   - The programme is represented on the Department of Engineering Industrial Advisory Board. This Board brings together academic staff with selected individuals from local industry including BAE Systems, Babcock International, Clyde Bergemann, Howden Compressors, Main Tool, NCE Switchgear, Rolls Royce, Scottish Power, with the aim of ensuring that the programme is meeting the needs of industry and that the industry is aware of research and programme development within Department.
   - The programme has a strong interaction with the University Careers Service, with a dedicated representative for the School. This representative is involved in the Industrial Advisory Board, in the delivery of few modules at the UG level and this is expected to continue when needed at this programme.
   - The curriculum is designed to meet the demands of future and current global difficulties such as the need to overcome global warming by providing a platform for engineering

graduates with the skills and attributes necessary for solving those difficulties. Graduates from this programme will be the next generation of engineers involved in many aspects of industry that have energy generation, transportation, instrumentation and communications at the forefront of their expertise.

7. Entrepreneurship and employability

- The entrepreneurial attitudes of the students are developed through modules and study opportunities.

- Students are encouraged to join the world leading Professional Bodies, IET and EI, the latter of which accredits this programme, as student members. They are also encouraged to attend the public lectures delivered by these bodies (and others) which provide an opportunity to develop their knowledge of the application of engineering principles, observe "real world" problems being solved, and network with fellow students and professional engineers alike.

8. Responsible leadership and professionalism

- SEBE offers a range of BEng, BEng(Hons), MEng and MSc programmes that are fully professionally accredited for either Chartered Engineer or Incorporated Engineer recognition. UK_SPEC has an emphasis on these two specific, but different, levels of professional recognition. Students with the MEng or MSc + BEng(Hons) meet the academic requirements for Chartered Engineer registration and those with BEng or above satisfy the academic requirements for Incorporated Engineer registration.

- The programme is designed with the intention of seeking professional body accreditation particularly the IET. Professional ethics, standards and leadership are intrinsic to professional accreditation and the Energy Institute is satisfied that students will meet the professional expectations on graduation.

3.4. Common Good Attributes

At GCU, the Common Good is supported, recognised and embedded within all of our programmes and the wider student experience. The learning experience prepares our students to develop the four 'Common Good Attributes' and equip them to make a positive difference to the communities they will serve. The attributes are:

- Active and Global Citizenship – e.g. recognising and actively seeking to address global

social challenges; participating in the community at a local, national or global level

- Entrepreneurial mind-set – e.g. identifying opportunities for change; creating solutions, and putting these into practice in response to identified real world problems
- Responsible Leadership – e.g. developing solutions that are ethical, visionary, realistic and sustainable; exercising empathy, resilience and professionalism
- Confidence – e.g. challenging yourself and continually learning from experience; believing you can make a positive difference by what you do

These 'Common Good' attributes are underpinned by the GCU core values of Integrity, Creativity, Responsibility, and Confidence. The Common Good attributes are derived from the SfL goal: "To develop graduates who are proficient in their discipline as well as entrepreneurial, confident, responsible and capable of fulfilling leadership roles in different organisational, cultural and global contexts."

GCU students develop the Common Good Attributes through their taught curriculum.

Within this programme, examples of how the common good attributes are developed include:

- Active and Global Citizenship

  As different countries apply different standards in their network, students will be given opportunities to explore the differences in standards and their impacts. MSc in itself addresses the demand of the international communities and candidates. The issues of energy audit and potential energy savings within the "energy audit and energy asset management" module are by nature global concerns.

- Entrepreneurial mind-set

  Students will investigate real world problems in electric energy supply and will contribute to find reasonable solutions that will benefit all communities. This will be covered in modules like power drives that mainly focusing on integration of energy sources into the grid using wide scheme of tools and techniques that make it possible and economically viable.

- Responsible Leadership

  In order to save energy resources for generations to come and reduce the impacts on the environment caused by fossil fuels, students will study and comment on sustainable use of energy resources and ways of integrating renewable sources for all communities.

- Confidence

Students will undertake projects that will reflect upon their capabilities to deliver a standard research projects and tackling challenges that may come from fields.

4. PROGRAMME STRUCTURES AND REQUIREMENTS, LEVELS, MODULES, CREDITS AND AWARDS

The proposed programme consists of 8 taught modules and an industrially relevant project. Each module is credited with 15 credits and the final dissertation is credited with 60 credits. In accordance with the University guidelines, the following exit awards are available:

➢ Un-named, Postgraduate Certificate, when obtaining any 60 credits of the 120 taught credits

➢ Postgraduate Diploma, when obtaining 120 credits

➢ Master of Science, 180 credits (120 credits of taught modules and 60 credits dissertation)

Hence a student accumulating ONLY 60 taught credits would be eligible for the award of Postgraduate Certificate (un-named), student completing the 8 modules and accumulating 120 credits would be eligible for the award of a Postgraduate Diploma in Electrical Power Engineering. On successful completion of the 8 modules, and the project, the student would be awarded the MSc in Electrical Power Engineering.

The Programme Structure is as follows:

Table 4.1: Full-Time MSc Electrical Power Engineering - Programme Structure				Year
Module Code	**Module Title**	**Credit**	Trimester	
MMH723673	Project Planning & Management	15	A	
MMH623585	Power Electronics and Drive Systems	15	A	
MMH624493	Power System Operation & Protection	15	A	
MMH120620	Control Systems	15	A	
MMH223558	Energy Audit and Energy Asset Management	15	B	Y1
MMH624492	Smart Grid & Sustainable Energy Systems	15	B	
MMH624490	Advanced AC and DC Transmission Systems	15	B	
MMH623670	Condition Monitoring	15	B	
MMH621937	MSc Dissertation	60	A/B/C	
		180		

Table 4.2: Part-Time MSc Electrical Power Engineering – programme Structure				
Module Code	**Module Title**	**Credit**	Trimester	Year
MMH723673	Project Planning & Management	15	A	Y1
MMH120620	Control Systems	15	A	
MMH623670	Condition Monitoring	15	B	
MMH624492	Smart Grid & Sustainable Energy Systems	15	B	
MMH623585	Power Electronics and Drive Systems	15	A	Y2
MMH624493	Power System Operation & Protection	15	A	
MMH624490	Advanced AC and DC Transmission Systems	15	B	
MMH223558	Energy Audit and Energy Asset Management	15	B	
MMH621937	MSc Dissertation	60	A/B/C	
		180		

5. SUPPORT FOR STUDENTS AND THEIR LEARNING

5.1. Student Induction

Student induction is a formal programme of events which occurs when students initially enrol on the programmes. Students will normally meet the Programme Organiser prior to teaching on the new Session in Trimester A in the University (and also in the first week of Trimester B for students start at this point).

The programme of events and information includes the following:

- Introduction to Programme Organiser and members of the programme team

- An induction pack which includes a programme information handbook, module descriptors, assessment schedules and a study skills pack.

- Introduction to the programme aims and objectives, the programme content and modes of assessment.

- Introduction to My Caledonian and GCU Learn (Blackboard) services

- Introduction to personal academic adviser

- Introduction to Student Services and the Learning Development Centre

- Tour of the Library and the use of on-line library catalogue

- Tour of the campus

- Selection of student representatives who attend the Student/Staff Consultative Group meetings

5.2. Student Support and Counselling

- Learning Development Centre support for academic activities

- Study skills packages and support from School Learning and Development Centre (LDC)

- Proactive school-based student support scheme including attendance/absence monitoring

- Students wellbeing services

- Equality and Diversity Policy

- Access to Student Support Services including Careers Service and Guidance

5.3. IT Support

- The University C&IT (Computer and Information Technology) services provide a range of student support mechanisms through, wireless access, My Caledonian, student email facilities, open access to a number of University Intranet and Internet connected laboratories, and a Learning Café, printing service.

- All students and staff are connected to the eduroam (education roaming).

- Everyone at GCU has access to lynda.com an online learning company that helps users learn business, software, technology and creative skills to achieve personal and professional goals

- The School also has a number of laboratories with University Intranet and also Internet connectivity to allow access to Managed Learning Environments such as GCU Learn 'Blackboard', which supplement and assist module provision and delivery.

- The school holds licences for many, industrially appreciated, software, many of them are web-based so students can use outwith lab time.

5.4. Academic Support

- Academic support is provided through access to academic advisor, module leaders and tutors. Staff room numbers, email and telephone contact details are provided in the Module Handbooks and can be accessed through a Managed Learning Environment.

- In order to provide on-going support for students, academic staff including the Programme Leader operates a policy of open access for consultation and help through email and suitable managed learning environments. If there is a major concern by an individual student, the

student is encouraged in the first instance to contact the Programme Leader/Organiser to discuss their concerns and to help try and facilitate an early resolution. Students are also made aware of the support and guidance offered by the Student Services Department and may be referred to Student Services as appropriate by both academic and administrative staff.

5.5. Personal Development Planning

- As part of the learning strategy students will participate in Personal Development Planning (PDP) to ensure that they undertake effective planning for their own personal, educational and career development.

- A key element in the PDP process is to foster the employability of graduates. Students will be encouraged to make use of the University Careers Guidance service and other mechanisms in order to develop an awareness of the industry and identify career opportunities.

- Students will be encouraged to attend research seminars and IMechE and IET local branch meetings which are mostly held within the University or at the Teacher Building, city centre.

- Part time students are already employed in a relevant industry and will normally be undertaking the programme as part of their continued professional development. However, the PDP process is also applicable to them and will help them to focus on their objectives and to ensure that they gain maximum benefit from the programme.

5.6. MSc Dissertation Support

Students who undertake this module are supported through the allocation of an *academic supervisor.* During the development of the Masters dissertation proposal students are encouraged and facilitated to approach and meet relevant academic staff to discuss the topic intended for masters' dissertation. After preparing the Masters dissertation proposal students submit a project agreement form that names the supervising staff member.

The programme also has a named academic who acts as the Masters *Dissertation coordinator* and who provides overall guidance for both the student cohort and the academic supervisors on the management and assessment procedures of the Masters dissertations. Prior to the start of Masters Dissertations, the Masters Dissertation coordinator will confirm to the students the allocation of academic supervisors for their Masters' dissertations.

The Masters Dissertation Handbook provides all the key information on the running, management and assessment of the Masters dissertation.

6. CRITERIA FOR ADMISSION

Candidates are required to meet the general entry requirements of the University. Specifically:-

a) A minimum of a 2:2 honours degree of a UK university or equivalent in an electrical engineering or similar.

   OR

b) A formal qualification equivalent to (a) above.

   OR

c) Substantial experience in industry or commerce and supporting evidence of an ability to undertake a programme of study at postgraduate level, AND

   A good knowledge of electrical systems as evidenced by (c) above or appropriate industrial certification or interview.

For students for whom English is not their first language

   An IELTS average score of 6.0 and no element less than 5.5

   OR

   A TOEFL score of 550 (213 for Computer based test)

   OR

   An equivalent qualification

Flexible Entry: Credit Transfer and RPL

Glasgow Caledonian University (GCU) recognises that knowledge and skills can be acquired from a wide range of learning experiences, both formal and informal. The University therefore encourages the Recognition of Prior Certificated Learning, or credit transfer, and the Recognition of Prior informal Learning as a means of providing entry to, or credit within, all of its programmes at both undergraduate and postgraduate levels. The University's Recognition of Prior Learning Guidance Document will be adhered to for all applicants. An applicant may wish to offer prior learning or experience or a combination of this and a formal qualification to gain access to the programme. The University RPL policy can be accessed from **here**

Applicants with a disability

GCU is committed to providing an inclusive student experience, which offers all students the opportunity to achieve their full potential. We positively welcome applications from disabled persons and endeavour to ensure that our application and admissions processes are inclusive of the needs of disabled applicants. Further information can be found in Section 9 of the University Admission Policy **here**

Entry with Advanced Standing:

No advance entry to this programme is permitted

Admissions Procedures

The Admissions tutor will refer applicants who have disclosed a disability on Postgraduate or Part-time application forms to the Disability Team if students have not done so themselves. A copy of the University's Disability Statement – Accessing Opportunity is sent to all such applicants. This details support and facilities available in the University and physical access into and within University buildings.

Applicants will be invited to make contact with the Disability Team to discuss and consider fully any support requirements they may have and how these can be best met.

No applicant will be refused a place on the grounds of disability at the University before this process of consultation has occurred. To assist applicants to make an informed choice, Admissions tutors and relevant academic staff will be available at this pre-entry stage to offer specialist input and allow for consideration of the delivery, content and assessment of the chosen course in relation to the student's disability – see below.

Opportunities for tours of the University campus to establish access routes, shadowing a class for the day, experiencing lab work and meeting with existing students will also be offered.

Assessment and identification of needs

Accurate assessment and identification of a student's learning needs will be the responsibility of the central Disability Team in liaison/partnership with key Academic Staff – Admissions Tutor, Module Leader, Year Leader and school Disability Co-ordinators. Liaison may extend to seeking further specialist advice and assessment from external disability organisations and specialists for applicants who have complex or high support needs.

The programme team is committed to creating an accessible learning environment for all students with disabilities; however in exceptional circumstances a disabled applicant may not be offered a place due to the nature of their disability. This may arise from the following:

> ➢ After the process of consultation outlined above, it may be concluded that an applicant will be unable to undertake a substantial part of the intended programme and fulfil course requirements.

> ➢ The university is unable to make adjustments, as these would be disruptive to other students.

> ➢ Adjustments would result in lowering academic and other standards.

> ➢ Risk assessment highlights hazards to personal safety.

In cases where applicants are refused a place on the grounds of their disability, Admissions staff will be required to detail in writing to the student the reasons for this. This will be endorsed and signed by the Head of the School to which the student has applied. The applicant will also be advised on alternative courses and other institutions in which programmes are available.

7. METHODS FOR EVALUATING AND IMPROVING THE QUALITY AND STANDARDS OF TEACHING AND LEARNING

The University has an established mechanism for evaluating and improving the quality and standards of teaching and learning. These are contained in the Handbook for Continuous Quality Improvement. And it is the intention of the programme team that all of these mechanisms will be adopted.

Mechanisms for review and evaluation of teaching, learning, assessment, the curriculum and outcome standards:

- Annual Programme Monitoring Process
- Annual Module Monitoring Process
- Module Feedback e-Questionnaire (MFQ)
- External Examiners' Reports
- Professional Body Programme Accreditation cycle as stipulated by appropriate PSB.
- Periodic review and re-approval including external peer review panel members.

Committees with responsibility for monitoring and evaluating quality and standards:

- Student-Staff Consultative Group (SSCG)
- Programme Board (PB)
- School Board

- School Learning and Teaching Committee.
- Assessment Board (AB)
- University Learning and Teaching Sub-Committee (LTSC)
- University Academic Policy Committee (APC)
- University Senate

Mechanisms for gaining student feedback on the quality of teaching and their learning experience:

- Student-Staff Consultative Group (SSCG)
- Student representation on Programme Board (PB)
- Student representation on School Board
- Module Feedback e-Questionnaire (MFQ)
- GCU Learn (Black Board)
- Open access to members of Programme Team e.g. Module Leaders, Programme Leader, Academic Advisor, Year Tutor

Staff development priorities include:

- Postgraduate Certificate in Learning and Teaching
- Continuous Professional Development (CPD)
- Performance Annual Review (PAR)
- Peer Support for Teaching
- Mentoring Scheme for New Lecturing Staff
- Conference and Seminar attendance and presentation
- Research Excellence Framework (REF) submission
- Research and consultancy activities and research publications.
- Membership of Higher Education Academy (HEA)
- Membership of, and involvement with, Professional Bodies
- University internal learning and teaching workshops
- Research forums for staff and student presentations
- Staff involvement as external examiners at other Universities

8. ASSESSMENTS REGULATION

University Assessment Regulations for Taught Post graduate Programmes, Academic Session 2016-2017 will apply to this programme.

Programme specific aspects: None

Section 17:

PgC (unnamed) may be awarded for successful completion of **any** four taught modules.

PgD Electrical Power Engineering may be awarded for successful completion of **the** eight taught modules.

9. INDICATORS OF QUALITY AND STANDARDS

- ➢ Details of approval, development events and reviews organised by the School/University
- ➢ Divisional statement on modules
- ➢ Annual programme monitoring
- ➢ PSB accreditation visits and reports
- ➢ QAA Subject Review/ University Subject Review
- ➢ External Examiner Reports
- ➢ Prizes awarded to students by Institutions/Agencies and Industry

10. INFORMATION ABOUT THE PROGRAMME

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 assessment methods of each module can be found in the Module Handbooks.

Key information about the programme can be found in:

- ♣ Programme Documentation
- ♣ Programme Handbook
- ♣ Module Handbook
- ♣ Student Handbook
- ♣ Project Handbook
- ♣ University Web Site www.gcu.ac.uk
- ♣ School Website/Publications
- ♣ Module Catalogue
- ♣ MyCaledonian and GCULearn (Managed Learning Environment)

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 assessment methods of each module can be found in the University Module catalogue which can be accessed from the University website. The accuracy of the information in this document is reviewed by the University and may be checked by the Quality Assurance Agency for Higher Education.

11.   APPENDIX, Module Mapping

Programme Outcomes with Modules – all modules are SCQF Level 11

			Knowledge and understanding								Practice: Applied knowledge, skills and understanding						Generic cognitive skills							Communication, numeracy and ICT skills						Autonomy, accountability and working with others								
			A1	A2	A3	A4	A5	A6	A7	A8	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	C6	C7	D1	D2	D3	D4	D5	D6	E1	E2	E3	E4	E5	E6	E7	E8	E9
1	MMH624490	Advanced AC and DC Transmission Systems	x	x		x				x	x		x		x	x	x							x	x		x	x										
2	MMH624492	Smart Grid & Sustainable Energy Systems			x		x			x		x						x					x		x		x		x	x	x			x			x		
3	MMH624493	Modern Power System Operation & Protection	x			x		x			x			x	x	x	x				x			x	x			x						x				
4	MMH120620	Control Systems	x			x					x		x				x								x													
5	MMH223558	Energy Audit and Energy Asset Management	x		x		x						x					x		x			x	x		x		x	x		x		x			x		
6	MMH723673	Project Planning & Management					x		x		x						x	x	x		x	x	x	x		x		x	x	x	x	x		x	x		x	x
7	MMH623585	Power Electronics and Drive Systems	x			x					x		x	x	x	x								x			x	x					x		x			x
8	MMH623670	Condition Monitoring	x	x		x	x	x					x				x							x	x			x	x					x				
9	MMH621937	MSc Dissertation	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x		x		x