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Programme Specification

Course record information

Name and level of final award:	MSc Electrical Engineering for Modern Sustainable Transport Systems
Name and level of intermediate awards:	Postgraduate Diploma (PGDip) Electrical Engineering Postgraduate Certificate (PGCert) Electrical Engineering
Awarding body/institution:	University of Westminster
Status of awarding body/institution:	Recognised Body
Location of delivery:	Cavendish
Language of delivery and assessment:	English
Course/programme leader:	Dr Anush Yardim
Course URL:	
Mode and length of study:	Full-Time (one year); Part-Time (Two years);
University of Westminster course code:	
JACS code:	H600
UCAS code:	
QAA subject benchmarking group:	Electrical Engineering Electronic Engineering
Professional body accreditation:	IET (to be accredited post validation)
Date of course validation/review:	2016
Date of programme specification:	2016

Admissions requirements

There are standard minimum entry requirements for all postgraduate courses. Students are advised to check the standard requirements for the most up-to-date information. For most courses a decision will be made on the basis of your application form alone. However, for some courses the selection process may include an interview to demonstrate your strengths in addition to any formal entry requirements. More information can be found here: https://www.westminster.ac.uk/courses/postgraduate/how-to-apply.

Aims of the course

The overall aim of Conversion MSc course Electrical Engineering for Modern Sustainable Transport Systems is to provide an enriching learning experience, enhancing the knowledge and skill base of the participating students in the area of intelligent and efficient transport systems design. In particular, the course will develop advanced practical skills to enable the student to determine system requirements, select and deploy a suitable design process and use the latest specialist tool chains to test and/or prototype a device or algorithm. Modern electrical, electronic and communication systems for intelligent transport today are a combination of skills and solutions that require engineers with cross-disciplinary abilities to implement them. The course covers a broad range of disciplines that will enable a successful graduate to enter into a career that requires a cross-disciplinary approach with a practical skillset. The course is intended both for engineers in current practice and for fresh honours graduates to facilitate their professional development, mobility and employability.

More specifically, the generic aims of the course are to:

G1. Encourage a lively investigative spirit that will sustain a commitment to independent future study.
G2. Provide communication skills associated with oral and written presentations of technical work and develop interpersonal and organisational skills associated with project planning, execution and appraisal.
G3. Provide individualised experience of a significant individual project which exploits and applies disparate modules of knowledge.
G4. Foster a spirit of independent student-centred study with effective management of time and development of research methods.
G5. Provide a broad coverage of engineering topics that includes not only technical design issues but also a wider set of considerations including social and economic issues, ethical issues and environmental issues.
G6. Develop team work skills by providing a frame work of team activities

In addition, the MSc in Electrical Engineering for Modern Sustainable Transport Systems aims to produce postgraduates with a strong practical skill base that will enable them to model, analyse, design electric motors with the appropriate drives and control, as well as sensors and communication subsystems for intelligent and efficient transport systems. Furthermore, the design and prototype of either power conversion circuits, or digital control sub-systems, or sensor system including data acquisition and processing systems will be pursued. Specialist knowledge and practical skillsets will be taught, extensively developed and practiced in the areas of electric motor and drives, power conversion circuits, control systems, sensors and communication. The analysis, categorisation and design strategies of rail and road vehicle systems that meet the increasingly stringent requirements for a sustainable and intelligent transport system will be addressed.

The knowledge and skillsets taught within the course are extensively used, as an example, in the design of electrical and electronic systems in modern electric vehicles and self-driving cars. They are also the key enabling skillsets used to implement devices, circuits and systems for applications such traffic monitoring and control, network rail condition control, and other possible services for future intelligent and efficient transport systems exploiting the availability of collaborative and cloud technologies.
Broader considerations such as the social and economic impact of modern and sustainable transport systems, health and safety and existing and forthcoming legislative issues will be examined. It is intended that the course will re-focus and enhance existing knowledge in the areas of electrical engineering, power electronics, sensor and communication systems to enable the student to participate in the fast expanding and exciting sector of intelligent road vehicle and rail transport systems.

In particular, the course aims to:

ERC1. Teach advanced system level design, documentation and implementation approaches and provide practical experience in the development and prototyping of electrical and electronic systems in the context of intelligent transport systems using innovative product design methodologies, platforms and tools.

ERC2. Explore broader issues concerning the development and adoption of an intelligent and efficient transport system including legislation for road vehicle and rail transport, sustainability and safety considerations and product life cycle.

ERC3. Teach and deploy mathematical and software based tools to analyse, model and describe the motion and behaviour of an electric machines with techniques that allow its usage as both motor and generator.

ERC4. Teach the theoretical background and develop practical skills to analyse, design, test and prototype power conversion and control sub-systems for electric motors and generators.

ERC5. Develop skills in the deployment and programming of real-time embedded microcontroller platforms for data acquisition and processing, providing first-hand experience in prototyping a sensor system.

ERC6. Teach analytical tools and methodologies to analyse, model and design communication systems including data transmission and security and frequency bands allocation.

ERC7. Deploy software tools and formalization techniques to design algorithms for smart transport applications, developing image analysis techniques for features recognition in the automotive domain, and devising formal descriptions of complex systems and infrastructures, such as railway networks.

Employment and further study opportunities

Today's organisations need graduates with both good degrees and skills relevant to the workplace, i.e. employability skills. The University of Westminster is committed to developing employable graduates by ensuring that:

- Career development skills are embedded in all courses;
- Opportunities for part-time work, placements and work-related learning activities are widely available to students;
- Staff continue to widen and strengthen the University's links with employers in all sectors, involving them in curriculum design and encouraging their participation in other aspects of the University's career education and guidance provision;
- Staff are provided with up-to-date data on labour market trends and employers' requirements, which will inform the service delivered to students.

The subject areas covered within the MSc course offer students an excellent launch pad which will enable the successful graduate to enter into this ever expanding, fast growing and dominant area within the electrical engineering sector, and particularly in the area of intelligent and efficient transport systems. With ever increasing demands from consumers such as efficient, sustainable and safe transport systems, reduced pollution, increased battery lifetime and advanced electronic assisted driving features combined with reductions in cost, modern electrical, electronic and communication systems are finding ever more application areas. As an example, recent advances in embedded system devices has led to a leap forward in electric motor design and utilization. Real time modelling and simulation are now incorporated as standard into many motor drives, thus allowing them to achieve very high level of dynamic performance and efficiency.
Industry and users have fed the explosion in demand for advancements in electrical, electronic and communication systems for transport. In particular, demands for higher efficiency and sustainability, driving assistance, position and traffic control for smart transport planning, demands to reduce transportation time and cost have become common place. This has led to expanding opportunities within the modern electrical, electronic and communication engineering sector. In particular, there is a need for engineers that can solve problems requiring a multi-disciplined approach covering skills from electrical engineering, control engineering, power electronic systems engineering, communication engineering, digital electronic systems engineering, analogue electronic engineering, and mechanics amongst others.

The MSc degree offered will provide the foundations required to re-focus existing knowledge and enter the world of multi-disciplined jobs. Possible job titles that a successful graduate with the relevant background education and experience may inspire to include:

- Electrical systems design engineer
- Control systems engineer
- Transport systems engineer
- Plant control engineer
- Electronic systems design engineer
- Communication systems design engineer
- Sensor systems engineer
- Computer systems engineer

In various industries such as:

- Transport industries
- Automobile industry
- Aviation industry
- Electrical systems industry
- Electronic systems industry
- Assembly line manufacturers
- Robotics and home help industries
- Toy industry
- Communication systems industry
- Logistics and distribution industries
- Consumer industry
- Life-style industry
- Security and surveillance industry
- Petro-chemical industry

The lists above are not prescriptive or exhaustive. There are many companies that require a workforce that have good engineering skills combined with a high level of knowledge in electrical and electronic technologies and transport systems. Despite the high demand for engineers that are competent in electrical systems as well as in control, electronic and communication disciplines, currently the supply of good systems engineers, that can fulfil all the requirements of these sectors, is too small. This has led to increased demand as companies scramble to get the best candidates that they can.

Learning outcomes

General Learning Outcomes

Knowledge and understanding

Graduates will satisfy the following criteria:

G1: they will be able to demonstrate their knowledge and understanding of essential facts, concepts, theories and principles pertaining to their area of engineering, and its underpinning science and mathematics. They will appreciate the social, environmental, ethical, economic and commercial considerations affecting the exercise of their engineering judgement.

Specific skills

G2: they will be able to apply appropriate quantitative science and engineering tools to the analysis of problems. They will be able to demonstrate creative and innovative ability in the synthesis of solutions and in formulating designs. They will be able to comprehend the broad picture and thus work with an appropriate level of detail.

G3: they will possess practical engineering skills acquired through, for example, work carried out in laboratories; in project work; in design work; and in the use of computer software in design and analysis.

Key transferable skills

G4: they will have developed transferable skills that will be of value in a wide range of situations. These skills include:

- The ability to exercise initiative and personal responsibility whilst working with others.
- The ability to plan self-learning and improve performance, as the foundation for lifelong learning
- The ability to communicate effectively through written reports and presentations and the ability to handle competently technical questioning.
- The ability to use effectively general IT and information retrieval facilities.
- The ability to develop, monitor and update a plan, to reflect a changing operating environment.
- The ability to monitor and adjust a personal programme of work on an on-going basis, and to learn independently;
- The ability to learn new theories, concepts, methods, etc and apply these to solve problems in unfamiliar situations.

Specific Learning Outcomes

1. Science and Mathematics

Graduates will be able to demonstrate:

SM1fl a comprehensive understanding of the scientific principles and underlying mathematics used to describe, model and evaluate the operation of electric motors and the underlying control, sensing and communication sub-systems that are used to realise an intelligent and efficient transport system;

SM2fl an awareness of the characteristics and limitations of current practices, technologies and state-of-the-art techniques used in modern and sustainable transport systems and their electro-mechanical, control, sensing and communication sub-systems, and how these characteristics and limitations influence the adoption of a specific motor and its control, and data acquisition, data processing and communication sub-systems in various transport systems;

SM3fl know-how in the analysis, modelling, deployment and underlying principles of electric motor and drives, power conversion, control systems, sensors and communication standard used in road vehicles and rail transport systems together with a broader understanding of legislation, safety and legislative requirements, environmental concerns, regulatory processes and certification requirements, in both individual coursework's and a final complex engineering project.

2. Engineering Analysis

Graduates will be able to demonstrate:

EA1fl in-depth know-how in the analysis and modelling of various complex sub-systems of intelligent and efficient transport systems to facilitate optimal planning and management, efficiency and sustainability, performance, robustness of control and stability together with an understanding of the limits of the models and analysis tools used;

EA2fl the ability to evaluate and review the research and/or industry issues in the area of intelligent and efficient transport systems and their control, sensing and communication sub-systems within a project domain given fundamental knowledge of the analysis and design tools used for road vehicles and rail transport systems design and where appropriate investigate and appraise new emerging technologies;

EA3fl the ability to use effectively appropriate methods of gathering and analysing information including research data to formulate a proposal that presents and/or defends research and current practice in the area of transport systems and then apply the appropriate innovative techniques, adaptation of an existing engineering analytic method or use of appropriate analysis techniques and tools to solve a complex real problem.

3. Design

Graduates will be able to demonstrate:

D1fl the ability of using knowledge gained to determine the initial requirements of a given road vehicle or rail transport system and/or control or sensing and communication problem with an incomplete or uncertain description by analysing, modelling and solving the motor electrical behaviour and/or control signal dynamics or communication bandwidth constraints of an intelligent and efficient transport system; the ability to determine an initial specification for the solution based on the requirements identified; the ability to implement a prototype test bench by writing real-time software for the solution on a given development platform and through experimentation quantify the effects of various configuration and parameter choices in respect of functionality, performance, efficiency, robustness and stability to produce the final design and solution;

D2fl the ability to undertake a complex project in the area of intelligent and efficient transport systems that is unfamiliar; the ability to select a suitable design process and methodology and apply them; the ability to communicate the objective defence of the chosen design process against other possible selections taking into account the nature of the technical solution and a broader range of engineering issues including professional codes of practice, commercial risk, sustainability, social and environmental impact, legislation, regulatory practice, safety and risk analysis;

D3fl the ability to independently work on and solve complex real problems in the area of intelligent and efficient transport systems from specification to final build and test, by applying, modifying where appropriate, and deploying advanced engineering techniques and tools to solve new design problems; the ability to critically evaluate their own work knowing current solutions and practices, identifying limitations of their work and assessing contributions of their work with respect to the existing knowledge base.

4. Economic, Legal, Social, Ethical and Environmental Context

Graduates will be able to demonstrate:

ET1fl the ability to fully articulate the importance of high levels of professional and ethical conduct given knowledge and understanding of development costs and the social and environmental impacts caused by the use of modern road vehicles and rail transport systems; the ability of the student to write technical reports to prescribed

standards and formats, to work to deadlines and to critically evaluate their work and give a critical reflection of the planning and management of their professional development;

ET2fl the ability to communicate an objective defence of the chosen design process taking into account commercial risk, codes of practice, ethical requirements, safety requirements and the environmental impact of intelligent and efficient transport systems;

ET3fl the ability to communicate an objective defence of the chosen business arguments taking into account commercial risk, regulatory practices and certification requirements, safety requirements and the environmental impact of modern and sustainable transport systems;

ET4fl the ability to identify required resources and defend and deploy methodologies, business arguments and design processes that will ensure sustainable development;

ET5fl the ability to communicate an objective defence of the design process, design methodology and/or business arguments chosen given the regulatory requirements in the area of modern and sustainable transport systems;

ET6fl the ability of the student to evaluate risks related to the environment, health and safety and where appropriate commercial risk of modern and sustainable transport systems.

5. Engineering Practice

Graduates will be able to demonstrate:

EP1fl an advanced level of knowledge and understanding of the principles, limitations and electro-mechanical characteristics of electric motors, timing characteristics, design and/or implementation, deployment and application of power drives and control systems, communication standard and interfaces, and instrumentation such as sensors and actuators in the context of intelligent and efficient road vehicles and rail transport systems;

EP2fl the ability to use effectively methods of gathering and analysing information and develop a thorough understanding and critical evaluation of current practices used in modern transport systems; the ability to identify and critically evaluate possible future trends in intelligent and efficient transport systems;

EP3fl the ability to select, report and apply a suitable design process and design methodology given commercial and industrial constraints for a complex road vehicle and rail transport system problem.

EP4fl understanding of different roles within an engineering team and exercise initiative and personal responsibility within their role.

Learning, teaching and assessment methods

Learning and Teaching

The taught portion of the courses is delivered in three highly concentrated 40 credit modules which we call learning modules. The teaching within these modules is delivered in the format of an industrial short course. This delivery style allows students to rapidly gain a full overview of the horizons of the subject matter and furthermore enables the student to achieve a state of relevant functionality without a great deal of elapsed time. This can be especially advantageous if the student is attending on an occasional basis, or has urgent needs of immediate skill in a given topic area at his/her place of work.

Within the taught portion of each module there is adequate time given to “hands-on” practice of concepts and tools taught. The student usually experiences practical in-place application of the knowledge being dispensed during the taught portion of the module on most days. Any assignments and exercises carried out within the taught portion of a module are meant to develop basic capability and, as such, serve as a useful vehicle for sharpening the skills baseline required for undertaking the portfolio of work described within the Independent Learning Package (ILP).

The ILP consists of a collection of short answer, long answer and open ended project based assignments and tasks that must be solved independently by the student. The project based task within the ILP will require the student to exercise and use principles, concepts and technologies within the specialism of the module to design, implement and verify the operation of a complex real system. In some modules the project component may be in the form of a group project whilst in other modules the project component may be in the form of an individual project.

Each taught module is allocated 400 hours of study time. Out of this time 70 hours or 10 working days are allocated to the delivery of the taught portion of the module, 16 hours are allocated to additional tutorial sessions and the remaining 314 hours are allocated to the student to work on and complete the ILP. To enable the student to further practise and solidify their understanding of material taught and their abilities in using the relevant tool sets additional tutorials outside of the taught portion of the module are provided. These tutorials provide just in time practice sessions during the ILP period of the module. The ILP is where the remaining learning takes place, where abundant ‘soak-time’ to solve the portfolio of work described within the ILP package document is given. The performance of work carried out for the ILP can take place at the university, within the students’ place of work or at their home.

Assessment

Assessment of Learning Modules

The assessment for the learning modules is formed by setting a portfolio of work known as an Independent Learning Package (ILP) that the student must complete. The ILP typically consists of short answer, long answer and open ended project based assignments and small tasks. The student must submit their completed ILP work in the form of an ILP report that will contain a critical, reflective and detailed description of the independent work carried out by the student and the results achieved by the student.

Unlike the assignments given in the ILP exercises carried out in the taught portion of a learning module are not assessed, these exercises are meant to develop basic capability and, as such, serve as a useful vehicle for sharpening the skills baseline for undertaking the associated Independent Learning Package (ILP) – often through keen competition within the class. In summary, the taught portion of a module is not explicitly subject to assessment, whereas ILPs are.

Assessment is carried out when the student presents himself/herself for examination. This process has two phases: submission of all supporting written evidence (worked problems, design and simulation results, software programs, written reports and the like) in the form of an ILP report, followed by attendance for an oral defence of the work detailed in the ILP report. An ILP Review Panel, consisting of at least two members of staff, will be empowered to determine the level of achievement of the student by giving a 'Pass with Distinction', 'Pass with Merit', 'Pass' or 'Fail' judgement after thorough scrutiny of the written evidence and hearing the oral defence and to make a recommendation to the Assessment Board.
It will be the principal task of the panel to assess the student's competence through carrying out the assigned work, with respect to the norms of professional-level competence which pertain to that subject. The result is a 'Pass with Distinction', 'Pass with Merit', 'Pass' or 'Fail' judgement. Students must achieve at least a 'Pass' to be awarded the credits for that module. Specifically, the criteria used for assessment are the learning outcomes of each Learning Module. In order to pass a module:

1. The student must demonstrate achievement in **each** and **every** learning outcome either through the written ILP submission or during the oral examination;
2. The majority of the required ILP work must be completed satisfactorily as viewed through the written submission;
3. The majority of the candidate's responses in the examination must be correct;
4. The oral examination must verify that the student has ownership of the ILP material and is able to defend it effectively.

The major purposes of the oral examination are to:

- verify that the student has ownership of the written submission;
- clarify the student's degree of subject authority in areas where this has not been established through the written submission;
- explore the student's mental flexibility in applying advanced levels of technical knowledge to new applications;
- probe the student's depth of understanding and capacity for higher level critical analysis;
- allow the student to demonstrate interactive communication skills.

Failure to submit the written material by the deadline acknowledged by the student or absence from the oral examination, without reasonable cause supported by evidence submitted in accordance with the University's mitigating circumstances procedures, will be considered a failure of the module. Therefore, a subsequent late submission or attendance at a re-scheduled oral examination would constitute a re-assessment. Students experiencing difficulties should contact their Personal Tutor, the Module Leader or the Course Leader for advice, well before the deadline.
If the candidate has passed the module at the first attempt and is not being reassessed, and the candidate's submitted ILP work and performance during the examination are deemed to be meritorious, the panel will flag the pass as being "With Merit". This is exemplified by:

1. the student demonstrating subject authority with reasonable confidence and fluency;
2. a virtually complete written submission, on time, with few mistakes;
3. little or no help required in handling technical questioning during the oral examination;
4. the ability to conceptualise and critically evaluate their subject matter.

If the candidate has passed the module at the first attempt and is not being reassessed, and the candidate's submitted ILP work and performance during the examination are deemed to

be outstanding, the panel will flag the pass as being "With Distinction". This is exemplified by:

1. the student demonstrating a complete subject authority with confidence and fluency;
2. a virtually complete written submission, on time, with no significant mistakes;
3. the ability to handle technical questions during the oral examination with confidence and fluency;
4. the ability to demonstrate in-depth know-how in their subject matter;
5. the student showing evidence of being able to extend and apply the taught material to new situations with alacrity.

The panel may make a recommendation of 'Pass', 'Pass with Merit' or 'Pass with Distinction' conditional upon minor modifications to the submitted ILP work being completed.

Project Assessment

Completion of the Individual Project is signalled by submission of the Project thesis for assessment. A Project Review Panel receives an oral defence of the project work and, incorporating its assessment of the thesis, decides upon credit award. Again, this is a 'Pass with Distinction', 'Pass with Merit', 'Pass' or 'Fail' decision.

Failure to submit the thesis by the deadline agreed by the student or absence from the oral examination, without reasonable cause supported by evidence submitted in accordance with the University's special circumstances procedures, would be considered a failure of the module. Therefore, a subsequent late submission or attendance at a re-scheduled oral examination will constitute a re-assessment. Students experiencing difficulties should contact their Supervisor, their Personal Tutor the Project Co-ordinator or the Course Leader for advice, well before the deadline. For further details, please refer to Section 6 of the handbook of academic regulations. You can also find information regarding assessment in section 5 of the essential Westminster Information Guide published by the university.

If the candidate has passed the Project at the first attempt and is not being reassessed, and the candidate's project thesis and performance during the examination are judged meritorious, the panel will flag the pass as being "With Merit". This would be exemplified by:

1. a significant amount of independent work undertaken during the project period;
2. the candidate demonstrating subject authority with reasonable confidence and fluency;
3. the ability to critically evaluate the work undertaken;
4. good written skills in terms of drafting and self-editing;
5. a thesis submitted on time, with few mistakes;
6. little or no help required in handling technical questioning during the oral examination.

If the candidate has passed the Project at the first attempt and is not being reassessed, and the candidate's project thesis and performance during the examination are judged outstanding, the panel will flag the pass as being "With Distinction". This would be exemplified by:

1. a substantial amount of independent work undertaken during the project period;
2. the candidate demonstrating a complete subject authority with confidence and fluency;
3. the ability to conceptualise and critically evaluate the work undertaken at a high level;
4. excellent written skills in terms of drafting and self-editing;
5. a thesis submitted on time, with no significant mistakes;
6. the ability to handle technical questions during the oral examination with confidence and fluency;
7. evidence of the student extending the original scope of the project.

A structured procedure will be employed in grading both the thesis and performance during the oral presentation. There will be at least three members on a Project Review Panel: Supervisor, Assessor and Moderator. The Project Supervisor has greatest familiarity with the topic and the volume, depth and quality of the student's work. The Assessor, like the Supervisor, will have studied the thesis prior to the presentation. By contrast, the Moderator

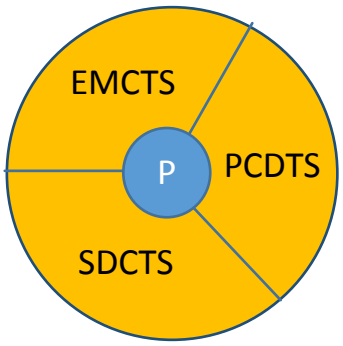
judges solely on the quality and accuracy of the oral presentation and the candidate's ability to conduct a credible defence during questioning. The Moderator, who is present at a significant number of the project oral examinations, has the additional responsibility to adjudicate and harmonise the panel's findings with those resulting from other Project presentations. Following the examinations, the Moderators meet as a panel to finalise the harmonisation of results across the cohort and to resolve any borderline cases.
As with the learning modules, the learning outcomes of the Project form the basis of the assessment criteria. No explicit weighting is placed on the written report and on the oral examination. The two forms of assessment collectively ensure that the learning outcomes of the Project are achieved for it to be passed. However, the oral examination has certain specific functions which include:

- the opportunity for the student to demonstrate presentation and interactive communication skills;
- verification that the project is the student's own work;
- clarification of the student's degree of subject authority in areas where this has not been established within the report;
- probing the student's depth of understanding of the project;
- exploring the student's mental flexibility in extending the reported project work to new areas.

Course structure

This section shows the core modules of the course and their credit value. Full-time Postgraduate students study 180 credits per year.

The course consists of three taught modules (40 credits each) plus an individual project (60 credits). All four modules (taught modules and the project) are core modules for the course (there are no option modules).



Credit Level 7				
Module code	**Module title**	**Status**	**UK credit**	**ECTS**
TBC	Electric Motors and Control for Transport Systems	Core	40	20
TBC	Power Conversion and Drives for Transport Systems	Core	40	20
TBC	Sensor, Data Acquisition and Communication for Transport Systems	Core	40	20
7ELEN016W	Project	Core	60	30

The inner layer represents the project module P (7ELEN016W), which is composed of two parts, denoted by Part I and Part II; students will need to have completed all the taught modules before undertaking Part II of the project module.

The outer layer represents the three taught core modules, which characterize the degree.

Each taught module consists of:

- A ten-day short course run Wednesday to Tuesday to provide two weekend breaks;
- An Independent Learning Package (ILP), which has the aim of assessing and reinforcing the learning outcomes developed through the taught material in the short course.

The ten-day short course structure of each of the taught modules within the MSc allows employees from Industry to undertake the course, wherever they are geographically based, by being released by their employer for this short period. Therefore, it provides a feasible route for them to completing the educational requirements for CEng while in employment.

The ILP allows students to tackle real life industry relevant engineering problem or challenge over eight weeks for full-time mode and sixteen weeks for part time mode.

Penalties for Late Submission of Coursework

The University operates a two-tier penalty system for late submission of ILP and project reports. This regulation applies to all students registered for an award, irrespective of their level of study. All University coursework deadlines are scheduled between Monday and Thursday inclusive.
If the report is submitted within 24 hours of the deadline, a Distinction grade cannot be awarded and a Merit grade cannot be awarded unless the work was, in fact, of Distinction quality. If the report is submitted more than 24 hours or more than one working day after the specified deadline you will be given a grade of 'fail' for the work in question.
Late work and any claim of mitigating circumstances relating to coursework must be submitted at the earliest opportunity to ensure as far as possible that the work can still be marked. Late work will not normally be accepted if it is received more than five working days after the original coursework deadline. Once the work of other students has been marked and returned, late submissions of that same piece of work cannot be assessed.

Reassessment of Learning Modules and the Project

Normally, no student shall be permitted to attempt a Learning Module more than twice other than when sanctioned by the Mitigated Circumstances Board. Following failure of the first assessment of the project, the student may either be reassessed or to retake the Project in entirety at the discretion of the Assessment Board. The Project cannot be retaken following reassessment nor can a second attempt be reassessed.
Reassessment may take the form of a re-submission of all or part of the ILP written submission or project report;
OR a repeat viva voce examination;
OR both.
The award of credits with Merit or Distinction cannot be made following reassessment.

The Assessment Boards

Wherever possible, there will be a joint combined Subject and Conferment Board for the following courses:

- Electrical Engineering for Modern Sustainable Transport Systems,
- Electronics with Robotic and Control Systems,

- Electronics with Embedded Systems,
- Electronics with System-on-Chip Technologies,
- Electronics with Medical Instrumentation,
- Telecommunications with Digital Signal Processing,
- Telecommunications with Satellite and Broadband Technologies,
- Telecommunications with Wireless Technologies,
- Computer Networks with Security,
- Computer Networks and Communications,
- Computer Networks with Cloud Technologies

The role of the Subject/Conferment Board is to confirm the recommendations of the ILP and Project Review Panels in the award of credits for modules passed and to recommend the award of MSc, PgDip and PgCert and whether these awards should be conferred with Merit or Distinction.
The Mitigating Circumstances Board will take into account any mitigating circumstances, submitted by the student, which may have affected the student's performance in one or more modules. Where the Mitigating Circumstances Board is satisfied that the mitigating circumstances affected the student's performance in that module assessment, it will recommend to the Subject/Conferment Board to compensate for the mitigating circumstances if the student has marginally failed or to allow deferred assessment.
The Subject/Conferment Board may make aegrotat awards in accordance with the Assessment Regulations of the University.

Role of the External Examiners

A panel of typically three External Examiners shall be appointed to these courses in accordance with the regulations of the University. The expertise of the panel should collectively span the subject areas of the courses being considered. The principal roles of the External Examiners are to oversee and certify:
1. the academic standards and advise on the operation of the core and option Learning Modules;
2. the individual projects of students;
3. the operation of the assessment boards and the overall standard of the awards.

The External Examiners will have access to all matters pertinent to the courses, including ILP reports of assessment retained by the Module Leaders. However – in view of the multitude of asynchronous milestones being completed by various students – it will not generally be practical to consult on anything other than a macroscopic, retrospective basis.
It is standard practice to record all oral examinations and to archive these recordings for at least one year. In this way, the External Examiners will be able to reconstruct and evaluate all factors which have contributed to any individual student’s assessment, thereby having unimpeded oversight of every aspect of course operation.
The duties of the External Examiners will include:
- sampling of ILP assignments to ensure the calibre of their content and the standard of the work carried out by the students;
- sampling of project theses to ensure that a postgraduate standard is being maintained;
- viewing samples of video records of oral examinations for ILPs and projects;
- attending assessment boards;
- providing an annual report to the University on the operation of the course and assessment procedures.

Academic Regulations

The MSc Electrical Engineering for Modern Sustainable Transport Systems and its intermediate awards operate in accordance with the University's Academic Regulations and the UK Quality Code for Higher Education Part A: Setting and Maintaining Academic Standards, Frameworks for Higher Education Qualifications of UK Degree-Awarding Bodies document published by the Quality Assurance Agency for Higher Education (QAA) in October 2014.

All students should make sure that they access a copy of the current edition of the general University handbook called Essential Westminster, which is available at http://www.westminster.ac.uk/study/current-students/resources/essential-westminster.

The following regulations should be read in conjunction with Section 18: Modular Framework for Postgraduate Courses and relevant sections of the current Handbook of Academic Regulations, which is available at westminster.ac.uk/academic-regulations

Award of Master of Science (MSc) Degree

To be eligible for the award of Master of Science (MSc) Degree, a student must have:

(a) obtained a minimum of 180 credits accrued from the Project and three taught modules forming their course, normally including all the core taught modules;
(b) attempted modules worth no more than 240 credits

Note: A first attempt of any module will count as an attempt, and a re-attempt of any module that a student has failed will count as a further, separate attempt. Reassessment following referral at the first sit will not count as a further separate attempt.

The MSc Degree may be awarded with Merit normally if the student has:
(a) passed the Project at the first attempt without reassessment;
(b) not failed, or been re-assessed in more than one taught module;
(c) accrued at least
  (i) 100 credits with Merit, or
  (ii) 80 credits with Distinction

The MSc Degree may be awarded with Distinction normally if the student has:
(a) passed the Project at the first attempt without reassessment;
(b) not failed, or been re-assessed in more than one taught module;
(c) accrued at least
  (i) 180 credits with Merit or Distinction including 100 credits with Distinction, or
  (ii) 140 credits with Distinction.

Award of the Postgraduate Diploma (PgDip)

To be eligible for the award of a Postgraduate Diploma (PgDip), a student must have obtained a minimum of 120 credits accrued from the modules forming their course, including:

- a core module, and
- a second core module or the Project

, ,
The Postgraduate Diploma may be awarded with Merit normally if the student has accrued 120 credits at the first attempt including 80 credits with Merit or Distinction

The Postgraduate Diploma may be awarded with Distinction normally if the student has accrued: 120 credits at the first attempt with Merit or Distinction including 80 credits with Distinction

Award of a Postgraduate Certificate (PgCert)

To be eligible for the award of a Postgraduate Certificate, a student must have a minimum of 60 credits

The Postgraduate Certificate may be awarded with Merit normally if the student has accrued 60 credits at the first attempt with Merit or Distinction

The Postgraduate Diploma may be awarded with Distinction normally if the student has accrued 60 credits at the first attempt with Distinction

A student registered for the MSc award may elect to submit his/her credits for the award of a Postgraduate Certificate or Postgraduate Diploma but, by so doing, relinquishes the right to submit those credits for the award of an MSc (or Postgraduate Diploma if submitting for Postgraduate Certificate) at a later date.

Statutes of Limitations

The time limit for a student to complete their programme of study shall be as follows

	Full-Time	Part-Time
MSc	4 years	5 years
PgDip	2 years	4 years
PGCert	1 year	2 years

Where a student, having attempted modules worth more than 80 credits, has failed modules worth ***more*** than **1/3** of total credits attempted, or has failed and cannot have a further attempt at a core module, and the Subject/Conferment Board judges that the student will not achieve the next named award to which the student would be eligible within the maximum period of registration, then the board may exclude the student from the programme of study. Alternatively, the Board may recommend that the student transfer to the Postgraduate Diploma programme (and consequently not undertake the Individual Project module). Normally, this would not be done if the student has passed at least **three** taught modules at the first attempt without reassessment.

How will you be supported in your studies?

Course Management

This course is managed by staff from the Department of Engineering in the Faculty of Science and Technology. The Course Team consists of lecturers on individual modules, the Head of Department and technical support staff. The day-to-day running of each course is the responsibility of the Course Leader, while the strategic direction of the courses and the allocation of staff is the responsibility of the Head of the Department. The Dean of the Faculty of Science and Technology takes overall responsibility for all departments within it.

Academic Support

Upon arrival, an induction programme will introduce you to the staff responsible for the course, the campus on which you will be studying, the Library and IT facilities, additional support available and to your Faculty Registry Office. You will be provided with the Course Handbook, which provides detailed information about the course. Each course has a course leader or Director of Studies. All students enrolled on a full-time course and part time students registered for more than 60 credits a year have a personal tutor, who provides advice and guidance on academic matters. The University uses a Virtual Learning Environment called Blackboard where students access their course materials, and can communicate and collaborate with staff and other students

Learning Support

The Academic Learning Development Centre supports students in developing the skills required for higher education. As well as online resources in Blackboard, students have the opportunity to attend Study Skills workshops and one to one appointments.

Learning support includes four libraries, each holding a collection of resources related to the subjects taught at that site. Students[1] can search the entire library collection online through the Library Search service to find and reserve printed books, and access electronic resources (databases, e-journals, e-books). Students can choose to study in the libraries, which have areas for silent and group study, desktop computers, laptops for loan, photocopying and printing services. They can also choose from several computer rooms at each campus where desktop computers are available with the general and specialist software that supports the courses taught at their Faculty. Students can also securely connect their own laptops and mobile devices to the University wireless network.

Support Services

The University of Westminster Student Affairs department provide advice and guidance on accommodation, financial and legal matters, personal counselling, health and disability issues, careers, specialist advice for international students and the chaplaincy providing multi-faith guidance. The University of Westminster Students' Union also provides a range of facilities to support students during their time at the University.

How do we ensure the quality of our courses and continuous improvement?
The course was initially approved by a University Validation Panel in 2016. The panel included internal peers from the University, academic(s) from another university and a representative from industry. This helps to ensure the comparability of the course to those offered in other universities and the relevance to employers.

The course is also monitored each year by the Faculty to ensure it is running effectively and that issues which might affect the student experience have been appropriately addressed. Staff will consider evidence about the course, including the outcomes from Course Committees, evidence of student progression and achievement and the reports from external examiners, to evaluate the effectiveness of the course. Each Faculty puts in to place an action plan. This may for example include making changes on the way the module is taught, assessed or even how the course is structured in order to improve the course, in such cases an approval process is in place.

[1] Students enrolled at Collaborative partners may have differing access due to licence agreements.

A Course review takes place periodically to ensure that the curriculum is up-to-date and that the skills gained on the course continue to be relevant to employers. Students meet with review panels to provide feedback on their experiences. Student feedback from previous years e.g. from Course Committees is also part of the evidence used to assess how the course has been running.

How do we act on student feedback?

Student feedback is important to the University and student views are taken seriously. Student feedback is gathered in a variety of ways.

- Through Course Committees students have the opportunity to express their voice in the running of their course. Student representatives are elected to Committee to expressly represent the views of their peer. The University and the Students' Union work together to provide a full induction to the role of the student representatives.

- Each Faculty also has its own Faculty Student Forum with student representatives; this enables wider discussions across the Faculty. Student representatives are also represented on key Faculty and university committees.

- All students are invited to complete a questionnaire before the end of each module. The feedback from this will inform the module leader on the effectiveness of the module and highlight areas that could be enhanced.

- The University also has an annual Postgraduate Taught Experience Survey or PTES which helps us compare how we are doing with other institutions, to make changes that will improve what we do in future and to keep doing the things that you value.

Reference points for the course

Internally

Staff research and development in Electronic systems design and application areas

Industrial Advisory Panel

University of Westminster Mission Statement

University teaching and learning policies

University quality assurance handbook and Modular Frameworks.

Handbook of Academic Regulations.

Faculty of Science and Technology teaching, learning and assessment strategies

Externally

UK-SPEC (Engineering Council's UK Standard for Professional Engineering Competence) The Accreditation of Higher Engineering Programmes, 3rd edition, 2014

IET (Institution of Engineering and Technology) Academic Accreditation Guidelines, 2015

Accreditation of Higher Education Programmes (AHEP) third edition, 2014

QAA Subject Benchmark for Engineering, draft document, 2014

Professional body accreditation

For more information about this course:

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