



## **Course Specification**

### **EECT068**

# **MSc Renewable Energy Engineering**

**Faculty of Engineering, Environment and Computing**

**School of Mechanical Aerospace and Automotive Engineering**

**Academic Year: 2021/2022**

Please note: This specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if s/he takes full advantage of the learning opportunities that are provided.

We regularly review our course content, to make it relevant and current for the benefit of our students. For these reasons, course modules may be updated

More detailed information on the learning outcomes, content, and teaching, learning and assessment methods of each module can be found in the Module Information Directory (MID), student module guide(s) and the course handbook.

The accuracy of the information contained in this document is reviewed by the University and may be verified by the Quality Assurance Agency for Higher Education.

Coventry University's accreditation with CMI is currently ongoing for the relevant modules and is regularly reviewed and monitored by the CMI through their quality systems. Whilst Coventry University anticipates that these reviews will continue to be successful, if they were to be unsuccessful, the relevant module in this course would no longer be accredited and we would notify applicants and students of this change as soon as possible.

**PART A Course Specification**  
**MSc Renewable Energy Engineering**

**1. Introduction**

This course will enable students to develop and critically analyse technologies and applications for renewable heat, power and transportation. The course is designed for engineering and science students that are interested in supporting the renewable energy industry as it continues its rapid growth to tackle the severe issues posed by climate change. Students will learn how to apply their engineering knowledge to address the requirement for cost-effective carbon reduction solutions and the course will foster an understanding of the associated global socio-economic challenges. Taught modules will include wind, solar and biomass energy engineering, thermofluid systems, alternative propulsion systems and design principles and practice. Through a Chartered Management Institute (CMI) recognised business module, students will develop their project management skills and have the opportunity to gain certificates in consultancy and leadership. Students will also carry out an individual research project under the guidance of an academic supervisor.

Globally, the total renewable energy capacity has quadrupled in the last ten years. In 2015, \$286 billion was invested in renewables and, for the first time, more than half of all added power generation came from renewables. However, significant increases in growth are still needed if global renewable energy targets are to be achieved. In the UK alone, it is expected that more than half a million jobs in the renewable energy sector will have been created by 2020. Renewable energy is set to expand even further as the UK aims to achieve an 80% reduction in greenhouse gas emissions by 2050, and similar targets are in place around the globe. Renewable energy also has a particularly important role to play in providing crucial services in developing countries to tackle poverty and support sustainable economic growth. This MSc will meet the demand for skilled renewable energy engineers and graduate career prospects will be wide ranging to include manufacture, design, consultancy and management.

The MSc course sits within the School of Mechanical, Aerospace and Automotive Engineering, which enjoys a global reputation for excellent teaching, outstanding student experience and exciting research. The School is located in an inspirational £55M state-of-the-art building with modern equipment and student facilities. Our innovative Activity-Led Learning (ALL) approach is internationally recognised and has shaped the unique culture of our forward-facing Faculty. The University also meets the wider needs of the energy sector by providing a range of Oil and Gas programmes. This course has a September and January intake.

We are focussed on preparing our students for their first professional position and future careers, with students benefiting significantly from our industrial and strategic partnerships. Our strong tradition of business-focussed research is reflected in the important relationships we have developed with companies such as Emirates, Jaguar Land Rover, Airbus, Rolls Royce and Unipart. The University is also home to the UK's first 'Faculty on the Factory Floor', the Institute for Advanced Manufacturing and Engineering.

For students in today's competitive employment markets having work experience can significantly enhance employment prospects. For this reason, the course offers students the opportunity to undertake a work placement, extending the main provision to a two-year course. The work placement could be International or UK with a focus which may be industry or research. Following a selection process within the first semester and subject to securing an approved placement opportunity, students would move onto the two-year course. International students who are interested in a work placement will be supported in completing an application for extending their Tier 4 visa by international student support services. Upon completion of their placement, students will return to complete the course and the final project for the full award.

The course has also been design around the engineering benchmarks which means it aligns to the academic standards expected of a graduate. As such the course is also accredited by the Institution of Mechanical Engineers (IMechE). This means the MSc meets, in part, the exemplifying academic benchmark requirements for registration as a Chartered Engineer. Accredited MSc graduates who also have a BEng (Hons) accredited for CEng will be able to show that they have satisfied the educational base for CEng registration.

As part of this course you will undertake a professional development module which is currently accredited by the Chartered Management Institute (CMI). Upon successful completion of the module, you will gain the CMI Level 7 Certificate in Strategic Management and Leadership Practice at no additional cost.

Working closely with the Institution of Mechanical Engineers, the Royal Aeronautical Society, the Chartered Institute of Logistics and Transport and the Institute of Engineering Technology, the School of Mechanical, Aerospace and Automotive engineering is justifiably proud to be leading the way in producing relevant, up-to-date and professionally accredited courses.

## 2 Available Award(s) and Modes of Study

Title of Award	Mode of attendance	UCAS Code	<a href="#">FHEQ Level</a>
MSc in Renewable Energy Engineering	Full-time 1 year PT – 2 years  2 years with Work Placement	N/A	7
Fall-back awards: PgD in Renewable Energy Engineering PgC in Renewable Energy Engineering			
<b>3 Awarding Institution/Body</b>	Coventry University		
<b>4 Collaboration</b>	None		
<b>5 Teaching Institution and Location of delivery</b>	Coventry University		
<b>6 Internal Approval/Review Dates</b>	Date of approval/latest review Date for next review: 2019/2020		
<b>7 Course Accredited by</b>	Institute for Mechanical Engineering (IMechE): The accredited MSc will meet, in part, the exemplifying academic benchmark requirements for registration as a Chartered Engineer. Accredited MSc graduates who also have a BEng (Hons) accredited for CEng will be able to show that they have satisfied the educational base for CEng registration.		
<b>8 Accreditation Date and Duration</b>	14 <sup>th</sup> January 2021, accreditation up to and including 2025 intakes		
<b>9 QAA Subject Benchmark Statement(s) and/or other external factors</b>	Developed in line with <b>The Framework for Higher Education</b> Qualifications <a href="https://www.qaa.ac.uk/docs/qaa/quality-code/qualifications-frameworks.pdf">https://www.qaa.ac.uk/docs/qaa/quality-code/qualifications-frameworks.pdf</a>  according to the <b>Subject Benchmark for Engineering</b> statements <a href="https://www.qaa.ac.uk/docs/qaa/subject-benchmark-statements/subject-benchmark-statement-engineering.pdf?sfvrsn=1f2c881_16">https://www.qaa.ac.uk/docs/qaa/subject-benchmark-statements/subject-benchmark-statement-engineering.pdf?sfvrsn=1f2c881_16</a>  the <b>Engineering Council UK-SPEC Fourth edition</b> <a href="https://www.engc.org.uk/media/3417/uk-spec-fourth-edition.pdf">https://www.engc.org.uk/media/3417/uk-spec-fourth-edition.pdf</a>  and Professional Bodies: The Institution of Engineering and Technology (IET) Institution of Mechanical Engineering (IMechE) and Energy Institute (EI).		
<b>10 Date of Course Specification</b>	July 2021		
<b>11 Course Director</b>	Jonathan Nixon		

## 12 Outline and Educational Aims of the Course

This MSc Renewable Energy Engineering course aims to provide students with a comprehensive understanding of renewable energy systems and develop knowledge, skills and expertise that can be applied to the renewable energy sector. The educational experience also aims to develop students' intellectual and personal skills, and give them the capability to undertake a practical research study and publish results. This will prepare students to pursue careers and be leaders in the energy industry.

Specifically, the course aims to:

- Enable students to explore the current and emerging technologies and applications for renewable energy
- Provide qualified engineering and science graduates with the opportunity to advance their engineering proficiency and develop new skills and knowledge
- Prepare students to make significant contributions to their professions, the economy and society
- Use activity-led learning, underpinned by research inspired teaching, to provide students with a transformative learning experience
- Create an educational environment that gives access to both academic and industrial experience
- Provide students with the opportunity to deal with complex issues, demonstrate self-direction and develop transferable skills
- Mentor students to be professional in their outlook, be capable of team working, be effective communicators, and be able to exercise responsibility and sound management approaches

These course aims have been developed in line with The Framework for Higher Education Qualifications <http://www.qaa.ac.uk/en/Publications/Documents/qualifications-frameworks.pdf>, Subject Benchmark for Engineering statements <http://www.qaa.ac.uk/en/Publications/Documents/SBS-engineering-15.pdf>, and the Engineering Council UK-SPEC Third edition [http://www.engc.org.uk/engcdocuments/internet/Website/UK-SPEC%20third%20edition%20\(1\).pdf](http://www.engc.org.uk/engcdocuments/internet/Website/UK-SPEC%20third%20edition%20(1).pdf)

## 13 Course Learning Outcomes

A student who successfully completes the course will be able to:

1. Select and apply appropriate systematic analysis methods to critically evaluate and solve complex renewable energy engineering problems
2. Analyse different energy resources and conversion processes using analytical modelling, experimental techniques and numerical simulations
3. Critically assess the use of renewable energy systems to mitigate climate change and improve the environment and social welfare
4. Make and justify decisions for selecting and optimising renewable energy products and systems based on technical, environmental, economic, risk and social criteria
5. Develop innovative solutions to meet the current global sustainability and renewable energy challenges
6. Demonstrate the application of legal and ethical requirements associated with renewable energy in an industrial environment
7. Apply the necessary study and research skills to support the analytical, critical and reflective requirements of written, oral and group assessments
8. Contribute to a team with the necessary planning, reviewing, adaptability, drive and leadership to achieve the required objectives and observe work schedules
9. Clearly communicate research, concepts, solutions and recommendations, and demonstrate a professional approach to written and/or oral presentations
10. Critically evaluate the principles for leading and developing people and entrepreneurial practice in strategic contexts.

## 14 Course Structure and Requirements, Levels, Modules, Credits and Awards

Modules within the course, their status (whether mandatory or options), the levels at which they are studied and their credit value are identified in the table below.

<i>Module Code</i>		<i>Credits</i>
7040MAA	Design Principles and Practice	15
7053MAA	Thermofluid systems	15
7027AAE	Sustainability and the Environment	15
7096MAA	Alternative Propulsion Systems	15
7087MAA	Solar Energy Engineering	15
7088MAA	Bioenergy Engineering	15
7063MAA	Wind and Hydro Power Engineering	20
7050CRB	Entrepreneurial Practice	10
7166MAA	Individual Project	60

Pre-Requisite or Co-Requisite

The MSc Renewable Energy Engineering is a 1-year full-time course, which will have a September and January intake. The following tables are a typical delivery pattern for this course based on the Teach-Teach-Project Cycle being used during the entry year. Personalised timetables will be issued to students prior to their course start date.

<b>September Intake Typical Delivery</b>		
Semester 1 Sept - Jan	7040MAA	Design Principles and Practice
	7050CRB	Entrepreneurial Practice
	7088MAA	Bioenergy Engineering
	7063MAA	Wind and Hydro Power Engineering
Semester 2 Jan - May	7053MAA	Thermofluid Systems
	7096MAA	Alternative Propulsion Systems
	7027AAE	Sustainability and the Environment
	7087MAA	Solar Energy Engineering
Semester 3 May - Sept	7166MAA	Individual Project

<b>January Intake Typical Delivery</b>		
Semester 1 Jan - May	7053MAA	Thermofluid Systems
	7096MAA	Alternative Propulsion Systems
	7027AAE	Sustainability and the Environment
	7087MAA	Solar Energy Engineering
Semester 2 May - Sept	7040MAA	Design Principles and Practice
	7050CRB	Entrepreneurial Practice
	7088MAA	Bioenergy Engineering
	7063MAA	Wind and Hydro Power Engineering
Semester 3 Sept - Jan	7166MAA	Individual Project

The course has been designed to meet the Engineering Council, UKSPEC requirements for Masters studies, 2014, with the intention of accreditation by the Institution of Mechanical Engineers after the first student graduate in 2018.

As outlined in the UK-SPEC, there is a need for engineers to undertake activities that will contribute to sustainable development, and engineers have a stewardship role in respect to using resources effectively and creating renewable energy systems and services. This is the underpinning of the MSc in Renewable Energy Engineering. The course content covers all six principles used as guidance to sustainability, as outlined by the Engineering Council: contributing to a sustainable society, applying professional judgement and taking a leadership role, exceeding legislation and codes, using resources more efficiently, seeking multiple views to solving sustainability challenges and managing risk to minimise impact on society and the environment.

During semester 1, students who have expressed an interest in undertaking a work placement should begin the application process for placement opportunities. Students have the responsibility for securing a placement, but they will be supported throughout the application process by a specialist employer engagement team. The university will work with employers to identify opportunities. Subject to securing a placement, the International Student Support team will work with international students to obtain UK study visa extensions. Visas required to work in other countries will be the responsibility of the student.

The course is structured so that students complete two semesters of taught modules and then spend three semesters on placement. During this time students would be enrolled onto modules 7102CEM Extended Masters Work Placement A, 7103CEM Extended Masters Work Placement B and 7104CEM Extended Masters Work Placement C. The modules are zero credit and do not contribute to the classification or name of the award but must be passed to complete the placement. Upon completion of the work placement, students are expected to return to Coventry to complete the final semester during which time they undertake their project module. Successful completion of the Work Placement is reflected in the final student transcript.

Credit level	Module Code	Title	Credit Value	Mandatory/ Optional	Course Learning Outcomes
Subject to securing an appropriate placement opportunity and fulfilling the selection requirements, students will be transferred to the two-year course and the Work Placement modules listed below are to be taken.					
7	7102CEM	Extended Masters Work Placement A	0	Optional	
7	7103CEM	Extended Masters Work Placement B	0	Optional	
7	7104CEM	Extended Masters Work Placement C	0	Optional	

The work placement is to be taken over three semesters and prior to the final semester of the course.

#### 14.2 Conditions for fall back award

##### Cascade of Awards:

##### The requirements for progression and awards:

Awards for Taught Masters programmes may be made with Distinction or with Merit as per the Academic Regulations.

- **MSc Renewable Energy Engineering** – The full curriculum (180 credits)
- **PgDip Renewable Energy Engineering** – 120 credits (any modules)
- **PgCert Renewable Energy Engineering** – 60 credits (any modules, excluding 7166MAA)

##### CMI Certificate:

Students who successfully complete the module and meet the CMI learning outcomes will gain a Level 7 Certificate in Strategic Management and Leadership Practice based on the following CMI units: Leading and Developing People to Optimise Performance (unit 702); Entrepreneurial Practice (unit 711).

Students who successfully complete this module will be awarded Foundation Chartered Manager status and be able to use the designation 'fCMgr' after their name.

<b>Module credit level</b>	<b>Module Code</b>	<b>Title</b>	<b>Credit Value</b>	<b>Course Learning Outcomes</b>
7	7050CRB	Entrepreneurial Practice	10	6, 7, 8, 9, 10
7	7166MAA	Individual Project	60	1, 2, 3, 4, 5, 6, 7, 9
7	7087MAA	Solar Energy Engineering	15	2, 3, 4, 7, 8, 9
7	7063MAA	Wind and Hydro Power Engineering	20	1, 2, 4, 7, 8, 9
7	7088MAA	Bioenergy Engineering	15	2, 3, 4, 5, 7, 9
7	7040MAA	Design Principles and Practice	15	5, 7, 8
7	7053MAA	Thermofluid Systems	15	2, 7, 8, 9
7	7027MAA	Sustainability and the Environment	15	3, 4, 7, 9
7	7096MAA	Alternative Propulsion Systems	15	1, 2, 4, 7, 9

## **15 Criteria for Admission and Selection Procedure**

To commence the full-time MSc Renewable Energy Engineering course, applicants must:

- Be an honours graduate of any physical science, mathematics or engineering discipline (minimum 2:2 or higher), obtained from a recognised university/HE institution, or hold an equivalent qualification acceptable to Coventry University
- Hold IELTS 6.5 or equivalent if English is not the applicant's first language.

Students who do not fit with the above entry requirements can gain entry but their degrees and experience will be assessed for appropriate content by the course director.

There is an accreditation for Recognised Prior Learning (RPL) process available which is in accordance with University regulations for taught postgraduate courses. The accreditation for Recognised Prior Experiential Learning (RPEL) will only be awarded for achievements equivalent to master's level. RPEL will be assessed in line with University Regulations.

## **16 Academic Regulations and Regulations of Assessment**

This Course conforms to the standard [University Academic Regulations](#) Postgraduate Mode R

## **17 Indicators of Quality Enhancement**

The Course is managed by the MAA Board of Study of the Faculty of Engineering, Environment and Computing.

The Programme Assessment Board (PAB) for School of Mechanical Aerospace and Automotive Engineering is responsible for considering the progress of all students and making awards in accordance with both the University and course-specific regulations.

The assurance of the quality of modules is the responsibility of the Boards of Study which contribute modules to the course.

External Examiners have the opportunity to moderate all assessment tasks and a sample of assessed work for each module. They will report annually on the course and/or constituent modules and their views are considered as part of the Course Quality Enhancement Monitoring (CQEM). Details of the CQEM process can be found on the Registry's web site.

Students are represented on the Student Forum, Board of Study and Faculty Board, all of which normally meet two or three times per year.

Student views are also sought through module and course evaluation questionnaires.

This Engineering Course has been designed in accordance with the:

1. QAA Engineering Subject Benchmark statement [February 2015]
2. UK Standards for Professional Engineering Competence [Third Edition]
3. Engineering Council Accreditation of Higher Education Programmes

The School of Mechanical, Aerospace and Automotive Engineering

- The MSc Renewable Energy Engineering course sits within the School of Mechanical, Aerospace and Automotive Engineering.
- The School works closely with the Institution of Mechanical Engineers and other professional bodies who inform on the curriculum.
- The School engages in a wide variety of research and attracts governmental funding
- The School engages with industry through advisory boards to inform curriculum design

The School conducts themed research within a number of Faculty Research Centres (FRC):

- Transport and Mobility Faculty Research Centre
- The Fluids and Complex Systems Research Centre
- The Materials and Manufacturing Faculty Research Centre
- The Institute of Advanced Manufacturing Engineering

### **QAA**

The report of QAA's Institutional Audit undertaken in 2015 confirmed that

1. The maintenance of the threshold academic standards of awards offered on behalf of degree-awarding bodies and/or other awarding organisations meets UK expectations.
2. The quality of student learning opportunities at the provider meets UK expectations
3. The quality of the information produced by the provider about its provision meets UK expectations.
4. The enhancement of student learning opportunities at the provider meets UK expectations.

## **18 Additional Information**

Enrolled students have access to additional key sources of information about the course and student support. This information can be found in:

- Student Handbook
- Course Handbook
- Module Guides
- Aula Course & Aula Webs
- Module Information Directory
- EEC Student Portal <https://share.coventry.ac.uk/students/EC/Pages/Home.aspx>
- Coventry University Student Portal <https://share.coventry.ac.uk/students/Pages/Index.aspx>

### **Induction**

Students engage in a series of induction events, 'Student Essentials' over the first six weeks of their programme. The Student Essentials encompass a number of academic, administrative and social events including a welcome and introduction to the university, the facilities and the faculty. As part of the Student Essentials induction events, all students are directed to an online student handbook and a course handbook which provides key information.

### **Buildings and Equipment**

The faculty is mainly based within two buildings, the Engineering and Computing building and the Sir John Laing building, all of which are equipped with specialist equipment to support students. This includes a high performance engineering centre which houses a full size harrier, three further simulators, a wind and smoke tunnel, civil engineering specialist testing equipment, a range of CNC machinery, a laser workshop and a 3D Geoscience Information Laboratory.

### **Student Support**

A comprehensive support and guidance system exists for all postgraduate students within the Faculty of Engineering, Environment and Computing. Support is available via Course Directors, who are available to advise students on academic and pastoral issues. Times that Course Directors are available to meet with students will be shown on course Aula webs and also their location. Module Leaders and the associated module team are available to offer support at module level. Again, Module Leaders advertise their contact times on module Aula webs and their location. Outside of office hours, you can also email any member of academic staff.

Prior to the commencement of the Masters project, individual supervisors with appropriate expertise or research experience are assigned to each student.

The Faculty Registry team support you through your studies, providing information and guidance on the rules and procedures that affect your academic progress. Faculty Registry can help you deal with problems you may be having with academic life and help you understand the University's academic processes and regulations. They have a detailed understanding of the curriculum structures and other specialist support that is available to you within the University.