Course Specification

Course Summary Information		
1	**Course Title**	Master of Research (MRes) in Sustainable Engineering
2	**Course Code**	PT1845-46
3	**Awarding Institution**	Birmingham City University
4	**Teaching Institution(s)** (if different from point 3)	N/A
5	**Professional Statutory or Regulatory Body (PSRB) accreditation** (if applicable)	

6	Course Description
	The Master of Research (MRes) in Sustainable Engineering is a flexible and comprehensive research training course designed to provide graduates with the skills and expertise necessary for a career in research, academia, or industry within the sustainable engineering sector. This course offers high-quality postgraduate training in research methods and practice, along with the development of transferable skills that will advance your knowledge in areas such as urban design, project management, sustainability, technology, and interdisciplinary collaboration. Throughout the course, you will engage in advanced research methods, from developing initial research ideas and proposals to applying contemporary research philosophies and methodologies. This process is designed to prepare you for further doctoral-level study, publishing your research, or demonstrating the skills required for a career in the sustainable engineering sector. You will also have the opportunity to specialise in a chosen area within sustainable engineering, benefiting from the multidisciplinary expertise of your research team. The MRes in Sustainable Engineering course is structured to provide a balance of independent research and taught elements, ensuring a rigorous research-focused experience. Central to the course is a major research thesis, where you will undertake a substantial independent research project within a specific area of sustainable engineering. This thesis is subject to examination by an external examiner, maintaining the high academic standards expected of research degrees. In addition to the thesis, you will engage in taught elements that provide essential research training, with the opportunity to specialise in areas aligned with your research topic. These taught modules are designed to support the development of your research skills and are tailored to the specialism you choose to pursue in your thesis. The course is ideal for graduates from diverse academic backgrounds, including automotive, electronics, mechanical, electrical, manufacturing and other engineering disciplines. Key areas of focus include advanced research methodology, data analysis, and the development of independent research skills within a specific area of sustainable engineering. The majority of the course is dedicated to conducting original research under the guidance of experienced supervisors, allowing you to focus deeply on a specialised topic. While some structured learning on research methods is included, the emphasis is on autonomous research, enabling you to engage critically with your chosen field. You will also develop essential skills in presenting your findings through professional outputs such as conference papers, grant proposals, and peer-reviewed journal articles. This approach ensures that you gain expertise in both your subject area and the research process, preparing you for successful careers in academia, research, or industry.

	With a growing demand for skilled researchers in sustainable engineering, this MRes course prepares you to make meaningful contributions to the sector, while also supporting your professional development and employability. You will have access to the wider Faculty and College's extensive industry networks and research groups, providing valuable opportunities to work with external partners and enhance your future career prospects.

7	**Course Awards**		
7a	**Name of Final Award**	**Level**	**Credits Awarded**
	Master of Research in Sustainable Engineering	Level 7	180
7b	**Exit Awards and Credits Awarded**		
	PGCert in Sustainable Engineering	Level 7	60

8	**Variation from the University Regulations**
	This course has approved variations to the University's Academic Regulations. These can be accessed via the student contract page: https://www.bcu.ac.uk/student-info/student-contract

9	**Delivery Patterns**		
Mode(s) of Study	**Location(s) of Study**	**Duration of Study**	**Code(s)**
Full Time September	City Centre	1 year	PT1846
Part Time September	City Centre	18 months	PT1845
Part Time January	City Centre	18 months	TBC

10	**Entry Requirements**
	The admission requirements for this course are stated on the course page of the BCU website at https://www.bcu.ac.uk/.

11	**Course Aims**
	The course is guided by four principal educational aims: • To enable students to acquire, develop, and demonstrate advanced knowledge, technical skills, and research experience in their field of study. • To enhance students' critical analysis of research methodologies, including hypothesis testing, high-quality experimental design, effective use of research equipment, robust data analysis, and the writing of scientific research papers. • To provide an extensive set of transferable research skills through targeted workshops, academic meetings, and subject-specific sessions. • To prepare students for application to doctoral-level study or advanced research positions.

12	**Course Learning Outcomes**
	Learning outcomes are statements that identify what learners will have gained as a result of their learning; they should be linked directly to the knowledge, understanding, skills, capabilities and values that a student will have gained after completing this course and should be set at an appropriate (FHEQ) level. ***Learning outcomes should be numbered, and separated into two sections: 'Knowledge and Understanding' and 'Skills and other attributes'.*** *The Education Development Service can provide further guidance on the development of Course Learning Outcomes.* *As a guide, normally a maximum of 10 intended learning outcomes can be defined in this section. Further learning outcomes may be added to meet the requirements of the subject or a PSRB.*
1	Demonstrate mastery of a specialist area within engineering through a deep understanding of current research, contemporary issues, and emerging trends in sustainability, technology, and interdisciplinary collaboration.
2	Design an original, feasible, and novel research proposal focused on a specific topic within engineering, integrating research methodologies that address key challenges in the sector.
3	Demonstrate critical thinking and analysis in evaluating and selecting the most appropriate research designs, methodologies, and approaches to address complex issues in engineering, such as sustainability, digital transformation, green innovation, innovative engineering solutions and sustainable technologies.
4	Develop comprehensive research skills and the ability to apply appropriate research methods, tools, and techniques to engineering, ensuring robust data collection, analysis, and interpretation within your chosen field of study.
5	Apply innovative technologies and approaches to disseminate complex research findings, making them accessible to a range of audiences, including industry professionals, policymakers, and academic communities, with a focus on practical impact in the engineering sector.
6	Conduct a substantial piece of independent research that demonstrates original thinking and contributes new knowledge to the field of sustainable engineering studies, with the potential to be developed further at doctoral level.
7	Apply reflective practice to evaluate your own research process, integrating feedback from supervisors to refine research approach and enhance the impact of the research study.

13	**Level Learning Outcomes**
	Level Learning outcomes are statements that identify what learners will have gained as a result of their learning; they should be linked directly to the knowledge, understanding, skills, capabilities and values that a student will have gained after completing each level of a course, in line with the Framework for Higher Education Qualifications *Level Learning outcomes should be numbered and separated to show what students will have achieved on completion of each potential exit award.* *The Education Development Service can provide further guidance on the development of Level Learning Outcomes.*
	Upon completion of 60 credits at Level 7, students will be able to obtain the Postgraduate Certificate in Sustainable Engineering

	Upon completion of 180 credits at Level 7 / the PG Dip, students will be able to the Masters by Research in Sustainable Engineering
	Knowledge and understanding of:
1	The scientific principles of Sustainable Engineering to an advanced level.
2	Mathematical and computer models relevant to Sustainable Engineering to a comprehensive level and an appreciation of their limitations.
3	Management and business practices and their limitations as applied to strategic and tactical issues as appropriate for Chartered Engineers.
4	Sustainable Engineering practise for future research and development
	Intellectual Skills – the ability to:
5	Use fundamental knowledge to investigate new technologies.
6	Apply advanced mathematical and computer-based models for solving complex problems in engineering, and the ability to assess the limitations of particular cases.
7	Extract data pertinent to an unfamiliar problem, and effect solutions using computer-based engineering tools when appropriate.
8	Debate contemporary issues in Sustainable Engineering
9	Critically discuss the importance of Sustainable Engineering practices on a global scale
	Practical/Subject Specific Skills – the ability to:
10	Use wide knowledge and comprehensive understanding of design processes and methodologies and apply and adapt them in unfamiliar situations and discuss the results in your final major project report.
11	Generate ground-breaking designs for products, systems, or components
12	Evaluate the impact of regulatory, commercial and environmental constraints on processes and products.
	General Transferable Skills – the ability to:
13	Display resourceful solutions to the limitations of Sustainable Engineering practice at Chartered Engineer Level.
14	Apply extensive knowledge and understanding of a wide range of engineering practices and systems.
15	Critically identify an engineering problem at the design stage
16	Critically apply advanced engineering tools to a variety of situations and discuss the results in your final major project report.

14	**Course Learning, Teaching and Assessment Strategy**
	This section explains the learning and teaching approaches, activities and experiences that your course will offer; the range of assessments and types of feedback and feed forward you will encounter and explain how these will support your continuous learning throughout the course, and explain the expectations we have of you in this learning partnership. The College of Engineering has adopted an approach that fosters active learning through enhanced engagement, encourages critical thinking, and grows problem-solving skills critical to preparing you for real-world engineering challenges. This engagement enables you to develop core competencies as an engineering postgraduate, including technical knowledge, professional skills, and personal attributes. Students on our courses receive personalized support for their development from course and module teams, mentors, supervisors, and the wider university support system.

	The assessment strategies at the College of Engineering uphold the academic standards for each course and its constituent modules. They are set and maintained at the appropriate level in accordance with the Framework for Higher Education Qualifications (FHEQ) and are comparable with other courses/awards at the same level. Assessments are designed to enable you to demonstrate achievement of the intended module and course learning outcomes. Formative and summative assessments are fully integrated into the learning process. Assessment brief and assessment criteria inform the assessment process and are robust to ensure reasonable parity between the judgments of different markers. You receive relevant feedback for your assessment tasks which are personalised where possible. The validity of assessments and their ongoing suitability is reviewed through the Course Monitoring and Enhancement process and Periodic Review, informed by External Examiners and external subject specialists (External Advisers). Overall, the teaching-learning and assessment strategies at the College of Engineering enable you to learn, practice, and grow your professional skills, and prepare you to tackle the 21st century engineering challenges.

15	Course Requirements

15a Level 7:

In order to complete this course a student must successfully complete the following CORE modules (totalling 140 credits):

Module Code	Module Name	Credit Value
ENG7142	Research Methods	20
ENG7228	Masters by Research (MRes) Thesis	120

In order to complete this course a student must successfully complete at least 40 credits from the following indicative list of OPTIONAL modules.

Module Code	Module Name	Credit Value
ENG7148	Control Engineering (OPTIONAL)	20
ENG7150	Advanced Dynamics (OPTIONAL)	20
ENG7151	Advanced Systems Engineering (OPTIONAL)	20

15b	Structure Diagram

Please note list of optional modules is indicative only. Students' choice will not be guaranteed for optional modules but a fair and transparent process will be adopted and shared with students.

Include a structure diagram for each mode of study. Level 4 is completed as an example including modules which extend the whole year.

Level 7

Course Module Grid Full-Time MRes Sustainable Engineering

Full Time _September intake			
Year 1 Semester 1	Optional module A/B 20 credits	Masters by Research (MRes) Thesis (c) (ENG7228) 40 (of 120 credits)	
Year 1 Semester 2	Optional module A/B/C 20 credits	Research Methods (c) ENG7142) 20 credits	Masters by Research (MRes) Thesis (c) (ENG7228) 20 (of 120 credits)
Year 1 Semester 3	Masters by Research (MRes) Thesis (c) (ENG7228) 60 (of 120 credits)		

<u>Optional modules:</u>

A: Control Engineering (ENG7148) 20 credits

B: Advanced Dynamics (ENG7150) 20 credits

C: Advanced Systems Engineering (ENG7151) 20 credits

Course Module Grid Part-Time MRes Sustainable Engineering

September Entry

<table>
<tr><th colspan="3">Part Time _September intake</th></tr>
<tr><td>Year 1
1st Semester of Study</td><td>Optional module A/B
20 credits</td><td>Masters by Research (MRes) Thesis (c) (ENG7228)
20 (of 120 credits)</td></tr>
<tr><td>Year 1
2nd Sem of Study</td><td>Optional module A/B/C
20 credits</td><td>Masters by Research (MRes) Thesis (c) (ENG7228)
20 (of 120 credits)</td></tr>
<tr><td>Year 1
3rd Sem of Study</td><td>Research Methods (c)
(ENG7142) 20 credits</td><td>Masters by Research (MRes) Thesis (c) (ENG7228)
20 (of 120 credits)</td></tr>
<tr><td>Year 2
1st Sem of Study</td><td colspan="2" rowspan="3">Masters by Research
(MRes) Thesis (c) (ENG7228)
60 (of 120 credits)</td></tr>
<tr><td>Year 2
2nd Sem of Study</td></tr>
<tr><td>Year 2
3rd Sem of Study</td></tr>
</table>

Optional modules:

A: Control Engineering (ENG7148) 20 credits

B: Advanced Dynamics (ENG7150) 20 credits

C: Advanced Systems Engineering (ENG7151) 20 credits

January Entry

Year 1 1st Semester (Jan – May)	Optional module A/B/C 20 credits	
Year 1 2nd Semester (Sept – Dec)	Optional module A/B/C 20 credits	
Year 2 1st Semester (Jan – May)	Research Methods (c) (ENG7142) 20 credits	Masters by Research (MRes) Thesis (c) (ENG7228) 120 credits
Year 2 2nd Semester (May – Sept)		

<u>Optional modules:</u>

A: Control Engineering (ENG7148) 20 credits

B: Advanced Dynamics (ENG7150) 20 credits

C: Advanced Systems Engineering (ENG7151) 20 credits

16	Overall Student Workload and Balance of Assessment

Overall student *workload* consists of class contact hours, independent learning and assessment activity, with each credit taken equating to a total study time of around 10 hours. While actual contact hours may depend on the optional modules selected, the following information gives an indication of how much time students will need to allocate to different activities at each level of the course.

- *Scheduled Learning* includes lectures, practical classes and workshops, contact time specified in timetable
- *Directed Learning* includes placements, work-based learning, external visits, on-line activity, Graduate+, peer learning
- *Private Study* includes preparation for exams

The *balance of assessment* by mode of assessment (e.g. coursework, exam and in-person) depends to some extent on the optional modules chosen by students. The approximate percentage of the course assessed by coursework, exam and in-person is shown below.

Level 7

Workload

XX% time spent in timetabled teaching and learning activity

Activity	Number of Hours
Scheduled Learning	156
Directed Learning	188
Private Study	1456
Total Hours	1800

Balance of Assessment

Assessment Mode	Percentage
Coursework	41%
Exam	28%
In-Person	31%