Template C4

Programme Specification

Title of Course: *MSc Advanced Product Design Engineering & Manufacturing*

Date first produced	01/03/2019
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Version number	5
Faculty	Faculty of Engineering, Computing and the Environment
School	School of Engineering
Department	Department of Mechanical Engineering
Delivery Institution	Kingston University

This Programme Specification is designed for prospective students, current students, academic staff and employers. It provides a concise summary of the main features of the programme and the intended learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if they take full advantage of the learning opportunities that are provided. More detailed information on the learning outcomes and content of each modules can be found in the course VLE site and in individual Module Descriptors.

SECTION 1: GENERAL INFORMATION

Award(s) and Title(s): ***Up to 10 pathways***	MSc Advanced Product Design Engineering & Manufacturing
Intermediate Awards(s) and Title(s): ***There are 4 Intermediate awards for each pathway***	PgDip PgCert
Course Code ***For each pathway and mode of delivery***	PPDEM1DEM20 PFDEM1DEM20
UCAS code ***For each pathway***	N/A

RQF Level for the Final Award:	MSc
Awarding Institution:	Kingston University
Teaching Institution:	Kingston University
Location:	Roehampton Vale
Language of Delivery:	English
Modes of Delivery:	Full Time Part-time With Professional Placement
Available as:	Full field
Minimum period of registration:	Full Time - 1 Part-time - 3 With Professional Placement - 2
Maximum period of registration:	Full Time - 2 Part-time - 4 With Professional Placement - 3
Entry Requirements:	1. Applicants for this course are normally required to have a good honours degree in a relevant engineering discipline. Exceptionally applicants with substantial relevant industrial experience who do not have an honours degree may be considered. Such applicants must demonstrate strong motivation to complete the course and the ability to work at this level. International applicants are required to satisfy the Admissions Officer that they have reached an equivalent academic standard as those required for home students.

	Each application is assessed on an individual basis and may be subject to additional requirements, such as undertaking short course(s), work experience and/or English language qualification(s). Meeting minimum entry requirements does not automatically guarantee a place. English language requirements Non-UK applicants will usually be required to provide certificated proof of English language competence before commencing their studies. For this course, the minimum requirement is Academic IELTS of 6.5 overall, with 6.0 in Writing and 5.5 in Reading, Listening and Speaking. Other equivalent qualifications will also be considered. For further information, including other acceptable qualifications (such as WAEC and NECO from Nigeria and Ghana, and Indian CBSE) and pre-sessional English courses; see the KU website: http://www.kingston.ac.uk/international/studying-at-kingston/language-requirements/
Programme Accredited by:	Institution of Mechanical Engineers
QAA Subject Benchmark Statements:	*All subject benchmark statements can be found here. For PG provision where there is no QAA subject benchmark make reference to the QAA Master's Degree Characteristics.*
Approved Variants:	To comply with Engineering Council regulations, a maximum of 20 credits can be compensated within this programme.
Is this Higher or Degree Apprenticeship course?	

For Higher or Degree Apprenticeship proposals only	
Higher or Degree Apprenticeship standard:	n/a
Recruitment, Selection and Admission process:	n/a

End Point Assessment Organisation(s):	n/a

SECTION 2: THE COURSE

A. Aims of the Course

The main aims of the MSc Advanced Product Engineering and Manufacturing

- Provide a "period of further learning" which is a requirement of the Institution of Mechanical Engineers for Chartered Engineer status for students with an accredited BEng.
- To equip students with the multi-disciplinary understanding and the key skills necessary to apply the principles of specialised subjects within the engineering field.
- Develop the personal attributes and skills expected of a graduate with a master's degree and to give them a secure foundation for their personal, intellectual, and professional development.
- To acquire a detailed knowledge of understanding of the latest Computer Aided techniques used in field of Engineering Product Design and Manufacture.
- To develop a scientific approach in proposing the necessary steps required to design and evaluate a technically functional product within the given specifications and constraints.
- To further enhance the knowledge of computer aided product design by engaging in an industrial oriented project. The student is required to apply all the techniques he has learnt on the course to produce satisfactory results and make feasible recommendations, supported by a broad literature research.

B. Intended Learning Outcomes

The field/course provides opportunities for students to develop and demonstrate knowledge and understanding specific to the subject, key skills and graduate attributes in the following areas. The programme outcomes are referenced to the QAA subject benchmarks for master's level Engineering (2015) and the Framework for Higher Education Qualifications in England, Wales and Northern Ireland (2008), and relate to the typical student.

The programme learning outcomes are the high-level learning outcomes that will have been achieved by all students receiving this award. They must align to the levels set out in the 'Sector Recognised Standards in England' (OFS 2022).

Programme Learning Outcomes					
	Knowledge and Understanding On completion of the course students will be able to:		**Intellectual Skills** On completion of the course students will be able to		**Subject Practical Skills** On completion of the course students will be able to
A4	Demonstrate knowledge of the principles of entrepreneurship and detailed requirements for the management, quality, safety and environmental issues in respect to engineering projects.	B4	Engage in the critical community including reflecting on one own and others practices and relate them to a product design procedure.	C1	Critically evaluate technical systems and specifications for a Manufacturing environment.
A3	Control projects in respect to time, cost and the risks inherent in engineering.	B3	Demonstrate the ability to understand and analyse complex problems in product design engineering, using advanced CAD/CAM/CAE tools.	C2	Use latest CAD/CAM and CAE systems to facilitate better optimisation and more efficient product design and manufacturing processes.
A2	Critically appraise and apply sophisticated computer design methods various manufacturing options to achieve rapid and reliable product.	B2	Identify current issues and trends in the areas of product design, mechanical, software and manufacture.	C3	Apply the product data management PDM and the product lifecycle management PLM strategies
A1	Demonstrate an in-depth understanding of specialized subjects necessary to apply the principles of computer product design and concurrent engineering.	B1	Engage in a critical awareness of the current developments in the engineering product design environment.	C4	Apply additive (3D printing) and subtractive (CNC) manufacturing techniques and a variety of measurement methods.

In addition to the programme learning outcomes, the programme of study defined in this programme specification will allow students to develop the following range of Graduate Attributes:

1. Creative Problem Solving
2. Digital Competency
3. Enterprise
4. Questioning Mindset
5. Adaptability
6. Empathy
7. Collaboration
8. Resilience
9. Self-Awareness

C. Outline Programme Structure

This MSc Advanced Product Design Engineering and Manufacturing course is designed to provide students with the latest technology in modern CAD/CAM/CAE/CNC and 3D printing (computer-aided design, additive and subtractive assisted manufacturing, and analysis) applications to enable students to acquire knowledge to rapid design and manufacture of a new product from a single computer terminal, without the need for lengthy prototype-and-test cycles. The implementation of this technology is essential to meet today's global marketplace, where the need to be first-to-market a product, is essential for continued survival.

This programme is structured to provide student with the latest developments in this still-evolving discipline of digital product development. It focuses on providing the student with hands-on experience of the latest computing design applications throughout the entire product development cycle, from simple 3D prismatic and freeform modelling techniques to an extended capability of reverse engineering, 3D laser scanning and coordinate measuring machine CMM in order to generate complex surfaces and measurements/inspection. Also, students gain practical and theoretical knowledge of analytical design tools to assist the product validation process by applying mould design, advanced mechanism design simulation and finite elements analysis techniques. Additionally, examines the importance of advanced manufacturing techniques by introducing subtractive and additive manufacturing strategies. Students will engage in the metal removal manufacturing, 3D printing and metrology laboratories activities working in depth in the use of computer aided manufacturing CAM, computer numerical control CNC, and rapid prototyping/3D printing technologies and use of metrology to carry out product inspection.

The course is delivered with the support of external industrial speakers who bring their experience into the classroom so that students can learn how real problems can be solved using the techniques they have learned in the lectures. Throughout the course innovative teaching methods, with the aid of a virtual learning platform, will be used inside and outside the classroom to enhance the students learning experience.

One of the main features of the course is that many of its subject materials are highly research oriented and taught by active and internationally recognised research academics in the faculty. This provides the students with additional opportunity to deepen their subject interest by selecting a research-based project dissertation. The project provides a challenge to the student to investigate a theoretical area in depth or to undertake a real-world problem. Student will be given close guidance to select a project that is relevant to their background or specialisation area. In the project students are required to apply the knowledge that they have learnt during the course to achieve a deliverable whilst satisfying given constraints.

Students are encouraged to present the output from their projects at National and International conferences and to publish in reputable research journals.

The programme has been accredited by the Institute Institution of Mechanical Engineers (IMechE), under licence from the UK regulator, the Engineering Council, as meeting the requirements for Further Learning for a Chartered Engineer (CEng) for candidates who have already acquired an accredited CEng (Partial) BEng (Hons) degree. It therefore takes an applied approach to product design, developing engineers capable of conceiving, designing, and prototyping before producing reliable product solutions. Our hands-on teaching methods utilise industrial-standard, state-of-the-art equipment, and software, from concept to implementation, giving a distinct advantage on the global job market. Our Strong Industrial Advisory Board, including industry leaders such as National Instruments, Thales, and industrial bodies such as the IET, SEMTA and the IMechE, ensure that the course content reflects the changing needs of industry and provides support in terms of course content and equipment.

The programme also helps develop employment-ready students through an integrated industrial experience in the form of a work placement on the two-year version of the programme.

This integrated placement provides students with an exciting opportunity to apply and develop their knowledge and skills in a real-world setting, which enables them to develop their self-confidence. Students undertaking such placement activities are in a stronger position to gain the skills and experience that employer's desire today.
This programme is part of the University Postgraduate Regulations (PR).

Programmes in the PR are made up of modules which are designated at level 7. Single modules in the framework are valued at 15 & 30 credits and the programme consists of 3 subject specific single 15 credit modules (3 core & 1 optional), 2 subject specific single 30 credit modules and the capstone project module valued as 2 single modules (60 credits). A Postgraduate Certificate (PgCert) or Postgraduate Diploma (PgDip) may be offered as an exit award, with the minimum requirement for a PgCert of 60 credits and PgDip of 120 credits. The MSc award is achieved with 180 credits completed of (all modules and the final individual project dissertation).

The programme is accredited by the Institution of Mechanical Engineers (IMechE) to Engineering Council regulations. The award of the accredited MSc requires completion of all modules with only 20 credits compensation; however, 30 credits of compensation is allowed under University Postgraduate Regulations and, in the event that no further resit opportunities are available, compensation may be applied, and the award of MSc Product Design and Manufacturing awarded. This award is not accredited with the IMechE.

The course offers the PG Certificate (PgCert), PG Diploma (PgDip) and MSc Product Design and Manufacturing only as an exit award.

All students will be provided with the University regulations and specific additions that are sometimes required for accreditation by outside bodies (e.g., professional, or statutory bodies that confer professional accreditation).

Full details of each module will be provided in module descriptors and student module guides.

Students on placement must complete a portfolio assessment which includes a reflection on how the theories they have learnt during their teaching year have helped them in their placement and demonstrate ability to apply their teaching in a real-world situation.

Note: As per GR5 within the general regulations, the University aims to ensure that all option modules listed below are delivered. However, for various reasons, such as demand, the availability of option modules may vary from year to year or between teaching blocks. The University will notify students by email as soon as these circumstances arise.

MSc Advanced Product Design Engineering & Manufacturing

Level 7							
MSc Advanced Product Design Engineering & Manufacturing							
Core modules	**Module code**	**Credit Value**	**Level**	**Teaching Block**	**Pre-requisites**	**Full Time**	**Part Time**
Advanced CAD\CAM Systems	ME7722	15	7	TB1		1	2
Dissertation	AE7743	60	7	TB3	None	1	1
Integrated Engineering Simulation	ME7739	15	7	TB2	None	1	1
Product Design Cycle Analysis	ME7741	30	7	TB2	none	1	1
Quality Management System	ME7738	15	7	TB1	None	1	1
Research Techniques, Innovation & Sustainability	AE7742	30	7	TB1	None	1	1
Optional Modules							
Advanced Product Modelling	ME7744	15	7	TB1	None	1	1
Industrial Robotics	ME7737	15	7	TB1	None	1	1
Professional Placement	CI7900	120	7	TY13	None	2	2

Level 7 information

Students exiting the programme with 60 credits are eligible for the award of PgCert.
Students exiting the programme with 120 credits are eligible for the award of PgDip.
Students exiting the programme with 30 credits compensated module are eligible for the award of MSc Product Design and Manufacturing.

D. Principles of Teaching, Learning and Assessment

The principles of teaching, learning and assessment are in line with the University's strategy. The fields are designed to give students a balanced portfolio of theoretical and practical experience, embracing diversity and individuality.

Industry specialists allied with lecturers and guest speakers contribute to our courses, reinforcing the theoretical aspects and provide an informative insight into industry, promoting innovation, creativity whilst offering an insight into entrepreneurial culture. The module lecturers, experts in the field of product design development, integrated computer aided design with the computer aided manufacturing CAD/CAM, reverse engineering, 3D printing, and the product data management are all driven by the latest research and use of cutting-edge technology to enrich content on the taught modules in the spirit of Kingston University; “research informed teaching” ethos. Furthermore, the practical workshops, open forums, company visits, and group presentations introduced into the modules provide students with a detailed understanding of the approaches taken in industry.

Taught materials, knowledge gained from the practical and case studies embedded within each module give student specialised knowledge, tools, and techniques. It will equip them with skills and methods for extracting and synthesising the information. These activities promote rigour, curiosity, excellence, originality, and breadth of knowledge. They must then further explore and exploit the information given, research and define outcomes accurately to produce detailed solutions and innovative work for each module and project dissertation.

It is recognised that teamwork is a very important aspect in industry, and this is implemented in the modules. The course ensures that the students are exposed to team working through group presentations, joint report writing, joint research and lab work, promoting consideration, courtesy, and collegiality.

The course teams are aware of the need for effective communication, both written and verbal, and take pride in the fact that the courses provide, in this regard, a means of preparing the students for their longer-term career plans and CPD. Apart from the project itself, each student has to give verbal presentations during the modules, normally to the student’s peer group and module leader. Students are also helped with verbal communication skills through seminars, tutorials, and discussion groups. Most modules are assessed by written assignments which are designed to improve students’ research and evaluation skills.

The individual project dissertation provides a challenge to the candidate to undertake a real-world problem because most projects are industrially orientated. Students will be given close guidance to select a project which is relevant to the chosen field. During the project, the student will be expected to apply the knowledge learnt during the course to achieve agreed deliverables, whilst satisfying any given constraints. Key skills in communication, presentation, literature search, problem analysis, project planning, report writing, and solution justification are all part of the learning objectives defined in the field. The project work is normally aligned with the research field of the staff involved and often leads to students publishing of join papers with their project supervisor.

Students also have a range of opportunities to participate in extra-curricular activities based around clubs and societies (e.g., Formula Student Club and Engineering society), which offer further opportunities to develop their communication skills, teamwork, and ability to apply their theoretical knowledge to hands-on activities.

A combination of assessment methods will be used throughout the course. These elements include module assignments, module examinations, in-class tests, experiment reports, industrial visit reports, seminars, verbal presentations, and the project dissertation. Each module leader is responsible for ensuring that the method of assessment reflects the aims

and learning objectives of the module, is demanding, and stimulating and at the appropriate master level.

Formative assessments are embedded into the delivery pattern of all the modules and are designed to help students learn more effectively by giving them feedback to improve their performance and feedforward towards summative assessments. Reflective practice by students and feedback from designated Personal tutors will also form part of the formative assessments. Group activities are an important part of the course teaching and assessment strategy where students learn and improve through peer feedback.

The programme embraces the use of Technology Enhanced Learning (TEL) to engage students actively. Some of the most widely used technologies in problem-solving activities are computer simulations and modelling which encompass Finite Elements Analysis (FEA), Computer Aided Design & Manufacture (CAD/CAM) in the curriculum. Digital tools such as a team's work file syncs Cloud, VLE assessment and YouTube videos are used to enhance the quality of student learning experience.

Research-informed teaching
Most of the module teams are engaged in engineering research or industry-related professional activities, such as Knowledge Transfer Partnerships (KTPs), which have significantly influenced the design and content of the programme. The Department's Industrial Advisory Board also provides valuable input from industry, further informing the programme's development.

The academic staff are committed to continuous professional development in teaching and learning in higher education and wider pedagogic issues. Their research and development of innovative ideas informs the curriculum and enhances student learning experience both within and outside the classroom.

Inclusive teaching practice
The University is committed to an inclusive curriculum, encouraging students to consider themselves as members of a professional community. The Student Voice Committee provides a platform for students to voice their opinions and suggest improvements for developing a more inclusive curriculum that takes into account the specific circumstances of the student body. To cater to different learning preferences and experiences, a diverse range of teaching activities is provided with a careful balance between individual and group-based activities. The assessment brief, provided at the beginning of the year, includes marking criteria for all assessments. The language used in the criteria is clear and concise to ensure that students understand the expectations. Additionally, in-class discussions are held to allow students to question and clarify any doubts regarding the marking criteria.

Focus on Active Learning and Enhancing student Engagement.
The programme emphasises on active learning through collaborative, problem-solving and enquiry-based workshops, and tutorials. Engaging sessions require students to prepare beforehand and actively participate during the class, as opposed to passively listening to lectures. Furthermore, the guided learning approach encourages students to consolidate their knowledge after the session. Additionally, students can benefit from opportunities for peer learning, group work and presentation practice. In these interactive sessions, the lecturer plays a crucial role in supporting students to construct their own knowledge and understanding while introducing and summarising key concepts through short mini lectures.

Active and collaborative learning techniques are utilised in the lectures, which may include interactive presentation software, question-and-answer sessions and brief student discussions integrated into the lecture. By incorporating these methods, valuable contact time is spent on applying and critically analysing knowledge, while also developing key skills

such as problem-solving, communication and teamwork. To further promote student engagement and sense of belonging, the programme offers various opportunities for students to interact with staff and peers, including through the personal tutorial scheme (PTS), field work, industrial visits, extra-curricular seminars, research internships, course representative system, student ambassador work, peer mentoring and outreach initiatives, as well as hands-on activities such as Formula Student, TT-Bike racing, Robotics Club and UK Talent. These efforts also support improved retention and progression among students and enhance student engagement, creativity, confidence, and self-reliance.

Development of Employability Skills
The programme not only focuses on imparting theoretical knowledge but also aims to develop a wide range of essential employability skills. This is achieved by embedding future-oriented skills throughout the curriculum via a Research Techniques, Innovation & Sustainability module. Through the programme, students are equipped with effective communication, problem-solving and creative thinking skills – qualities that employers seek in postgraduates. The integration of 'Skills for Innovation' across both business and higher education domains ensures that graduates have the skills, experience and opportunities required to excel in their chosen careers.

The course is designed with close consultation with the School's Industrial Advisory Board, hence taking on board the latest requirements of industry for graduates. Employability skills are developed throughout the delivery of the modules, particularly as part of capstone dissertation. Furthermore, students are equipped with business, management, and entrepreneurial skills to enhance their employability potential globally. Delivery of many modules involves industrial speakers, who introduce students to latest industrial requirements.
Employability criteria identified using feedback from employers, alumni, Industrial Advisory Board, and the Institution of Mechanical Engineers (IMechE) are embedded in the curriculum. Each module is examined to determine opportunities to incorporate employability skills. The University's academic and Careers and Employability Service teams identify appropriate provisions and tailor opportunities to bridge gaps.

The IMechE Formula Student competition, on the other hand, serves as an integral component of the curriculum, equipping students with a well-rounded skill set that extends beyond academic learning and prepares them for the demands of the professional world. Students are required to design and manufacture a prototype of a single-seat race car. This demanding task enables students to refine their technical skills and deepen their understanding of engineering design and manufacturing processes. Moreover, the competition goes beyond developing technical expertise. It provides a platform for students to cultivate essential skills like teamwork, time management, project management, budgeting, and presentation. These competencies, highly sought-after by employers, can significantly enhance students' employability prospects.
Throughout the course students have access to a dedicated employment coordinator; attend specially arranged employer seminars, university career workshops and research seminars, to prepare them for the world of work once graduated.

Students who successfully complete the MSc will have acquired a significant research background and analytical skills in the broader issues of design problem solving relating to Product Design Engineering and Manufacturing. This should therefore enable students to substantially enhance their prospects of gaining employment and progress their career in the engineering industry. Postgraduates of this course have taken up posts in a variety of employment settings including design consultancy, research and developments and production engineers. Our recent graduates were recruited by companies such as (Thales, Eurostar, BAE, Precision Press Parts Corp, and various other Design Consultancy Companies). Other MSc postgraduates opt to study for a PhD research project.

The breadth of knowledge and ability gained by the graduates will prepare them to take on the roles such as:

- Project leaders and managers
- Manufacturing Plant Engineer/Manager
- Operation Managers
- Engineering consultants
- Quality Manager
- Scholars in higher education
- Research and development engineers
- Opportunity to undertake further research for a PhD qualification.

The level and content of courses are relevant and satisfy the Engineering Council's guidance and criteria (for further information see the Institute Institution of Mechanical Engineering and Engineering Council links part K).

E. Support for Students and their Learning

A personal tutor (PT) will be assigned to each student to personalise their learning experience and support their academic and professional development from the first induction day at the university all the way to graduation and their career destination. The personal tutors will help their tutees with issues of transition from undergraduate master's and understand how to use feedback on the postgraduate course. They will play an important role in supporting the large community of international students to settle down and take advantage of the university wide support system. They will also encourage students to be proactive in making links between their course and their professional and/or academic aspirations and explore their research interests as well as being part of a wider disciplinary and/or professional community in support of their career choices.

Personal tutors are allocated on a course basis during induction week. Student numbers are divided equally amongst the staff within the Department. Students will keep the same tutor throughout their course of study.

Additionally, Students are supported by a range of other course and/or university level systems, including:

- A Module Leader for each module
- A Course Leader to help students understand the programme structure.
- A Personal Tutor to provide academic advice and guidance.
- A dedicated Course Administrator
- Technical support on use of IT and workshop/lab facilities.
- A designated programme administrator.
- A dedicated employability consultant practitioner.
- An induction programme at the beginning of each new academic session.
- Series of research seminars delivered by internal and external speakers informing students about latest advances in research.
- Invited guest lecturers informing students about latest developments in technology and professional practise.
- Student Voice Committee (SVC).
- Canvas - a versatile on-line interactive Virtual Learning Environment (VLE).
- ECE Study Skills Centre (S3) that provides academic skills support.

- KU student support facilities that provide advice on issues such as finance, regulations, legal matters, accommodation, etc.
- Disabled student support.
- The KU Students' Union.
- KU Careers and Employability Service.

F. Ensuring and Enhancing the Quality of the Course

The University has several methods for evaluating and improving the quality and standards of its provision. These include:

- External examiners
- Annual Monitoring and Enhancement
- Continuous Monitoring of courses through the Kingston Course Enhancement Programme (KCEP+)
- Student evaluation including Module Evaluation Questionnaires (MEQs), level surveys and the Postgraduate Taught Experience Survey (PTES)
- Moderation policies
- Feedback from employers
- Industrial Advisory Board
- Professional body reaccreditation is required every four years.

In addition to the University quality systems, the course currency and quality is continuously supported and evaluated by the School's Industrial Advisory Board. The module content and delivery methods are informed by the research and enterprise activities of academic staff. The course is also supported, monitored, and accredited by the Institution of Mechanical Engineers (IMechE), under licence from the UK regulator, the Engineering Council, as meeting the requirements for further learning for a Chartered Engineer (CEng) status for candidates who have already acquired an accredited CEng (Partial) BEng (Hons) degree.

Accreditation is a mark of assurance that the degree meets the standards set by the Engineering Council in the UK Standard for Professional Engineering Competence (UK-SPEC). Some employers recruit preferentially from accredited degrees, and an accredited degree is likely to be recognised by other countries that are signatories to international accords.

G. Employability and work-based learning

The course is designed with close consultation with the School's Industrial Advisory Board, hence taking on board the latest requirements of industry for graduates. Employability skills are developed throughout the delivery of the modules, particularly as part of capstone individual project. Furthermore, students are equipped with business, management and entrepreneurial skills to enhance their employability potential globally. Delivery of many modules involves industrial speakers, who introduce students to latest industrial requirements.

Throughout the course students have access to a dedicated employment coordinator; attend specially arranged employer seminars, university career workshops and research seminars, to prepare them for the world of work once graduated.

Students who successfully complete the MSc will have acquired a significant research background and analytical skills in the broader issues of design problem solving relating to

mechanical engineering. This should therefore enable students to substantially enhance their prospects of gaining employment and progress their career in the engineering industry. Postgraduates of this course have taken up posts in a variety of employment settings including design consultancy, research and developments and production engineers. Our recent graduates were recruited by companies such as (Thales, Eurostar, BAE, Precision Press Parts Corp and various other Design Consultancy Companies). Other MSc postgraduates opt to study for a PhD research project.

The breadth of knowledge and ability gained by the graduates will prepare them to take on the roles such as:

- Project leaders and managers
- Manufacturing Plant Engineer/Manager
- Operation Managers
- Engineering consultants
- Quality Manager
- Scholars in higher education
- Research and development engineers
- Opportunity to undertake further research for a PhD qualification

Work-based learning, including sandwich courses and higher or degree apprenticeships

Work placements are actively encouraged, although it is the responsibility of individual students to source and secure such placements. This allows students to reflect upon their own personal experience of working in an applied setting, to focus on aspects of this experience that they can clearly relate to theoretical concepts and to evaluate the relationship between theory and practice.

Students on courses with professional placement can register for the IMechE Monitored Professional Development Scheme (MPDS) scheme if they desire their placement year to be accredited by the IMechE. The MPDS scheme, adhering to the competencies outlined by the Engineering Council's UK Standard for Professional Engineering Competence (UK-SPEC), provides the students with a structured development framework. This facilitates their journey towards professional registration by enabling them to demonstrate their learning through the submission of reports to the IMechE. Furthermore, participation in the MPDS scheme counts as the first year of industrial experience required for Chartership. Thus, the scheme not only aids students in their professional registration application but also acts as a catalyst for their career progression by speeding up their path towards Chartership.

While it is the responsibility of individual students to secure such placements, the Careers and Employability Service support offers each student support at all stages of the application process, including writing CVs, completing application forms, participating in mock interviews, assessment centre activities and psychometric tests. The process of applying for a placement gives students the opportunity to experience a real-life, competitive job application process.

The business experience period enables students to apply their learning in the real-world work environment, to reflect upon their own personal experience of working in an applied setting, to focus on aspects of this experience that they can clearly relate to theoretical concepts and to evaluate the relationship between theory and practice. Students will be assessed during and at the end of this period, normally through a portfolio. This will be marked as pass/fail.

Students who undertake work-based placements often benefit greatly from the experience, gaining real experience and work achievements.

H. Other sources of information that you may wish to consult

Engineering Council UK-SPEC
https://www.engc.org.uk/ukspec
Institution of Mechanical Engineers IMechE
http://www.imeche.org/Home
Kingston University Web site:
Advanced Product Design Engineering & Manufacturing (MSc) degree course - London postgraduate courses - Kingston University London

I. Development of Course Learning Outcomes in Modules

This table maps where course learning outcomes are **summatively** assessed across the modules for this course. It provides an aid to academic staff in understanding how individual modules contribute to the course aims, a means to help students monitor their own learning, personal and professional development as the course progresses and a checklist for quality assurance purposes.

Module Code		Level 7								
		ME7738	ME7739	ME7741	ME7744	AE7742	AE7743	ME7737	CI7900	ME7722
Knowledge & Understanding	A4	S		S	S	S	S	S		
	A3				S			S		
	A2	S		S		S	S			
	A1		S	S	S		S	S		
Intellectual Skills	B4		S	S	S		S	S		
	B3		S	S	S			S		
	B2	S	S		S	S	S	S		
	B1	S		S		S	S			
Practical Skills	C1						S			
	C2		S	S						
	C3				S		S	S		
	C4		S	S	S		S	S		

Students will be provided with formative assessment opportunities throughout the course to practise and develop their proficiency in the range of assessment methods utilised.