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**Programme Specification**

**Title of Course:** MSc in Advanced Product Design Engineering

**Date Specification Produced:** November 2012

**Date Specification Last Revised:** July 2018

This Programme Specification is designed for prospective students, current students, academic staff and potential 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 he/she takes full advantage of the learning opportunities that are provided. More detailed information on the teaching, learning and assessment methods, learning outcomes and content of each module can be found in the Course Handbook and Module Descriptors.

**SECTION 1: GENERAL INFORMATION**

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| **Title:** | MSc in Advanced Product Design Engineering |
| **Awarding Institution:** | Kingston University, London |
| **Teaching Institution:** | Kingston University, London |
| **Location:** | Roehampton Vale |
| **Programme Accredited by:** | Institution of Mechanical Engineers |

**SECTION 2: THE PROGRAMME**

1. **Programme Introduction**

This MSc Advanced Product Design Engineering course is designed to provide students with the latest technology in modern CAD/CAM/CAE (computer-aided design, 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 market place, 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 solid modelling techniques to an extended capability of 3D laser scanning to generate complex surfaces and models. Also students gain practical and theoretical knowledge of analytical design tools to assist the product validation process by applying advanced mechanism design simulation and finite elements analysis techniques. Additionally, examines the importance of advanced manufacturing techniques and the methods used to integrate Computer Aided Manufacturing CAM with computer numerical control, rapid prototyping technologies into product data management PDM.

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 in order 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 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 employers desire today.

1. **Aims of the Course**

#### The main aims of the MSc Advanced Product Design Engineering (APDE) are:

* Equip students with the multi-disciplinary understanding and the key skills necessary to apply the principles of specialised subjects within the engineering field.
* Enhance the skills and knowledge required to enable students to contribute effectively to manufacturing and other engineering industries, and give them the capability to hold responsible positions within industry.
* Provide access to a postgraduate course with specialisation options, for students from different engineering backgrounds.
* 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.
* Acquire a detailed knowledge of understanding of the latest Computer Aided techniques used in field of Engineering Product Design.
* Develop a scientific approach in proposing the necessary steps required to design and test a technically functional product within the given specifications and constraints.
* Further enhance the knowledge of computer aided product design by engaging an industrial oriented project. The student is required to apply all the techniques he has learnt in the course in order to produce satisfactory results and make feasible recommendations, support by a broad literature research.
* Give students on the 2 year version an opportunity to develop further skills, preparing them for higher levels of employment.

**C. 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.

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| **Programme Learning Outcomes** |
|  | **Knowledge and Understanding****On completion of the course students will be able to:** |  | **Intellectual skills – able to:****On completion of the course students will be able to:** |  | **Subject Practical skills** **On completion of the course students will be able to:** |
| A1 | Have an in-depth understanding of specialized subjects necessary to apply the principles of computer product design and concurrent engineering. | B1 | Have a critical awareness of the current developments in the engineering product design environment. | C1 | Have the capability to critically evaluate technical systems and specifications for a Manufacturing environment. |
| A2 | Critically appraise and apply sophisticated computer design methods various manufacturing options to achieve rapid and reliable product. | B2 | A detailed understanding in manufacturing and product design engineering. | C2 | Use latest CAD/CAM and CAE systems to facilitate better optimisation and more efficient product design and manufacturing processes. |
| A3 | Control projects in respect to time, cost and the risks inherent in engineering. | B3 | Have the ability to understand and analyse complex problems in product design engineering, using advanced CAD/CAM/CAE tools. | C3 | Apply the product data management PDM and the product lifecycle management PLM strategies |
| 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. |  |  |
| **Key Skills** |
|  | **Self Awareness Skills** |  | **Communication Skills** |  | **Interpersonal Skills** |
| AK1 | Take responsibility for own learning and plan for and record own personal development | BK1 | Express ideas clearly and unambiguously in writing and the spoken work | CK1 | Work well with others in a group or team |
| AK2 | Recognise own academic strengths and weaknesses, reflect on performance and progress and respond to feedback | BK2 | Present, challenge and defend ideas and results effectively orally and in writing | CK2 | Work flexibly and respond to change |
| AK3 | Organise self effectively, agreeing and setting realistic targets, accessing support where appropriate and managing time to achieve targets | BK3 | Actively listen and respond appropriately to ideas of others | CK3 | Discuss and debate with others and make concession to reach agreement |
| AK4 | Work effectively with limited supervision in unfamiliar contexts |  |  | CK4 | Give, accept and respond to constructive feedback |
|  |  |  |  | CK5 | Show sensitivity and respect for diverse values and beliefs |
|  | **Research and information Literacy Skills** |  | **Numeracy Skills** |  | **Management & Leadership Skills** |
| DK1 | Search for and select relevant sources of information | EK1 | Collect data from primary and secondary sources and use appropriate methods to manipulate and analyse this data | FK1 | Determine the scope of a task (or project) |
| DK2 | Critically evaluate information and use it appropriately | EK2 | Present and record data in appropriate formats | FK2 | Identify resources needed to undertake the task (or project) and to schedule and manage the resources |
| DK3 | Apply the ethical and legal requirements in both the access and use of information | EK3 | Interpret and evaluate data to inform and justify arguments | FK3 | Evidence ability to successfully complete and evaluate a task (or project), revising the plan where necessary |
| DK4 | Accurately cite and reference information sources | EK4 | Be aware of issues of selection, accuracy and uncertainty in the collection and analysis of data | FK4 | Motivate and direct others to enable an effective contribution from all participants |
| DK5 | Use software and IT technology as appropriate |  |  |  |  |
|  | **Creativity and Problem Solving Skills** |  |  |  |  |
| GK1 | Apply scientific and other knowledge to analyse and evaluate information and data and to find solutions to problems |  |  |  |  |
| GK2 | Work with complex ideas and justify judgements made through effective use of evidence |  |  |  |  |
| **Teaching/learning methods and strategies** |
| The teaching and learning strategy is in line with the university Led by Learning strategy. It is designed to engage, empower and enable students to acquire and expand their knowledge, technical expertise and key skills for a successful career in their chosen engineering subject. The ethos of the strategy is to enhance students experience through research informed/practice led teaching, provision of inclusive physical and virtual learning environment, effective performance feedback and embedded employability skills. To achieve this, a range of methods, as appropriate to individual modules, are employed including. * Formal lectures by internal and external subject experts
* Problem solving tutorial sessions
* Practical classes using extensive and modern software and technical facilities
* Industrial case study workshops, discussion forums and research seminars
* Group activities
* Individual supervision
* Technology enhanced learning environment
* Reflective studies through guided independent learning, Please also see section F
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| **Assessment strategies** |
| The assessment strategy is designed to support Students’ learning experience. Formative assessments are integrated into the learning programme and timely feedback will be provided making it clear how performance can be improved. Assessment criteria are clear, transparent and explicit and the scope of each assessment is discussed with students within modules. The course employs a variety of assessment methods to ensure module and course outcomes are appropriately assessed. These include: * Written Examinations and in-class tests
* Problem-solving assignments
* Analytical and research based essays,
* Technical reports
* Group and individual presentations
* Project dissertation
* Scientific research papers
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1. Entry Requirements
2. **General Admissions Regulations**

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 demonstrated 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 particular 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. Further information is available on the University web site.

1. **Admission with Advanced Standing**

Normally, exemptions from the study of particular modules will only be granted only on the basis of relevant previous study at Masters Level (APL) or extensive relevant experience (APEL). Students wishing to gain admission to the course with advanced standing will be required to provide certificates, a course/module synopsis and a portfolio of evidence of their previous learning or work-based experience.

1. **Field/Course Structure**

This programme is offered in full-time/part-time mode, and leads to the award of MSc. Entry is normally at level 7 with a first degree or equivalent qualifications (See section D).

The course features two intakes per year (September and January) and the academic year is divided into two teaching blocks. Students will do their individual projects from May until the end of September. Taught modules, consisting of core and optional modules, are delivered in week-block mode over two weeks for a 30 credit module not necessary subsequent to each other.

The field is offered in the following alternative patterns: 1 year full-time or 2 years part-time.

**E1. Professional and Statutory Regulatory Bodies**

Institution of Mechanical Engineers (IMechE) and Engineering Council (EC)

This degree is accredited by IMechE and therefore provides elements of further learning towards Chartered status, for the graduates who have already completed an accredited first degree. The programme meets the requirements of the Engineering Council supplement to UK-SPEC on “*Applicability of Output Standards to Master degrees other than the integrated MEng”*, published in 2011.

**E2. Work-based learning, including sandwich programmes**

The 2-year version of the programme is designed to include work-based learning through assessments and the reflective report. Many of the students on the programme are already working and they can use that experience to relate to theoretical concepts and to evaluate the relationship between theory and practice.

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.

**E3. Outline Programme Structure**

This programme is part of the University Postgraduate Credit Framework (PCF). Programmes in the PCF are made up of modules which are designated at level 7. Single modules in the framework are valued at 30 credits and the programme consists of 4 subject specific single modules (3 core and 1 optional) 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 Master degree is achieved with 180 credits completion of (all modules and the final individual project).

*The course offers the PG Certificate and PG Diploma 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 starting the course in September will work on the placement for between 10 – 12 months, starting from June, before their dissertation. Those students must confirm their placement before 15 May. Students on courses with January intake will work on the placement for between 10 – 12 months, starting from February, after completing their dissertation. Students on this intake must confirm their placement before 20 December. In either case, the suitability of the placement requires approval of the Course Leader.

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.

**Duration and academic year structure**

* The maximum duration of the MSc is one-two years full-time and two-four years part-time.
* Students may commence in September or January.
* The taught modules will normally run from September to May each year.
* Part-time students will normally complete their taught modules over two years and then complete their project.

See also diagrammatic representation of the course structure Appendix A.

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| **Level 7** |
| **Compulsory Modules** | **Module Code** | **Credit** **Value** | **Level**  | **Written Exam****%** | **Practical Exam****%** | **Course-work****%** | **Teaching Block** |  |
| Engineering Research Techniques, Entrepreneurship and Quality Management | ME7711 | 30 | 7 | 0 | 0 | 100 | 2 Weeks | None |
| Computer Integrated Product Development | ME7721 | 30 | 7 | 0 | 0 | 100 | 2 Weeks | None |
| Advanced CAD/CAM Systems | ME7722 | 30 | 7 | 0 | 0 | 100 | 2 Weeks | None |
| Individual Project Dissertation | ME7761 | 60 | 7 | 0 | 0 | 100 | 600 Hrs | None |
| **Option modules** |  |  |  |  |  |  |  | **Pre-requisites** |
| Industrial Operation Management & Resources Simulation | ME7713 | 30 | 7 | 0 | 0 | 100 | 2 Weeks |  |
| Green Engineering & Energy efficiency | ME7725 | 30 | 7 | 0 | 0 | 100 | 2 Weeks | None |
| Mechatronics Design & Automation | ME7732 | 30 | 7 | 0 | 0 | 100 | 2 Weeks | None |
| Professional Placement  | CI7900 | 120   |  |  |  |  |  |  |
| Students exiting the programme with 60 credits are eligible for the award of PgCertStudents exiting the programme with 120 credits are eligible for the award of PgDip |

1. **Principles of Teaching Learning and Assessment**

The principles of teaching, learning and assessment are in line with the University's strategy, 'Led by Learning'. 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, and also 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 team work 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 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.

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

1. **Support for Students and their Learning**

A personal tutor 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 UG to Masters 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.

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
* 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.
* Staff Student Consultative Committee
* Canvas - a versatile on-line interactive intranet an learning environment
* SEC 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 Students’ Union
* KU Careers and Employability Service
1. **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
* Boards of study with student representation
* Industrial Advisory Board
* Annual review and development
* Periodic review undertaken at the subject level
* Student evaluation
* Moderation policies
* 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 Institute 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.

1. **Employability Statement**

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
1. Approved Variants from the Postgraduate Regulations

None

1. **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:

<https://www.kingston.ac.uk/postgraduate-course/industrial-manufacturing-systems-msc/>

**Development of Programme Learning Outcomes in Modules**

This map identifies where the programme learning outcomes are assessed across the modules for this programme. It provides an aid to academic staff in understanding how individual modules contribute to the programme aims, and a means to help students monitor their own learning, personal and professional development as the programme progresses and a checklist for quality assurance purposes. Include both core and option modules.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Module Code** |  | ME7711 | ME7721 | ME7722 | ME7761 | ME7713 | ME7725 | ME7732 |
| **Programme Learning Outcomes** | **Knowledge & Understanding** | A1 | F | S | S | S |  | S | S |
| A2 | F/S | S | S | S |  | F/S | S |
| A3 | F | F | F | S | F | F | F |
| A4 | S | F | F | S | S | S | F |
| **Intellectual Skills** | B1 | S | S | S | S |  | S | S |
| B2 | S | S | S | S | F/S | S | S |
| B3 | S | S | S | F/S |  | F | S |
| B4 | F | S | S | F/S |  | S | S |
| **Subject Practical Skills** | C1 | F | F/S | F/S | F/S | F | F/S | F/S |
| C2 | F | S | S | S | S | F | S |
| C3 |  | S | S | S | S | F |  |
| **Key Skills** | **Self Awareness Skills** | AK1 | F | F |  | F | F |  | S |
|  | AK2 | F/S | F | F | F | F/S | F | F |
|  | AK3 | F | S |  | F | F |  | S |
|  | AK4 | F | S | S | F | F | F |  |
| **Communication Skills** | BK1 | F/S | S | S | S | F/S | S | S |
|  | BK2 | F/S | S | S | S | F/S | S |  |
|  | BK3 | F | F | F | S | F | F |  |
| **Interpersonal Skills** | CK1 | F/S | S |  | S | F/S | F/S | F |
|  | CK2 | F | F | F | S | F | F/S | F |
|  | CK3 | F | F |  | S | F | F | F |
|  | CK4 | F/S | F | F | S | F/S | F/S |  |
|  | CK5 | F | F | F | S | F | F |  |
| **Research and Information**  | DK1 | S | S | S | S | S | F/S | S |
| **Literacy Skills** | DK2 | S | S | S | S | S | F/S | S |
|  | DK3 |  | S |  |  |  | S |  |
|  | DK4 | F/S | S | S | F/S | F/S | S | F/S |
|  | DK5 | F | F |  | S | F | F/S | F |
| **Numeracy Skills** | EK1 | F/S | S | S | S | F/S | S | F/S |
|  | EK2 | S | S | S | S | S | S | F/S |
|  | EK3 | S | S | S | S | S |  |  |
|  | EK4 | S | S | S | S | S |  |  |
| **Management & Leadership Skills** | FK1 | F | S | S |  | F | S | F |
|  | FK2 | F | S | S |  | F | S | S |
|  | FK3 | F/S | S | S | F | F/S | S | S |
|  | FK4 | F | F |  | F | F | F | F |
| **Creativity and Problem Solving Skills** | GK1 | S | S | S | S | S | F | F |
|  | GK2 | F/S | S | S | S | F/S | F/S | S |

**S**  indicates where a summative assessment occurs.

**F** where formative assessment/feedback occurs.

**Technical Annex**

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| **Final Award(s):** | MSc Advanced Product Design Engineering |
| **Intermediate Award(s):** | PgDip, PgCert |
| **Minimum period of registration:** | 1 year FT and 2 years PT |
| **Maximum period of registration:** | 2 year FT and 4 years PT |
| **FHEQ Level for the Final Award:** | MSc |
| **QAA Subject Benchmark:** | Engineering |
| **Modes of Delivery:** | FT and PT |
| **Language of Delivery:** | English |
| **Faculty:** | SEC |
| **School:** | Mechanical & Aerospace Engineering |
| **JACS code:** | H700 |
| **UCAS Code:** | N/A |
| **Course Code:** | N/A |
| **Route Code:** | N/A |

**Appendix - A**

**MSc Advanced Product Design Engineering**

***Core Modules - 90 Credits***

***ME7711***

**Engineering Research Techniques, Entrepreneurship and Quality Management**

***30 Credits***

***ME7721***

***Computer Integrated Product Development***

***30 Credits***

***ME7722***

***Advanced CAD/CAM Systems***

***30 Credits***

***Optional Modules - 30 Credits***

***ME7713***

***Industrial Operation Management & Resources Simulation***

***30 Credits***

***ME7725***

***Green Engineering & Energy Efficiency***

***30 Credits***

***ME7732***

***Mechatronics Design & Automation***

***30 Credits***

***Project – 60 Credits***

***ME7761***

***Individual project***

***60 Credits***