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**Programme Specification**

**Title of Course: MSc Advanced Industrial & Manufacturing Systems (Piraeus University of Applied Sciences)**

**Date Specification Produced: December 2012**

**Date Specification Last Revised: Oct 2016**

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 Student Handbooks and Module Descriptors.

**SECTION 1: GENERAL INFORMATION**

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| **Title:** | MSc Advanced Industrial & Manufacturing Systems |
| **Awarding Institution:** | Kingston University |
| **Teaching Institution:** | Piraeus University of Applied Sciences |
| **Location:** | Piraeus, Greece |
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**SECTION2: THE PROGRAMME**

1. **Programme Introduction**

Manufacturing is always an essential element of a sustainable industrial growth for many developed and developing countries. Today many top economy countries including the USA, Germany, Japan, Korea and China to name but a few, they all have a strong manufacturing sector. However, in today’s global competitive stage, it is no longer sufficient to just master the manufacturing techniques alone, but it is equally important to implement the right strategy in management and logistics too.

This MSc in Advanced Industrial & Manufacturing Systems is aimed to equip students with both the technological and managerial aspects of modern manufacturing industry. It further provides students with the acute awareness of how to make a manufacturing company stand out from its competitors through productivity and efficiency gain. Many companies are looking for graduates who can demonstrate such combined technological and managerial capabilities.

In this course students will be taught the essential manufacturing methods and resource optimisation techniques so that innovative ideas can be turned into real products in a competitive and efficient way. The course covers critical skills such as Computer-Aided Design and Manufacture, robotics automation, quality management, factory management and Entrepreneurship so that new products can be developed, manufactured and distributed efficiently within budget, time and other defined constraints, yet maintaining the highest possible quality at any time.

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 dissertation, which can be customised to meet the individual requirement and career ambition of a student, will enable them to be specialised in a chosen field and prepare them for the world of work.

Students will also have the opportunity to engage with the wider Faculty research community through attending regular research seminars and participating in research forums run by PhD students. This may lead to the possibility of furthering their studies towards a PhD research degree. There are also ample opportunities for Maser students to take leading roles in a range of extracurricular activities which are run across all levels of a subject area in the Faculty.

The delivery of the course is led by technology. In addition to the well balanced structure of lectures and practical sessions using cutting edge technology, all course materials including teaching and supplementary materials, tutorial questions, subject discussion forums, video clips, , relevant case studies, module guides and assessment marking schemes can be accessed online in an enriched virtual learning environment.

The programme is accredited by the Institution of Mechanical Engineers (IMechE). This accreditation certifies the fact that this course is of the appropriate standard and content, representing the knowledge base required to achieve Chartered status. Graduates from this course will see their employability potential greatly enhanced, and they can take the unique mix of knowledge and skills acquired in this course to work in any company in the world.

1. **Aims of the Programme**

#### The main aims of MSc Advanced Industrial & Manufacturing Systems (AIMS)

are to provide students with the opportunity to:

* 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.
* Develop an acute awareness of the latest manufacturing techniques and management concept used in industry.
* Understand and analyse a given manufacturing problem with systematic approach.
* Tackle an industrial oriented project related to manufacturing by applying various techniques and knowledge learnt in the course, and to recommend feasible solutions supported by a broad literature research.
1. **Intended Learning Outcomes**

The programme provides opportunities for students to develop and demonstrate knowledge and understanding, skills and other attributes in the following areas. The programme outcomes are referenced to the QAA subject benchmarks for Mechanical Engineering and the Framework for Higher Education Qualifications in England, Wales and Northern Ireland, and relate to the typical student.

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| **Programme Learning Outcomes** |
|  | **Knowledge and Understanding****On completion of the course students will have knowledge and understanding of:** |  | **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 | A systematic and detailed understanding of a chosen coherent subset of the manufacturing process. | B1 | Demonstrate a critical awareness of the current developments in the manufacturing environment. | C1 | To select and use effectively a range of methods and techniques used by manufacturing companies, including software solutions. |
| A2 | An understanding of the various technologies used in manufacturing processes. | B2 | Develop a good understanding in manufacturing engineering. | C2 | Have the capability to critically evaluate technical challenges and recommend appropriate solutions for a Manufacturing related problem. |
| A3 | Devise and critically evaluate logical manufacturing procedures to problem areas and implement proposed solutions. | B3 | Identify current issues and trends in manufacturing industry. | C3 | Apply effective CAD/CAM technologies to facilitate faster and a more cost effective engineering design-to-manufacture cycle. |
| A4 | Critically evaluate various manufacturing options and their cause and effect and cost implication in a manufacturing area. | B4 | Engage in the critical community including reflecting on one’s own and others practices and relate them to a manufacturing environment.  | C4 | Critically analyse a given design or manufacturing problem and establish the connection of this problem to other related manufacturing areas. |
| A5 | Have an in-depth understanding and be able to apply state-of-the-art automation technologies in appropriate industries. | B5 | Demonstrate the ability to evaluate, analyse and resolve complex problems in manufacturing. | C5 | Select and apply computer-based and other advanced technologies to a wide range of mechanical engineering applications.  |
| A6 | Have an in-depth understanding of CAD/CAM technologies to accelerate engineering design processes. | B6 | Initiate and sustain a planned and disciplined personal effort when working alone or in a team. | C6 | Prioritise and justify, through logical evaluation, a number of workable solutions to a given manufacturing related problem. |
| **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** |
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|  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
* Research Projects

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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**D. Entry Requirements**

**a. 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.

**b. Admission with Advanced Standing**

Normally, exemptions from the study of particular modules will only be granted 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. **Programme Structure**

This programme is offered in full-time and 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**

Institute of Mechanical Engineers (IMechE) and Engineering Council:

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**

N/A

**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’s 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. Institute of Mechanical Engineers)

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

**Duration and academic year structure**

* The 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 and their project over two years.

To successfully complete the MSc, students must pass three core modules, one option module, and complete an individual project which is normally industry/research related with distinctive emphasis of industrial applications. See also diagrammatic representation of the course structure Appendix A.

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.

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| **Level 7**  |
| **Compulsory Modules** | **Module Code** | **Credit** **Value** | **Level**  | **Teaching Block** | **Pre-requisites** |
| Engineering Research Techniques, Entrepreneurship and Quality Management | ME7711 | 30 | 7 | 2 weeks | None |
| Advanced CAD/CAM Systems | ME7722 | 30 | 7 | 2 weeks | None |
| Mechatronic Design and Automation  | ME7732 | 30 | 7 | 2 weeks | None |
| Individual project Dissertation | ME7761 | 60 | 7 | 600 hours | None |
| **Option modules** |  |  |  |  | **Pre-requisites** |
| Industrial Operation Management & Resources Simulation | ME7713 | 30 | 7 | 2 weeks | None |
| E-Engineering Systems | ME7714 | 30 | 7 | 2 weeks | None |
| Green Engineering & Energy efficiency | ME7725 | 30 | 7 | 2 weeks | None |
| Advanced Stress Analysis & Materials | ME7723 | 30 | 7 | 2 weeks | None |

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, guest speakers and mature students 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 manufacturing, CAD/CAM, automation, materials, solid modelling, control etc. are embedding their latest research and relevant case studies to enrich content on the taught modules in the spirit of Kingston University ;'research informed teaching' ethos. Furthermore, the practical workshops, open forums and group presentations introduced into the modules provide students with a detailed understanding of the approaches taken in industry, aiding development of students' employability through the course.

Taught materials, knowledge gained from the practicals and case studies embedded within each module give students specialised knowledge, tools and techniques. These are delivered using specialist engineering software in hands-on sessions and interacting with the Virtual Learning Environment, which includes use of on-line learning materials and YouTube. 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. 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.

A combination of assessment methods will be used throughout the course as appropriate. These elements include module assignments, module examinations, in-class tests, experiment 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 outcomes of the module, is demanding and stimulating and at the appropriate master level. Formative assessments are embedded into the delivery pattern of all 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 Engineers 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 Director 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
* StudySpace - 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

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.

The market for graduates of the MSc Advanced Industrial & Manufacturing Systems is continually evolving and this programme, with its balance of applied specialist learning and practical, will prepare its graduates well for the senior technical and management positions in a range of industry such as:

* Avionics
* Defence
* Automotive Engineering
* Electronic Engineering
* Robotics & Automation
* Public sector and Education
* Manufacturing
* Transportation systems
* Software development
* Electrical machines

The breath 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 UMS/PCF**

None.

1. **Other sources of information that you may wish to consult**

Engineering benchmarks statement and accrediting institution

<http://www.engc.org.uk/>

Institute of Mechanical Engineering

http://www.imeche.org/Home

Kingston University MSc Advanced Industrial Manufacturing Systems programme web site

<http://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** |  | ME7711Engineering Research tec | ME7722Ad. CAD/CAM | ME7732Automation | ME7713Ind. Op. Mngt | ME7714E-Engineering Sys | ME7725Green Eng. | ME7723Ad. Stress | ME7761Project |
| **Programme Learning Outcomes** | **Knowledge & Understanding** | A1 | F | S | S | F | F, S | F, S | S | F, S |
| A2 | F | S | S | F, S |  | F, S | S | F, S |
| A3 | F, S | S |  | S | F, S | F, S |  | F, S |
| A4 | S | S | S | F, S | F, S | F, S | F | F, S |
| A5 | F, S | S | S | S | F | F | F | F, S |
| A6 |  | F, S | F, S |  | S |  |  | F |
| **Intellectual Skills** | B1 | F, S | F, S | S | F | F | F | F, S | F, S |
| B2 | F | F, S | S | F | F | F | S | F, S |
| B3 | F | S | S | S | F, S | F | S | F, S |
| B4 | F, S | S | F | F, S | F | F, S | S | F, S |
| B5 | F, S | S | S | S | S | F, S |  | F, S |
| B6 | S | S | S | S | S | S | S | F, S |
| **Subject Practical Skills** | C1 | F, S | S | S | S | F, S | F, S | F, S | F, S |
| C2 | F, S | F, S | S | F, S | S | F, S | S | F, S |
| C3 |  | S | F, S |  |  |  | S | F |
| C4 | S | S |  | F | F, S | S |  | F, S |
| C5 | S | S | S | S | S | S |  | F, S |
| C6 | F, S | F, S | F, S | F, S | F, S | S |  | F, S |
| **Key Skills** | **Self Awareness Skills** | AK1 | F | F | S | F | F | F, S |  | F |
| AK2 | F, S | F | F | F, S | F, S | F | F | F, S |
| AK3 | F | S | S | F | F | F | S | F, S |
| AK4 | F | S |  | F | F | F | S | F |
| **Communication Skills** | BK1 | F, S | S | S | F, S | F, S | S | S | F, S |
| BK2 | F, S | S |  | F, S | F, S | S | S | F, S |
| BK3 | F | F |  | F | F | F | F | F |
| **Interpersonal Skills** | CK1 | F, S | S | F | F, S | F, S | F, S |  | S |
| CK2 | F | F | F | F | F | F, S  | F | S |
| CK3 | F | F | F | F | F | F, S |  | S |
| CK4 | F, S | F |  | F, S | F, S | F, S | F | S |
| CK5 | F | F |  | F | F | F | F | S |
| **Research and Information Literacy Skills** | DK1 | S | S | S | S | S | F, S | S | S |
| DK2 | S | S | S | S | S | F, S | S | S |
| DK3 |  | S |  |  | F | S |  | F |
| DK4 | F, S | S | F, S | F, S | F, S | S | S | F, S |
| DK5 | F | F | F | F | F | F, S |  | S |
| **Numeracy Skills** | EK1 | F, S | S | F, S | F, S | F, S | S | S | S |
| EK2 | S | S | F, S  | S | S | S | S | S |
| EK3 | S | S |  | S | S | S | S | S |
| EK4 | S | S |  | S | S | S | S | S |
| **Management & Leadership Skills** | FK1 | F | S | F | F | F | S | F, S | F |
| FK2 | F | S | S | F | F | S | F, S | F |
| FK3 | F, S | S | S | F, S | F, S | S | F, S | F, S |
| FK4 | F | F | F | F | F | F |  | F |
| **Creativity and Problem Solving Skills** | GK1 | S | S | F | S | S | F, S | S | S |
|  | GK2 | F, S | S | S | F, S | F, S | F, S | S | S |

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

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

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| **Technical Annex** |  |
| **Final Award(s):** | MSc |
| **Intermediate Award(s):** | PgD, PgCert |
| **Minimum period of registration:** | 1 year FT and 2 years PT |
| **Maximum period of registration:** | 2 years 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 & Automotive Engineering |
| **JACS code:** | H100, H700 |
| **UCAS Code:** | N/A |
| **Course Code:** | N/A |
| **Route Code:** | N/A |
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**MSc Advanced Industrial & Manufacturing Systems Structure**

**Core Specific Modules - 90 Credits**

***ME7711***

***Engineering Research Techniques, Entrepreneurship and Quality Management 30 Credits***

***ME7722***

***Advanced CAD/CAM Systems***

***30 Credits***

***ME7732***

***Mechatronic Design and Automation***

***30 Credits***

**One Option Module - 30 Credits**

***ME7713***

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

***30 Credits***

***ME7714***

***E-Engineering Systems***

***30 Credits***

***ME7725***

***Green Engineering & Energy Efficiency***

***30 Credits***

***ME7723***

***Advanced Stress Analysis & Materials***

***30 Credits***

**Project - 60 Credits**

***ME7761***

***Individual Project***

***60 Credits***