Course Specification

Published Date:	23-Nov-2020
Produced By:	Oliver Jones
Status:	Validated

Core Information

Awarding Body / Institution:	University of Wolverhampton		
School / Institute:	School of Engineering		
Course Code(s):	MA007H01UV MA007H31UV	Full-time Part-time	3 Years 6 Years
Course Title:	BEng (Hons) Mechanical Engineering		
Hierarchy of Awards:	Bachelor of Engineering with Honours Mechanical Engineering Bachelor of Engineering Mechanical Engineering Diploma of Higher Education Mechanical Engineering Certificate of Higher Education Engineering University Statement of Credit University Statement of Credit		
Language of Study:	English		
Date of DAG approval:	10/May/2017		
Last Review:	2019/0		
Course Specification valid from:	2014/5		
Course Specification valid to:	2024/5		

Academic Staff

Course Leader:	Dr Ahmad Baroutaji
Head of Department:	Dr Syed Hasan

Course Information

Location of Delivery:	University of Wolverhampton
Category of Partnership:	Not delivered in partnership
Teaching Institution:	University of Wolverhampton
Open / Closed Course:	This course is open to all suitably qualified candidates.

Entry Requirements:

Entry requirements are subject to regular review. The entry requirements applicable to a particular academic year will be published on the University website (and externally as appropriate e.g. UCAS

2017 Entry

- A Level grade BB or CDD to include Maths and either a technology or science-based subject, or equivalent qualification(s)
- BTEC National Diploma grade MMP, BTEC National Certificate grade DM.
- BTEC QCF Extended Diploma grade MMP, BTEC QCF Diploma grade DM.
- Applicants will normally be expected to hold GCSE English and Maths at grade C+/4 or above (or equivalent)
- If you've got other qualifications or relevant experience, please contact The Gateway for further advice before applying.
- International entry requirements and application guidance can be found here
- Successful completion of the BSc(Hons) Science and Engineering with Foundation Year guarantees entry on to this course
- Successful completion of the International Foundation Year in Science and Engineering guarantees entry on to this course

Other Requirements

Students must have studied a minimum of two years post GCSE level. However, it is expected that some applicants will be mature students with work experience, who wish to further their career development. These applicants will be processed through standard procedures, which may involve an interview as part of the process. Please see http://wlv.ac.uk/mature for further information.

Those who do not meet the entry requirements may be offered an alternative course.

Distinctive Features of the Course:

The Mechanical Engineering course is designed integrating five key attributes listed below to certain that the graduates are 'fit for purpose' with specialist skills and philosophies to meet the challenges of the 21st century engineering profession.

1. Creativity
2. Employability
3. Professional Standards
4. Sustainability
5. Unique Specialist Skills

The Mechanical Engineering course will provide students with the opportunity to gain unique and distinctive specialist skills in the following key areas:

High-tech Manufacturing: Knowledge and skills relating to the latest and state of the art manufacturing

technologies such as Additive Layer Manufacturing (ALM) and High Speed Machining.

Engineering Design: Knowledge, skills and experience using industry standard design tools such as SolidWorks.

Engineering Analysis: Knowledge, skills and experience applying industry standard numerical simulation packages for computational structural, thermal and fluid analysis.

The students gain in depth knowledge using Direct Metal Laser Sintering machines, allowing complex mechanical components to be built from microscopic layers of metal powder. With one of very few machines in the UK capable of manufacturing titanium parts the students 'understand and experience' how this advanced technology is used by the mechanical, aerospace, motorsport, and other premium engineering sectors.

In addition to the integration of these key attributes the Mechanical Engineering course reflects the emphasis of Project Based Learning through its ambitions club activities (see below the list of club activities) and the integrated employability skills and placement opportunities.

Through these undertakings, our students; in addition to gaining in-depth knowledge and understanding of the mechanical engineering principles, also gain experience of working with real engineering projects exercising their critical thinking and team working skills in a professional, ethical and sustainable manner. The mechanical engineering course features a 40 credit project module at each level to ensure that all the above skills are met through problem solving and team working.

List of Club Activities for Mechanical Engineering Students
1. Formulae Student
2. Formulae 3
3. Morgan Challenge

Finally, due to the Department's specialist research and consultancy expertise being at the forefront of research and working with world-leading companies, the students will have the opportunities to work with lecturers who are recognised as leading experts in their field.

Educational Aims of the Course:

The Mechanical Engineering degree offered by the University of Wolverhampton is designed to prepare students for a wide range of career choices in the field of mechanical engineering. It is also intended for students whose career objectives require greater flexibility. Consequently, the educational aims of the mechanical engineering programme are laid out to prepare students for professional practice in an era of rapidly evolving technological advances. The programme combine a strong base in theoretical background (mechanics, materials, fluid, thermal, systems and control) along with project based laboratory, design, build and simulation experiences as recognisable by the professional mechanical engineering community as an accredited degree (subject to approval). The educational aims for mechanical engineering collectively strive to develop independence, creative talent, and leadership, as well as the capability for continuing professional growth and self-learning. This ensures that graduates are equipped with the appropriate knowledge and enterprising capabilities to practise engineering professionally, ethically and sustainably. Thus, the course will:

- Provide the mechanical engineering industry, profession and public services with graduates who can play leading roles by combining theory with practice and employing relevant managerial and communication skills enabling the analysis and synthesis of products and systems across mechanical engineering and related disciplines.
- Enable students to pursue professional careers in mechanical or related engineering disciplines at a level which requires the exercise of sound judgement, initiative, and the ability to make informed decisions in complex and unpredictable circumstances that reflect a responsible, ethical, social and sustainable outlook.

- Provide students with up-to-date knowledge and skills enabling them to create and develop 'innovative and economically' viable products, processes and systems to meet a predefined criteria.
- Encourage a systems approach encompassing both holistic and modular views to the analysis, synthesis and realisation of mechanical engineering products and systems.
- Allow a broadly based education in mechanical engineering, combined with an appreciation of mechatronics, control and design, thereby providing access to a wide range of career paths within the engineering profession or to pursue further studies if desired.

Intakes:

September
January

Major Source of Funding:

Office for Students (OFS)

Tuition Fees:

Tuition fees are reviewed on an annual basis. The fees applicable to a particular academic year will be published on the University website.

Year	Status	Mode	Amount
2020/1	H	Full Time / Sandwich	£9250.00
2020/1	Overseas	Full Time / Sandwich	£12250.00
2020/1	H	Part Time	£3050.00
2020/1	Overseas	Part Time	£6125.00
2021/2	H	Full Time / Sandwich	£9250.00
2021/2	Overseas	Full Time / Sandwich	£12950.00

PSRB:

None

Course Structure:

January (Full-time)

Part time students study alongside full time students. However, they do not study more than 80 credits in each academic calendar year.

Year 1

Full time and Sandwich Undergraduate Honours students normally study 120 credits per academic year; 60 credits semester 1 and 60 credits semester 2.

Module	Title	Credits	Period	Type
4MA017	Mechanical Engineering Principles	20	SEM2	Core
4MA029	Industrial Design Project	20	SEM2	Core
4MA028	Engineering Experimentation	20	SEM2	Core

4MA007	Engineering Mathematics	20	SEM1	Core
4MA008	Engineering Science	20	SEM1	Core
4MA009	Computer Aided Design	20	SEM1	Core

January (Full-time)

Part time students study alongside full time students. However, they do not study more than 80 credits in each academic calendar year.

Year 2

Full time and Sandwich Undergraduate Honours students normally study 120 credits per academic year; 60 credits semester 1 and 60 credits semester 2.

Module	Title	Credits	Period	Type
5MA036	Solid Mechanics and FEA	20	SEM2	Core
5MA037	Materials Science and Manufacturing	20	SEM2	Core
5MA038	Enterprising Group Innovation Project	40	CRYRA	Core

5MA044	Applied Instrumentation and Control	20	SEM1	Core
5MA039	Thermodynamics and Fluids	20	SEM1	Core

January (Full-time)

Part time students study alongside full time students. However, they do not study more than 80 credits in each academic calendar year.

Year 3

Full time and Sandwich Undergraduate Honours students normally study 120 credits per academic year; 60 credits semester 1 and 60 credits semester 2.

Module	Title	Credits	Period	Type
6MA016	Structural Mechanics and Stress Analysis	20	SEM2	Core
6MA038	Individual Innovation Project	40	CRYRA	Core
6MA036	ESEE - Economic, Social, Ethical and Environmental	20	SEM2	Core

6MA034	Machines Design and Reliability	20	SEM1	Core
6MA043	Aerodynamic Design and CFD	20	SEM1	Core

September (Full-time)

Part time students study alongside full time students. However, they do not study more than 80 credits in each academic calendar year.

Year 1

Full time and Sandwich Undergraduate Honours students normally study 120 credits per academic year; 60 credits semester 1 and 60 credits semester 2.

Module	Title	Credits	Period	Type
4MA007	Engineering Mathematics	20	SEM1	Core
4MA008	Engineering Science	20	SEM1	Core
4MA017	Mechanical Engineering Principles	20	SEM2	Core
4MA029	Industrial Design Project	20	SEM2	Core
4MA009	Computer Aided Design	20	SEM1	Core
4MA028	Engineering Experimentation	20	SEM2	Core

September (Full-time)

Part time students study alongside full time students. However, they do not study more than 80 credits in each academic calendar year.

Year 2

Full time and Sandwich Undergraduate Honours students normally study 120 credits per academic year; 60 credits semester 1 and 60 credits semester 2.

Module	Title	Credits	Period	Type
5MA044	Applied Instrumentation and Control	20	SEM1	Core
5MA036	Solid Mechanics and FEA	20	SEM2	Core
5MA039	Thermodynamics and Fluids	20	SEM1	Core
5MA037	Materials Science and Manufacturing	20	SEM2	Core
5MA038	Enterprising Group Innovation Project	40	YEAR	Core

September (Full-time)

Part time students study alongside full time students. However, they do not study more than 80 credits in each academic calendar year.

Year 3

Full time and Sandwich Undergraduate Honours students normally study 120 credits per academic year; 60

credits semester 1 and 60 credits semester 2.

Module	Title	Credits	Period	Type
6MA034	Machines Design and Reliability	20	SEM1	Core
6MA043	Aerodynamic Design and CFD	20	SEM1	Core
6MA016	Structural Mechanics and Stress Analysis	20	SEM2	Core
6MA038	Individual Innovation Project	40	YEAR	Core
6MA036	ESEE - Economic, Social, Ethical and Environmental	20	SEM2	Core

Please note: Optional modules might not run every year, the course team will decide on an annual basis which options will be running, based on student demand and academic factors, to create the best learning experience.

Learning, Teaching and Assessment

Academic Regulations Exemption:

In situations where Professional Body and University regulations differ, the respective Professional Body (IET) regulation will have precedent over the exempted University regulation;

Section 1.2.5 - Exemption to permit less than 33% differentiation (mainly at Level 4 and Level 5) between the majority of named undergraduate Engineering degree programmes.

Section 4.4.1 - Exemption in accordance with Institution of Engineering and Technology (IET) requirements. Compensation will be limited to no more than 20 credits at each level of study and maximum of 40 credits overall. There is no compensation permitted for independent study or postgraduate modules. Deferment of a project submission date at Level 6 or Level 7 is allowed only for exceptional reasons and for a maximum of three months.

APPROVED (by Chair's Action on 11/7/2019).

Section 5.2.2 - Exemption to use all Level 5 and Level 6 module grades excluding placement modules (assessed using a Pass/Fail marking scheme) to contribute towards overall BEng classifications with aggregated weightings at each level of study as follows;

Level	Weighting
4	-
5	25%
6	75%

These above weightings also apply to any students studying less than 120 credits at Level 5.

For students being admitted directly at Level 6, on degrees which do not have professional accreditation, student degree classifications are based upon the average of their highest module grades achieved over 100 credits at Level 6 according to weightings listed below as follows;

Level	Weighting
4	-
5	-
6	100%

For accredited programmes, the PSRB will assess the educational qualifications of an applicant for either IEng or CEng status based upon the receipt of a certified transcript from the University Registry (and with the applicant's authorisation).

APPROVED on 17/5/2018.

Reference Points:

- The Engineering Council UK-SPEC 3rd edition-2014
- QAA Engineering Benchmark Statement QAA-2010 and Accreditation of Higher Education Degree Programmes AHEP 3rd edition-2014
- The Institution of Mechanical Engineers (IMechE) Academic Accreditation Guidelines 2013

IET Learning Outcomes Handbook Incorporating UK-SPEC for Bachelors and MEng Degree Programmes 2009 has been used to inform the selection and development of learning outcomes, thereby ensuring that the academic requirements of the appropriate PSRBs 'Institution of Engineering and Technology' (IET) and The Institution of Mechanical Engineers (IMechE) are addressed.

In addition to these the following reference points were also used in the development of this module:

- Skills Framework for the Information Age,
- e-Skills
- The Equality Act 2010
- University Blended Learning Strategy
- University Learning and Teaching Strategy

Learning Outcomes:

CertHE Course Learning Outcome 1 (CHECLO1)

Demonstrate knowledge of the underlying concepts and principles associated with your area(s) of study, and an ability to evaluate and interpret these within the context of that area of study

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CertHE Course Learning Outcome 2 (CHECLO2)

Demonstrate an ability to present, evaluate and interpret qualitative and quantitative data, in order to develop lines of argument and make sound judgements in accordance with basic theories and concepts of your subject(s) of study.

CertHE Course Learning Outcome 3 (CHECLO3)

Evaluate the appropriateness of different approaches to solving problems related to your area(s) of study and/or work

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CertHE Course Learning Outcome 4 (CHECLO4)

Communicate the results of your study/work accurately and reliably, and with structured and coherent arguments

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CertHE Course Learning Outcome 5 (CHECLO5)

Demonstrate the qualities and transferable skills necessary for employment requiring the exercise of some personal responsibility

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DipHE Course Learning Outcome 1 (DHE#CLO1)

Demonstrate knowledge and critical understanding of the well-established principles of your area(s) of study, and of the way in which those principles have developed with an understanding of the limits of your knowledge, and how this influences analyses and interpretations based on that knowledge.

DipHE Course Learning Outcome 2 (DHE#CLO2)

Demonstrate the ability to apply underlying concepts and principles outside the context in which they were first studied, including, where appropriate, the application of those principles in an employment context

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DipHE Course Learning Outcome 3 (DHE#CLO3)

Demonstrate knowledge of the main methods of enquiry in the subject(s) relevant to the named award, and ability to evaluate critically the appropriateness of different approaches to solving problems in the field of study

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DipHE Course Learning Outcome 4 (DHE#CLO4)

Use a range of established techniques to initiate and undertake critical analysis of information, and to propose solutions to problems arising from that analysis

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DipHE Course Learning Outcome 5 (DHE#CLO5)

Effectively communicate information, arguments and analysis in a variety of forms to specialist and non-specialist audiences, and deploy key techniques of the discipline effectively

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DipHE Course Learning Outcome 6 (DHE#CLO6)

Demonstrate the qualities and transferable skills necessary for employment, requiring the exercise of personal responsibility and decision-making and undertake further training, developing existing skills and acquire new competences that will enable them to assume significant responsibility within organisations.

Ordinary Degree Course Learning Outcome 1 (ORD#CLO1)

Design, analyse and synthesise mechanical engineering products, systems, and processes to demonstrate an innovative and creative approach to design realisation.

Ordinary Degree Course Learning Outcome 2 (ORD#CLO2)

Analyse and evaluate a range of solutions to mechanical engineering problems, drawn from a broad-based multidisciplinary engineering and technology specialities with an ability to adapt theories or methods to solve unfamiliar problems.

Ordinary Degree Course Learning Outcome 3 (ORD#CLO3)

Select and apply appropriate mathematical and scientific methods to solve problems in the analysis and synthesis of mechanical engineering products and systems.

Ordinary Degree Course Learning Outcome 4 (ORD#CLO4)

Contribute to teamwork effectively and ethically, addressing the prominent mechanical engineering concepts, considering also the wider aspects of social, environmental, ethical, commercial, legal, and enterprise issues through the effective management, communication, policy integration, standard-compliance, planning and self-learning.

Ordinary Degree Course Learning Outcome 5 (ORD#CLO5)

Select and apply appropriate software packages along with relevant professional codes for design, analysis, and synthesis of mechanical engineering systems to critically reflect and communicate the results with appropriate levels of detail.

Ordinary Degree Course Learning Outcome 6 (ORD#CLO6)

Relate theory and practice to the recognition of processes and products thereby facilitating the efficient realisation of viable mechanical engineering products, systems and processes.

Honours Degree Course Learning Outcome 1 (DEG#CLO1)

Design, analyse and synthesise mechanical engineering products, systems, and processes to demonstrate an innovative and creative approach to design realisation.

Honours Degree Course Learning Outcome 2 (DEG#CLO2)

Analyse and evaluate a range of solutions to mechanical engineering problems, drawn from a broad-based multidisciplinary engineering and technology specialities with an ability to adapt theories or methods to solve unfamiliar problems.

Honours Degree Course Learning Outcome 3 (DEG#CLO3)

Select and apply appropriate mathematical and scientific methods to solve problems in the analysis and synthesis of mechanical engineering products and systems.

Honours Degree Course Learning Outcome 4 (DEG#CLO4)

Contribute to teamwork effectively and ethically, addressing the prominent mechanical engineering concepts, considering also the wider aspects of social, environmental, ethical, commercial, legal, and enterprise issues through the effective management, communication, policy integration, standard-compliance, planning and self-learning.

Honours Degree Course Learning Outcome 5 (DEG#CLO5)

Select and apply appropriate software packages along with relevant professional codes for design, analysis, and synthesis of mechanical engineering systems to critically reflect and communicate the results with appropriate levels of detail.

Honours Degree Course Learning Outcome 6 (DEG#CLO6)

Relate theory and practice to the recognition of processes and products thereby facilitating the efficient realisation of viable mechanical engineering products, systems and processes.

Honours Degree Course Learning Outcome 7 (DEG#CLO7)

Validate, manage and implement a research study in your discipline and effectively disseminate the findings that arise.

Overview of Assessment:

Module	Title	Course Learning Outcomes
4MA007	Engineering Mathematics	CHECLO2, CHECLO3, CHECLO5
4MA008	Engineering Science	CHECLO2, CHECLO3
4MA009	Computer Aided Design	CHECLO1, CHECLO4, CHECLO5
4MA017	Mechanical Engineering Principles	CHECLO1, CHECLO2, CHECLO3
4MA028	Engineering Experimentation	CHECLO2, CHECLO5
4MA029	Industrial Design Project	CHECLO1, CHECLO2, CHECLO3, CHECLO4, CHECLO5
5MA036	Solid Mechanics and FEA	DHE#CLO1, DHE#CLO3, DHE#CLO5, DHE#CLO6
5MA037	Materials Science and Manufacturing	DHE#CLO1, DHE#CLO2, DHE#CLO3, DHE#CLO6
5MA038	Enterprising Group Innovation Project	DHE#CLO1, DHE#CLO2, DHE#CLO3, DHE#CLO4, DHE#CLO5, DHE#CLO6
5MA039	Thermodynamics and Fluids	DHE#CLO1, DHE#CLO2, DHE#CLO3, DHE#CLO4, DHE#CLO6
5MA044	Applied Instrumentation and Control	DHE#CLO2, DHE#CLO3
6MA016	Structural Mechanics and Stress Analysis	DEG#CLO1, DEG#CLO2, DEG#CLO3, DEG#CLO6, ORD#CLO1, ORD#CLO2, ORD#CLO3, ORD#CLO6
6MA034	Machines Design and Reliability	DEG#CLO1, DEG#CLO2, DEG#CLO3, DEG#CLO6, ORD#CLO1, ORD#CLO2, ORD#CLO3, ORD#CLO6
6MA036	ESEE - Economic, Social, Ethical and Environmental	DEG#CLO4, DEG#CLO6, ORD#CLO4, ORD#CLO6
6MA038	Individual Innovation Project	DEG#CLO1, DEG#CLO2, DEG#CLO3, DEG#CLO4, DEG#CLO5, DEG#CLO6, DEG#CLO7, ORD#CLO1, ORD#CLO2, ORD#CLO3, ORD#CLO4, ORD#CLO5, ORD#CLO6
6MA043	Aerodynamic Design and CFD	DEG#CLO1, DEG#CLO2, DEG#CLO3, DEG#CLO5, DEG#CLO6, ORD#CLO1, ORD#CLO2, ORD#CLO3, ORD#CLO5, ORD#CLO6

Teaching, Learning and Assessment:

Developing knowledge and understanding

- Lectures and tutorial sessions
- Reading – core and supplementary texts, journals and electronic sources
- Information retrieval from articles, journals and books for assessments
- Use of industrially placed guest lectures to enhance both learning experience but also employability
- Use of industrially placed ex-students to give insight into job roles post education.

Engineering analysis

- Simulation and problem solving exercises
- Engaging in informed discussion with fellow students and academic staff in tutorials and seminars
- Researching articles, journals and books for assessments

Engineering design

- Problem-based learning techniques, e.g. design projects, case studies
- Providing solutions to meet real world problems/requirements
- Solving closed and open ended problems
- Applying systematic methods to develop (novel) solutions
- Use vortex learning via the core projects each year to challenge and extend learning

Engineering practice

- Practical and laboratory sessions
- Group activities aimed at developing team-working skills in a multi-disciplinary environment

Additional general skills

- Using computer software and hardware to model and simulate products and engineering systems
- Preparing written presentations; both analytically and textually based
- Oral presentations; both group and individual
- Student led presentations
- Coursework reports (technical and discursive)
- Preparing for unseen examinations
- Writing Project dissertation
- Critical examination of data.

Assessment Methods:

At the University of Wolverhampton, a variety of modes of assessment will be used to support and test your learning and progress and to help you develop capabilities that are valued beyond your University studies and into your working life. Your course may include a variety of assessment activities:

Written examinations (including online examinations, open and closed book examinations and quizzes)
Coursework (for example, essays, reports, portfolios, project proposals and briefs, CVs, poster presentation)
Practical (for example, oral and video presentations, laboratory work, performances, practical skills assessment)

In the final year of your undergraduate degree, and at the end of your postgraduate degree, you are likely to be expected to write an extended piece of work or research, such as a dissertation or a practice-based piece of research.

Student Support:

Enhanced learning support is provided in the following areas:

1. Generic support to link theory with practice and to establish the need for learning through project based club activities such as the Formula Student Project and Formula Renault Project.
2. Support for mathematics and analytic-based modules through CANVAS and custom workshops.
3. Face-to-face tutorial sessions in mathematics
4. Report writing and oral/presentation communications skills workshop
5. Learning centre support for literature searches and information searches
6. Practical/lab/experimental activities and reporting to link theory with practice
7. Research for project work (major individual and group projects, assignments and team building activities.
8. Promotion of independent learning during tutorials, face-to-face sessions.

University provided support:

As well as providing general counselling support the University Counselling Service provides short courses on topics such as "Self Confidence", "Stress Management and Relaxation" and "Life Skills". They also provide study skills and academic support, providing short courses such as provide help in areas such as "Writing and Assignment Skills", "Exam Techniques", "Enhancing Professional Skills", "Personal Development Planning" and "Making Choices for the Future."

In addition to the subject knowledge that you will gain from studying on your course, there are opportunities available to develop a range of skills that will help with your academic work; such academic skills include giving presentations, group work, academic writing, referencing and time management (specific help for maths is also available). The Learning and Skills Team in Learning and Information Services (LIS) offer year-round academic skills support and guidance to all students. Students who are new to academic study and unsure of how to get started, or any student who wants to improve on their academic performance can attend

drop-in sessions and workshops, or obtain advice via email or Skype. More details about how the Learning and Skills Team can help you are available at; http://www.wlv.ac.uk/skills

Employability in the Curriculum:

Mechanical Engineers may choose industrially based careers in research and development, design, or product development. The combination of engineering skills, design capability and management provides graduates of this course with a wide range of employment opportunities in technical environments across the world. Typical examples include the co-ordination of activities related to product and process design of mechanical and electro-mechanical systems, and the management of projects in a wide range of technical environments.

The course enables graduates to attain management positions, with significant levels of responsibility within a relatively short time.

Graduates may also study for a research degree, MPhil/PhD, with the Department.

Graduates are also equipped with the relevant enterprising skills to create, develop and commercialise a product, process or system to solve a particular problem or to meet a specified task.

The transferable skills gained during the course, including: project management, group working, communication skills and analytical thinking, also enable a graduate to pursue careers in non-technical fields such as: law, accountancy, authoring, and computing.