Faculty of Science and Technology
Department of Design and Engineering

Framework Specification

Design & Engineering Framework

- BSc (Hons) Design Engineering
- BSc (Hons) Design Engineering (Top-up)
- BA (Hons) Industrial Design
- BA (Hons) Product Design
- BSc (Hons) Product Design
- BEng (Hons) Engineering
- BEng (Hons) Mechanical Engineering
- MDes (Hons) Product Design
- MEng (Hons) Engineering
- MEng (Hons) Mechanical Engineering
- MSc Engineering Project Management
- MA Industrial Design
- MSc Mechanical Engineering Design
- MSc Product Design

May 2018

Version 4.11-0918
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## 1 BASIC FRAMEWORK / PROGRAMME DATA

<table>
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<th>Originating institution(s)</th>
<th>Bournemouth University</th>
</tr>
</thead>
</table>
| **Award(s) and title(s)** | BSc (Hons) Design Engineering
BSc (Hons) Design Engineering (Top-up)
BEng (Hons) Engineering
BA (Hons) Industrial Design
BA (Hons) Product Design
BSc (Hons) Product Design
BEng (Hons) Engineering
BEng (Hons) Mechanical Engineering
* (includes DipHE and CertHE)
MDes (Hons) Product Design
MEng (Hons) Engineering
MEng (Hons) Mechanical Engineering
** (includes PGDip and PGCert)
MSc Engineering Project Management
MA Industrial Design
MSc Mechanical Engineering Design
MSc Product Design
*** (includes CertHE, DipHE, BEng (Hons))
BSc (Hons) Design Engineering – H100
BSc (Hons) Design Engineering (Top-up) – H150
BA (Hons) Industrial Design – W242
BA (Hons) Product Design – W240
BSc (Hons) Product Design – H101
BEng (Hons) Engineering
BEng (Hons) Mechanical Engineering - H305
MDes (Hons) Product Design – 3LD4
MEng (Hons) Engineering
MEng (Hons) Mechanical Engineering – H105

Students who undertake the BEng (Hons) Engineering or MEng (Hons) Engineering part-time/flexible learning awards may do so in order to meet the academic requirements of the Product Design and Development Engineer or Manufacturing Engineer degree apprenticeship route.
External reference points

- UK Quality Code for Higher Education (The QAA):
  - Chapter A1: The National Level (incorporating the Framework for Higher Education Qualifications (FHEQ))
  - Chapter B3: Learning and Teaching indicators (formerly Section 2: Collaborative provision and flexible and distributed learning including e-learning – amplified version)
  - Chapter B10: Management of collaborative arrangements
- Subject benchmark statements – Art and Design (2008)
- Subject benchmark statements - Engineering (2015)
- Subject benchmark statements - General Business and Management (2007)
- Masters level benchmark statements – Business and Management (2007)
- UK standard for professional Engineering Competence: Engineering Technician, Incorporated Engineer and Chartered Engineer Standard (UK-SPEC) from the Engineering Council UK (January 2014)
Professional, Statutory and/or Regulatory Body links

**Institution of Engineering Designers:**
- BSc (Hons) Design Engineering (Membership and IEng registration, 2014-2019)
- BSc (Hons) Design Engineering (Top-up) (To give membership of the IED and fully meets the academic requirements for IEng level with the Engineering Council, 2014-2019)
- BEng (Hons) Engineering (Membership and IEng registration, 2014-2019)
- BEng (Hons) Mechanical Engineering (Membership and IEng registration, 2014-2019)
- BA (Hons) Industrial Design (Membership and RProdDes, 2014-2019)
- BA (Hons) Product Design (Membership and RProdDes, 2014-2019)
- BSc (Hons) Product Design (Membership and RProdDes, 2014-2019)
- MSc Mechanical Engineering Design (meets the further learning requirements for CEng, 2014-2019)
- MDes (Hons) Product Design (Membership and CTPD registration, 2016-2019)
- MEng (Hons) Engineering (Membership and meets the further learning requirements for CEng, 2014-2019)
- MEng (Hons) Mechanical Engineering (Membership and meets the further learning requirements for CEng, 2014-2019)
- MSc Product Design (meets the further learning requirements for CTPD, 2016-2018)

**Institution of Mechanical Engineers:**
- BSc (Hons) Design Engineering (IEng registration, 2016-2018)
- BSc (Hons) Design Engineering (Top-up) (IEng registration, 2016-2018)
- BEng (Hons) Engineering (meet, in part, the exemplifying academic benchmark requirements for registration as a Chartered Engineer and IEng registration in full (for students progressing from the FdEng Engineering (Mechanical Design) only), 2016-2018)
- BEng (Hons) Mechanical Engineering (meet, in part, the exemplifying academic benchmark requirements for registration as a Chartered Engineer and IEng registration in full, 2016-2018)
- MSc Mechanical Engineering Design (meets the further learning requirements for CEng, 2016-2018)
- MEng (Hons) Engineering (meet, in part, the exemplifying academic benchmark requirements for registration as a Chartered Engineer (for students progressing from the FdEng Engineering (Mechanical Design) only), 2016-2018)
- MEng (Hons) Mechanical Engineering (meet, in part, the exemplifying academic benchmark requirements for registration as a Chartered Engineer, 2016-2018)

**Place(s) of delivery**
Bournemouth University, Faculty of Science and Technology

**Mode(s) of delivery/attendance**
Full-time / Full-time sandwich / Part-time / Part-time sandwich / distance learning (flexible learning)
Credit Structure

BA, BSc and BEng Programmes 120/120/120 (60/60/60) Level 4, 5 and 6 credits
MDes Programme 120/120/120/120 (60/60/60/60) Level 4, 5, 6, and 7 credits
MEng Programmes 120/120/120/120 (60/60/60/60) Level 4, 5, 6 and 7 credits
DipHE 120/120 (60/60) Level 4 and 5 credits
CertHE 120 (60) Level 4 credits

MA and MSc Programmes 180 (90) Level 7 credits
(120 (60) credits taught units and 60 (30) credits project)
PG Dip 120 (60) Level 7 credits
PG Cert 60 (30) Level 7 credits

Duration

UG:
Full-time 3 years
Full-time sandwich 4 years
Part-time 6 years
3 (BA/BSc (Hons)) or 4 (MDes (Hons)) years full-time
4 (BA/BSc (Hons)) or 5 (MDes (Hons)) years sandwich
2 (BEng (Hons)) to 4 (MEng (Hons)) years part-time and/or flexible learning
3 (BEng (Hons)) or 4 (MEng (Hons)) years full-time
4 (BEng (Hons)) or 5 (MEng (Hons)) years sandwich

PG:
Full-time 1 year or 2 years including 1 year placement
Part-time 2 years or 3 years including 1 year placement
(min and max periods are covered in the regulations)

Date of original approval(s)

Date of first intake
Expected Start Dates
September 2017 (Combined UG and PG Framework)
September

Placements
Normally minimum 30 weeks

Partner institution(s) and model(s)
N/A

Date and version number of this Framework Specification
June 2018 v5.0-0918

Student intake(s)/cohort(s)
All new enrolments from September 2018 will be following this version of the framework specification
July 2014 – Modification
DEC 1213 01: Design and Engineering Framework Level P and Level 7 placement: A Study Abroad option (up to a maximum of one semester) within the 40 week placement undergraduate and postgraduate units was approved.

October 2014 - Modification
SciTech 141502: MEng (Hons) Engineering (FT/SW/PT/FL): A change to the admission regulations to remove the option for direct entry to Level M (MEng level) was approved.

January 2015 – Modifications
SciTech 1415 03:
Programmes affected
BSc (Hons) Design Engineering
BSc (Hons) Design Engineering (Top-up)
Change
Change of unit title of ‘Learning Electronics’ to ‘Research Based Electronics’ (Level 6)

SciTech 1415 04:
Programmes affected
BSc (Hons) Design Engineering
MEng (Hons) Engineering (FT)
BSc (Hons) Product Design
Change
Change of units at Level 4:
BSc (Hons) Design Engineering
Replace Engineering Applications with Electrical and Electronic Principles, replace Technological Principles with Statics and Dynamics

MEng (Hons) Engineering (FT)
Replace Engineering Applications with Electrical and Electronic Principles, replace Technological Principles with Statics and Dynamics

BA/BSc (Hons) Product Design
Technological Principles is now a standalone unit on BA/BSc (Hons) Product Design only

SciTech 1415 05:
Programmes affected
BSc (Hons) Design Engineering
MEng (Hons) Engineering (FT)
Change
Change of assessment weightings for units at Level 5:

MEng (Hons) Engineering (FT)
Mechanical Design Applications
Engineering Simulation

BSc (Hons) Design Engineering
Engineering Simulation

SciTech 1415 06:
Programme affected
BA (Hons) Industrial Design
Change
Change to ILOs for unit Visual Concept Communication (Level 6)

April 2015 – Modifications
SciTech 1415 07:
Programme affected
MEng (Hons) Engineering (FT/SW/PT/FL)
MSc Mechanical Engineering Design
Change
Change to assessment weighting for Materials Failure and Prevention unit (Level 7)

SciTech 1415 08:
Programme affected
MEng (Hons) Engineering (FT/SW/PT/FL)
Change
Changes to admission and assessment regulations

July 2015 – Modification
SciTech 1415 18:
Programme affected
BSc (Hons) Built Environment Design (FT/SW)

Change

Relates to changes to Earth and Society (Level 4 unit), Environmental Pollution (Level 5 unit), Environmental Law & Management (Level 6 unit) as a result of changes made during the review of the LES Framework

December 2015 – Review and modifications

E1516 038, review of MEng (Hons) Mechanical Engineering 04.12.15, previously version 3.4
FST1516 05, approved 04.12.15, previously version 3.4
FST1516 06, approved 04.12.15, previously version 3.4. Note: separate curricula are articulated in this document for students commencing MEng (Hons) Engineering (blended/flexible learning) in September 2016/September 2017, and those commencing from September 2018 onwards.

FST1516 21 Approved 18/5/16. Previously v3.5-0916
FST 1617 04 Approved 9/11/2016. Previously v3.9-0916

BU1617 01, Approved 24/02/2016. Previously v3.10-0916

FST 1617 11, Approved 04/04/17. Previously v3.11-0917

July 2017 – Approval

E2017040, Approval of BEng (Hons) Engineering and BEng (Hons) Mechanical Engineering, previously version 3.12-0917

FST 1718 14, approved 08/11/17. Previously version 4.9-0917

May 2018 – Review and Approval

E20171850 – BSc (Hons) Design Engineering
E20171851 – BSc (Hons) Design Engineering (level 6 top-up)
E20171852 – MEng (Hons) Engineering
E20171853 – BEng (Hons) Engineering
E20171854 – MSc Engineering Project Management
E20171855 – BA (Hons) Industrial Design
E20171856 – MA Industrial Design
E20171857 – MEng (Hons) Mechanical Engineering
E20171858 – BEng (Hons) Mechanical Engineering
E20171859 – MSc Mechanical Engineering Design
E20171860 – BA / BSc (Hons) Product Design
E20171861 – MDes (Hons) Product Design
E20171862 – MSc Product Design
E20171865 – BA (Hons) Product Design Futures
E20171866 – MA Design Management
E20171890 – UG and PG Design and Engineering Framework – post-event amendment to document the approval of the BEng (Hons)/MEng (Hons) curricula for delivery to satisfy level 6 of the Product Design and Development Engineer or Manufacturing Engineer degree apprenticeship standards.
2 AIMS OF THE DOCUMENT

The aims of the document are to:

- define the structure of the Design and Engineering Framework
- define the programme degree names and grouping of programmes in the framework
- identify programme and level learning outcomes
- articulate the regulations governing the awards offered through this Framework
- present a programme structure diagram for each programme including the final and intermediate award names
- give a programme profile document for each programme

3 PROGRESSION ROUTES

MDes (Hons) Product Design (Full time)
All students who are accepted on the Integrated Masters programme will be required to complete the BSc or BA (Hons) part of the programme with an upper second class or first class profile in order to continue to the final level of the programme.

BEng (Hons) Engineering (Part time – flexible learning)
Students who have successfully completed the FdEng Engineering (Mechanical Design, Manufacturing Management or Electronic Design) programmes at Bournemouth and Poole College with a minimum classification of Merit will be eligible to apply for entry with advanced standing to the Level 6 of the BEng (Hons) Engineering programme at Bournemouth University and credited with 120 credits at Level 4 and 120 credits at Level 5.

MEng (Hons) Engineering (Part time – flexible learning)
Students who have successfully completed the FdEng Engineering (Mechanical Design, Manufacturing Management or Electronic Design) programmes at Bournemouth and Poole College with a minimum classification of Merit will be eligible to apply for entry with advanced standing to the Level 6 of the MEng (Hons) Engineering programme at Bournemouth University and credited with 120 credits at Level 4 and 120 credits at Level 5.

BEng (Hons) Mechanical Engineering (Full time)
Students who have successfully completed the FdEng Engineering (Mechanical Design) programme at Bournemouth and Poole College with a minimum classification of Merit will be eligible to apply for entry with advanced standing to the Level 6 of the BEng (Hons) Mechanical Engineering programme at Bournemouth University and credited with 120 credits at Level 4 and 120 credits at Level 5.
**MEng (Hons) Mechanical Engineering (Full time)**

Students who have successfully completed the FdEng Engineering (Mechanical Design) programme at Bournemouth and Poole College with a minimum classification of Merit will be eligible to apply for entry with advanced standing to the Level 6 of the MEng (Hons) Mechanical Engineering programme at Bournemouth University and credited with 120 credits at Level 4 and 120 credits at Level 5.

Students who have successfully completed Level 5 of the BEng (Hons) Mechanical Engineering programme with a merit (60% to less than 70%) or distinction (70% or more) profile will be eligible to apply for entry with advanced standing to the Level 6 of the MEng (Hons) Mechanical Engineering programme and credited with 120 credits at Level 4 and 120 credits at Level 5.

Additionally, all students who are accepted on either of the Integrated engineering Masters programmes will be required to complete the BEng (Hons) part of the programmes with an upper second class or first class profile in order to continue to the final level of the programmes.

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**4 ACADEMIC AND PROFESSIONAL CONTEXTS**

Bournemouth University commenced teaching design in 1988 with the validation of BSc (Hons) Engineering Business Development that consisted of a three way mix; design, business and engineering.

In 1989 the holistic technological based Product Design programme was developed. This was the first of its type in the Country and the Institution of Engineering Designers, in defining the accreditation standards needed to become a recognised Product Design course, adopted the Bournemouth programme objectives.

Shortly afterwards a Design Visualisation programme was developed which concentrated on computer aided design techniques and methods. This was the for-runner of BSc (Hons) Design Visualisation.

The then Department of Product Design & Manufacture was given the remit to establish a full range of design programmes and this saw the advent of Design Engineering, Furniture Design and Interior Design. All of these programmes have a technological bias.

In 1994 a strategic decision was taken to move into a less technological design programme to suit the many applicants to Bournemouth University who did not have a mathematical or technological background. Following on from this, in 2005 the BA (Hons) Industrial Design joined the stable of programmes that gives the opportunity to undertake a variety of disciplines utilising the new technologies with a commercial focus.
In 2008 all undergraduate Design programmes were aligned within the context of the School of Design, Engineering and Computing’s (Faculty of Science and Technology from January 2014) vision, the Corporate plan and the Strategic plan of Bournemouth University. This resulted in the creation of the Design Framework. Following an assessment of the operation of the new frameworks coupled with changes in market demand for the pathways offered, in 2010 it was decided to combine the existing Design Framework and the Design Masters programmes into one framework, as well as, modifying the portfolio of both undergraduate and Masters pathways offered. In 2012 a full time and part time integrated masters MEng (Hons) Engineering programme was validated leading to the Design framework being renamed as the Design and Engineering Framework. In 2013 a new postgraduate pathway, MA Industrial Design, was added to the framework. In 2015 two new integrated masters MDes (Hons) Product Design and MEng (Hons) Mechanical Engineering were added to the framework. In 2016 a number of the engineering programmes gained Institute of Mechanical Engineering (IMechE) accreditation for the first time.

The University has invested in a wide range of physical resources based in the Science and Technology Innovation Centre, which includes a modern rapid prototyping and manufacturing facility and experimental laboratories.

Over the years, Design at Bournemouth University has gained a number of awards; including the British Aerospace Design Council Award in Engineering Design, the Partnership Award for the teaching of new computer design tools and the Dyson Award for the Best Product Design Project, numerous Institution of Engineering Designers prizes, and a New Designers prize for product design.

Members of staff have been actively involved in the design profession both nationally and internationally. This includes assisting in developing design provision in South Africa, Australia, Europe and Romania. The Department of Product Design and Manufacture founded the Conference in Product Design Education in 1994. This has since been taken over by the Institution of Engineering Designers and amalgamated with SEED (Sharing Experience in Engineering Design) to become the International Conference in Engineering and Product Design Education. Staff continue to be actively involved with managing and contributing to this conference series.

All of the programmes are accredited by the Institution of Engineering Designers and/or Institution of Mechanical Engineers:

<table>
<thead>
<tr>
<th>Pathway</th>
<th>IED/IMechE Registration</th>
<th>ECUK/IED Registration Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSc (Hons) Design Engineering</td>
<td>Membership</td>
<td>IEng</td>
</tr>
<tr>
<td>BSc (Hons) Design Engineering (Top-up)</td>
<td>Membership</td>
<td>IEng</td>
</tr>
<tr>
<td>Course</td>
<td>Membership</td>
<td>Qualification</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>------------</td>
<td>--------------------------------------------</td>
</tr>
<tr>
<td>BEng (Hons) Engineering</td>
<td>Membership</td>
<td>IEng (CEng in part)</td>
</tr>
<tr>
<td>BEng (Hons) Mechanical Engineering</td>
<td>Membership</td>
<td>IEng (CEng in part)</td>
</tr>
<tr>
<td>BA (Hons) Industrial Design</td>
<td>Membership</td>
<td>RProdDes</td>
</tr>
<tr>
<td>BA/BSc (Hons) Product Design</td>
<td>Membership</td>
<td>RProdDes</td>
</tr>
<tr>
<td>MDes (Hons) Product Design</td>
<td>Membership</td>
<td>CTPD</td>
</tr>
<tr>
<td>MEng (Hons) Engineering</td>
<td>Membership</td>
<td>CEng in full from IED</td>
</tr>
<tr>
<td>MEng (Hons) Mechanical Engineering</td>
<td>Membership</td>
<td>CEng in part from IMechE</td>
</tr>
<tr>
<td>MSc Mechanical Engineering Design</td>
<td>Membership</td>
<td>Further learning to CEng</td>
</tr>
<tr>
<td>MSc Engineering Project Management</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>MA Industrial Design</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>MSc Product Design</td>
<td>-</td>
<td>CTPD</td>
</tr>
</tbody>
</table>
5 AIMS OF THE PROGRAMMES

5.1 BSc (Hons) Design Engineering

The DE pathway aims:

- To provide students with a course of study to the standard of an Honours degree in the area of engineering design.
- To give students sufficient knowledge, understanding and skills to employ modern design methodologies and tools to achieve optimum solutions to engineering design problems in an efficient and effective manner, to further develop their design creativity, and to present their design solutions.
- To provide the students with a thorough understanding and knowledge of engineering principles, analysis, tools and practices, and the ability to apply these to the design of manufactured products and technical applications.
- To provide the students with a broad understanding of business development processes, management techniques, industrial marketing activities, accounting, and the application of business law.
- To develop understanding of relevant stakeholders and the social and cultural structures outside of their normal community of practice, recognising that the impacts of their decisions may be global and long-lasting.

Engineering design and its application is at the core of this pathway and provides the essence for the integration of units. The catalyst for implementing this is through the programme of projects, which are the major integrating activities in each level. The projects increase in complexity and diversity through the programme addressing a broader scope of perspective at each level. Through their projects, the students will address a variety of scenarios ranging from mass production to niche, one off solutions. Integral to each of the project units, students develop practical understanding and capability through workshop practice, simulation and technical demonstration.

The pathway will treat computers and software as a means of achieving the aims of the course, and not as individual elements in which the student would necessarily attain highly specialised expertise.

Students are expected to make real contributions as engineers and designers; becoming recognised by their professional community early after graduation.

The pathway seeks to develop global citizens who understand how the world works economically, politically, socially, culturally, technologically and environmentally. Design Engineering students have the opportunity to undertake overseas work placement within a relevant industry. This helps to promote awareness and tolerance of diversity and allows for cultural exchange.
The pathway strives to enhance the students’ graduate capabilities so that they can continue to develop the appropriate knowledge, understanding, values and attitudes, cognitive, social and practical skills for continuing employability.

The pathway promotes partnerships and collaborations with local, regional, national and international partners (i.e. communities, institutions and companies). This is achieved by promoting and supporting students for their placements (both nationally and internationally), by facilitating widening access and the progression of Top-up students from industry (local and regional) and by supporting the commercialisation of final year projects.

From the perspectives of the graduate and the employer, this route of study is an effective means to gaining the academic requirements for IEng. Table 1, Appendix B indicates how this programme meets the ECUK requirements.

5.2 BEng (Hons) Engineering

BEng (Hons) Engineering pathway aims:

- To deliver a balanced, broad education to the level and standard of an Honours degree in the area of general engineering.
- To provide students with a set of modern professional engineering skills.
- To provide students with the ability and confidence to apply their knowledge and skills to specific engineering problems individually or in a group, and also communicate effectively with both those working in the field of engineering and with the wider public.
- To provide students with a working knowledge and understanding of business related issues, encompassing finance, development, marketing, and legal issues.
- To develop knowledge and understanding of a wide range of modern materials, technologies and processes.
- To enable students with the ability to apply mathematical and computer-based models for solving problems in engineering, and the ability to assess the limitations of particular cases.
- To enable students to manage, document and communicate, project plans and results.

The BEng (Hons) Engineering programme will develop high calibre engineers who are able to function as an engineer in industries such as aerospace, marine, automotive, alternative energy, oil and gas, and similar high-tech industries.

The main emphasis of the programme will be in studying solid-state mechanics, manufacturing and/or modern/non-traditional engineering technologies and their integration. An aligned individual project in the final
year together with up-to-date engineering skills will ensure the graduate can not only understand the technologies but apply them.

Advanced modelling and simulation techniques are harnessed to shorten design time and reduce market entry costs.

Sound business knowledge is required. The business element of the programme will ensure that, as well as being able to function as an engineer, the graduate will have knowledge of strategic management and how it interacts with the business development process.

The BEng (Hons) Engineering part time (flexible learning) route has been developed specifically for engineers in employment. The programme is not a traditional day release programme, each unit is predominately studied through distance learning supported by a number of face-to-face tutorials with academic staff and peers. In addition, mentoring of students to enable them to gain professional engineering qualifications (IEng) will be offered (dependent upon relevant industrial experience).

5.3 MEng (Hons) Engineering

MEng (Hons) Engineering pathway aims:

- To deliver a balanced, broad education to the level and standard of an Honours degree plus additional study at Masters level, in the area of general engineering.
- To provide students with a set of modern professional engineering skills.
- To provide students with the ability and confidence to apply their knowledge and skills to specific engineering problems individually or in a group, and also communicate effectively with both those working in the field of engineering and with the wider public.
- To provide students with a working knowledge and understanding of business related issues, encompassing finance, development, marketing, and legal issues.
- To develop comprehensive knowledge and understanding of a wide range of existing and emerging materials, technologies and processes.
- To enable students with the ability to apply mathematical and computer-based models for solving problems in engineering, and the ability to assess the limitations of particular cases.
- To enable students to manage, document and communicate, project plans and results.

The MEng (Hons) Engineering programme will develop high calibre engineers who are able to function both as an engineer and a technology leader in industries such as aerospace, marine, automotive, alternative energy, oil and gas, and similar high-tech industries.
Key to the exploitation of emerging technologies is understanding their behaviour, performance and limitations. The ability to model and simulate the performance of new technologies is paramount where design optimisation is required.

Advanced modelling and simulation techniques can also be harnessed to shorten design time and reduce market entry costs. This is essential where emerging technologies are exploited as existing methodologies may prohibit lengthy development programmes.

Understanding how emerging technologies can be harnessed through enterprise is essential for an innovative market. Therefore sound business knowledge is required as well as identifying avenues for research funding and strategic collaboration.

The main emphasis of the programme will be in studying solid-state mechanics, manufacturing and/or modern/non-traditional engineering technologies and their integration. An aligned individual project in the final year together with up-to-date engineering skills will ensure the graduate can not only understand the technologies but apply them.

The business element of the programme will ensure that, as well as being able to function as an engineer, the graduate will have the skills and vision to embrace technological innovation and integrate it within their industry.

The MEng (Hons) Engineering part time (flexible learning) route has been developed specifically for engineers in employment. The programme has flexible entry and exit points to suit those with different educational requirements. The programme is not a traditional day release programme, each unit is predominately studied through distance learning supported by a number of face-to-face tutorials with academic staff and peers. In addition, mentoring of students to enable them to gain professional engineering qualifications (IEng or CEng) will be offered (dependent upon relevant industrial experience).

From the perspectives of the graduate and the employer, this route of study is an effective means to gaining the academic requirements for IEng or CEng. Tables 3 and 5, Appendix B indicates how this programme meets the ECUK requirements.

5.4 BEng (Hons) Mechanical Engineering

The BEng (Hons) Mechanical Engineering pathway aims:

- To deliver a balanced, broad education to the level and standard of an Honours degree in the area of mechanical engineering.
- To provide students with a set of modern professional mechanical engineering skills.
• To provide students with the ability and confidence to apply their knowledge and skills to specific mechanical engineering problems individually or in a group, and also communicate effectively with both those working in the general field of engineering and with the wider public.

• To provide students with a working knowledge and understanding of business related issues, encompassing finance, development, marketing, management and legal issues.

• To develop knowledge and understanding of a wide range of modern materials, technologies and processes.

• To enable students with the ability to apply appropriate science, mathematics and engineering tools for solving problems in mechanical engineering, and the ability to assess the limitations of particular cases.

• To develop students’ appreciation of the social, environmental and ethical considerations affecting their engineering judgement.

• To enable students to develop, manage, monitor, update and communicate, project plans and results.

The BEng (Hons) Mechanical Engineering programme integrates the study of scientific and engineering principles, manufacturing and materials knowledge with business and management skills to produce graduates who will contribute to developing and advancing the mechanical engineering field.

An integrated approach is used to develop the understanding and the application of concepts through projects. Theoretical, experimental and computational methods are introduced and compared to understand the limitations of each.

Engineering Design is heavily integrated into the programme. A number of projects incorporate a build element to integrate Engineering Practice. Advanced modelling and simulation techniques are utilised to shorten design time and reduce market entry costs. The guidance for the projects reduce through the programmes and the students are required to fully research the problem as well as developing the design culminating in their final project.

The programme incorporates business and management units to develop knowledge and understanding of the commercial, economic and management aspects of engineering. All students receive seminars on professional behaviour and ethical conduct as part of their final year projects unit.

Sustainability has been heavily built into the curriculum and is embedded in a number of projects. This is informed by the research conducted by the BU Sustainable Design Research cluster.

Engineering Practice is integrated throughout the programmes through projects, workshops and laboratories to gain a practical understanding of the theory. In year one, students are given an introduction to workshop practice which develops through the programmes to include CAD/CAM and Rapid Manufacturing. Students apply experimental mechanics techniques to
validate engineering designs and also engage in electronic design and manufacture.

5.5 MEng (Hons) Mechanical Engineering

The MEng (Hons) Mechanical Engineering pathway aims:

- To deliver a balanced, broad education to the level and standard of an Honours degree plus additional study at Masters level, in the area of mechanical engineering.
- To provide students with a set of modern professional mechanical engineering skills.
- To provide students with the ability and confidence to apply their knowledge and skills to specific mechanical engineering problems individually or in a group, and also communicate effectively with both those working in the general field of engineering and with the wider public.
- To provide students with a working knowledge and understanding of business related issues, encompassing finance, development, marketing, management and legal issues.
- To develop comprehensive knowledge and understanding of a wide range of existing and emerging concepts, materials, technologies and processes.
- To enable students with the ability to apply appropriate science, mathematics and engineering tools for solving problems in mechanical engineering, and the ability to assess the limitations of particular cases.
- To develop students' appreciation of the social, environmental and ethical considerations affecting their engineering judgement.
- To enable students to develop, manage, monitor, update and communicate, project plans and results.

The MEng (Hons) Mechanical Engineering programme integrates the study of scientific and engineering principles, manufacturing and materials knowledge with business and management skills to produce graduates who will lead in developing and advancing the mechanical engineering field.

An integrated approach is used to develop the understanding and the application of concepts through projects. Theoretical, experimental and computational methods are introduced and compared to understand the limitations of each.

Engineering Design is heavily integrated into the programme. A number of projects incorporate a build element to integrate Engineering Practice. Advanced modelling and simulation techniques are utilised to shorten design time and reduce market entry costs. The guidance for the projects reduce through the programmes and the students are required to fully research the problem as well as developing the design culminating in their final project.
The programme incorporates business and management units to develop knowledge and understanding of the commercial, economic and management aspects of engineering. All students receive seminars on professional behaviour and ethical conduct as part of their final year projects unit.

Sustainability has been heavily built into the curriculum and is embedded in a number of projects. This is informed by the research conducted by the BU Sustainable Design Research cluster.

Engineering Practice is integrated throughout the programmes through projects, workshops and laboratories to gain a practical understanding of the theory. In year one, students are given an introduction to workshop practice which develops through the programmes to include CAD/CAM and Rapid Manufacturing. Students apply experimental mechanics techniques to validate engineering designs and also engage in electronic design and manufacture.

From the perspectives of the graduate and the employer, this route of study is an effective means to gaining the academic requirements for IEng or CEng. Tables 2 and 4, Appendix B indicates how this programme meets the ECEn requirements.

5.6 BA (Hons) Industrial Design

The InD pathway aims:

- To deliver a balanced education to the level and standard of an Honours degree, in the area of Industrial Design.
- To develop graduates who are able to analyse the contextual and commercial aspects of a design and translate this into an appropriate design solution, that can be industrially manufactured.
- To provide design expertise in the areas of user centred design, through the understanding, knowledge and application of aesthetics and interaction design to industrial design.
- To develop a structured and methodical approach in the application of free-hand design techniques, digital media and design visualisation tools, during all stages of the design process.

Industrial design is a prominent feature of culture and society and is a continuing process for improving the quality of everyday life. This is achieved through the conception, planning and manufacture of industrially produced objects that could be anything from a teapot to a space rocket.

Industrial design conveys ideas, attitudes and values, communicating diverse ideologies of quality from utility to luxury. The industrial designer provides the interface between the user and the machine through consideration of aesthetics, ergonomics, commercialisation, function, materials and industrial production.
Design is an organised activity that integrates a breadth of criteria and creative design skills to arrive at a feasible, commercially viable design solution. Application of design methods and techniques, planning, team working and an appreciation of the design process are necessary for effective project management.

Development of both creativity and analytical skills, along with the ability to think both laterally and logically is essential. These apply throughout the progression and development of a design and are reinforced through integrated design projects. The designer needs to be able to adopt and apply these skills appropriately, as necessary.

Application of digital media has progressed to a point where it is no longer a 'bolt on' feature of design and applies to the conception, evolution, development and planning stages of the design process. Computer design visualisation systems assist the designer, providing a set of useful design tools, alongside freehand methods.

This pathway seeks to provide industry and society with creative and imaginative, commercial industrial designers who can apply themselves to design problems; to provide design solutions that can be industrially produced, that meet user needs and consumer requirements.

Emphasis is placed upon the priority of user centred design issues, interaction design, design commercialisation and design for industrial production. Furthermore, that they do this with the integration of free-hand methods with the utilisation of digital media and computer design visualisation tools, throughout the design process.

Graduates from IED accredited degree programmes must achieve learning outcomes incorporating the key skills of knowledge and understanding, intellectual abilities, practical skills, and general transferable skills. The learning outcomes are expressed in terms of design; economic, social and environmental context; underpinning science and mathematics and associated disciplines; engineering analysis and design practice. Details of where this programme meets these learning outcomes can be found in Appendix C.

5.7 BA/BSc/MDes (Hons) Product Design

The PD pathway aims:

- To provide the students with a broad, generic education, to the standard of an Honours degree, plus additional study at Masters level, in the area of product design.
- To give the students a balanced educational experience that encompasses the appropriate integration of design processes, technology, materials, production techniques, aesthetics, ergonomics,
design methods, computer tools, professional practice and prototype manufacture in the industrial aspects of product design.

- To provide the students with the environment in which to develop their creativity, analytical ability, knowledge, understanding, and the broad based skills necessary to practice design of industrially manufactured products.
- For the BSc pathway, to provide students with the opportunity to develop a deeper understanding of the technological aspects of products, and how this knowledge may be applied to improve the design of manufactured products.
- For the BA pathway, to provide students with the opportunity to develop a deeper understanding of the way that users interact with products, and how this knowledge may be applied to improve the design of manufactured products.
- For study to MDes level, to provide students with the opportunity to develop and evaluate solutions to design problems against conflicting constraints and challenge conventional solutions. Additionally, to demonstrate complex visual literacy and an ability to synthesise a broad range of design aspects.

Products are sophisticated solutions to complex and diverse problems, not just a novel idea or elaborate solution. The designer must arrive at a product that is a considered compromise between many different and varied fields of study that at times results in conflicting constraints. The ability to think both laterally and logically, in both artistic and scientific domains is crucial in order to satisfy aesthetic, ergonomic, technological, manufacturing, standards and economic criteria.

Design is the result of a considerable amount of unseen concurrent effort by multi-disciplinary design teams. Product designers are the product champions and design team leaders directing the product development process. Product Design is a difficult process which requires dedication, commitment and attention to both "the big picture" and details.

In addition to the need for a broad basic knowledge and the ability to communicate in a wide range of disciplines, is the recognition that designers must be able to think both creatively and analytically. For example, arriving at a detailed technical answer is the result of a clear and uncluttered analytical approach. However, generating an appropriate visual image requires a creative approach. This pathway will develop both analytical and creative abilities.

The designer has to be realistic. To develop a sense of design realism means designing the whole product to answer the essential problem. For many students, the production of a working prototype is an essential part of the educational process required to produce realistic designers. The course therefore develops the practical skills of designers who learn real lessons about design by producing working prototype of their solutions.
Well-developed hand/eye/mind co-ordination, spatial awareness and manual sketching techniques are essential in design practice. Designers need to be able to develop and communicate their ideas rapidly and effectively. Discussion and debate are crucial elements of the product development process so written and oral presentation are also important.

Whilst they cannot replace manual techniques, it is important that a Product Designer gains experience in using CAD systems ranging from 2D drafting, to 3D solid modelling, to sophisticated analysis tools. It is an intention to educate designers who are able to utilise CAD technology appropriately and effectively to assist in the design of a product.

The key academic elements of research, understanding, analysis, assimilation, creativity, development and presentation are implicit within the process of product design making this course a highly suitable area of study for a first degree.

Essentially, this programme covers a very broad area of study preparing students for careers and continuing personal development in the field of Product Design. Students are able to develop a level of specialist approach by choosing to study for a BA or BSc at Level 6 before broadening and deepening their knowledge at Level 7.

Graduates from IED accredited degree programmes must achieve learning outcomes incorporating the key skills of knowledge and understanding, intellectual abilities, practical skills, and general transferable skills. The learning outcomes are expressed in terms of design; economic, social and environmental context; underpinning science and mathematics and associated disciplines; engineering analysis and design practice. Details of where this programme meets these learning outcomes can be found in Appendix C for MIED only at the Bachelors level and MIED/CTPD at the Master of Design level.

5.8 MSc Mechanical Engineering Design

The primary aim of this programme is the development of masters level graduates who:

- have the ability to apply mathematical and computer-based models for solving problems in engineering design, and the ability to assess the limitations of particular cases;
- have comprehensive knowledge and understanding of a wide range of materials, manufacturing processes and the failure criteria;
- are fully aware of the enterprise and business driven aspects of design;
- have the ability and confidence to apply their knowledge and skills to specific design problems individually or in a group, and also communicate effectively with both those working in the field of design engineering and with the wider public;
- are fully conversant with contemporary information resources and use them effectively and efficiently.

The MSc Design Engineering is a course for graduate designers who wish to enhance their skills/knowledge/experience in design engineering and gain the internationally recognised title of Chartered Engineer (CEng) but do not currently meet the academic requirements. It is generally accepted that professionals holding CEng status benefit from significantly improved careers prospects than their peers.

Whilst there are a number of ways to achieve academic requirements, it is becoming increasingly common that would-be Chartered Engineers will hold an appropriate Masters degree. The course is primarily targeted at undergraduate engineering graduates. Applicants may be recently qualified graduates or those who completed their degrees some time ago. Table 6, Appendix B indicates how this programme meets the EC UK requirements for further learning to CEng.

5.9 MSc Engineering Project Management

The MEPM pathway aims to provide the candidate with the ability to plan and efficiently manage new technology projects, using modern methods and tools. The primary aim of this programme is the development of masters level graduates who:

- understand project management methods and tools, and are able to employ them in the planning and execution of projects;
- are fully aware of engineering design methods and tools available and investigate, select and learn to employ those appropriate to the needs of their industries;
- are fully conversant with contemporary information resources and use them effectively and efficiently;
- are able to document and communicate, using oral and written presentations, project plans and results;
- are able to plan, conduct and report on small engineering research projects.

In recent years there have been significant developments in the philosophies, methods and tools for planning and executing projects. These developments are particularly important to industries engaged in developing new products, systems or capabilities. This programme is designed to provide industry with personnel who understand and can employ management and technical tools, and are able to spearhead and manage the development of new products and projects appropriate for the technological industries. This programme will be of particular relevance to Knowledge Transfer Partnership Associates engaged in the engineering and manufacturing sectors.
5.10 MA Industrial Design

The MID pathway aims to provide the candidate with the ability to design creatively with the insight of applied knowledge gained from directed design research. The primary aim of this programme is the development of Masters level graduates who are able to:

- develop designs of an aesthetic potency based upon analytical, creative research study and semiotic expression;
- design for human interaction through applied ergonomic research and knowledge;
- understand commercial markets and design in an entrepreneurial way for design business;
- direct, manage, plan, document and communicate an industrial design project throughout the design process;
- design for the ecological and environmental needs of people and industry in a sustainable society;
- establish the creative design direction through the rigorous application of research methods and tools.

This programme provides industry with personnel who are visionary with industrial design; having an entrepreneurial approach to creative design with the ability to research and apply design knowledge. Graduates from this programme will have the flexibility to be employed in a breadth of creative design industries: From graphics, packaging and product; to furniture, transport and interior design.

5.11 MSc Product Design

The MPD pathway aims to provide the candidate with the ability to design holistic, commercially viable products, using advanced design methods and tools. The primary aim of this programme is the development of masters level graduates who:

- are fully aware of advanced product design methods and tools available and investigate, select and learn to employ those appropriate to the requirements of their industries;
- are able to realise design solutions using advanced design and analysis tools;
- are able to design for human interaction through applied ergonomic research and knowledge;
- are fully aware of management techniques to ensure effective operation of teams;
- are able to manage, document and communicate, project plans and results.

This programme provides industry with personnel who understand and can conduct product design using cutting edge analysis methods as well as employing management expertise for use in a competitive environment.
Graduates from this programme will also be able to spearhead and manage projects appropriate for the design and manufacture industries.

Graduates from IED accredited degree programmes must achieve learning outcomes incorporating the key skills of knowledge and understanding, intellectual abilities, practical skills, and general transferable skills. The learning outcomes are expressed in terms of design; economic, social and environmental context; underpinning science and mathematics and associated disciplines; engineering analysis and design practice. Details of where this programme meets these learning outcomes can be found in Appendix C for further learning to CTPD.
6 INTENDED LEARNING OUTCOMES

6.1 BSc (Hons) Design Engineering

6.1.1 Programme Outcomes - Level 6
This programme provides opportunities for students to develop and demonstrate knowledge and understanding, and skills, as follows:

A  Subject knowledge and understanding
A1. Develop detailed knowledge and understanding of an increased range of engineering principles and processes.
A2. Develop systematic knowledge and understanding of analytical tools to gain confidence in applying them to engineering design and technological problems at a professional design engineer level.
A3. Have an advanced knowledge and understanding of the use of modern computer tools to model, simulate and analyse complex products and assemblies to achieve optimum solutions.
A4. Integrate and apply the knowledge and understanding acquired on the course in the planning, implementation and presentation of a major individual project.
A5. Analyse business situations with respect to strengths and weaknesses, opportunities and threats and develop ways and means to counteract or exploit such aspects.
A6. Comprehend the importance of competitiveness in industry and how to form a new enterprise.

B  Intellectual skills
B1. Approach and implement design in a methodical and disciplined manner.
B2. Evaluate critically, and apply scientific knowledge and skills in the development and implementation of practical solutions to engineering problems.
B3. Evaluate computer based packages for the integration of design functions from concept to realisation.
B4. Plan and implement engineering design projects individually and in a group.
B5. Demonstrate a level and type of education to allow the pursuit of postgraduate research in a related discipline.

C  Subject specific / practical skills
C1. Identify, understand and employ the appropriate mathematical models to solve engineering design problems.
C2. Use highly specialised manual and computer-based methods for engineering communication and product presentation.
C3. Be able to employ efficiently advanced modelling, simulation and analysis packages in engineering design.
C4. Critically review and select engineering materials and material processing methods for the design of components.
C5. Design and use a range of electronic system modules in the process of product design.
C6. Use basic workshop-based material processing tools and machines, safely and effectively.
C7. Use basic electrical and electronic components, safely and effectively.
C8. Identify and safely use appropriate laboratory methods.

D Transferable skills
D1. Communicate effectively by oral, written and visual means.
D2. Use IT including the Web, spreadsheets, presentation and word processing.
D3. Solve numerical and statistical problems using appropriate techniques.
D4. Work effectively in collaboration with others, including staff and students.
D5. Demonstrate creativity in problem solving and the application of knowledge across discipline areas.
D6. Identify and work towards targets for personal, career, and academic development.
D7. Be independent and reflective learners.

Learning and Teaching Methods and Strategies
Core knowledge and understanding (A1-A6) are acquired via lectures, tutorials, practical work, laboratory sessions, group work activities and private study. Students will be expected to undertake their own independent research as part of the individual project.

Intellectual skills (B1-B5) are acquired via lectures, tutorials, practical work, laboratory sessions, group work activities and private study. Students are encouraged to undertake independent reading. The University support services continue to offer sessions in the use of, for example, MyBU, electronic resources, library and study skills.

Subject specific skills (C1-C8) are attained through lectures, laboratory sessions, tutorials, and practical work. The project supervisor provides specific support for the student, and where appropriate technical support is also provided.

Transferable skills (D1-D7) are developed via lectures, tutorials, practical work, laboratory sessions, group work activities and private study. Students are encouraged to work more independently, reading around their selected subject areas. The design and business groups allow for discussion and exchange of ideas. Meetings for the individual projects also provide a forum to debate, develop and exchange ideas.

Assessment
The core knowledge (A1-A3) is assessed through examinations, in-class tests and lab-books. The project understanding (A4) is assessed with individual and group reports and oral presentations. The knowledge of business development processes (A5-A6) is assessed through examinations and coursework.
The intellectual skills (B1-B5) are partially assessed through examinations. However the main vehicle for the assessment of the higher order skills is through coursework and practical work. A variety of assessment methods are used, including individual reports, oral presentations and lab-books.

Subject specific skills are assessed through the design projects (C1-C7) and through lab-books (C6-C8).

The individual and group projects assess either directly or indirectly all of the transferable skills (D1-D7). Some transferable skills are not formally assessed but are demonstrated through meeting all course deadlines and the industrial year outcomes (D6).

6.1.2 Level Outcomes – Level 5

A  Subject knowledge and understanding
A1. Further enhance their abilities in identifying and applying engineering principles and analysis to the solution of design problems.
A2. Have an understanding of the fundamentals of the underlying principles embedded in the modelling and analysis software packages.
A3. Have a full awareness of the limitations and potentials of these tools, and be able to evaluate the solutions.
A4. Have a critical understanding of marketing, financial and management techniques and strategies within engineering and manufacturing industries.
A5. Approach increasingly complex engineering designs in a creative, dynamic and professionally structured manner.

B  Intellectual skills
B1. Approach and implement design in a methodical and disciplined manner.
B2. Critically evaluate, and apply scientific knowledge and skills in the development and implementation of practical solutions to engineering problems.
B3. Evaluate computer based packages for the integration of design functions from concept to realisation.
B4. Plan and implement engineering design projects individually and in a group.

C  Subject specific / practical skills
C1. Identify, understand and employ the appropriate mathematical models to solve engineering design problems.
C2. Learn manual and computer-based methods for engineering communication and product presentation.
C3. Be able to employ efficiently advanced modelling, simulation and analysis packages in engineering design.
C4. Understand engineering materials and material processing methods, and intelligently select materials and manufacturing processes.
C5. Design and use a range of electronic system modules in the process of product design.
C6. Identify and safely use appropriate laboratory methods.

D Transferable skills
D1. Be reflective learners.
D2. Communicate and argue effectively in both written and verbal form.
D3. Work effectively in teams.
D4. Demonstrate problem-solving skills.
D5. Apply a range of statistical tests to laboratory work and market data.

Learning and Teaching Methods and Strategies
Knowledge and understanding (A1-A5) are acquired via lectures, tutorials, practical work, laboratory sessions, group work activities and private study. Students will be expected to undertake their own independent research as part of the individual projects.

Intellectual skills (B1-B4) are acquired via lectures, tutorials, practical work, laboratory sessions, group work activities and private study. Students are encouraged to undertake independent reading. The University support services continue to offer sessions in the use of, for example, MyBU, electronic resources, library and study skills.

Subject specific skills (C1-C6) are attained through lectures, laboratory sessions, tutorials and practical work. The project supervisor provides specific support for the student, and where appropriate technical support is also provided.

Transferable skills (D1-D5) are developed via lectures, tutorials, practical work, laboratory sessions, group work activities and private study. Students are encouraged to undertake independent reading and relate this to the concepts covered in Level 5. Regular feedback during tutorials and laboratory sessions as well as on assignments, allows students to develop both their understanding and ability to communicate their ideas.

Assessment
The core knowledge (A1-A3) is assessed through examinations, in-class tests and lab-books. The project understanding (A5) is assessed with individual and group reports and oral presentations. The knowledge of business development processes (A4) is assessed through an end examination.

The intellectual skills (B1-B4) are partially assessed through examinations. However the main vehicle for the assessment of the higher order skills is through coursework and practical work. A variety of assessment methods are used, including individual reports, oral presentations and lab-books.

Subject specific skills are assessed through the design projects (C1-C5) and through lab-books (C6).

The individual and group projects assess either directly or indirectly all of the transferable skills (D1-D5). Transferable skill D5 is also assessed with the lab-books.
6.1.3 Level Outcomes – Level 4

A Subject knowledge and understanding
A1. Understand the scientific foundations of a range of engineering principles and apply them to the solution of appropriate engineering design problems.
A2. Identify the problem in a design task and the appropriate engineering techniques for its solution.
A3. Develop a knowledge and understanding of mathematical fundamentals, models and processes and their application to a range of engineering principles and processes.
A4. Understand project planning and the product development process.

B Intellectual skills
B1. Approach and implement design in a methodical and disciplined manner.
B2. Evaluate, and apply scientific knowledge and skills in the development and implementation of practical solutions to engineering problems.
B3. Plan and implement engineering design projects individually and in a group.

C Subject specific / practical skills
C1. Identify, understand and employ the appropriate mathematical models to solve engineering design problems.
C2. Learn manual and computer-based methods for engineering communication and product presentation.
C3. Understand engineering materials and material processing methods, and intelligently select materials and manufacturing processes.
C4. Use basic workshop-based material processing tools and machines, safely and effectively.
C5. Use basic electrical and electronic components, safely and effectively.
C6. Identify and safely use appropriate laboratory methods.

D Transferable skills
D1. Communicate effectively by oral, written and visual means.
D2. Use IT including the Web, spreadsheets and word-processing.
D3. Apply a range of basic statistical tests to laboratory work, and understand other relevant mathematical procedures in the processing of data.
D4. Work in collaboration with others, including staff and students.
D5. Demonstrate problem solving skills and the application of knowledge across discipline areas.
D6. Be independent and reflective learners.

Learning and Teaching Methods and Strategies
Knowledge and understanding (A1-A4) are acquired via lectures, tutorials, practical work, laboratory sessions, group work activities and private study. Students will be expected to undertake their own independent research as part of the individual projects.
Intellectual skills (B1-B3) are acquired via lectures, tutorials, practical work, laboratory sessions, group work activities and private study. Students are encouraged by academic staff to undertake independent reading and practical exercises. The University support services continue to offer sessions in the use of, for example, MyBU, electronic resources, library and study skills.

Subject specific skills (C1-C6) are attained through lectures, tutorials, laboratory and workshop sessions. Additional support in the area of library skills is provided by the Subject Librarian during the first term.

Transferable skills (D1-D6) are developed via lectures, tutorials, practical work, laboratory sessions, group work activities and private study. Students are encouraged to undertake independent reading and relate this to the concepts covered in Level 4. Regular feedback during tutorials and laboratory sessions as well as on assignments, allows students to develop both their understanding and ability to communicate their ideas. IT skills are developed through the components of some Level 4 units and through individual learning, which is supported by University-wide workshops.

Assessment
The core knowledge (A1-A3) is assessed through examinations, in-class tests and lab-books. The project understanding (A4) is assessed with individual and group reports and oral presentations.

The intellectual skills (B1-B3) are assessed through coursework. A variety of assessment methods are used, including individual reports, oral presentations and lab-books.

Subject specific skills are assessed through the design projects (C1-C5) and lab-books (C4-C6).

The individual and group projects assess either directly or indirectly all of the transferable skills (D1-D6).

6.2 BEng (Hons) Engineering

6.2.1 Programme Outcomes – BEng (Hons) Engineering - Level 6
This Honours level programme provides opportunities for students to develop and demonstrate knowledge and understanding, and skills, as follows:

A Subject knowledge and understanding
A1. Develop knowledge and understanding of modern engineering technologies and processes for potential application in industry at a professional engineer level.
A2. Develop knowledge and understanding of the appropriate analytical and/or computer tools for efficiently and effectively predicting performance in-service.
A3. Integrate and apply the knowledge and understanding acquired on the course in the planning, implementation and presentation of an individual project.
A4. Analyse business situations with respect to strengths and weaknesses, opportunities and threats and develop ways and means to counteract or exploit such aspects.

B **Intellectual skills**
B1. Approach and implement engineering in a methodical and disciplined manner.
B2. Evaluate and synthesise information from a number of sources in order to gain a coherent understanding of engineering theory and practice.
B3. Evaluate critically, and apply scientific knowledge and skills in the development and implementation of practical solutions to engineering problems.
B4. Plan and implement engineering design projects individually and in a group.
B5. Demonstrate a level and type of education to allow the pursuit of postgraduate research in a related discipline.

C **Subject specific / practical skills**
C1. Identify, understand and employ the appropriate analytical models to solve engineering design problems.
C2. Use highly specialised manual and/or computer-based methods for engineering communication and presentation.
C3. Be able to employ efficiently advanced modelling, simulation and analysis packages in engineering design.
C4. Critically review and select engineering materials and material processing methods for the design of components.
C5. Use basic workshop-based material processing tools and machines, safely and effectively.
C6. Identify and safely use appropriate laboratory methods.
C7. Use modern engineering technologies and tools to establish innovative non-routine engineering solutions and adapt engineering designs.

D **Transferable skills**
D1. Communicate effectively and confidently by oral, written and visual means to appropriate professional and academic standards.
D2. Work effectively in collaboration with others, including staff and students.
D3. Demonstrate creativity in problem solving and the application of knowledge across discipline areas.
D4. Identify and work towards targets for personal, career, and academic development.
D5. Be independent and reflective learners.
D6. Use IT including the Web, spreadsheets, presentation and word processing.
D7. Solve numerical and statistical problems using appropriate techniques.
Learning and Teaching Methods and Strategies

Core knowledge and understanding (A1-A4) are acquired via lectures, tutorials, practical work, laboratory sessions, group work activities and private study. Students will be expected to undertake their own independent research as part of the individual project.

Intellectual skills (B1-B6) are acquired via lectures, tutorials, practical work, laboratory sessions, group work activities and private study. Students are encouraged to undertake independent reading. The University support services continue to offer sessions in the use of, for example, MyBU, electronic resources, library and study skills.

Subject specific skills (C1-C7) are attained through lectures, laboratory sessions, tutorials, and practical work. The project supervisor provides specific support for the student, and where appropriate technical support is also provided.

Transferable skills (D1-D7) are developed via lectures, tutorials, practical work, laboratory sessions, group work activities and private study. Students are encouraged to work more independently, reading around their selected subject areas. The innovation and business groups allow for discussion and exchange of ideas. Meetings for the individual projects also provide a forum to debate, develop and exchange ideas.

When the programme is delivered by on-line distance learning the lectures and seminars and tutorials will be virtual, in some cases the student will work independently in others it will be tutor led by the use of blogs and discussion forums. Many of the laboratories will also be delivered virtually, with students accessing appropriate simulation software in their own workspace, however, for some units this will be supplemented by face to face laboratories delivered in a block mode. In all case the distance learning will be supported by face to face tutorials at which their will be peer and academic support for each unit.

Assessment

The project understanding (A3) is assessed with individual and group reports and oral presentations. The knowledge of business development processes (A4) is assessed through examinations and coursework. The core knowledge (A1-A2) is assessed through examinations, in-class tests and lab-books.

The intellectual skills (B1-B6) are partially assessed through examinations. However the main vehicle for the assessment of the higher order skills is through coursework and practical work. A variety of assessment methods are used, including individual reports, oral presentations and lab-books.

Subject specific skills are assessed through unit assessments and through the BEng project (C1-C7).
The individual and group projects assess either directly or indirectly all of the transferable skills (D1-D7). Some transferable skills are not formally assessed but are demonstrated through meeting all course deadlines and the industrial year outcomes (D4).

6.3 MEng (Hons) Engineering

6.3.1 Programme Outcomes – Integrated MEng (Hons) Engineering

This programme provides opportunities for students to develop and demonstrate knowledge, understanding and skills as follows:

A Subject Knowledge and Understanding
A1. Systematic engineering design processes, involving analysing and solving advanced engineering problems related to own specialisation.
A2. Develop comprehensive knowledge and understanding of modern engineering technologies and processes for potential application in industry at a professional engineer level taking account of a range of commercial and industrial constraints.
A3. Develop comprehensive knowledge and understanding of the appropriate analytical and/or computer tools for efficiently and effectively predicting performance in-service.
A4. Integrate the extensive knowledge and understanding acquired from a range of areas in the effective planning, implementation and presentation of an individual engineering project demonstrating originality in the application of the knowledge.
A5. Selection and application of different advanced techniques used in the management and control of projects, with special emphasis on project teams.

B Intellectual Skills
B1. Analytical thinking in respect of part and assembly design utilising comprehensive understanding of the scientific principles of own specialisation and related disciplines.
B2. Evaluate critically current research and advanced scholarship to formulate, plan, execute and report on a project involving scientific knowledge and skills, and original engineering design in a structured and disciplined manner.
B3. Critically reflect upon interpersonal skills required to operate in a team environment as a professional engineer.
B4. Independent evaluation and argument of alternative approaches to situations, problems or issues that occur when managing a project.
B5. The undertaking of decision making techniques and awareness of the commercial implications of design management decisions.

C Subject specific / practical skills
C1. Identify, understand, assess and employ the appropriate advanced analytical models to solve engineering design problems recognising their limitations for particular cases.
C2. Independently apply advanced simulation tools to analyse engineering design problems.
C3. Use highly specialised manual and/or computer-based methods for engineering communication and presentation.
C4. Apply and critically evaluate various management techniques to ensure efficient operation of a team.
C5. Diagnose the causes of the different types of service failure and the ability to propose methods of avoiding them in future.
C6. Use basic workshop-based material processing tools and machines, safely and effectively.
C7. Use modern engineering technologies and tools to establish innovative non-routine engineering solutions and adapt engineering designs.

D Transferable Skills
D1. Communicate effectively and confidently by oral, written and visual means to appropriate professional and academic standards.
D2. Work effectively in collaboration with others, including staff and students.
D3. Demonstrate creativity in problem solving and the application of knowledge across discipline areas.
D4. Identify and work towards targets for personal, career, and academic development.
D5. Be independent and reflective learners.
D6. Gather, select, and analyse a range of experimental and fieldwork data and present professionally using appropriate media.
D7. Distil, synthesise and critically analyse alternative approaches and methodologies to problems and research results reported in literature and elsewhere.

Learning and Teaching Methods and Strategies
Core knowledge and understanding is acquired through lectures, seminars, tutorials, workshops, relevant fieldwork and independent learning. Students are expected to undertake independent reading and to relate the concepts introduced in different units. Regular feedback on assignments allows students to refine and develop their understanding.

Intellectual skills are developed through the learning and teaching methods and strategies outlined above. Many units of the programme involves extensive in-class discussions and the opportunity in some units to deal with real data and “live” engineering problems.

Transferable skills are acquired through a variety of forms: face-to-face sessions where each may include a mix of delivery modes: lecture, seminar, tutorial, and workshop, guided reading and development, and self-managed study. Students are encouraged to share their academic and industrial expertise with their peers, to enrich the learning process. Regular feedback on assignments allows the students to refine and develop their understanding.

The independent learning element will be partly directed by the unit lecturer with regard to recommended reading (text books, articles and research papers) and tutorial problems to be tackled.
When the programme is delivered by on-line distance learning the lectures and seminars and tutorials will be virtual, in some cases the student will work independently in others it will be tutor led by the use of blogs and discussion forums. Many of the laboratories will also be delivered virtually, with students accessing appropriate simulation software in their own workspace, however, for some units this will be supplemented by face to face laboratories delivered in a block mode. In all case the distance learning will be supported by face to face tutorials at which their will be peer and academic support for each unit.

Assessment
The core knowledge and understanding is assessed through appropriately structured coursework reports, presentations and examination (A1 - A5).

The intellectual skills are assessed through report based coursework, often involving case studies and presentations (B1 – B5).

Outcomes C1 to C7 are assessed through structured reports and examination.

Learning outcomes D1-D7 will be assessed through coursework assessments and the MEng (Hons) Project.

6.3.2 Level Outcomes - Level 7

A Subject Knowledge and Understanding
A2. Selection and application of different techniques used in the management and control of projects, with special emphasis on project teams.
A3. Have a critical understanding of the mechanisms of common static and dynamic failures in emerging, metallic, polymeric and ceramic materials, when under load and/or due to corrosion and other environmental effects.
A4. The advantages and limitations of utilising simulation tools in the product development process.
A5. Life cycle assessment and influencing sustainable development within the design process.
A6. Total quality and quality systems in the design and manufacture of products.

B Intellectual Skills
B1. Analytical thinking in respect of part and assembly design.
B2. Evaluate critically current research and advanced scholarship to formulate, plan, execute and report on a project involving scientific knowledge and skills, and original engineering design in a structured and disciplined manner.
B3. Critically reflect upon interpersonal skills required to operate in a team environment as a professional engineer.
B4. Independent evaluation and argument of alternative approaches to situations, problems or issues that occur when managing a project.
B5. The undertaking of decision making techniques and awareness of the commercial implications of design management decisions.

C  Subject specific / practical skills
C1. Identify, understand and employ the appropriate analytical models to solve engineering design problems.
C2. Independently apply advanced simulation tools to analyse engineering design problems.
C3. Apply and critically evaluate various management techniques to ensure efficient operation of a team.
C4. Diagnose the causes of the different types of service failure and the ability to propose methods of avoiding them in future.

D  Transferable Skills
D1. Communicate effectively and confidently by oral, written and visual means to appropriate professional and academic standards.
D2. Work effectively in collaboration with others, including staff and students.
D3. Demonstrate creativity in problem solving and the application of knowledge across discipline areas.
D4. Identify and work towards targets for personal, career, and academic development.
D5. Be independent and reflective learners.
D6. Gather, select, and analyse a range of experimental and fieldwork data and present professionally using appropriate media.
D7. Distil, synthesise and critically analyse alternative approaches and methodologies to problems and research results reported in literature and elsewhere.

Learning and Teaching Methods and Strategies
Core knowledge and understanding is acquired through lectures, seminars, tutorials, workshops, relevant fieldwork and independent learning. Students are expected to undertake independent reading and to relate the concepts introduced in different units. Regular feedback on assignments allows students to refine and develop their understanding.

Intellectual skills are developed through the learning and teaching methods and strategies outlined above. Many units of the programme involves extensive in-class discussions and the opportunity in some units to deal with real data and “live” engineering problems.

Transferable skills are acquired through a variety of forms: face-to-face sessions where each may include a mix of delivery modes: lecture, seminar, tutorial, and workshop, guided reading and development, and self-managed study. Students are encouraged to share their academic and industrial expertise with their peers, to enrich the learning process. Regular feedback on assignments allows the students to refine and develop their understanding.
The independent learning element will be partly directed by the unit lecturer with regard to recommended reading (text books, articles and research papers) and tutorial problems to be tackled.

When the programme is delivered by on-line distance learning the lectures and seminars and tutorials will be virtual, in some cases the student will work independently in others it will be tutor led by the use of blogs and discussion forums. Many of the laboratories will also be delivered virtually, with students accessing appropriate simulation software in their own workspace, however, for some units this will be supplemented by face to face laboratories delivered in a block mode. In all case the distance learning will be supported by face to face tutorials at which their will be peer and academic support for each unit.

**Assessment**

The core knowledge and understanding is assessed through appropriately structured coursework reports, presentations and examination (A1 – A6).

The intellectual skills are assessed through report based coursework, often involving case studies and presentations (B1 – B5).

Outcomes C1 to C4 are assessed through structured reports and examination.

Learning outcomes D1-D7 will be assessed through coursework assessments and the MEng (Hons) Project.

**6.3.3 Programme Outcomes – BEng (Hons) Engineering - Level 6**

This Honours level programme provides opportunities for students to develop and demonstrate knowledge and understanding, and skills, as follows:

**A Subject knowledge and understanding**

A1. Develop knowledge and understanding of modern engineering technologies and processes for potential application in industry at a professional engineer level.

A2. Develop knowledge and understanding of the appropriate analytical and/or computer tools for efficiently and effectively predicting performance in-service.

A3. Integrate and apply the knowledge and understanding acquired on the course in the planning, implementation and presentation of an individual project.

A4. Analyse business situations with respect to strengths and weaknesses, opportunities and threats and develop ways and means to counteract or exploit such aspects.

**B Intellectual skills**

B1. Approach and implement engineering in a methodical and disciplined manner.

B2. Evaluate and synthesise information from a number of sources in order to gain a coherent understanding of engineering theory and practice.
B3. Evaluate critically, and apply scientific knowledge and skills in the development and implementation of practical solutions to engineering problems.

B4. Plan and implement engineering design projects individually and in a group.

B5. Demonstrate a level and type of education to allow the pursuit of postgraduate research in a related discipline.


C **Subject specific / practical skills**

C1. Identify, understand and employ the appropriate analytical models to solve engineering design problems.

C2. Use highly specialised manual and/or computer-based methods for engineering communication and presentation.

C3. Be able to employ efficiently advanced modelling, simulation and analysis packages in engineering design.

C4. Critically review and select engineering materials and material processing methods for the design of components.

C5. Use basic workshop-based material processing tools and machines, safely and effectively.

C6. Identify and safely use appropriate laboratory methods.

C7. Use modern engineering technologies and tools to establish innovative non-routine engineering solutions and adapt engineering designs.

D **Transferable skills**

D1. Communicate effectively and confidently by oral, written and visual means to appropriate professional and academic standards.

D2. Work effectively in collaboration with others, including staff and students.

D3. Demonstrate creativity in problem solving and the application of knowledge across discipline areas.

D4. Identify and work towards targets for personal, career, and academic development.

D5. Be independent and reflective learners.

D6. Use IT including the Web, spreadsheets, presentation and word processing.

D7. Solve numerical and statistical problems using appropriate techniques.

**Learning and Teaching Methods and Strategies**

Core knowledge and understanding (A1-A4) are acquired via lectures, tutorials, practical work, laboratory sessions, group work activities and private study. Students will be expected to undertake their own independent research as part of the individual project.

Intellectual skills (B1-B6) are acquired via lectures, tutorials, practical work, laboratory sessions, group work activities and private study. Students are encouraged to undertake independent reading. The University support services continue to offer sessions in the use of, for example, MyBU, electronic resources, library and study skills.
Subject specific skills (C1-C7) are attained through lectures, laboratory sessions, tutorials, and practical work. The project supervisor provides specific support for the student, and where appropriate technical support is also provided.

Transferable skills (D1-D7) are developed via lectures, tutorials, practical work, laboratory sessions, group work activities and private study. Students are encouraged to work more independently, reading around their selected subject areas. The innovation and business groups allow for discussion and exchange of ideas. Meetings for the individual projects also provide a forum to debate, develop and exchange ideas.

When the programme is delivered by on-line distance learning the lectures and seminars and tutorials will be virtual, in some cases the student will work independently in others it will be tutor led by the use of blogs and discussion forums. Many of the laboratories will also be delivered virtually, with students accessing appropriate simulation software in their own workspace, however, for some units this will be supplemented by face to face laboratories delivered in a block mode. In all case the distance learning will be supported by face to face tutorials at which their will be peer and academic support for each unit.

Assessment
The project understanding (A3) is assessed with individual and group reports and oral presentations. The knowledge of business development processes (A4) is assessed through examinations and coursework. The core knowledge (A1-A2) is assessed through examinations, in-class tests and lab-books.

The intellectual skills (B1-B6) are partially assessed through examinations. However the main vehicle for the assessment of the higher order skills is through coursework and practical work. A variety of assessment methods are used, including individual reports, oral presentations and lab-books.

Subject specific skills are assessed through unit assessments and through the BEng project (C1-C7).

The individual and group projects assess either directly or indirectly all of the transferable skills (D1-D7). Some transferable skills are not formally assessed but are demonstrated through meeting all course deadlines and the industrial year outcomes (D4).

6.4 BEng (Hons) Mechanical Engineering

6.4.1 Programme Outcomes – BEng (Hons) Mechanical Engineering - Level 6
This Honours level programme provides opportunities for students to develop and demonstrate knowledge and understanding, and skills, as follows:
A **Subject knowledge and understanding**
A1. Develop knowledge and understanding of modern mechanical engineering technologies and processes for potential application in industry at a professional engineer level.
A2. Develop knowledge and understanding of a range of mechanical and related engineering theories and concepts.
A3. Develop knowledge and understanding of the appropriate analytical and/or computer tools for efficiently and effectively predicting performance in-service.
A4. Integrate and apply the knowledge and understanding acquired on the course in the planning, implementation and presentation of an individual project.
A5. Analyse business situations with respect to strengths and weaknesses, opportunities and threats and develop ways and means to counteract or exploit such aspects.

B **Intellectual skills**
B1. Approach and implement mechanical engineering in a methodical and disciplined manner.
B2. Evaluate and synthesise information from a number of sources in order to gain a coherent understanding of mechanical engineering theory and practice.
B3. Evaluate critically, and apply scientific knowledge and skills in the development and implementation of practical solutions to mechanical engineering problems.
B4. Plan and implement mechanical engineering design projects individually and in a group.
B5. Demonstrate a level and type of education to allow the pursuit of postgraduate research in a related discipline.

C **Subject specific / practical skills**
C1. Identify, understand and employ the appropriate analytical models to solve mechanical engineering design problems.
C2. Use highly specialised manual and/or computer-based methods for engineering communication and presentation.
C3. Be able to employ efficiently advanced modelling, simulation and analysis packages in mechanical engineering design.
C4. Critically review and select engineering materials and material processing methods for the design of components.
C5. Select and use workshop-based material processing tools and machines, safely and effectively.
C6. Identify and safely use appropriate laboratory methods.
C7. Use modern engineering technologies and tools to establish mechanical engineering solutions and adapt engineering designs.

D **Transferable skills**
D1. Communicate effectively and confidently by oral, written and visual means to appropriate professional and academic standards.
D2. Work effectively in collaboration with others, including staff and students.
D3. Demonstrate creativity in problem solving and the application of knowledge across discipline areas.
D4. Identify and work towards targets for personal, career, and academic development.
D5. Be independent and reflective learners.
D6. Use IT including the Web, spreadsheets, presentation and word processing.
D7. Solve numerical and statistical problems using appropriate techniques.

Learning and Teaching Methods and Strategies
Core knowledge and understanding (A1-A5) are acquired via lectures, tutorials, practical work, laboratory sessions, group work activities and private study. Students will be expected to undertake their own independent research as part of the individual project.

Intellectual skills (B1-B6) are acquired via lectures, tutorials, practical work, laboratory sessions, group work activities and private study. Students are encouraged to undertake independent reading. The University support services continue to offer sessions in the use of, for example, MyBU, electronic resources, library and study skills.

Subject specific skills (C1-C7) are attained through lectures, laboratory sessions, tutorials, and practical work. The project supervisor provides specific support for the student, and where appropriate technical support is also provided.

Transferable skills (D1-D7) are developed via lectures, tutorials, practical work, laboratory sessions, group work activities and private study. Students are encouraged to work more independently, reading around their selected subject areas. The innovation and business groups allow for discussion and exchange of ideas. Meetings for the individual projects also provide a forum to debate, develop and exchange ideas.

Assessment
The project understanding (A4) is assessed with individual and group reports and oral presentations. The knowledge of business development processes (A5) is assessed through examinations and coursework. The core knowledge (A1-A2) is assessed through examinations, in-class tests and lab-books. The knowledge and understanding of computational tools (A3) is assessed through project based coursework.

The intellectual skills (B1-B6) are partially assessed through examinations. However the main vehicle for the assessment of the higher order skills is through coursework and practical work. A variety of assessment methods are used, including individual reports, oral presentations and lab-books.

Subject specific skills are assessed through unit assessments and through the BEng project (C1-C7).
The individual and group projects assess either directly or indirectly all of the transferable skills (D1-D7). Some transferable skills are not formally assessed but are demonstrated through meeting all course deadlines and the industrial year outcomes (D4).

6.4.2 Level Outcomes – Level 5

A Subject knowledge and understanding
A1. Broaden and deepen knowledge and understanding of an increased range of mechanical engineering principles and processes.
A2. Develop knowledge and understanding of analytical tools to apply them to engineering design and technological problems at a professional mechanical engineer level.
A3. Understand and apply the physical and analytical principles required to achieve solutions to a range of standard and non-standard mechanical engineering problems.
A4. Analyse business situations with respect to strengths and weaknesses, opportunities and threats and develop ways and means to counteract or exploit such aspects.

B Intellectual skills
B1. Approach and implement mechanical engineering in a methodical and disciplined manner.
B2. Identify and evaluate information from a number of sources in order to gain a coherent understanding of mechanical engineering theory and practice.
B3. Evaluate and apply scientific knowledge and skills in the development and implementation of practical solutions to mechanical engineering problems.
B4. Plan and implement solutions to mechanical engineering design problems individually and in a group.

C Subject specific / practical skills
C1. Identify, understand and employ the appropriate analytical models to solve mechanical engineering design problems.
C2. Use highly specialised manual and/or computer-based methods for engineering communication and presentation.
C3. Be able to employ efficiently advanced modelling, simulation and analysis packages in mechanical engineering design.
C4. Review and select engineering materials and material processing methods for the design of components.
C5. Use basic workshop-based material processing tools and machines, safely and effectively.
C6. Safely use appropriate laboratory methods.
C7. Collect, analyse, evaluate, present and use research information.

D Transferable skills
D1. Communicate effectively and confidently by oral, written and visual means to appropriate professional and academic standards.
D2. Work effectively in collaboration with others, including staff and students.
D3. Demonstrate an enhanced ability in problem solving and the application of knowledge across discipline areas.
D4. Identify and work towards targets for personal, career, and academic development.
D5. Be independent and reflective learners.
D6. Use IT including the Web, spreadsheets, presentation and word processing.
D7. Solve numerical and statistical problems using appropriate techniques.

Learning and Teaching Methods and Strategies
Knowledge and understanding (A1-A4) are acquired via lectures, tutorials, practical work, laboratory sessions, group work activities and private study. Students will be expected to undertake their own independent research as part of the individual projects.

Intellectual skills (B1-B4) are acquired via lectures, tutorials, practical work, laboratory sessions, group work activities and private study. Students are encouraged to undertake independent reading. The University support services continue to offer sessions in the use of, for example, MyBU, electronic resources, library and study skills.

Subject specific skills (C1-C7) are attained through lectures, laboratory sessions, tutorials and practical work. The unit leader provides specific support for the student, and where appropriate technical support is also provided.

Transferable skills (D1-D7) are developed via lectures, tutorials, practical work, laboratory sessions, group work activities and private study. Students are encouraged to undertake independent reading and relate this to the concepts covered in Level 5. Regular feedback during tutorials and laboratory sessions as well as on assignments, allows students to develop both their understanding and ability to communicate their ideas.

Assessment
The core knowledge (A1-A3) is assessed through coursework which will include individual and group reports and oral presentations. The knowledge of management and commercialisation (A4) is assessed through an end examination.

The intellectual skills (B1-B4) are partially assessed through examinations. However, the main vehicle for the assessment of the higher order skills is through coursework and practical work. A variety of assessment methods are used, including individual reports, oral presentations and lab-books.

Subject specific skills are assessed through the coursework (C1-C7) and through lab-books (C6).
The individual and group assignments assess either directly or indirectly all of the transferable skills (D1-D7). Transferable skill D3 is also assessed with the lab-books.

6.4.3 Level Outcomes – Level 4

A Subject knowledge and understanding
A1. Develop knowledge and understanding of a range of mechanical engineering principles and processes.
A2. Develop knowledge and understanding of analytical tools to gain confidence in applying them to mechanical engineering design and technological problems at a professional mechanical engineer level.
A3. Develop knowledge and understanding of mathematical fundamentals, models and processes and their application to a range of mechanical engineering principles and processes.

B Intellectual skills
B1. Approach and implement mechanical engineering in a methodical and disciplined manner.
B2. Review and use information from a number of sources in order to gain a coherent understanding of mechanical engineering theory and practice.
B3. Evaluate and apply basic scientific knowledge and skills in the development and implementation of practical solutions to mechanical engineering problems.

C Subject specific / practical skills
C1. Understand and employ appropriate analytical models to solve mechanical engineering design problems.
C2. Use highly specialised manual and/or computer-based methods for engineering communication and presentation.
C3. Review and select engineering materials and material processing methods for the design of components.
C4. Use basic workshop-based material processing tools and machines, safely and effectively.
C5. Use basic electrical and electronic components, safely and effectively.
C6. Safely use appropriate laboratory methods.

D Transferable skills
D1. Communicate effectively and confidently by oral, written and visual means to appropriate professional and academic standards.
D2. Work effectively in collaboration with others, including staff and students.
D3. Demonstrate ability in problem solving and the application of knowledge across discipline areas.
D4. Identify and work towards targets for personal, career, and academic development.
D6. Use IT including the Web, spreadsheets, presentation and word processing.
D7. Solve numerical and statistical problems using appropriate techniques.

Learning and Teaching Methods and Strategies
Knowledge and understanding (A1-A3) are acquired via lectures, tutorials, practical work, laboratory sessions, group work activities and private study.

Intellectual skills (B1-B3) are acquired via lectures, tutorials, practical work, laboratory sessions, group work activities and private study. Students are encouraged by academic staff to undertake independent reading and practical exercises. The University support services continue to offer sessions in the use of, for example, MyBU, electronic resources, library and study skills.

Subject specific skills (C1-C6) are attained through lectures, tutorials, laboratory and workshop sessions. Additional support in the area of library skills is provided by the Subject Librarian during the first term.

Transferable skills (D1-D7) are developed via lectures, tutorials, practical work, laboratory sessions, group work activities and private study. Students are encouraged to undertake independent reading and relate this to the concepts covered in Level 4. Regular feedback during tutorials and laboratory sessions as well as on assignments, allows students to develop both their understanding and ability to communicate their ideas. IT skills are developed through the components of some Level 4 units and through individual learning, which is supported by University-wide workshops.

Assessment
The core knowledge (A1-A3) is assessed through examinations, in-class tests, coursework and lab-books.

The intellectual skills (B1-B3) are assessed through coursework. A variety of assessment methods are used, including individual reports, oral presentations and lab-books.

Subject specific skills are assessed through the coursework (C1-C6) and lab-books (C4-C6).

The individual and group assignments assess either directly or indirectly all of the transferable skills (D1-D7).

6.5 MEng (Hons) Mechanical Engineering

6.5.1 Programme Outcomes – Integrated MEng (Hons) Mechanical Engineering
This programme provides opportunities for students to develop and demonstrate knowledge, understanding and skills as follows:

A Subject Knowledge and Understanding
A2. Develop comprehensive knowledge and understanding of an increased range of mechanical and related engineering theories and concepts.

A3. Develop comprehensive knowledge and understanding of modern mechanical engineering technologies and processes for potential application in industry at a professional engineer level taking account of a range of commercial and industrial constraints.

A4. Develop comprehensive knowledge and understanding of the appropriate analytical and/or computer tools for efficiently and effectively predicting performance in-service.

A5. Integrate the extensive knowledge and understanding acquired from a range of areas in the effective planning, implementation and presentation of an individual mechanical engineering project demonstrating originality in the application of the knowledge.

A6. Selection and application of different advanced techniques used in the management and control of projects, with special emphasis on both project management and teams.

B Intellectual Skills

B1. Analytical thinking in respect of part and assembly design utilising comprehensive understanding of the scientific principles of own specialisation and related disciplines.

B2. Evaluate critically current research and advanced scholarship to formulate, plan, execute and report on a project involving scientific knowledge and skills, and original mechanical engineering design in a structured and disciplined manner.

B3. Critically reflect upon interpersonal skills required to operate in a team environment as a professional mechanical engineer.

B4. Independent evaluation and argument of alternative approaches to situations, problems or issues that occur when managing a project.

B5. Planning, execution and reporting on the management of a mechanical engineering project.

C Subject specific / practical skills

C1. Identify, understand, assess and employ the appropriate advanced analytical models to solve mechanical engineering design problems recognising their limitations for particular cases.

C2. Independently apply advanced simulation tools to analyse mechanical engineering design problems.

C3. Use highly specialised manual and/or computer-based methods for engineering communication and presentation.

C4. Apply and critically evaluate various management techniques to ensure efficient operation of a team.

C5. Diagnose the causes of the different types of service failure and the ability to propose methods of avoiding them in future.

C6. Use workshop-based material processing tools and machines, safely and effectively.

C7. Use modern engineering technologies and tools to establish innovative non-routine mechanical engineering solutions and adapt engineering designs.
D Transferable Skills
D1. Communicate effectively and confidently by oral, written and visual means to appropriate professional and academic standards.
D2. Work effectively in collaboration with others, including staff and students.
D3. Demonstrate creativity in problem solving and the application of knowledge across discipline areas.
D4. Identify and work towards targets for personal, career, and academic development.
D5. Be independent and reflective learners.
D6. Gather, select, and analyse a range of experimental and fieldwork data in an ethical manner and present professionally using appropriate media.
D7. Distil, synthesise and critically analyse alternative approaches and methodologies to problems and research results reported in literature and elsewhere.

Learning and Teaching Methods and Strategies
Core knowledge and understanding is acquired through lectures, seminars, tutorials, workshops, relevant fieldwork and independent learning. Students are expected to undertake independent reading and to relate the concepts introduced in different units. Regular feedback on assignments allows students to refine and develop their understanding.

Intellectual skills are developed through the learning and teaching methods and strategies outlined above. Many units of the programme involve extensive in-class discussions and the opportunity in some units to deal with real data and “live” engineering problems.

Transferable skills are acquired through a variety of forms: face-to-face sessions where each may include a mix of delivery modes: lecture, seminar, tutorial, and workshop, guided reading and development, and self-managed study. Students are encouraged to share their academic and industrial expertise with their peers, to enrich the learning process. Regular feedback on assignments allows the students to refine and develop their understanding.

The independent learning element will be partly directed by the unit lecturer with regard to recommended reading (text books, articles and research papers) and tutorial problems to be tackled.

Assessment
The core knowledge and understanding is assessed through appropriately structured coursework reports, presentations and examination (A1 – A6).

The intellectual skills are assessed through report based coursework, often involving case studies and presentations (B1 – B5).

Outcomes C1 to C7 are assessed through structured reports, workshop and laboratory exercises and examination.

Learning outcomes D1-D7 will be assessed through coursework assessments and the MEng (Hons) Project.
6.5.2 Programme Outcomes – BEng (Hons) Mechanical Engineering - Level 6
This Honours level programme provides opportunities for students to develop and demonstrate knowledge and understanding, and skills, as follows:

A Subject knowledge and understanding
A1. Develop knowledge and understanding of modern mechanical engineering technologies and processes for potential application in industry at a professional engineer level.
A2. Develop knowledge and understanding of a range of mechanical and related engineering theories and concepts.
A3. Develop knowledge and understanding of the appropriate analytical and/or computer tools for efficiently and effectively predicting performance in-service.
A4. Integrate and apply the knowledge and understanding acquired on the course in the planning, implementation and presentation of an individual project.
A5. Analyse business situations with respect to strengths and weaknesses, opportunities and threats and develop ways and means to counteract or exploit such aspects.

B Intellectual skills
B1. Approach and implement mechanical engineering in a methodical and disciplined manner.
B2. Evaluate and synthesise information from a number of sources in order to gain a coherent understanding of mechanical engineering theory and practice.
B3. Evaluate critically, and apply scientific knowledge and skills in the development and implementation of practical solutions to mechanical engineering problems.
B4. Plan and implement mechanical engineering design projects individually and in a group.
B5. Demonstrate a level and type of education to allow the pursuit of postgraduate research in a related discipline.

C Subject specific / practical skills
C1. Identify, understand and employ the appropriate analytical models to solve mechanical engineering design problems.
C2. Use highly specialised manual and/or computer-based methods for engineering communication and presentation.
C3. Be able to employ efficiently advanced modelling, simulation and analysis packages in mechanical engineering design.
C4. Critically review and select engineering materials and material processing methods for the design of components.
C5. Select and use workshop-based material processing tools and machines, safely and effectively.
C6. Identify and safely use appropriate laboratory methods.
C7. Use modern engineering technologies and tools to establish mechanical engineering solutions and adapt engineering designs.

**D Transferable skills**

D1. Communicate effectively and confidently by oral, written and visual means to appropriate professional and academic standards.
D2. Work effectively in collaboration with others, including staff and students.
D3. Demonstrate creativity in problem solving and the application of knowledge across discipline areas.
D4. Identify and work towards targets for personal, career, and academic development.
D5. Be independent and reflective learners.
D6. Use IT including the Web, spreadsheets, presentation and word processing.
D7. Solve numerical and statistical problems using appropriate techniques.

**Learning and Teaching Methods and Strategies**

Core knowledge and understanding (A1-A5) are acquired via lectures, tutorials, practical work, laboratory sessions, group work activities and private study. Students will be expected to undertake their own independent research as part of the individual project.

Intellectual skills (B1-B6) are acquired via lectures, tutorials, practical work, laboratory sessions, group work activities and private study. Students are encouraged to undertake independent reading. The University support services continue to offer sessions in the use of, for example, MyBU, electronic resources, library and study skills.

Subject specific skills (C1-C7) are attained through lectures, laboratory sessions, tutorials, and practical work. The project supervisor provides specific support for the student, and where appropriate technical support is also provided.

Transferable skills (D1-D7) are developed via lectures, tutorials, practical work, laboratory sessions, group work activities and private study. Students are encouraged to work more independently, reading around their selected subject areas. The innovation and business groups allow for discussion and exchange of ideas. Meetings for the individual projects also provide a forum to debate, develop and exchange ideas.

**Assessment**

The project understanding (A4) is assessed with individual and group reports and oral presentations. The knowledge of business development processes (A5) is assessed through examinations and coursework. The core knowledge (A1-A2) is assessed through examinations, in-class tests and lab-books. The knowledge and understanding of computational tools (A3) is assessed through project based coursework.

The intellectual skills (B1-B6) are partially assessed through examinations. However the main vehicle for the assessment of the higher order skills is
through coursework and practical work. A variety of assessment methods are used, including individual reports, oral presentations and lab-books.

Subject specific skills are assessed through unit assessments and through the BEng project (C1-C7).

The individual and group projects assess either directly or indirectly all of the transferable skills (D1-D7). Some transferable skills are not formally assessed but are demonstrated through meeting all course deadlines and the industrial year outcomes (D4).

6.5.3 Level Outcomes – Level 5

A Subject knowledge and understanding
A1. Broaden and deepen knowledge and understanding of an increased range of mechanical engineering principles and processes.
A2. Develop knowledge and understanding of analytical tools to apply them to engineering design and technological problems at a professional mechanical engineer level.
A3. Understand and apply the physical and analytical principles required to achieve solutions to a range of standard and non-standard mechanical engineering problems.
A4. Analyse business situations with respect to strengths and weaknesses, opportunities and threats and develop ways and means to counteract or exploit such aspects.

B Intellectual skills
B1. Approach and implement mechanical engineering in a methodical and disciplined manner.
B2. Identify and evaluate information from a number of sources in order to gain a coherent understanding of mechanical engineering theory and practice.
B3. Evaluate and apply scientific knowledge and skills in the development and implementation of practical solutions to mechanical engineering problems.
B4. Plan and implement solutions to mechanical engineering design problems individually and in a group.

C Subject specific / practical skills
C1. Identify, understand and employ the appropriate analytical models to solve mechanical engineering design problems.
C2. Use highly specialised manual and/or computer-based methods for engineering communication and presentation.
C3. Be able to employ efficiently advanced modelling, simulation and analysis packages in mechanical engineering design.
C4. Review and select engineering materials and material processing methods for the design of components.
C5. Use basic workshop-based material processing tools and machines, safely and effectively.
C6. Safely use appropriate laboratory methods.
Collect, analyse, evaluate, present and use research information.

**Transferable skills**

D1. Communicate effectively and confidently by oral, written and visual means to appropriate professional and academic standards.

D2. Work effectively in collaboration with others, including staff and students.

D3. Demonstrate an enhanced ability in problem solving and the application of knowledge across discipline areas.

D4. Identify and work towards targets for personal, career, and academic development.

D5. Be independent and reflective learners.

D6. Use IT including the Web, spreadsheets, presentation and word processing.

D7. Solve numerical and statistical problems using appropriate techniques.

**Learning and Teaching Methods and Strategies**

Knowledge and understanding (A1-A4) are acquired via lectures, tutorials, practical work, laboratory sessions, group work activities and private study. Students will be expected to undertake their own independent research as part of the individual projects.

Intellectual skills (B1-B4) are acquired via lectures, tutorials, practical work, laboratory sessions, group work activities and private study. Students are encouraged to undertake independent reading. The University support services continue to offer sessions in the use of, for example, MyBU, electronic resources, library and study skills.

Subject specific skills (C1-C7) are attained through lectures, laboratory sessions, tutorials and practical work. The unit leader provides specific support for the student, and where appropriate technical support is also provided.

Transferable skills (D1-D7) are developed via lectures, tutorials, practical work, laboratory sessions, group work activities and private study. Students are encouraged to undertake independent reading and relate this to the concepts covered in Level 5. Regular feedback during tutorials and laboratory sessions as well as on assignments, allows students to develop both their understanding and ability to communicate their ideas.

**Assessment**

The core knowledge (A1-A3) is assessed through coursework which will include individual and group reports and oral presentations. The knowledge of management and commercialisation (A4) is assessed through an end examination.

The intellectual skills (B1-B4) are partially assessed through examinations. However, the main vehicle for the assessment of the higher order skills is through coursework and practical work. A variety of assessment methods are used, including individual reports, oral presentations and lab-books.
Subject specific skills are assessed through the coursework (C1-C7) and through lab-books (C6).

The individual and group assignments assess either directly or indirectly all of the transferable skills (D1-D7). Transferable skill D3 is also assessed with the lab-books.

6.5.4 Level Outcomes – Level 4

A Subject knowledge and understanding
A1. Develop knowledge and understanding of a range of mechanical engineering principles and processes.
A2. Develop knowledge and understanding of analytical tools to gain confidence in applying them to mechanical engineering design and technological problems at a professional mechanical engineer level.
A3. Develop knowledge and understanding of mathematical fundamentals, models and processes and their application to a range of mechanical engineering principles and processes.

B Intellectual skills
B1. Approach and implement mechanical engineering in a methodical and disciplined manner.
B2. Review and use information from a number of sources in order to gain a coherent understanding of mechanical engineering theory and practice.
B3. Evaluate and apply basic scientific knowledge and skills in the development and implementation of practical solutions to mechanical engineering problems.

C Subject specific / practical skills
C1. Understand and employ appropriate analytical models to solve mechanical engineering design problems.
C2. Use highly specialised manual and/or computer-based methods for engineering communication and presentation.
C3. Review and select engineering materials and material processing methods for the design of components.
C4. Use basic workshop-based material processing tools and machines, safely and effectively.
C5. Use basic electrical and electronic components, safely and effectively.
C6. Safely use appropriate laboratory methods.

D Transferable skills
D1. Communicate effectively and confidently by oral, written and visual means to appropriate professional and academic standards.
D2. Work effectively in collaboration with others, including staff and students.
D3. Demonstrate ability in problem solving and the application of knowledge across discipline areas.
D4. Identify and work towards targets for personal, career, and academic development.
D6. Use IT including the Web, spreadsheets, presentation and word processing.  
D7. Solve numerical and statistical problems using appropriate techniques.

**Learning and Teaching Methods and Strategies**  
Knowledge and understanding (A1-A3) are acquired via lectures, tutorials, practical work, laboratory sessions, group work activities and private study.

Intellectual skills (B1-B3) are acquired via lectures, tutorials, practical work, laboratory sessions, group work activities and private study. Students are encouraged by academic staff to undertake independent reading and practical exercises. The University support services continue to offer sessions in the use of, for example, MyBU, electronic resources, library and study skills.

Subject specific skills (C1-C6) are attained through lectures, tutorials, laboratory and workshop sessions. Additional support in the area of library skills is provided by the Subject Librarian during the first term.

Transferable skills (D1-D7) are developed via lectures, tutorials, practical work, laboratory sessions, group work activities and private study. Students are encouraged to undertake independent reading and relate this to the concepts covered in Level 4. Regular feedback during tutorials and laboratory sessions as well as on assignments, allows students to develop both their understanding and ability to communicate their ideas. IT skills are developed through the components of some Level 4 units and through individual learning, which is supported by University-wide workshops.

**Assessment**  
The core knowledge (A1-A3) is assessed through examinations, in-class tests, coursework and lab-books.

The intellectual skills (B1-B3) are assessed through coursework. A variety of assessment methods are used, including individual reports, oral presentations and lab-books.

Subject specific skills are assessed through the coursework (C1-C6) and lab-books (C4-C6).

The individual and group assignments assess either directly or indirectly all of the transferable skills (D1-D7).

### 6.6 BA (Hons) Industrial Design

**6.6.1 Programme Outcomes - Level 6**  
This programme provides opportunities for students to develop and demonstrate knowledge, understanding and skills, as follows:

A **Subject knowledge and understanding**  
A1. Management and application of CAD tools and systems for design.
A2. Operation of business and marketing in design commercialisation.
A3. User centred analysis and design methodologies in industrial design.
A4. Integration of industrial materials, processing and manufacturing in design.
A5. Utilisation of the design process in industrial design project management.

B Intellectual skills
B1. Formulate and justify decisions with reference to research.
B2. Critically evaluate issues, in a balanced and constructive manner.
B3. Reflect upon problems and develop alternative perspectives and solutions.
B4. Identify and rationalise uncertainty and ambiguity in decisions.
B5. Articulate and defend a particular philosophical approach.

C Subject specific / practical skills
C1. Utilise design visualisation CAD modelling tools throughout the design process.
C2. Establish commercial driving forces and respond to promote commercial success.
C3. Identify user centred design problems and provide useful design solutions.
C4. Design and plan for industrial manufacturing criteria, limits and constraints.
C5. Manage an industrial design project from inception stage through to final design.

D Transferable skills
D1. Adopt new knowledge, expertise and understanding from diverse fields.
D2. Manage, organise and plan time and resources reasonably and responsibly.
D3. Provide documentation of work in progress and eventual outcomes.
D4. Commitment to work undertaken and completing a task.
D5. Participate in group activities and work towards common objectives.

Learning and Teaching Methods and Strategies
Subject knowledge and understanding (A1-5) and subject specific skills (C1-5) will be directed through the commercial and industrial design projects and the business development units. These units are a consolidation and focus for the industrial design programme and will be delivered via a series of lectures, tutorials and laboratories where appropriate.

There is a greater emphasis upon self-directed and independent learning. The teaching will facilitate guidance and support within specific subject fields and domains. Emphasis will be upon the integration and application of subject knowledge and understanding to specific individual design projects and research fields.
The intellectual skills (B1-5) and transferable skills (D1-5) are delivered across the programme level with the intention of putting these skills into practice through the design projects and business development units.

Assessment
Subject knowledge and understanding (A1-5) and subject specific skills (C1-5) will be assessed through the commercial and industrial design projects and the business development units. These units are a consolidation and focus for the industrial design programme and will be assessed via coursework only.

The assessment of subject knowledge and understanding A5 and subject specific skill C5 will be specifically assessed in the commercial and industrial design projects units, with reference to the integration and application of some of subject specific skills C1-4 where appropriate to the particular project.

The intellectual skills (B1-5) and transferable skills (D1-5) are assessed across the programme level via the respective units and are prominent within the design projects and business development units. Intellectual skill B1 and transferable skills D1, D3 and D4 are assessed across all units as they are necessary for academic study at this level.

6.6.2 Level Outcomes - Level 5
This programme provides opportunities for students to develop and demonstrate knowledge, understanding and skills, as follows:

A  Subject knowledge and understanding
A1.  CAD modelling, communication, visualisation and animation for industrial design.
A2.  Business principles, commercial issues, marketing and design management.
A3.  Interaction design methodologies and their application to industrial design;
A4.  Planning and design for industrial mass production, assembly and distribution.
A5.  The total design process and the implications upon industrial design practice.

B  Intellectual skills
B1.  Draw conclusions from data and information, and establish results.
B2.  Engage in debate about issues and provide logical arguments.
B3.  Conceptualise a range of ideas as potential solutions.
B4.  Resolve conflicting theories and influential criteria.
B5.  Compare and evaluate different ideological approaches.

C  Subject specific / practical skills
C1.  Visualise design concepts and details through digital media CAD tools.
C2.  Identify commercial design driving forces and develop strategic plans.
C3.  Establish, verify, document and justify user needs through a variety of methods.
C4. Design within materials, manufacturing and production criteria and constraints.
C5. Analyse, specify, conceptualise, detail and justify industrial design solutions.

**D Transferable skills**
D1. Engage in research and selectively process information and data.
D2. Balance and economise the utilisation of time and resources.
D3. Record, document and present work undertaken.
D4. Work independently in a structured and organised way.
D5. Contribute as a team member in group activities.

**Learning and Teaching Methods and Strategies**
Subject knowledge and understanding (A1-5) and subject specific skills (C1-5) will be delivered within the respective subject units via a series of lectures, tutorials and laboratories where appropriate.

The projects unit will integrate and apply some of the material from these units to industrial design. Thus acquisition of A5 and application of C5 provides for the facilitation of integrating and applying some of C1-4 through a series of integrating design projects.

The intellectual skills (B1-5) and transferable skills (D1-5) are delivered across the programme level via the respective units and are prominent within the design projects. Transferable skills D1 and D4 are delivered across all units in the programme as they are necessary for academic study at this level.

**Assessment**
Subject knowledge and understanding (A1-5) and subject specific skills (C1-5) will be assessed in the respective subject units through a combination of coursework and examinations where appropriate. The application and integration of some of these skills to industrial design as an activity will be assessed through a series of integrating design projects.

The assessment of subject knowledge and understanding A5 and subject specific skill C5 will be specifically assessed in the design projects units, with reference to the integration and application of some of subject specific skills C1-4 where appropriate to the particular project.

The intellectual skills (B1-5) and transferable skills (D1-5) are assessed across the programme level via the respective units and are prominent within the design projects. Transferable skills D1 and D4 are assessed across all units as they are necessary for academic study at this level.

**6.6.3 Level Outcomes - Level 4**
This programme provides opportunities for students to develop and demonstrate knowledge, understanding and skills, as follows:
A  **Subject knowledge and understanding**
A1.  A variety of free-hand and digital design communication techniques.
A2.  An awareness of cultural and society design issues and perspectives.
A3.  Sensitivity to the design needs and requirements of people in society.
A4.  Industrial material differences, their properties, uses and processing.
A5.  Stages of the design process and design methods and techniques.

B  **Intellectual skills**
B1.  Analyse a problem and establish clear objectives.
B3.  Generate a range and breadth of ideas.
B4.  Analyse and compare data from a diverse range of sources.
B5.  Identify and explain different methodological approaches.

C  **Subject specific / practical skills**
C1.  Visually communicate design intentions through a range of design media.
C2.  Structured writing about design issues, clearly and coherently.
C3.  Adopt a user centred approach to design with reference to the needs of people.
C4.  Specify the selection and processing constraints of different materials.
C5.  Formulate a feasible design concept and perform detail design and development.

D  **Transferable skills**
D1.  Analyse information, formulate ideas and express opinions.
D2.  Plan time effectively and efficiently.
D3.  Clear and coherent communication and presentation skills.
D4.  Responsibly work to deadlines.
D5.  Communicate and discuss ideas within a group.

**Learning and Teaching Methods and Strategies**
Subject knowledge and understanding (A1-5) and subject specific skills (C1-5) will be delivered within the respective subject units via a series of lectures, tutorials and laboratories where appropriate.

The projects unit will integrate and apply some of the material from these units to industrial design. Thus acquisition of A5 and application of C5 provides for the facilitation of integrating and applying some of C1-4 through a series of integrating design projects.

The intellectual skills (B1-5) and transferable skills (D1-5) are delivered across the programme level via the respective units and are prominent within the design projects. Transferable skills D1 and D4 are delivered across all units in the programme as they are necessary for academic study at this level.

**Assessment**
Subject knowledge and understanding (A1-5) and subject specific skills (C1-5) will be assessed in the respective subject units through a combination of coursework and examinations where appropriate. The application and
integration of some of these skills to industrial design as an activity will be assessed through a series of integrating design projects. The assessment of subject knowledge and understanding A5 and subject specific skill C5 will be specifically assessed in the design projects units, with reference to the integration and application of some of subject specific skills C1-4 where appropriate to the particular project.

The intellectual skills (B1-5) and transferable skills (D1-5) are assessed across the programme level via the respective units and are prominent within the design projects. Transferable skills D1 and D4 are assessed across all units as they are necessary for academic study at this level.

6.6.4. Transitional Arrangements
The following outlines transitional arrangements for Industrial Design students as their programme closes to new entrants from 2019/20 academic year. This is on the basis that this is an interim arrangement for a limited number of students and linked to the outcome of a programme approval/review for closure. These transitional arrangements will be facilitated by units from a different (i.e. new) course which fulfils the existing ILOs and POs. This process will start from September 2019 for repeaters of units in Level 4 from AY 18-19. There is also the option of remedial classes for a small minority of cases if required.

NOTE: for issues such as interruption of studies, which fall outside arrangements below, the student may be asked to sign up to the BA (Hons) Product Design Futures programme. It is anticipated there will be very few cases of this nature.

<table>
<thead>
<tr>
<th>BA Industrial Design</th>
<th>From</th>
<th>BA Product Design Futures</th>
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<tbody>
<tr>
<td><strong>Level 4</strong></td>
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<tr>
<td>Industrial Design Projects 1 (40 credits)</td>
<td>Design Projects 1 (20 credits) <strong>and</strong> Team Project (20 credits)</td>
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<tr>
<td>Materials and Processing</td>
<td>Materials and Technology A</td>
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<tr>
<td>User Centred Design</td>
<td>Design Studies 1</td>
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<tr>
<td>Contextual Design</td>
<td>Contextual Design (no replacement unit – would run as original for repeating students only)</td>
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<tr>
<td>Design Media</td>
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<td>BA Industrial Design</td>
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<td><strong>Level 5</strong></td>
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<tr>
<td>Industrial Design Projects 2 (40 credits)</td>
<td>Design Futures Project 2A (20 credits) and Design Futures Project 2B (20 credits)</td>
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<tr>
<td>Management and Commercialisation for Technical Projects</td>
<td>Management and Commercialisation</td>
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<td>Manufacturing and Production</td>
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<td><strong>Level 6</strong></td>
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<tr>
<td>Industrial Design Project 3 (60 credits)</td>
<td>Design Futures Project 3 (60 credits)</td>
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<tr>
<td>Industrial Design Studies</td>
<td>Design Studies 3</td>
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<td>Business Development</td>
<td>Business Development</td>
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<tr>
<td>Visual Concept Communication</td>
<td>Visual Concept Communication</td>
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### 6.7 BA/BSc/MDes (Hons) Product Design

#### 6.7.1 Programme Outcomes – Integrated MDes (Hons) Product Design Level 7

This programme provides opportunities for students to develop and demonstrate knowledge, understanding and skills as follows:

**A. Subject Knowledge and Understanding**

A1. A comprehensive understanding, detailed knowledge and application of the design processes to complex problems.

A2. A sound grasp of basic science, mathematics and technology and a well-developed ability to apply them appropriately to Product Design.

A3. The detailed knowledge and well developed understanding to select test and evaluate the use of materials, processes and manufacturing techniques while designing for relevant cost implications.

A4. Demonstration of complex visual literacy and advanced communication tools.

A5. A sound grasp of complex Visual, Psychology, Ergonomic Design Issues, including latest trends in design thinking and an ability to apply them appropriately to Product Design.
A6. Working effectively as part of a group and to develop an understanding of leadership.
A7. The broad education necessary to understand the impact of Design solutions in a global and societal context, including legal requirements in familiar and unfamiliar situations.
A8. Application of social and environmental impact analysis and application of sustainable design principles.

B Intellectual Skills
B1. Be creative and innovative in solving problems.
B2. Generate ideas, concepts, proposals, solutions or arguments.
B3. Evaluate complex design solutions against conflicting constraints.
B4. Independently and/or collaboratively in response to set briefs and/or as self-initiated activity.
B5. Take a holistic approach, applying professional judgments, balancing costs, benefits, safety, quality, reliability, appearance and environmental impact.
B6. Maintain a sound theoretical approach in enabling the introduction of new and advancing technology to enhance current practice.
B7. Generate and evaluate a wide range of processes and products, and suggest improvements using logical thinking processes and design methodologies.
B8. Address human needs through the use of research and data collection according to customer and user requirements to produce and challenge a product design specification.

C Subject specific / practical skills
C1. Produce high quality prototypes which, as closely as possible, look like, feel like and work in the same way as a manufactured item.
C2. Apply a wide range of tools, techniques and equipment, including appropriate software and research techniques.
C3. Employ appropriate materials, media, techniques, methods, technologies and tools with skill and imagination whilst observing design codes of practice and industry standards.
C4. Generate primary data using a range of laboratory work, test rigs, user trips and synthesis it to produce the solution to a complex product based problem.

D Transferable Skills
D1. Source, navigate, select, retrieve, evaluate, manipulate and manage information from a variety of sources.
D2. Select and employ communication and information technologies.
D3. Articulate ideas and information professionally in visual, oral and written forms.
D4. Analyse complex problems and present solutions in a range of situations.
D5. Interact effectively with others, for example through collaboration, collective endeavor and negotiation.
D6. Analyze information and experiences, formulate independent judgments.
D7. Articulate reasoned arguments through reflection, review and evaluation.
D8. Formulate reasoned responses to the critical judgments of others.
D9. Identify personal strengths and needs.
D10. Study independently, set goals, manage their own workloads and meet deadlines including application of design process management.
D11. Independence of mind, with intellectual integrity, particularly in respect of ethical issues.
D12. Enthusiastic, in the application of their knowledge and understanding and skills.
D13. Enquiring mind, eager for new knowledge and understanding

Learning and Teaching Methods and Strategies
In essence, this level of the course is concerned with the application of and appreciation of knowledge to the design process and the resultant complex patterns that arise.

The MDes project is central to the development of research methods for product design to the formulation and solution of complex problems. Supporting the MDes project are a number of taught units which develop either the humanistic or technological aspects of product design as well as management, understanding of global and environmental impact and team working requirements of product design study at this level.

Assessment
Various methods of assessment are used at this level. These include examinations, case studies, Reports, Viva-voce, log book (design journal), drawings, prototypes and an exhibition of work

6.7.2 Programme Outcomes – BA/BSc (Hons) Product Design - Level 6
This programme provides opportunities for students to develop and demonstrate knowledge, understanding and skills, as follows:

A  Subject knowledge and understanding
A1. A comprehensive understanding and detailed knowledge of the design process at a professional level.
A2. A sound grasp of basic science, mathematics and technology and a well-developed ability to apply them appropriately to Product Design.
A3. The detailed knowledge and well developed understanding to select test and make appropriate use of materials, processes and manufacturing techniques.
A4. Comprehensive understanding of and, ability to use, an industry-standard solid modelling software package and an awareness of other appropriate software tools.
A5. A sound grasp of basic Visual, Psychology, Ergonomic Design Issues and an ability to apply them appropriately to Product Design.
A6. The knowledge required to be prepared for continuing personal & professional development.
A7. The broad education necessary to understand the impact of Design solutions in a global and societal context, and an awareness of relevant contemporary issues.
A8. An appropriate knowledge of strategic management and business development in the context of Product Design.

B **Intellectual skills**
B1. Be creative and innovative in solving problems.
B2. Generate ideas, concepts, proposals, solutions or arguments.
B3. Analyze problems logically to arrive at suitable solutions.
B4. Independently and/or collaboratively in response to set briefs and/or as self-initiated activity.
B5. Take a holistic approach, applying professional judgments, balancing costs, benefits, safety, quality, reliability, appearance and environmental impact.
B6. Maintain a sound theoretical approach in enabling the introduction of new and advancing technology to enhance current practice.
B7. Evaluate designs, processes and products, and suggest improvements.
B8. Undertake research and analysis of information from a variety of sources.

C **Subject specific / practical skills**
C1. Produce high quality prototypes which, as closely as possible, look like, feel like and work in the same way as a manufactured item.
C2. Use a wide range of tools, techniques and equipment, including appropriate software and rapid prototyping techniques.
C3. Employ appropriate materials, media, techniques, methods, technologies and tools with skill and imagination whilst observing good working practices.
C4. Laboratory works, test rigs, use laboratory and workshop equipment to generate valuable data.

D **Transferable skills**
D1. Source, navigate, select, retrieve, evaluate, manipulate and manage information from a variety of sources.
D2. Select and employ communication and information technologies.
D3. Articulate ideas and information comprehensibly in visual, oral and written forms.
D4. Present ideas in a range of situations.
D5. Interact effectively with others, for example through collaboration, collective endeavor and negotiation.
D6. Analyze information and experiences, formulate independent judgments.
D7. Articulate reasoned arguments through reflection, review and evaluation.
D8. Formulate reasoned responses to the critical judgments of others.
D9. Identify personal strengths and needs.
D10. Study independently, set goals, manage their own workloads and meet deadlines.
D11. Independence of mind, with intellectual integrity, particularly in respect of ethical issues.

D12. Enthusiastic, in the application of their knowledge and understanding and skills.

D13. Enquiring mind, eager for new knowledge and understanding.

**Learning and Teaching Methods and Strategies**

In essence, this level of the course is concerned with the application of and appreciation of knowledge to the design process and the resultant complex patterns that arise.

The Individual project is a central theme. Supporting the Individual project is the research and planning unit where students will conduct appropriate research and plan project goals. This will result in a report which will focus on Technical aspects for BSc students and Humanistic aspects for BA students.

The Individual Project will be defined to encompass all aspects of design and result in the manufacture of a high quality prototype. The working prototype is used to evaluate the final design. The choice of project will depend on the route that students have chosen to take, i.e. BA or BSc. The final year exhibition will also be managed as part of the Final Year Project unit.

Continuing the theme of application and study of current examples, general course materials are also brought together in a meaningful and practical way within the Design Case Studies. The Case Studies theme allows all students to evaluate a series of ‘up-to-date’ products technically and humanistically under the guidance of staff. BA students will be expected to demonstrate a fine awareness of humanistic issues in an assessed product evaluation. BSc students will be expected to demonstrate a credible awareness of technical issues in an assessed product evaluation.

Professional Design studies is common to both streams and will contain essential elements of professional practice such as liability, IPR, management etc.

**Assessment**

Various methods of assessment are used at this level. These include examinations, case studies, Reports, Viva-voce, log book (design journal), drawings, prototypes and an exhibition of work.

**6.7.3 Level Outcomes - Level 5**

This programme provides opportunities for students to develop and demonstrate knowledge, understanding and skills, as follows:

A  **Subject knowledge and understanding**

A1. A clear understanding of the Design Process and Design Methods and their value in the product development process.
A2. A broad knowledge of less common materials and associated manufacturing processes and an understanding of how to design components and assemblies to suit appropriate production Processes.
A3. A well developed knowledge of prototyping techniques.
A4. The knowledge and understanding required to apply technical principles to design problems and an understanding of how some advanced products function.
A5. A developed understanding of appropriate Visual, Psychological, Ergonomic and Social issues and their impact upon Product Design.
A6. A broad knowledge of how Databases spread sheets and Visualisation techniques may be applied during the process of design.
A7. An advanced user's knowledge of an industry-standard solid modelling software tool.

B Intellectual skills
B1. Use creativity, innovation and analysis in solving problems.
B2. Generate ideas, concepts, proposals and solutions.
B3. Use analytical understanding to assist in generating and judging ideas.
B4. Work effectively using their own initiative and as part of a group.
B5. Use a holistic and balanced approach to design tasks.

C Subject specific / practical skills
C1. Produce prototypes that demonstrate the function, manufacture, visual and ergonomic aspects of their designs.
C2. Use a wide and varied range of workshop tools, techniques and equipment.
C3. Employ various materials, media, techniques, methods, technologies and tools whilst observing good working practices.
C4. Use practical test rigs to test ideas and prototypes to evaluate their solutions.
C5. Use advanced 3D computerized modeling techniques to aid their design process.

D Transferable skills
D1. Undertake research, evaluate and summarise information from a wide variety of sources.
D2. Use appropriate computer software.
D3. Select and employ communication and information technologies.
D4. Present visual work in a wide variety of different ways.
D5. Communicate ideas in oral and written forms.
D6. Present ideas and work in a professional manner effectively to different audiences.
D7. Work effectively with others in a group situation.
D8. Clearly explain the reasons and judgments that informed their decisions.
D9. Be constructive and supportive in criticizing the work of others.
D10. Listen to, evaluate and respond to criticism of their own work.
D11. Plan their own time effectively, set priorities and meet deadlines.
D12. A committed awareness of the need for academic study.
D13. Enjoy developing and applying their knowledge, understanding and skills.
D14. A clear awareness and personal interest in professional development.

Learning and Teaching Methods and Strategies
Continuing from the start made at level 4, Level 5 seeks to reinforce the importance of developing an extensive knowledge base and the ability to apply it to realistic problems.

A variety of Learning and Teaching Methods are used. At this stage, some units are viable with tutorial contact only however the majority of units retain lectures and appropriately sized tutorial sessions.

Assessment
Each term ends with an Assessment Week during which Time-constrained assessments and Phase tests will be used to determine student’s progress. However, the project unit provides a continuing theme of assessment.

During the second year, students are expected to make applications for an industrial placement. The placement team will provide considerable support and encouragement, but students are personally responsible for finding an acceptable placement.

6.7.4 Level Outcomes - Level 4
This programme provides opportunities for students to develop and demonstrate knowledge, understanding and skills, as follows:

A  Subject knowledge and understanding
A1. A developing awareness of the Design Process, some basic Design Methods and their usefulness and importance to the product Designer.
A2. A broad knowledge of and a basic ability in the use of development, communication and presentation tools.
A3. A basic understanding of Visual, Ergonomic, Product Psychology and physiology issues and their effect upon design.
A4. A clear understanding of some basic mathematical, Technological and Scientific principles and their application to Product Design problems.
A5. A good understanding of the basic structure of materials and how these affect their properties and a broad knowledge and understanding of general Workshop Theory and Practice.
A6. A general awareness of basic materials and production Processes and an understanding of how to design simple components to suit some production processes.
A7. A working knowledge of personal computers, Office software and Internet.
A8. A basic working knowledge of an industry-standard 2D drafting package and a 3D modelling package.

B  Intellectual skills
B1. Be creative and innovative in solving problems.
B2. Generate ideas, proposals and solutions for simple product ideas.
B3. Analyse problems logically to arrive at suitable solutions.
B4. Work alone or in small groups.
B5. Use time planning techniques to organise their own time.
B6. Be aware of the need for a holistic and balanced approach to design tasks.
B7. Apply basic analytical and creative techniques to design problems.

C Subject specific / practical skills
C1. Produce simple prototypes that function reasonably well and portray an appropriate visual image of simple products.
C2. Develop and communicate their ideas using manual techniques.
C3. Produce clear effective engineering drawings to the appropriate standard.
C4. Use various workshop tools, techniques and equipment.
C5. Undertake practical test rigs to test ideas.
C6. Use 2D-computer drafting and 3D Computer modeling packages.

D Transferable skills
D1. Research and utilise information from both manual and digital sources.
D2. Use basic office software on a PC efficiently and accurately.
D3. Present visual work in a variety of different ways.
D4. Communicate ideas in oral and written forms.
D5. Present ideas and work to an audience.
D6. Work in a group situation.
D7. Justify decisions based upon reasonable analysis, evaluation and consideration.
D8. Develop the ability to take and give constructive criticism.
D9. Plan their own time and meet deadlines.
D10. A developing awareness of the need for academic study.
D11. Enjoy developing their knowledge, understanding and skills.
D12. A developing awareness and personal interest in professional development.

Learning and Teaching Methods and Strategies
Level 4 is where most students change from being ‘rote’ learners to ‘thinkers and appliers’ The learning and teaching methods adopted in each unit contribute to this process. The basic, fundamental approach that is adopted in all units is crucial in ensuring that students develop a solid fundamental understanding.

The integrating effect of the projects unit is an important tool that ensures that students learn the value and importance of the taught content.

At this stage, all units have a lecture element where basic facts, information, reason and need are introduced. Where appropriate, tutorials or seminars in suitable group sizes are arranged to give the students the opportunity to develop and hone their skills, ability and knowledge.
Basic transferable skills are of course implicit within the course Material.
Assessment
Whilst the product Design One Unit provides a continuing theme of assessment. Most units are assessed during ‘assessment weeks’ only, which fall at the end of each term. This concentration of assessments avoids the common phenomenon of ‘assignment bunching’ by the process of ‘Time Constrained Assignment’ or ‘Phase Test’

6.8 MSc Mechanical Engineering Design

6.8.1 Programme Outcomes
This Level 7 programme provides opportunities for students to develop and demonstrate knowledge, and understanding, and skills as follows:

A Subject Knowledge and Understanding
This programme provides opportunities for students to develop and demonstrate knowledge and understanding of:

A1. Develop and demonstrate strategic issues relating to business and enterprise.
A2. Systematic design processes, involving analysing and solving design problems.
A3. Selection and application of different techniques used in the management and control of projects, with special emphasis on project teams.
A4. Demonstrate full knowledge and understanding of appropriate modern mathematical techniques required for the design of complex products and/or components.
A5. Have a critical understanding of the mechanisms of common static and dynamic failures in metallic, polymeric and ceramic materials, when under load.
A7. The advantages and limitations of utilising simulation tools in the engineering development process.

Learning and Teaching Methods and Strategies
Core knowledge and understanding is acquired through lectures, seminars, tutorials, workshops, relevant fieldwork and independent learning. Students are expected to undertake independent reading and to relate the concepts introduced in different units. Regular feedback on assignments allows students to refine and develop their understanding.

Assessment
The core knowledge and understanding is assessed through appropriately structured coursework reports, presentations and examination (A1 - 7).

B Intellectual Skills
This programme provides opportunities for students to develop and demonstrate skills, as follows:
B2. Formulate, plan, execute and report on a project involving original engineering design in a structured and disciplined manner.
B3. Critically reflect upon interpersonal skills required to operate in a team environment as a professional design engineer.
B4. Demonstrate critical awareness of the scope and limitations of mathematical techniques and computer-based mathematical models.
B5. Analytical thinking in respect of part and assembly design.
B6. Critical evaluation of different research methods and selection and application of them.
B7. Communication of project findings to professional and academic standards.
B8. Planning, execution and reporting on a project involving original engineering design.

Learning and Teaching Methods and Strategies
Intellectual skills are developed through the learning and teaching methods and strategies outlined above. Many units of the programme involves extensive in-class discussions and the opportunity in some units to deal with real data and “live” design engineering problems.

Assessment
The intellectual skills are assessed through report based coursework, often involving case studies and presentations (B1 – B8).

C  Subject specific / practical skills
This programme provides opportunities for students to develop and demonstrate skills, as follows:

C1. Conduct strategic external analysis to formulate business strategy.
C2. Apply and critically evaluate various management techniques to ensure efficient operation of a team.
C3. Independently apply advanced simulation tools to analyse engineering design problems.
C4. Diagnose the causes of the different types of service failure and the ability to propose methods of avoiding them in future.
C5. Independently apply structural integrity theories to solve a range of engineering problems.

Learning and Teaching Methods and Strategies
Subject specific skills are developed through the learning and teaching methods outlined above. Many of the taught units of the programme involves extensive in class discussions and the opportunity in some units to deal with real data derived from recent research and consultancy activities, and from “live” design problems. Where subjects involve the development of simulation tools skills, the candidate will be given as much hands-on exposure to appropriate software packages as is possible.
**Assessment**
Outcomes C1 to C5 are assessed through structured reports and examination.

**D Transferable Skills**
This programme provides opportunities for students to develop and demonstrate skills, as follows:

D1. Demonstrate problem solving skills and the application of knowledge across the discipline areas.
D2. Gather, select, and analyse a range of experimental and fieldwork data and present professionally using appropriate media.
D3. Distil, synthesise and critically analyse alternative approaches and methodologies to problems and research results reported in literature and elsewhere.
D5. Work autonomously and become reflective learners.
D6. Communicate effectively and confidently to appropriate professional and academic standards.

**Learning and Teaching Methods and Strategies**
Transferable skills are acquired through a variety of forms: face-to-face sessions where each may include a mix of delivery modes: lecture, seminar, tutorial, and workshop, guided reading and development, and self-managed study. Students are encouraged to share their academic and industrial expertise with their peers, to enrich the learning process. Regular feedback on assignments allows the students to refine and develop their understanding.

The independent learning element will be partly directed by the unit lecturer with regard to recommended reading (text books, articles and research papers) and tutorial problems to be tackled.

**Assessment**
Learning outcomes D1-D6 will be assessed through coursework assessments and the Individual Masters Project.

**6.9 MSc Engineering Project Management**

**6.9.1 Programme Outcomes**
This Level 7 programme provides opportunities for students to develop and demonstrate knowledge, and understanding, and skills as follows:

**A Subject Knowledge and Understanding**
This programme provides opportunities for students to develop and demonstrate knowledge and understanding of:

A1. Develop and demonstrate strategic issues relating to business and enterprise.
A2. Selection and application of different techniques used in the management and control of projects, with special emphasis on project management.

A3. Systematic design processes involving analysing and solving design problems.

A4. Total quality and quality systems in the design and manufacture of products.

A5. The reasons for, and benefits and disadvantages of, Knowledge Transfer.

**Learning and Teaching Methods and Strategies**

Core knowledge and understanding is acquired through lectures, seminars, tutorials, workshops, relevant fieldwork and independent learning. Students are expected to undertake independent reading and to relate the concepts introduced in different units. Regular feedback on assignments allows students to refine and develop their understanding.

**Assessment**

The core knowledge and understanding is assessed through appropriately structured coursework reports, presentations and examination (A1 - 5).

**B Intellectual Skills**

This programme provides opportunities for students to develop and demonstrate skills, as follows:


B2. Formulate, plan, execute and report on a project involving original design in a structured and disciplined manner.

B3. Analytical and critical thinking with respect to the planning of product design and development projects.

B4. Independent evaluation and argument of alternative approaches to situations, problems or issues that occur when managing a project.

B5. The undertaking of decision making techniques and awareness of the commercial implications of design management decisions.

B6. Ability to analyse and discuss how systems might interface within a broader manufacturing scenario.

B7. Planning, execution and reporting on the management of an engineering project.

**Learning and Teaching Methods and Strategies**

Intellectual skills are developed through the learning and teaching methods and strategies outlined above. Each taught unit of the programme involves extensive in-class discussions and the opportunity in some units to deal with real data and “live” project management problems.

**Assessment**

The intellectual skills are assessed through report based coursework, often involving case studies and presentations (B1 – B6). Outcome B7 is assessed through the Individual Masters Project.
C  **Subject specific / practical skills**  
This programme provides opportunities for students to develop and demonstrate skills, as follows:

C1. Conduct strategic external analysis to formulate business strategy.
C2. The ability to apply expertly a number of different techniques used in the management and control of projects.

**Learning and Teaching Methods and Strategies**
Subject specific skills are developed through the learning and teaching methods outlined above. Each taught unit of the programme involves extensive in class discussions and the opportunity in some units to deal with real data derived from recent research and consultancy activities, and from “live” design problems. Where subjects involve the development of computer aided design skills, the candidate will be given as much hands-on exposure to appropriate software packages as is possible.

**Assessment**
Outcomes C1 and C2 are assessed through a structured report.

D  **Transferable Skills**  
This programme provides opportunities for students to develop and demonstrate skills, as follows:

D1. Demonstrate problem solving skills and the application of knowledge across the discipline areas.
D2. Gather, select, and analyse a range of experimental and fieldwork data and present professionally using appropriate media.
D3. Distil, synthesise and critically analyse alternative approaches and methodologies to problems and research results reported in literature and elsewhere.
D5. Work autonomously and become reflective learners.
D6. Communicate effectively and confidently to appropriate professional and academic standards.

**Learning and Teaching Methods and Strategies**
Transferable skills are acquired through a variety of forms: face-to-face sessions where each may include a mix of delivery modes: lecture, seminar, tutorial, and workshop, guided reading and development, and self-managed study. Students are encouraged to share their academic and industrial expertise with their peers, to enrich the learning process. Regular feedback on assignments allows the students to refine and develop their understanding.

The independent learning element will be partly directed by the unit lecturer with regard to recommended reading (text books, articles and research papers) and tutorial problems to be tackled.
Assessment
Learning outcomes D1-D6 will be assessed through coursework assessments and the Individual Masters Project.

6.10 MA Industrial Design

6.10.1 Programme Outcomes
This Level 7 programme provides opportunities for students to develop and demonstrate knowledge, understanding and skills, as follows:

A Subject Knowledge and Understanding
This programme provides opportunities for students to develop and demonstrate knowledge and understanding of:

A1. Semiotic analysis and synthesis through applied aesthetic expression to the creative design direction.
A2. Ergonomic principles of human interaction and the integration and application through design.
A4. Planning and implementing industrial design projects with selection and application of different management techniques.
A5. Life cycle assessment and influencing sustainable development within the design process.
A6. Research methods and tools used in design and their application to an industrial design research project.

Learning and Teaching Methods and Strategies
Core knowledge and understanding is acquired through lectures, seminars, tutorials, workshops and independent learning. Students are expected to undertake independent reading and to relate and investigate further the concepts introduced in different units. Feedback on assignments allows students to refine and develop their understanding.

Assessment
The core knowledge and understanding is assessed through appropriately structured coursework reports and traditional examination (A1-6).

B Intellectual Skills
This programme provides opportunities for students to develop and demonstrate skills, as follows:

B1. Engage with experimental methods and structured reflection to formulate a coherent voice of aesthetic design argument.
B2. Analyse and establish ergonomic design parameters to formulate experimental criteria and methodology.
B3. Critical thinking, problem solving and decision making to solve complex business problems.
B4. Decision making techniques and awareness of the commercial implications of design management decisions.
B5. Formulate, plan, execute and report on a project involving creative design in a structured and disciplined manner.

B6. Distillation, summary and critical appraisal of research methods, tools and results reported in literature and elsewhere.

Learning and Teaching Methods and Strategies
Guided reading and development will involve the student in the critical appraisal of academic papers or of hardware implementations. Each unit of the programme will involve extensive in-class discussion and debate. In addition, in some units “live” projects will be used where students will research hardware implementations, deal with real data, create hardware designs, evaluate alternatives and give justified conclusions.

Assessment
The intellectual skills are assessed through report based coursework, often involving case studies (B1-B6).

C Subject Specific / practical skills
This programme provides opportunities for students to develop and demonstrate skills, as follows:

C1. Manipulate experimental and structured aesthetics and semiotics methods.
C2. Examine and establish ergonomic design needs and requirements.
C3. Conduct strategic analysis to formulate business strategy.
C4. Apply different techniques used in the management of projects.
C5. Employ methods and tools for sustainable design.
C6. Apply research methods and tools to design projects.

Learning and Teaching Methods and Strategies
Subject specific skills are developed through the learning and teaching methods outlined above. Each taught unit of the programme involves extensive in-class discussions and the opportunity in some units to deal with real data derived from recent research, consultancy activities and from ‘live’ design problems. Where subjects involve the development of computer design skills, the candidate will be given as much hands-on exposure to appropriate software packages as is possible.

Assessment
The subject specific/practical skills are assessed through structured reports, often involving case studies (C1-C6).

D Transferable Skills
This programme provides opportunities for students to develop and demonstrate skills, as follows:

D1. Work autonomously and become reflective learners.
D2. Gather, select, and analyse a range of experimental and fieldwork data and present professionally using appropriate media.
D3. Demonstrate creative and problem solving skills and the application of knowledge across the discipline areas.


D5. Distil, synthesise and critically analyse alternative approaches and methodologies to problems and research results reported in literature and elsewhere.

D6. Communicate effectively and confidently to appropriate professional and academic standards.

Learning and Teaching Methods and Strategies
Transferable skills are acquired through a variety of forms: Face-to-face sessions where each may include a mix of delivery modes; lecture, seminar, tutorial, and workshop; guided reading and development; and self-managed study. Students are encouraged to share their academic and industrial expertise with their peers, to enrich the learning process. Regular feedback on assignments allows the students to refine and develop their understanding.

The independent learning element will be partly directed by the unit lecturer with regard to recommended reading (text books, articles and research papers) and tutorial problems.

Assessment
Learning outcomes D1-D6 will be assessed through coursework assessments and the Individual Masters Project.

6.11 MSc Product Design

6.11.1 Programme Outcomes
This Level 7 programme provides opportunities for students to develop and demonstrate knowledge, and understanding, and skills as follows:

A Subject Knowledge and Understanding
This programme provides opportunities for students to develop and demonstrate knowledge and understanding of:

A1. Apply strategies for team building and conflict resolution.
A2. Systematic design processes, involving analysing and solving design problems.
A3. Selection and application of different techniques used in the management and control of projects, with special emphasis on project teams.
A4. Life cycle assessment and influencing sustainable development within the design process.
A5. Apply and critically evaluate management techniques for the effective operation of a team.
A6. The advantages and limitations of utilising simulation tools in the product development process.
A7. Ergonomic principles of human interaction and the integration and application through design.
A8. Research methods and tools used in design and their application to an industrial design research project.

**Learning and Teaching Methods and Strategies**
Core knowledge and understanding is acquired through lectures, seminars, tutorials, workshops and independent learning. Students are expected to undertake independent reading and to relate and investigate further the concepts introduced in different units. Feedback on assignments allows students to refine and develop their understanding.

**Assessment**
The core knowledge and understanding is assessed through appropriately structured coursework reports and traditional examination (A1 – 8).

**B Intellectual Skills**
This programme provides opportunities for students to develop and demonstrate skills, as follows:

B1. Critical thinking, problem solving and decision making to solve complex product design problems.
B2. Formulate, plan, execute and report on a project involving original design in a structured and disciplined manner.
B3. Planning of product design and development projects.
B4. Critical appraisal, and identification, of types of design and evaluation tools, processes and project plans.
B5. Analyse and establish ergonomic design parameters to formulate experimental criteria and methodology.
B6. Analytical thinking in respect of part and assembly design.
B7. Planning, execution and reporting on a project involving original design.
B8. Distillation, summary and critical analysis of research results reported in literature and elsewhere.

**Learning and Teaching Methods and Strategies**
Guided reading and development will involve the student in the critical appraisal of academic papers or of hardware implementations. Each unit of the programme will involve extensive in-class discussion and debate. In addition, in some units “live” projects will be used where students will research hardware implementations, deal with real data, create hardware designs, evaluate alternatives and give justified conclusions.

**Assessment**
The intellectual skills are assessed through report based coursework, often involving case studies (B1 – B8).

**C Subject Specific / practical skills**
This programme provides opportunities for students to develop and demonstrate skills, as follows:

C1. Apply team building strategies for successful product design.
C2. The ability to apply expertly a number of different techniques used in the management and control of projects.
C3. Examine and establish ergonomic design needs and requirements.
C4. Independently apply advanced simulation tools to analyse design problems.
C5. Employ methods and tools for sustainable design.
C6. Apply research methods and tools to design projects.

Learning and Teaching Methods and Strategies
Subject specific skills are developed through the learning and teaching methods outlined above. Each taught unit of the programme involves extensive in-class discussions and the opportunity in some units to deal with real data derived from recent research and consultancy activities, and from “live” design problems. Where subjects involve the development of computer design skills, the candidate will be given as much hands-on exposure to appropriate software packages as is possible.

Assessment
The subject specific/practical skills are assessed through structured reports, often involving case studies (C1 – C6).

D Transferable Skills
This programme provides opportunities for students to develop and demonstrate skills, as follows:

D1. Demonstrate problem solving skills and the application of knowledge across the discipline areas.
D2. Gather, select, and analyse a range of experimental and fieldwork data and present professionally using appropriate media.
D3. Distil, synthesise and critically analyse alternative approaches and methodologies to problems and research results reported in literature and elsewhere.
D5. Work autonomously and become reflective learners.
D6. Communicate effectively and confidently to appropriate professional and academic standards.

Learning and Teaching Methods and Strategies
Transferable skills are acquired through a variety of forms: face-to-face sessions where each may include a mix of delivery modes: lecture, seminar, tutorial, and workshop, guided reading and development, and self-managed study. Students are encouraged to share their academic and industrial expertise with their peers, to enrich the learning process. Regular feedback on assignments allows the students to refine and develop their understanding.

The independent learning element will be partly directed by the unit lecturer with regard to recommended reading (text books, articles and research papers) and tutorial problems to be tackled.
Assessment
Learning outcomes D1-D6 will be assessed through coursework assessments and the Individual Masters Project.

7 LEARNING AND TEACHING STRATEGIES AND METHODS

The range of learning and teaching methods and strategies employed across the framework are detailed in Section 6 of this documentation.

8 ASSESSMENT STRATEGIES AND METHODS

Descriptions of how knowledge and understanding, intellectual skills, practical skills and transferable skills are assessed across the framework are detailed in Section 6. Assessment methods are specified in more detail in the unit specifications.

9 PROGRAMME SKILLS MATRICES

The programme skills matrices in this section show the relationship between ILOs specified at programme and unit levels.
### Programme Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Units</th>
<th>Programme Intended Learning Outcomes</th>
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<tbody>
<tr>
<td></td>
<td>A</td>
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<td>Level 6 - Advanced Mechanics and Simulation</td>
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<td>Level 6 - Research Based Electronics</td>
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<td>Level 6 - Business Development</td>
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<td>Level 6 - Design Engineering Projects 3</td>
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<td>Level 5 - Engineering Design Tools</td>
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<td>Level 5 - Engineering Simulation</td>
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<td>Level 5 - Management and Commercialisation for Technical Projects</td>
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<td>Level 5 - Manufacturing and Production</td>
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<td>Level 5 - Design Engineering Projects 2</td>
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<td>Level 4 - Engineering Principles</td>
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<td>Level 4 - Electrical and Electronic Principles</td>
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<td>Level 4 - Materials and Processing</td>
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<tr>
<td>Level 4 - Design Engineering Projects 1</td>
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</table>

**A - Subject Knowledge and Understanding**

1. Develop detailed knowledge and understanding of an increased range of engineering principles and processes.
2. Develop systematic knowledge and understanding of analytical tools to gain confidence in applying them to engineering design and technological problems at a professional design engineer level.
3. Have an advanced knowledge and understanding of the use of modern computer tools to model, simulate and analyse complex products and assemblies to achieve optimum solutions.
4. Integrate and apply the knowledge and understanding acquired on the course in the planning, implementation and presentation of a major individual project.
5. Analyse business situations with respect to strengths and weaknesses, opportunities and threats and develop ways and means to counteract or exploit such aspects.
6. Comprehend the importance of competitiveness in industry and how to form a new enterprise.

**C - Subject-specific/Practical Skills**

1. Identify, understand and employ the appropriate mathematical models to solve engineering design problems.
2. Use highly specialised manual and computer-based methods for engineering communication and product presentation.
3. Be able to employ efficiently advanced modelling, simulation and analysis packages in engineering design.
4. Critically review and select engineering materials and material processing methods for the design of components.
5. Design and use a range of electronic system modules in the process of product design.
6. Use basic workshop-based material processing tools and machines, safely and effectively.
7. Use basic electrical and electronic components, safely and effectively.
8. Identify and safely use appropriate laboratory methods.
<table>
<thead>
<tr>
<th>B - Intellectual Skills</th>
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<tbody>
<tr>
<td>1. Approach and implement design in a methodical and disciplined manner.</td>
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<td>2. Evaluate critically, and apply scientific knowledge and skills in the development and implementation of practical solutions to engineering problems.</td>
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<tr>
<td>3. Evaluate computer based packages for the integration of design functions from concept to realisation.</td>
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<tr>
<td>4. Plan and implement engineering design projects individually and in a group</td>
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<tr>
<td>5. Demonstrate a level and type of education to allow the pursuit of postgraduate research in a related discipline.</td>
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<tr>
<th>D - Transferable Skills</th>
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<tbody>
<tr>
<td>1. Communicate effectively by oral, written and visual means.</td>
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<td>2. Use IT including the Web, spreadsheets, presentation and word processing</td>
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<tr>
<td>3. Solve numerical and statistical problems using appropriate techniques.</td>
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<td>4. Work effectively in collaboration with others, including staff and students.</td>
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<td>5. Demonstrate creativity in problem solving and the application of knowledge across discipline areas.</td>
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<td>6. Identify and work towards targets for personal, career, and academic development.</td>
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<td>7. Be independent and reflective learners.</td>
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</table>
# 9.2 BA (Hons) Industrial Design

<table>
<thead>
<tr>
<th>Units</th>
<th>Programme Intended Learning Outcomes</th>
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<td>L5</td>
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<td>Management and Commercialisation for Technical Projects</td>
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## A - Subject Knowledge and Understanding
1. Management and application of CAD tools and systems for design.
2. Operation of business and marketing in design commercialisation.
3. User centred analysis and design methodologies in industrial design.
4. Integration of industrial materials, processing and manufacturing in design.
5. Utilisation of the design process in industrial design project management.

## B - Intellectual Skills
1. Formulate and justify decisions with reference to research.
2. Critically evaluate issues, in a balanced and constructive manner.
3. Reflect upon problems and develop alternative perspectives and solutions.
4. Identify and rationalise uncertainty and ambiguity in decisions.
5. Articulate and defend a particular philosophical approach.

## C – Subject-specific/Practical Skills
1. Utilise design visualisation CAD modelling tools throughout the design process.
2. Establish commercial driving forces and respond to promote commercial success.
3. Identify user centred design problems and provide useful design solutions.
4. Design and plan for industrial manufacturing criteria, limits and constraints.
5. Manage an industrial design project from inception stage through to final design.

## D - Transferable Skills
1. Adopt new knowledge, expertise and understanding from diverse fields.
2. Manage, organise and plan time and resources reasonably and responsibly.
3. Provide documentation of work in progress and eventual outcomes.
4. Commitment to work undertaken and completing a task.
5. Participate in group activities and work towards common objectives.
9.2b BA (Hons) Industrial Design (transitional arrangements)

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A - Subject Knowledge and Understanding
1. Management and application of CAD tools and systems for design.
2. Operation of business and marketing in design commercialisation.
3. User centred analysis and design methodologies in industrial design.
4. Integration of industrial materials, processing and manufacturing in design.
5. Utilisation of the design process in industrial design project management.

B - Intellectual Skills
1. Formulate and justify decisions with reference to research.
2. Critically evaluate issues, in a balanced and constructive manner.
3. Reflect upon problems and develop alternative perspectives and solutions.
4. Identify and rationalise uncertainty and ambiguity in decisions.
5. Articulate and defend a particular philosophical approach.

C - Subject-specific/Practical Skills
1. Utilise design visualisation CAD modelling tools throughout the design process.
2. Establish commercial driving forces and respond to promote commercial success.
3. Identify user centred design problems and provide useful design solutions.
4. Design and plan for industrial manufacturing criteria, limits and constraints.
5. Manage an industrial design project from inception stage through to final design.

D - Transferable Skills
1. Adopt new knowledge, expertise and understanding from diverse fields.
2. Manage, organise and plan time and resources reasonably and responsibly.
3. Provide documentation of work in progress and eventual outcomes.
4. Commitment to work undertaken and completing a task.
5. Participate in group activities and work towards common objectives.
9.3 BA/BSc (Hons) Product Design

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<td>Design Projects and Prototypes 1</td>
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**A - Subject Knowledge and Understanding**
1. A comprehensive understanding and detailed knowledge of the design process at a professional level.
2. A sound grasp of basic science, mathematics and technology and a well-developed ability to apply them appropriately to Product Design.
3. The detailed knowledge and well developed understanding to select test and make appropriate use of materials, processes and manufacturing techniques.
4. Comprehensive understanding of and, ability to use, an industry-standard solid modelling software package and an awareness of other appropriate software tools.
5. A sound grasp of basic Visual, Psychology, Ergonomic Design Issues and an ability to apply them appropriately to Product Design.
6. The knowledge required to be prepared for continuing personal & professional development.
7. The broad education necessary to understand the impact of Design solutions in a global and societal context, and an awareness of relevant contemporary issues.
8. An appropriate knowledge of strategic management and business development in the context of Product Design.

**C – Subject-specific/Practical Skills**
1. Produce high quality prototypes which, as closely as possible, look like, feel like and work in the same way as a manufactured item.
2. Use a wide range of tools, techniques and equipment, including appropriate software and rapid prototyping techniques.
3. Employ appropriate materials, media, techniques, methods, technologies and tools with skill and imagination whilst observing good working practices.
4. Laboratory works, test rigs, use laboratory and workshop equipment to generate valuable data.
<table>
<thead>
<tr>
<th><strong>B - Intellectual Skills</strong></th>
<th><strong>D - Transferable Skills</strong></th>
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<tbody>
<tr>
<td>1. Be creative and innovative in solving problems.</td>
<td>1. Source, navigate, select, retrieve, evaluate, manipulate and manage information from a</td>
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<tr>
<td>2. Generate ideas, concepts, proposals, solutions or arguments.</td>
<td>variety of sources.</td>
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<tr>
<td>3. Analyze problems logically to arrive at suitable solutions.</td>
<td>2. Select and employ communication and information technologies.</td>
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<td>4. Independently and/or collaboratively in response to set briefs and/or as self-initiated activity.</td>
<td>3. Articulate ideas and information comprehensibly in visual, oral and written forms.</td>
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<td>5. Take a holistic approach, applying professional judgments, balancing costs, benefits, safety, quality, reliability, appearance and environmental impact.</td>
<td>4. Present ideas in a range of situations.</td>
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<td>6. Maintain a sound theoretical approach in enabling the introduction of new and advancing technology to enhance current practice.</td>
<td>5. Interact effectively with others, for example through collaboration, collective endeavor and negotiation.</td>
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<tr>
<td>7. Evaluate designs, processes and products, and suggest improvements.</td>
<td>6. Analyze information and experiences, formulate independent judgments.</td>
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<tr>
<td>8. Undertake research and analysis of information from a variety of sources.</td>
<td>7. Articulate reasoned arguments through reflection, review and evaluation.</td>
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<td>8. Formulate reasoned responses to the critical judgments of others.</td>
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<td>9. Identify personal strengths and needs.</td>
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<td>10. Study independently, set goals, manage their own workloads and meet deadlines.</td>
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<td>11. Independence of mind, with intellectual integrity, particularly in respect of ethical issues.</td>
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<td>12. Enthusiastic, in the application of their knowledge and understanding and skills.</td>
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<td>13. Enquiring mind, eager for new knowledge and understanding.</td>
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### 9.4 MDes (Hons) Product Design

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<td>Group Project</td>
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</table>

**A - Subject Knowledge and Understanding**
1. A comprehensive understanding, detailed knowledge and application of the design processes to complex problems.
2. A sound grasp of basic science, mathematics and technology and a well-developed ability to apply them appropriately to Product Design.
3. The detailed knowledge and well-developed understanding to select test and evaluate the use of materials, processes and manufacturing techniques while designing for relevant

**C - Subject-specific/Practical Skills**
1. Produce high quality prototypes which, as closely as possible, look like, feel like and work in the same way as a manufactured item.
2. Apply a wide range of tools, techniques and equipment, including appropriate software and research techniques.
3. Employ appropriate materials, media, techniques, methods, technologies and tools with skill and imagination whilst observing design codes of practice and industry standards.
cost implications.
4. Demonstration of complex visual literacy and advanced communication tools.
5. A sound grasp of complex Visual, Psychology, Ergonomic Design Issues, including latest trends in design thinking and an ability to apply them appropriately to Product Design.
6. Working effectively as part of a group and to develop an understanding of leadership.
7. The broad education necessary to understand the impact of Design solutions in a global and societal context, including legal requirements in familiar and unfamiliar situations.
8. Application of social and environmental impact analysis and application of sustainable design principles.

4. Generate primary data using a range of laboratory work, test rigs, user trips and synthesis it to produce the solution to a complex product based problem.

B - Intellectual Skills
1. Be creative and innovative in solving problems.
2. Generate ideas, concepts, proposals, solutions or arguments.
3. Evaluate complex design solutions against conflicting constraints.
4. Independently and/or collaboratively in response to set briefs and/or as self-initiated activity.
5. Take a holistic approach, applying professional judgments, balancing costs, benefits, safety, quality, reliability, appearance and environmental impact.
6. Maintain a sound theoretical approach in enabling the introduction of new and advancing technology to enhance current practice.
7. Generate and evaluate a wide range of processes and products, and suggest improvements using logical thinking processes and design methodologies.
8. Address human needs through the use of research and data collection according to customer and user requirements to produce and challenge a product design specification.

D - Transferable Skills
1. Source, navigate, select, retrieve, evaluate, manipulate and manage information from a variety of sources.
2. Select and employ communication and information technologies.
3. Articulate ideas and information professionally in visual, oral and written forms.
4. Analyse complex problems and present solutions in a range of situations.
5. Interact effectively with others, for example through collaboration, collective endeavor and negotiation.
6. Analyze information and experiences, formulate independent judgments.
7. Articulate reasoned arguments through reflection, review and evaluation.
8. Formulate reasoned responses to the critical judgments of others.
9. Identify personal strengths and needs.
10. Study independently, set goals, manage their own workloads and meet deadlines including application of design process management.
11. Independence of mind, with intellectual integrity, particularly in respect of ethical issues.
12. Enthusiastic, in the application of their knowledge and understanding and skills.
13. Enquiring mind, eager for new knowledge and understanding.
### 9.5 MSc Mechanical Engineering Design

#### Units

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#### A - Subject Knowledge & Understanding

1. Develop and demonstrate strategic issues relating to business and enterprise.
2. Systematic design processes, involving analysing and solving design problems.
3. Selection and application of different techniques used in the management and control of projects, with special emphasis on project teams.
4. Demonstrate full knowledge and understanding of appropriate modern mathematical techniques required for the design of complex products and/or components.
5. Have a critical understanding of the mechanisms of common static and dynamic failures in metallic, polymeric and ceramic materials, when under load.

#### B - Intellectual Skills

1. Critical thinking, problem solving and decision making to solve complex business problems.
2. Formulate, plan, execute and report on a project involving original engineering design in a structured and disciplined manner.
3. Critically reflect upon interpersonal skills required to operate in a team environment as a professional design engineer.
4. Demonstrate critical awareness of the scope and limitations of mathematical techniques and computer-based mathematical models.
5. Analytical thinking in respect of part and assembly design.
6. Critical evaluation of different research methods and selection and application of them.
7. Communication of project findings to professional and academic standards.
8. Planning, execution and reporting on a project involving original engineering design.

#### C – Subject-specific / Practical Skills

1. Conduct strategic external analysis to formulate business strategy.
2. Apply and critically evaluate various management techniques to ensure efficient operation of a team.
3. Independently apply advanced simulation tools to analyse engineering design problems.
4. Diagnose the causes of the different types of service failure and the ability to propose methods of avoiding them in future.
5. Independently apply structural integrity theories to solve a range of engineering problems.

#### D - Transferable Skills

1. Demonstrate problem solving skills and the application of knowledge across the discipline areas.
2. Gather, select, and analyse a range of experimental and fieldwork data and present professionally using appropriate media.
3. Distil, synthesise and critically analyse alternative approaches and methodologies to problems and research results reported in literature and elsewhere.
5. Work autonomously and become reflective learners.
6. Communicate effectively and confidentially to appropriate professional and academic standards.
9.6 MSc Engineering Project Management

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A - Subject Knowledge and Understanding
1. Develop and demonstrate strategic issues relating to business and enterprise.
2. Selection and application of different techniques used in the management and control of projects, with special emphasis on project management.
3. Systematic design processes involving analysing and solving design problems.
4. Total quality and quality systems in the design and manufacture of products.
5. The reasons for, and benefits and disadvantages of, Knowledge Transfer.

B - Intellectual Skills
1. Critical thinking, problem solving and decision making to solve complex business problems.
2. Formulate, plan, execute and report on a project involving original design in a structured and disciplined manner.
3. Analytical and critical thinking with respect to the planning of product design and development projects.
4. Independent evaluation and argument of alternative approaches to situations, problems or issues that occur when managing a project.
5. The undertaking of decision making techniques and awareness of the commercial implications of design management decisions.
6. Ability to analyse and discuss how systems might interface within a broader manufacturing scenario.
7. Planning, execution and reporting on the management of an engineering project.

C - Subject-specific / Practical Skills
1. Conduct strategic external analysis to formulate business strategy.
2. The ability to apply expertly a number of different techniques used in the management and control of projects.

D - Transferable Skills
1. Demonstrate problem solving skills and the application of knowledge across the discipline areas.
2. Gather, select, and analyse a range of experimental and fieldwork data and present professionally using appropriate media
3. Distil, synthesise and critically analyse alternative approaches and methodologies to problems and research results reported in literature and elsewhere.
4. Demonstrate initiative, self-direction and exercise personal responsibility for management of own learning
5. Work autonomously and become reflective learners.
6. Communicate effectively and confidentially to appropriate professional and academic standards.
## 9.7 MSc Product Design

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**A - Subject Knowledge & Understanding**
1. Apply strategies for team building and conflict resolution.
2. Systematic design processes, involving analysing and solving design problems.
3. Selection and application of different techniques used in the management and control of projects, with special emphasis on project teams.
4. Life cycle assessment and influencing sustainable development within the design process.
5. Apply and critically evaluate management techniques for the effective operation of a team.
6. The advantages and limitations of utilising simulation tools in the product development process.
7. Ergonomic principles of human interaction and the integration and application through design.
8. Research methods and tools used in design and their application to an industrial design research project.

**B - Intellectual Skills**
1. Critical thinking, problem solving and decision making to solve complex product design problems.
2. Formulate, plan, execute and report on a project involving original design in a structured and disciplined manner.
3. Planning of product design and development projects.
4. Critical appraisal, and identification, of types of design and evaluation tools, processes and project plans.
5. Analyse and establish ergonomic design parameters to formulate experimental criteria and methodology.
6. Analytical thinking in respect of part and assembly design.
7. Planning, execution and reporting on a project involving original design.
8. Distillation, summary and critical analysis of research results reported in literature and elsewhere.

**C – Subject-specific / Practical Skills**
1. The ability to apply expertly a number of different techniques used in the management and control of projects.
2. Examine and establish ergonomic design needs and requirements.
3. Independently apply advanced simulation tools to analyse design problems.
4. Employ methods and tools for sustainable design.
5. Apply research methods and tools to design projects.

**D - Transferable Skills**
1. Demonstrate problem solving skills and the application of knowledge across the discipline areas.
2. Gather, select, and analyse a range of experimental and fieldwork data and present professionally using appropriate media.
3. Distil, synthesise and critically analyse alternative approaches and methodologies to problems and research results reported in literature and elsewhere.
5. Work autonomously and become reflective learners.
6. Communicate effectively and confidently to appropriate professional and academic standards.
9.8 MA Industrial Design

Programme Intended Learning Outcomes

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A. Subject Knowledge & Understanding
1. Semiotic analysis and synthesis through applied aesthetic expression to the creative design direction.
2. Ergonomic principles of human interaction and the integration and application through design.
3. Business innovation and entrepreneurship principles and techniques to demonstrate strategic issues relating to business and enterprise.
4. Planning and implementing industrial design projects with selection and application of different management techniques.
5. Life cycle assessment and influencing sustainable development within the design process.
6. Research methods and tools used in design and their application to an industrial design research project.

B. Intellectual Skills
1. Engage with experimental methods and structured reflection to formulate a coherent voice of aesthetic design argument.
2. Analyse and establish ergonomic design parameters to formulate experimental criteria and methodology.
3. Critical thinking, problem solving and decision making to solve complex business problems.
4. Decision making techniques and awareness of the commercial implications of design management decisions.
5. Formulate, plan, execute and report on a project involving creative design in a structured and disciplined manner.
6. Distillation, summary and critical appraisal of research methods, tools and results reported in literature and elsewhere.

C. Subject-specific / Practical Skills
1. Manipulate experimental and structured aesthetics and semiotics methods.
2. Examine and establish ergonomic design needs and requirements.
3. Conduct strategic analysis to formulate business strategy.
4. Apply different techniques used in the management of projects.
5. Employ methods and tools for sustainable design.
6. Apply research methods and tools to design projects.

D. Transferable Skills
1. Work autonomously and become reflective learners.
2. Gather, select, and analyse a range of experimental and fieldwork data and present professionally using appropriate media.
3. Demonstrate creative and problem solving skills and the application of knowledge across the discipline areas.
5. Distill, synthesise and critically analyse alternative approaches and methodologies to problems and research results reported in literature and elsewhere.
6. Communicate effectively and confidently to appropriate professional and academic standards.
## 9.9 MEng (Hons) Mechanical Engineering (Full Time)

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### A - Subject Knowledge & Understanding

1. Systematic engineering design processes, involving analysing and solving unfamiliar engineering problems related to mechanical engineering.
2. Develop comprehensive knowledge and understanding of an increased range of mechanical and related engineering theories and concepts.
3. Develop comprehensive knowledge and understanding of modern mechanical engineering technologies and processes for potential application in industry at a professional engineer level taking account of a range of commercial and industrial constraints.
4. Develop comprehensive knowledge and understanding of the appropriate analytical methods for solving complex mechanical engineering problems.

### C - Subject-specific / Practical Skills

1. Identify, understand, assess and employ the appropriate advanced analytical models to solve mechanical engineering design problems recognising their limitations for particular cases.
2. Independently apply advanced simulation tools to analyse mechanical engineering design problems.
3. Use highly specialised manual and/or computer-based methods for engineering communication and presentation.
4. Apply and critically evaluate various management techniques to ensure efficient operation of a team.
5. Diagnose the causes of the different types of service failure and the ability to propose effective solutions.
and/or computer tools for efficiently and effectively predicting performance in-service.

5. Integrate the extensive knowledge and understanding acquired from a range of areas in the effective planning, implementation and presentation of an individual mechanical engineering project demonstrating originality in the application of the knowledge.

6. Selection and application of different advanced techniques used in the management and control of projects, with special emphasis on both project management and teams.

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<th>B - Intellectual Skills</th>
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<tr>
<td>1. Analytical thinking in respect of part and assembly design utilising comprehensive understanding of the scientific principles of own specialisation and related disciplines.</td>
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<td>2. Evaluate critically current research and advanced scholarship to formulate, plan, execute and report on a project involving scientific knowledge and skills, and original mechanical engineering design in a structured and disciplined manner.</td>
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<td>3. Critically reflect upon interpersonal skills required to operate in a team environment as a professional mechanical engineer.</td>
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<td>4. Independent evaluation and argument of alternative approaches to situations, problems or issues that occur when managing a project.</td>
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<td>5. Planning, execution and reporting on the management of a mechanical engineering project.</td>
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<tr>
<td>1. Communicate effectively and confidently by oral, written and visual means to appropriate professional and academic standards.</td>
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<td>2. Work effectively in collaboration with others, including staff and students.</td>
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<td>3. Demonstrate creativity in problem solving and the application of knowledge across discipline areas.</td>
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<td>4. Identify and work towards targets for personal, career, and academic development.</td>
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<td>5. Be independent and reflective learners.</td>
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<td>6. Gather, select, and analyse a range of experimental and fieldwork data in an ethical manner and present professionally using appropriate media.</td>
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<td>7. Distil, synthesise and critically analyse alternative approaches and methodologies to problems and research results reported in literature and elsewhere.</td>
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9.10 MEng (Hons) Engineering (Part Time and Flexible Learning)

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<td>x</td>
</tr>
<tr>
<td>Project Management (20)</td>
<td>x</td>
</tr>
<tr>
<td>Design Management (20)</td>
<td>x</td>
</tr>
<tr>
<td>Materials Optimisation for Sustainability (20)</td>
<td>x</td>
</tr>
<tr>
<td>Design Simulation (20)</td>
<td>x</td>
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<tr>
<td>Group Project (20)</td>
<td>x</td>
</tr>
<tr>
<td>Real Time Control for Mechatronics (20)</td>
<td>x</td>
</tr>
<tr>
<td>Materials Failure and Prevention (20)</td>
<td>x</td>
</tr>
<tr>
<td>Advanced Engineering (20)</td>
<td>x</td>
</tr>
<tr>
<td>BEng Project (40)</td>
<td>x</td>
</tr>
<tr>
<td>Business Development (20)</td>
<td>x</td>
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<tr>
<td>Computational Engineering (20)</td>
<td>x</td>
</tr>
<tr>
<td>Mechatronics (20)</td>
<td>x</td>
</tr>
<tr>
<td>Manufacturing Operations (20)</td>
<td>x</td>
</tr>
<tr>
<td>Advanced Stress and Vibration (20)</td>
<td>x</td>
</tr>
</tbody>
</table>

**A - Subject Knowledge & Understanding**
1. Systematic engineering design processes, involving analysing and solving engineering problems.
2. Develop knowledge and understanding of modern engineering technologies and processes for potential application in industry at a professional engineer level.
3. Develop knowledge and understanding of the appropriate analytical and/or computer tools for efficiently and effectively predicting performance in-service.
4. Integrate and apply the knowledge and understanding acquired on the course in the planning, implementation and presentation of an individual project.
5. Selection and application of different techniques used in the management and control of projects, with special emphasis on project teams.

**B - Intellectual Skills**
1. Analytical thinking in respect of part and assembly design.
2. Formulate, plan, execute and report on a project involving scientific knowledge and skills, and original engineering design in a structured and disciplined manner.
3. Critically reflect upon interpersonal skills required to operate in a team environment as a professional engineer.
4. Independent evaluation and argument of alternative approaches to situations, problems or issues that occur when managing a project.
5. The undertaking of decision making techniques and awareness of the commercial implications of design management decisions.

**C - Subject-specific / Practical Skills**
1. Identify, understand and employ the appropriate analytical models to solve engineering design problems.
2. Independently apply advanced simulation tools to analyse engineering design problems.
3. Use highly specialised manual and/or computer-based methods for engineering communication and presentation.
4. Apply and critically evaluate various management techniques to ensure efficient operation of a team.
5. Diagnose the causes of the different types of service failure and the ability to propose methods of avoiding them in future.
6. Use basic workshop-based material processing tools and machines, safely and effectively.
7. Use modern engineering technologies and tools to establish innovative non-routine engineering solutions and adapt engineering designs.

**D - Transferable Skills**
1. Communicate effectively and confidentially by oral, written and visual means to appropriate professional and academic standards.
2. Work effectively in collaboration with others, including staff and students.
3. Demonstrate creativity in problem solving and the application of knowledge across discipline areas.
4. Identify and work towards targets for personal, career, and academic development.
5. Be independent and reflective learners.
6. Gather, select, and analyse a range of experimental and fieldwork data and
<p>| | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>7.</td>
<td>Distil, synthesise and critically analyse alternative approaches and methodologies to problems and research results reported in literature and elsewhere.</td>
</tr>
</tbody>
</table>
## 9.11 BEng (Hons) Mechanical Engineering (Full Time)

<table>
<thead>
<tr>
<th>Units</th>
<th>Programme Intended Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A1 A2 A3 A4 A5 B1 B2 B3 B4 B5 B6 C1 C2 C3 C4 C5 C6 D1 D2 D3 D4 D5 D6 D7</td>
</tr>
<tr>
<td>LEVEL 6</td>
<td>Computational Engineering (20)</td>
</tr>
<tr>
<td>LEVEL 6</td>
<td>Thermofluids and Energy Conversion (20)</td>
</tr>
<tr>
<td>LEVEL 6</td>
<td>BEng Project (40)</td>
</tr>
<tr>
<td>LEVEL 6</td>
<td>Business Development (20)</td>
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<tr>
<td>LEVEL 5</td>
<td>Advanced Stress and Vibration (20)</td>
</tr>
<tr>
<td>LEVEL 5</td>
<td>Manufacturing and Production (20)</td>
</tr>
<tr>
<td>LEVEL 5</td>
<td>Management and Commercialisation for Technical Projects (20)</td>
</tr>
<tr>
<td>LEVEL 5</td>
<td>Engineering Simulation (20)</td>
</tr>
<tr>
<td>LEVEL 5</td>
<td>Mechanical Systems Design (20)</td>
</tr>
<tr>
<td>LEVEL 5</td>
<td>Stress and Dynamics (20)</td>
</tr>
<tr>
<td>LEVEL 5</td>
<td>Fluids and Thermodynamics (20)</td>
</tr>
<tr>
<td>LEVEL 4</td>
<td>Engineering Mathematics (20)</td>
</tr>
<tr>
<td>LEVEL 4</td>
<td>Electrical and Electronic Principles (20)</td>
</tr>
<tr>
<td>LEVEL 4</td>
<td>Engineering Design (20)</td>
</tr>
<tr>
<td>LEVEL 4</td>
<td>Engineering Practice (20)</td>
</tr>
<tr>
<td>LEVEL 4</td>
<td>Materials &amp; Processing (20)</td>
</tr>
<tr>
<td>LEVEL 4</td>
<td>Engineering Principles (20)</td>
</tr>
</tbody>
</table>

### A – Subject Knowledge & Understanding
1. Develop knowledge and understanding of modern mechanical engineering technologies and processes for potential application in industry at a professional engineer level.
2. Develop knowledge and understanding of a range of mechanical and related engineering theories and concepts.
3. Develop knowledge and understanding of the appropriate analytical and/or computer tools for efficiently and effectively predicting performance in-service.
4. Integrate and apply the knowledge and understanding acquired on the course in the planning, implementation and presentation of an individual project.
5. Analyse business situations with respect to strengths and weaknesses, opportunities and threats and develop ways and means to counteract or exploit such aspects.

### C – Subject-specific / Practical Skills
1. Identify, understand and employ the appropriate analytical models to solve mechanical engineering design problems.
2. Use highly specialised manual and/or computer-based methods for engineering communication and presentation.
3. Be able to employ efficiently advanced modelling, simulation and analysis packages in mechanical engineering design.
4. Critically review and select engineering materials and material processing methods for the design of components.
5. Select and use workshop-based material processing tools and machines, safely and effectively.
6. Identify and safely use appropriate laboratory methods.
7. Use modern engineering technologies and tools to establish mechanical engineering solutions and adapt engineering designs.
<table>
<thead>
<tr>
<th>B - Intellectual Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Approach and implement mechanical engineering in a methodical and disciplined manner.</td>
</tr>
<tr>
<td>2. Evaluate and synthesise information from a number of sources in order to gain a coherent understanding of mechanical engineering theory and practice.</td>
</tr>
<tr>
<td>3. Evaluate critically, and apply scientific knowledge and skills in the development and implementation of practical solutions to mechanical engineering problems.</td>
</tr>
<tr>
<td>4. Plan and implement mechanical engineering design projects individually and in a group.</td>
</tr>
<tr>
<td>5. Demonstrate a level and type of education to allow the pursuit of postgraduate research in a related discipline.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>D - Transferable Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Communicate effectively and confidently by oral, written and visual means to appropriate professional and academic standards.</td>
</tr>
<tr>
<td>2. Work effectively in collaboration with others, including staff and students.</td>
</tr>
<tr>
<td>3. Demonstrate creativity in problem solving and the application of knowledge across discipline areas.</td>
</tr>
<tr>
<td>4. Identify and work towards targets for personal, career, and academic development.</td>
</tr>
<tr>
<td>5. Be independent and reflective learners.</td>
</tr>
<tr>
<td>6. Use IT including the Web, spreadsheets, presentation and word processing.</td>
</tr>
<tr>
<td>7. Solve numerical and statistical problems using appropriate techniques.</td>
</tr>
</tbody>
</table>
## 9.12 BEng (Hons) Engineering (Part Time and Flexible Learning)

### Units | Programme Intended Learning Outcomes
--- | ---
**A** - Subject Knowledge & Understanding | **C** - Subject-specific / Practical Skills
1. Develop knowledge and understanding of modern engineering technologies and processes for potential application in industry at a professional engineer level. | 1. Identify, understand and employ the appropriate analytical models to solve engineering design problems.
2. Develop knowledge and understanding of the appropriate analytical and/or computer tools for efficiently and effectively predicting performance in-service. | 2. Use highly specialised manual and/or computer-based methods for engineering communication and presentation.
3. Integrate and apply the knowledge and understanding acquired on the course in the planning, implementation and presentation of an individual project. | 3. Be able to employ efficiently advanced modelling, simulation and analysis packages in engineering design.
4. Analyse business situations with respect to strengths and weaknesses, opportunities and threats and develop ways and means to counteract or exploit such aspects. | 4. Critically review and select engineering materials and material processing methods for the design of components.
5. Use basic workshop-based material processing tools and machines, safely and effectively. | 5. Use basic workshop-based material processing tools and machines, safely and effectively.
6. Identify and safely use appropriate laboratory methods. | 6. Identify and safely use appropriate laboratory methods.
7. Use modern engineering technologies and tools to establish innovative non-routine engineering solutions and adapt engineering designs. | 7. Use modern engineering technologies and tools to establish innovative non-routine engineering solutions and adapt engineering designs.

### B - Intellectual Skills
1. Approach and implement engineering in a methodical and disciplined manner. | **D** - Transferable Skills
2. Evaluate and synthesise information from a number of sources in order to gain a coherent understanding of engineering theory and practice. | 1. Communicate effectively and confidentially by oral, written and visual means to appropriate professional and academic standards.
3. Evaluate critically, and apply scientific knowledge and skills in the development and implementation of practical solutions to engineering problems. | 2. Work effectively in collaboration with others, including staff and students.
4. Plan and implement engineering design projects individually and in a group. | 3. Demonstrate creativity in problem solving and the application of knowledge across discipline areas.
5. Demonstrate a level and type of education to allow the pursuit of postgraduate research in a related discipline. | 4. Identify and work towards targets for personal, career, and academic development.

### C - Intellectual Skills
1. Develop knowledge and understanding of modern engineering technologies and processes for potential application in industry at a professional engineer level. | **D** - Transferable Skills
2. Develop knowledge and understanding of the appropriate analytical and/or computer tools for efficiently and effectively predicting performance in-service. | 1. Communicate effectively and confidentially by oral, written and visual means to appropriate professional and academic standards.
3. Integrate and apply the knowledge and understanding acquired on the course in the planning, implementation and presentation of an individual project. | 2. Work effectively in collaboration with others, including staff and students.
4. Analyse business situations with respect to strengths and weaknesses, opportunities and threats and develop ways and means to counteract or exploit such aspects. | 3. Demonstrate creativity in problem solving and the application of knowledge across discipline areas.
5. Use basic workshop-based material processing tools and machines, safely and effectively. | 4. Identify and work towards targets for personal, career, and academic development.
6. Identify and safely use appropriate laboratory methods. | 5. Be independent and reflective learners.
7. Use modern engineering technologies and tools to establish innovative non-routine engineering solutions and adapt engineering designs. | 6. Use IT including the Web, spreadsheets, presentation and word processing.
8. Solve numerical and statistical problems using appropriate techniques.
10 PLACEMENT ELEMENT

10.1 Undergraduate

All undergraduate programmes offer a placement unit which is part of Level 5, but bears no credit rating. The duration of the placement is normally a minimum 30-week supervised work experience and the aims of the placement year are to give the students experience of working within an appropriate professional environment which will contribute to their potential employability, mobility and global awareness.

At commencement of the programme all students studying at BU will be enrolled on a four (DE, InD, BEng (Hons) Mechanical Engineering) or five year (MEng (Hons) Mechanical Engineering, MDes (Hons) Product Design) sandwich degree. Completion of the four or five year degree will entitle students to a ‘sandwich award’. Students studying on the FT FdEng Engineering framework at Bournemouth and Poole College (BPC) who wish to join Level 6 of the BEng Engineering, MEng Engineering, BEng Mechanical Engineering or MEng Mechanical Engineering programme at BU will also be eligible to undertake a placement year before commencing their level 6 studies and receive a ‘sandwich award’.

During the course of the first year placement presentations, the Employability Co-ordinators will inform BU students that should they wish to take the three/four year full-time degree rather than the four/five year sandwich degree, they will need to complete a transfer application form and provide a rationale for wishing to change, and their application will be subject to approval by the Faculty’s Placements Panel. Decisions regarding transfer to full-time mode will be completed by the end of the first year. Completion of the three/four year full-time degree will entitle students to a ‘full-time award’.

Near the end of the first year, the employability co-ordinator from BU will visit the FT FdEng students at BPC to introduce the placement year. BPC students will also receive further placement sessions in the second year of the FdEng. The students will be required to opt-in to the placement year at the time they apply for entry to the BEng or MEng Engineering/BEng or MEng Mechanical Engineering programme if they wish to undertake the placement year.

The placement is recognised at Bournemouth as adding considerable value to graduate profiles, and school leavers and their equivalent age group are very strongly advised to follow the sandwich route.

The non-sandwich route is designed for mature students who have experience of the world of work and who may need to complete their course in three/four years, for example for financial reasons. In some cases, on submission of relevant evidence such students may be eligible for Recognition of Prior Learning (RPL). This will give them exemption from the
placement year but will still entitle them to a sandwich degree. Consideration of RPL will be discussed by the Faculty’s Placements Panel. The deadline for requesting placement exemption is normally end of August in the students second year (Level 5).

**Late Changes:** Students whose circumstances change, may be allowed to change their decision after the deadline *subject to capacity*. Given the need to operate seminars and laboratories with sufficient numbers to make the learning experience suitably rich and diverse, there will not be scope for many learners to change their decision. Switching is thus only a possibility, and is not guaranteed. This will usually only be allowed if there are special circumstances.

### 10.2 Postgraduate

The placement is recognised at Bournemouth as adding considerable value to a postgraduate profile, students have the option to choose a non-placement path. Students make their decision as to undertake placement before the end of the second semester.

Satisfactory completion of a placement will not be indicated on the Masters Certificate. However, it will be reflected on the transcript.

**Note:** For both Undergraduate and postgraduate programmes, students may also have the option of incorporating a period of academic Study Abroad within their placement. Further details will be available in your Faculty.
11 PROGRAMME DIAGRAMS

11.1 BSc (Hons) Design Engineering

PROGRAMME DIAGRAM
BSc (Hons) Design Engineering

Year 4 / Level 6

Core units (Compulsory)
Design Engineering Projects 3 (60)
Business Development (20)
Advanced Mechanics and Simulation (20)
Research Based Electronics (20)

Exit qualification: BSc (Hons) Design Engineering
Sandwich UG programme:
Requires 120 Level 6 credits,
120 Level 5 credits and 120
Level 4 credits and
successful completion of a
placement year
Standard UG programme:
Requires 120 Level 6 credits,
120 Level 5 credits and 120
Level 4 credits

Year 3 / Level P

Optional placement year in industry
Exemption is possible for those who provide an acceptable
rationale for not undertaking the placement

Progression requirement
Satisfactory completion of a minimum 30-weeks of work in industry

Year 2 / Level 5

Core units (Compulsory)
Design Engineering Projects 2 (40)
Manufacturing and Production (20)
Engineering Design Tools (20)
Management and Commercialisation for Technical Projects (20)
Engineering Simulation (20)

Progression requirements
Requires 120 credits at Level 5

Exit qualification: Dip HE Design Engineering
Requires 120 Level 5 credits
and 120 Level 4 credits

Year 1 / Level 4

Core units (Compulsory)
Design Engineering Projects 1 (40)
Materials and Processing (20)
Design Media (20)
Engineering Principles (20)
Electrical and Electronic Principles (20)

Progression requirements
Requires 120 credits at Level 4

Exit qualification: Cert HE Design Engineering
Requires 120 Level 4 credits
## 11.2 BEng (Hons) Mechanical Engineering (Full Time/Sandwich)

### Programme Diagram

#### BEng (Hons) Mechanical Engineering (Full Time)

<table>
<thead>
<tr>
<th>Year 4 / Level 6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Core units (Compulsory)</strong></td>
</tr>
<tr>
<td>BEng Project (40)</td>
</tr>
<tr>
<td>Thermofluids and Energy Conversion (20)</td>
</tr>
<tr>
<td>Business Development (20)</td>
</tr>
<tr>
<td>Computational Engineering (20)</td>
</tr>
<tr>
<td>Advanced Stress and Vibration (20)</td>
</tr>
<tr>
<td><strong>Exit qualification: BEng (Hons) Mechanical Engineering</strong></td>
</tr>
<tr>
<td><strong>Sandwich UG programme:</strong></td>
</tr>
<tr>
<td>Requires 120 Level 6 credits, 120 Level 5 credits and 120 Level 4 credits and successful completion of a placement year</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year 3 / Level P</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Optional placement year in industry</strong></td>
</tr>
<tr>
<td>Exemption is possible for those who provide an acceptable rationale for not undertaking the placement</td>
</tr>
<tr>
<td><strong>Progression requirement</strong></td>
</tr>
<tr>
<td>Satisfactory completion of a minimum 30-weeks of work in industry</td>
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</table>

<table>
<thead>
<tr>
<th>Year 2 / Level 5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Core units (Compulsory)</strong></td>
</tr>
<tr>
<td>Manufacturing and Production (20)</td>
</tr>
<tr>
<td>Engineering Simulation (20)</td>
</tr>
<tr>
<td>Management and Commercialisation for Technical Projects (20)</td>
</tr>
<tr>
<td>Mechanical Systems Design (20)</td>
</tr>
<tr>
<td>Stress and Dynamics (20)</td>
</tr>
<tr>
<td>Fluids and Thermodynamics (20)</td>
</tr>
<tr>
<td><strong>Progression requirements</strong></td>
</tr>
<tr>
<td>Requires 120 credits at Level 5</td>
</tr>
<tr>
<td><strong>Exit qualification: DipHE Mechanical Engineering</strong></td>
</tr>
<tr>
<td>Requires 120 level 5 credits, 120 Level 4 credits</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year 1 / Level 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Core units (Compulsory)</strong></td>
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<tr>
<td>Engineering Mathematics (20)</td>
</tr>
<tr>
<td>Engineering Principles (20)</td>
</tr>
<tr>
<td>Electrical and Electronic Principles (20)</td>
</tr>
<tr>
<td>Materials and Processing (20)</td>
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<tr>
<td>Engineering Design (20)</td>
</tr>
<tr>
<td>Engineering Practice (20)</td>
</tr>
<tr>
<td><strong>Progression requirements</strong></td>
</tr>
<tr>
<td>Requires 120 credits at level 4</td>
</tr>
<tr>
<td><strong>Exit qualification: CertHE Mechanical Engineering</strong></td>
</tr>
<tr>
<td>Requires 120 level 4 credits</td>
</tr>
</tbody>
</table>
11.3 MEng (Hons) Mechanical Engineering (Full Time/Sandwich)

**PROGRAMME DIAGRAM**

**MEng (Hons) Mechanical Engineering (Full time)**

**Year 5 / Level 7**
- Core units (Compulsory)
  - MEng Project (40)
  - Group Project (20)
  - Project Management (20)
  - Materials Failure and Prevention (20)
  - Structural Integrity (20)
- Exit qualification: MEng (Hons) Mechanical Engineering
  - Sandwich UG programme: Requires 120 Level 7 credits, 120 Level 6 credits, 120 Level 5 credits and 120 Level 4 credits and successful completion of a placement year
  - Standard UG programme: Requires 120 Level 7 credits, 120 Level 6 credits, 120 Level 5 credits and 120 Level 4 credits

**Year 4 / Level 6**
- Core units (Compulsory)
  - BEng Project (40)
  - Thermofluids and Energy Conversion (20)
  - Business Development (20)
  - Computational Engineering (20)
  - Advanced Stress and Vibration (20)
- Option units
- Progression requirements
  - Requires completion of the BEng part of the programme with an upper second class or first class profile
- Exit qualification: BEng (Hons) Mechanical Engineering
  - Sandwich UG programme: Requires 120 Level 6 credits, 120 Level 5 credits and 120 Level 4 credits and successful completion of a placement year
  - Standard UG programme: Requires 120 Level 6 credits, 120 Level 5 credits and 120 Level 4 credits

**Year 3 / Level P**
- Optional placement year in industry
- Exemption is possible for those who provide an acceptable rationale for not undertaking the placement
- Progression requirement
  - Satisfactory completion of a minimum 30-weeks of work in industry

**Year 2 / Level 5**
- Core units (Compulsory)
  - Manufacturing and Production (20)
  - Engineering Simulation (20)
  - Management and Commercialisation for Technical Projects (20)
  - Mechanical Systems Design (20)
  - Stress and Dynamics (20)
  - Fluids and Thermodynamics (20)
- Option units
- Progression requirements
  - Requires 120 credits at Level 5
  - Exit qualification: DipHE Mechanical Engineering
  - Requires 120 level 5 credits, 120 Level 4 credits

**Year 1 / Level 4**
- Core units (Compulsory)
  - Engineering Mathematics (20)
  - Engineering Principles (20)
  - Electrical and Electronic Principles (20)
  - Materials and Processing (20)
  - Engineering Design (20)
  - Engineering Practice (20)
- Option units
- Progression requirements
  - Requires 120 credits at level 4
  - Exit qualification: CertHE Mechanical Engineering
  - Requires 120 level 4 credits
For students commencing from September 2018 onwards

### 11.4 BEng (Hons) Engineering (Part time and Flexible Learning)

#### PROGRAMME DIAGRAM

**BEng (Hons) Engineering (Part time and Flexible Learning)**

<table>
<thead>
<tr>
<th>Year 1/2/Level 6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Core units (Compulsory)</strong></td>
</tr>
<tr>
<td>Advanced Engineering (20)</td>
</tr>
<tr>
<td>BEng Project (40)</td>
</tr>
<tr>
<td>Business Development (20)</td>
</tr>
<tr>
<td><strong>Option units</strong></td>
</tr>
<tr>
<td>Choose 2 of the following from your theme:</td>
</tr>
<tr>
<td>Advanced Stress and Vibration (20)</td>
</tr>
<tr>
<td>Manufacturing Operations (20)</td>
</tr>
<tr>
<td>Computational Engineering (20)</td>
</tr>
<tr>
<td>Mechatronics (20)</td>
</tr>
<tr>
<td><strong>Exit qualification: BEng (Hons) Engineering</strong></td>
</tr>
<tr>
<td>Requires 120 Level 6 credits, 120 Level 5 credits and 120 Level 4 credits (appropriate FdSc, FdEng, HND or equivalent)</td>
</tr>
</tbody>
</table>
For students commencing in September 2016 and 2017

11.5 MEng (Hons) Engineering (Part time and Flexible Learning)

PROGRAMME DIAGRAM
MEng (Hons) Engineering (Part time and Flexible Learning)

Year 3/4/Level 7
Core units (Compulsory)
MEng Project (40)
Project Management (20)
Option units
Choose 3 of the following from your theme:
Design Management (20)
Materials Optimisation for Sustainability (20)
Materials Failure & Prevention (20)
Design Simulation (20)
Real Time Control for Mechatronics (20)
Exit qualification: MEng (Hons) Engineering
Requires 120 Level 7 credits, 120 Level 6 credits, 120 Level 5 credits and 120 Level 4 credits

Year 1/2/Level 6
Core units (Compulsory)
Advanced Engineering (20)
BEng Project (40)
Business Development (20)
Option units
Choose 2 of the following from your theme:
Mechanical Design Analysis (20)
Manufacturing Operations (20)
Advanced Computer Applications (20)
Mechatronics (20)
Progression requirements
Requires completion of the BEng part of the programme with an upper second class or first class profile
Exit qualification: BEng (Hons) Engineering
Requires 120 Level 6 credits, 120 Level 5 credits and 120 Level 4 credits (appropriate FdSc, FdEng, HND or equivalent)
For students commencing from September 2018 onwards

11.5 MEng (Hons) Engineering (Part time and Flexible Learning)

PROGRAMME DIAGRAM
MEng (Hons) Engineering (Part time and Flexible Learning)

Year 3/4/Level 7

Core units (Compulsory)
MEng Project (40)
Project Management (20)

Option units
Choose 3 of the following from your theme:
Design Management (20)
Materials Optimisation for Sustainability (20)
Materials Failure & Prevention (20)
Design Simulation (20)
Real Time Control for Mechatronics (20)

Exit qualification: MEng (Hons) Engineering
Requires 120 Level 7 credits, 120 Level 6 credits, 120 Level 5 credits and 120 Level 4 credits

Year 1/2/Level 6

Core units (Compulsory)
Advanced Engineering (20)
BEng Project (40)
Business Development (20)

Option units
Choose 2 of the following from your theme:
Advanced Stress and Vibration (20)
Manufacturing Operations (20)
Computational Engineering (20)
Mechatronics (20)

Progression requirements
Requires completion of the BEng part of the programme with an upper second class or first class profile

Exit qualification: BEng (Hons) Engineering
Requires 120 Level 6 credits, 120 Level 5 credits and 120 Level 4 credits (appropriate FdSc, FdEng, HND or equivalent)
11.6 BA (Hons) Industrial Design

PROGRAMME DIAGRAM
BA (Hons) Industrial Design

Year 4 / Level 6

Core units (Compulsory)
- Industrial Design Projects 3 (60)
- Business Development (20)
- Industrial Design Studies (20)
- Visual Concept Communication (20)

Exit qualification: BA (Hons) Industrial Design
Sandwich UG programme:
Requires 120 Level 6 credits, 120 Level 5 credits and 120 Level 4 credits and successful completion of a placement year

Year 3 / Level P

Optional placement year in industry
Exemption is possible for those who provide an acceptable rationale for not undertaking the placement

Progression requirement
Satisfactory completion of a minimum 30-weeks of work in industry

Year 2 / Level 5

Core units (Compulsory)
- Industrial Design Projects 2 (40)
- Manufacturing and Production (20)
- Industrial Design Tools (20)
- Management and Commercialisation for Technical Projects (20)
- Interaction Design (20)

Progression requirements
Requires 120 credits at Level 5
Exit qualification: Dip HE Industrial Design
Requires 120 Level 5 credits and 120 Level 4 credits

Year 1 / Level 4

Core units (Compulsory)
- Industrial Design Projects 1 (40)
- Materials and Processing (20)
- Design Media (20)
- User Centred Design (20)
- Contextual Design (20)

Progression requirements
Requires 120 credits at Level 4
Exit qualification: Cert HE Industrial Design
Requires 120 Level 4 credits
For students repeating from September 2019 onwards

11.7 BA (Hons) Industrial Design (transitional arrangements)

PROGRAMME DIAGRAM
BA (Hons) Industrial Design

Year 4 / Level 6

Core units (Compulsory)
Design Futures Project 3 (60)
Business Development (20)
Design Studies 3 (20)
Visual Concept Communication (20)

Exit qualification: BA (Hons) Industrial Design
Sandwich UG programme:
Requires 120 Level 6 credits, 120 Level 5 credits and 120 Level 4 credits and successful completion of a placement year

Standard UG programme:
Requires 120 Level 6 credits, 120 Level 5 credits and 120 Level 4 credits

Year 3 / Level P

Optional placement year in industry
Exemption is possible for those who provide an acceptable rationale for not undertaking the placement

Progression requirement
Satisfactory completion of a minimum 30-weeks of work in industry

Year 2 / Level 5

Core units (Compulsory)
Design Futures Projects 2A (20)
Design Futures Projects 2B (20)
Manufacturing and Technology (20)
Product Design Tools (20)
Management and Commercialisation (20)
Design Studies 2 (20)

Progression requirements
Requires 120 credits at Level 5

Exit qualification: Dip HE Industrial Design
Requires 120 Level 5 credits and 120 Level 4 credits

Year 1 / Level 4

Core units (Compulsory)
Design Projects 1 (20)
Team Project (20)
Materials and Technology A (20)
Design Communication (20)
Design Studies 1 (20)
Contextual Design (20)

Progression requirements
Requires 120 credits at Level 4

Exit qualification: Cert HE Industrial Design
Requires 120 Level 4 credits
11.8 BA (Hons) Product Design

PROGRAMME DIAGRAM

BA (Hons) Product Design

Year 4 / Level 6

Core units (Compulsory)
- Design Projects 3 (60)
- Design Prototypes 3 (20)
- Business Development (20)
- Humanistic Design Studies (20)

Exit qualification: BA (Hons) Product Design
Sandwich UG programme:
Requires 120 Level 6 credits,
120 Level 5 credits and 120
Level 4 credits and
successful completion of a
placement year
Standard UG programme:
Requires 120 Level 6 credits,
120 Level 5 credits and 120
Level 4 credits

Year 3 / Level P

Optional placement year in industry
Exemption is possible for those who provide an acceptable
rationale for not undertaking the placement

Progression requirement
Satisfactory completion of a
minimum 30-weeks of work in
industry

Year 2 / Level 5

Core units (Compulsory)
- Design Projects and Prototypes 2 (40)
- Manufacturing and Production (20)
- Product Design Tools (20)
- Management and Commercialisation for Technical Projects (20)
- Applied Technology (20)

Progression requirements
Requires 120 credits at Level 5

Exit qualification: Dip HE
Product Design
Requires 120 Level 5 credits
and 120 Level 4 credits

Year 1 / Level 4

Core units (Compulsory)
- Design Projects and Prototypes 1 (40)
- Materials and Processing (20)
- Design Media (20)
- Technological Principles (20)
- User Centred Design (20)

Progression requirements
Requires 120 credits at Level 4

Exit qualification: Cert HE
Product Design
Requires 120 Level 4 credits
11.9 BSc (Hons) Product Design

PROGRAMME DIAGRAM
BSc (Hons) Product Design

Year 4 / Level 6

Core units (Compulsory)
Design Projects 3 (60)
Design Prototypes 3 (20)
Business Development (20)
Advanced Technology (20)

Exit qualification: BSc (Hons) Product Design
Sandwich UG programme:
Requirements: 120 Level 6 credits,
120 Level 5 credits and 120
Level 4 credits and
successful completion of a
placement year
Standard UG programme:
Requires 120 Level 6 credits,
120 Level 5 credits and 120
Level 4 credits

Year 3 / Level P

Optional placement year in industry
Exemption is possible for those who provide an acceptable
rationale for not undertaking the placement

Progression requirement
Satisfactory completion of a
minimum 30-weeks of work in
industry

Year 2 / Level 5

Core units (Compulsory)
Design Projects and Prototypes 2 (40)
Manufacturing and Production (20)
Product Design Tools (20)
Management and Commercialisation for Technical Projects (20)
Applied Technology (20)

Progression requirements
Requires 120 credits at Level
5

Exit qualification: Dip HE
Product Design
Requires 120 Level 5 credits
and 120 Level 4 credits

Year 1 / Level 4

Core units (Compulsory)
Design Projects and Prototypes 1 (40)
Materials and Processing (20)
Design Media (20)
Technological Principles (20)
User Centred Design (20)

Progression requirements
Requires 120 credits at Level
4

Exit qualification: Cert HE
Product Design
Requires 120 Level 4 credits
11.10 MDes/BA (Hons) Product Design

**PROGRAMME DIAGRAM**

**MDes (Hons) Product Design**

**Year 5 / Level 7**
- **Core units (Compulsory)**
  - MDes Project (40)
  - Group Project (20)
  - Project Management (20)
  - Materials Optimisation for Sustainability (20)
- **Option units**
  - Choose 1 of the following:
    - Design Simulation (20)
    - Or
    - Design Interaction (20)
- **Exit qualification:** MDes (Hons) Product Design
  - Requires 120 Level 7 credits, 120 Level 6 credits, 120 Level 5 credits and 120 Level 4 credits

**Year 4 / Level 6**
- **Core units (Compulsory)**
  - Design Projects 3 (60)
  - Design Prototypes 3 (20)
  - Business Development (20)
  - Humanistic Design Studies (20)
- **Option units**
- **Progression requirements**
  - Requires completion of the BA part of the programme with an upper second class or first class profile
- **Exit qualification:** BA (Hons) Product Design
  - Requires 120 level 6 credits, 120 Level 5 credits and 120 Level 4 credits

**Year 3 / Level P**
- **Optional placement year in industry**
  - Exemption is possible for those who provide an acceptable rationale for not undertaking the placement
- **Progression requirement**
  - Satisfactory completion of a minimum 30-weeks of work in industry

**Year 2 / Level 5**
- **Core units (Compulsory)**
  - Design Projects & Prototypes 2 (40)
  - Manufacturing and Production (20)
  - Mgt & Commercialisation for Technical Projects (20)
  - Product Design Tools (20)
  - Applied Technology (20)
- **Option units**
- **Progression requirements**
  - Requires 120 credits at Level 5
- **Exit qualification:** DipHE Product Design
  - Requires 120 level 5 credits, 120 Level 4 credits

**Year 1 / Level 4**
- **Core units (Compulsory)**
  - Design Projects & Prototypes 1 (40)
  - Materials & Processing (20)
  - Design Media (20)
  - Technological Principles (20)
  - User Centred Design (20)
- **Option units**
- **Progression requirements**
  - Requires 120 credits at level 4
- **Exit qualification:** CertHE Product Design
  - Requires 120 level 4 credits
11.11 MDes/BSc (Hons) Product Design

PROGRAMME DIAGRAM
MDes (Hons) Product Design

Year 5 / Level 7
Core units (Compulsory)
- MDes Project (40)
- Group Project (20)
- Project Management (20)
- Materials Optimisation for Sustainability (20)
Option units
Exit qualification: MDes (Hons) Product Design
Requires 120 Level 7 credits, 120 Level 6 credits, 120 Level 5 credits and 120 Level 4 credits

Year 4 / Level 6
Core units (Compulsory)
- Design Projects 3 (60)
- Design Prototypes 3 (20)
- Business Development (20)
- Advanced Technology (20)
Option units
Progression requirements
Requires completion of the BSc part of the programme with an upper second class or first class profile
Exit qualification: BSc (Hons) Product Design
Requires 120 level 6 credits, 120 Level 5 credits and 120 Level 4 credits

Year 3 / Level P
Optional placement year in industry
Exemption is possible for those who provide an acceptable rationale for not undertaking the placement
Progression requirement
Satisfactory completion of a minimum 30-weeks of work in industry

Year 2 / Level 5
Core units (Compulsory)
- Design Projects & Prototypes 2 (40)
- Manufacturing and Production (20)
- Mgt & Commercialisation for Technical Projects (20)
- Product Design Tools (20)
- Applied Technology (20)
Option units
Progression requirements
Requires 120 credits at Level 5
Exit qualification: DipHE Product Design
Requires 120 level 5 credits, 120 Level 4 credits

Year 1 / Level 4
Core units (Compulsory)
- Design Projects & Prototypes 1 (40)
- Materials & Processing (20)
- Design Media (20)
- Technological Principles (20)
- User Centred Design (20)
Option units
Progression requirements
Requires 120 credits at Level 4
Exit qualification: CertHE Product Design
Requires 120 level 4 credits
11.12 BSc (Hons) Design Engineering (Top-up)

PROGRAMME DIAGRAM

BSc (Hons) Design Engineering (Top-up)

Year 3 / Level 6

Core units (Compulsory)
Design Engineering Projects 3 (60)
Business Development (20)
Advanced Mechanics and Simulation (20)
Research Based Electronics (20)

Exit qualification: BSc (Hons) Design Engineering (Top-up)
Requires 120 Level 6 credits

level 6 entry
On attainment of an overall Merit or Distinction profile
11.13 MSc Mechanical Engineering Design

PROGRAMME DIAGRAM

MSc Mechanical Engineering Design

Stage 2/Level 7

Core units (Compulsory)
Individual Masters Project (60)

Exit qualification: MSc Mechanical Engineering Design
Requires 180 Level 7 credits

Optional placement year in industry

Progression requirement
Satisfactory completion of a minimum 30-week of work in industry

Stage 1/Level 7

Core units (Compulsory)
Research Methods (20)
Business Innovation & Enterprise (20)
Design Simulation (20)
Group Project (20)
Materials Failure and Prevention (20)
Structural Integrity (20)

Progression requirements 120 Level 7 credits

Exit qualification: PG Cert Design
Requires 60 Level 7 credits

Exit qualification: PG Dip Mechanical Engineering Design
Requires 120 Level 7 credits
11.14 MSc Engineering Project Management

PROGRAMME DIAGRAM

MSc Engineering Project Management

Stage 2/Level 7

Core units (Compulsory)
Individual Masters Project (60)

Exit qualification: MSc Engineering Project Management
Requires 180 Level 7 credits

Optional placement year in industry

Progression requirement
Satisfactory completion of a minimum 30-weeks of work in industry

Stage 1/Level 7

Core units (Compulsory)
Research Methods (20)
Business Innovation & Enterprise (20)
Competitive Product Development (20)
Design Management (20)
Project Management (20)
Knowledge Transfer (20)

Progression requirements
120 Level 7 credits

Exit qualification: PG Cert Design
Requires 60 Level 7 credits
Exit qualification: PG Dip Engineering Project Management
Requires 120 Level 7 credits
11.15 MA Industrial Design

PROGRAMME DIAGRAM
MA Industrial Design

Stage 2/Level 7

Core units (Compulsory)
Individual Masters Project (60)

Exit qualification: MA Industrial Design
Requires 180 Level 7 credits

Optional placement year in industry

Progression requirement
Satisfactory completion of a minimum 30-week of work in industry

Stage 1/Level 7

Core units (Compulsory)
Business Innovation & Enterprise (20)
Design Aesthetics (20)
Design Interaction (20)
Design Management (20)
Materials Optimisation for Sustainability (20)
Research Methods (20)

Progression requirements 120 Level 7 credits

Exit qualification: PG Cert Design
Requires 60 Level 7 credits
Exit qualification: PG Dip Industrial Design
Requires 120 Level 7 credits

Requires 120 Level 7 credits
Exit qualification: PG Cert Design
Requires 60 Level 7 credits
Exit qualification: PG Dip Industrial Design
Requires 120 Level 7 credits
11.16 MSc Product Design

PROGRAMME DIAGRAM
MSc Product Design

Stage 2/Level 7

Core units (Compulsory)
Individual Masters Project (60)

Exit qualification: MSc Product Design
Requires 180 Level 7 credits

Optional placement year in industry

Progression requirement
Satisfactory completion of a minimum 30-week of work in industry

Stage 1/Level 7

Core units (Compulsory)
Materials Optimisation for Sustainability (20)
Design Interaction (20)
Design Simulation (20)
Project Management (20)
Group Project (20)
Research Methods (20)

Progression requirements
120 Level 7 credits

Exit qualification: PG Cert Design
Requires 60 Level 7 credits

Exit qualification: PG Dip Product Design
Requires 120 Level 7 credits
12 ADMISSION REGULATIONS

The regulations for this framework are the University’s Standard Undergraduate and Postgraduate Admission Regulations, with the following exceptions to the Undergraduate Admissions Regulations: (The University Standard Admission Regulations are available on the portal at https://staffintranet.bournemouth.ac.uk/aboutbu/policiesprocedures/)

BSc (Hons) Design Engineering (top-up)
Additionally, applicants require an HND, FdEng or FdSc accredited to Partial IEng, IEng or EngTech level.

MSc Mechanical Engineering Design
Additionally, applicants who wish to meet the Engineering Council registration requirements (standard route applicants) for the Masters programme Mechanical Engineering Design require a degree accredited to IEng level.

All applicants to the programme will be interviewed to determine if they are standard or non-standard route applicants. It will be ensured that non-standard route applicants will be made fully aware that they will not be entitled to use the MSc Mechanical Engineering Design qualification to meet the academic requirements for professional registration.

BEng (Hons) Mechanical Engineering (Full time)

Entry to Level 4
Applicants will require A-Level Mathematics and any Science or Technology subject or equivalent.

Entry to Level 5
Applicants to level 5 for the BEng programme Mechanical Engineering require:

- an HNC Engineering at Bournemouth and Poole College with Merit

or

- an HNC with Merit in an engineering discipline accredited to EngTech

Entry to Level 6
Students who have successfully completed the FdEng Engineering (Mechanical Design) programme at Bournemouth and Poole with a minimum classification of Merit will be eligible to apply for entry with advanced standing to the Level 6 of the BEng (Hons) Mechanical Engineering programme at Bournemouth University and credited with 120 credits at Level 4 and 120 credits at Level 5.
Additionally, other applicants to level 6 for the BEng programme Mechanical Engineering require a FdSc, FdEng or HND with Merit in an engineering discipline accredited to EngTech or partial IEng or IEng.

**MEng (Hons) Mechanical Engineering (Full time)**

**All applicants**
All applicants who are accepted on the Integrated Masters programme will be required to complete the BEng (Hons) Mechanical Engineering part of the programme with an upper second class or first class profile in order to continue to the final level of the programme.

**Entry to Level 4**
Applicants will require A-Level Mathematics and any Science or Technology subject or equivalent.

**Entry to Level 5**
Applicants to level 5 for the MEng programme Mechanical Engineering require:

- an HNC Engineering at Bournemouth and Poole College with Merit

or

- an HNC with Merit in an engineering discipline accredited to EngTech

**Entry to Level 6**
Students who have successfully completed the FdEng Engineering (Mechanical Design) programme at Bournemouth and Poole with a minimum classification of Merit will be eligible to apply for entry with advanced standing to the Level 6 of the MEng (Hons) Mechanical Engineering programme at Bournemouth University and credited with 120 credits at Level 4 and 120 credits at Level 5.

Additionally, other applicants to level 6 for the MEng programme Mechanical Engineering require a FdSc, FdEng or HND with Merit in an engineering discipline accredited to EngTech, partial IEng or IEng.

Students who have successfully completed Level 5 of the BEng (Hons) Mechanical Engineering programme with a merit (60% to less than 70%) or distinction (70% or more) profile will be eligible to apply for entry with advanced standing to the Level 6 of the MEng (Hons) Mechanical Engineering programme and credited with 120 credits at Level 4 and 120 credits at Level 5.

**Entry to Level 7**
Applicants to Level 7 require an upper second class or first class BEng (Hons) Mechanical Engineering degree accredited to IEng from Bournemouth University. Students returning to study at Level 7 must normally have achieved an upper second or first class degree. Entry for applicants who are
no longer registered as BU students will be assessed according to the principles set out in 3P - Recognition of Prior Learning (RPL) and UK Credit Transfer (UKCT): Policy and Procedure.

**BEng (Hons) Engineering (Part time – flexible learning)**

**Entry to Level 6**
Students who have successfully completed the FdEng Engineering (Mechanical Design, Manufacturing Management or Electronic Design) programmes at Bournemouth and Poole with a minimum classification of Merit will be eligible to apply for entry with advanced standing to the Level 6 of the BEng (Hons) Engineering programme at Bournemouth University and credited with 120 credits at Level 4 and 120 credits at Level 5.

Additionally, other applicants to level 6 for the MEng programme Mechanical Engineering require a FdSc, FdEng or HND with Merit in an engineering discipline accredited to EngTech, partial IEng or IEng.

**MEng (Hons) Engineering (Part time – flexible learning)**

**All applicants**
All applicants who are accepted on the Integrated Masters programme will be required to complete the BEng (Hons) Engineering part of the programme with an upper second class or first class profile in order to continue to the final level of the programme.

**Entry to Level 6**
Students who have successfully completed the FdEng Engineering (Mechanical Design, Manufacturing Management or Electronic Design) programmes at Bournemouth and Poole with a minimum classification of Merit will be eligible to apply for entry with advanced standing to the Level 6 of the MEng (Hons) Engineering programme at Bournemouth University and credited with 120 credits at Level 4 and 120 credits at Level 5.

Additionally, other applicants to level 6 for the MEng programme Mechanical Engineering require a FdSc, FdEng or HND with Merit in an engineering discipline accredited to EngTech, partial IEng or IEng.

**Entry to Level 7**
Applicants to Level 7 require an upper second class or first class BEng (Hons) Engineering degree accredited to IEng from Bournemouth University. Students returning to study at Level 7 must normally have achieved an upper second or first class degree. Entry for applicants who are no longer registered as BU students will be assessed according to the principles set out in 3P - Recognition of Prior Learning (RPL) and UK Credit Transfer (UKCT): Policy and Procedure.
Transfer between delivery modes for the MEng (Hons) Mechanical Engineering and MEng (Hons) Engineering

Students can request to transfer from full-time MEng (Hons) Mechanical Engineering to part-time (flexible learning) MEng (Hons) Engineering and vice versa, at any point during the programmes. Each transfer will be considered on a case by case basis.

Transfer from MEng to BEng (Hons) Mechanical Engineering and MEng to BEng (Hons) Engineering

Students can request to transfer from MEng (Hons) Mechanical Engineering to BEng (Hons) Mechanical Engineering, at any point during the programme. Each transfer will be considered on a case by case basis.

Students can request to transfer from MEng (Hons) Engineering to BEng (Hons) Engineering, at any point during the programme. Each transfer will be considered on a case by case basis.

Students on MEng (Hons) Mechanical Engineering who fail to achieve at least a merit profile (60% to less than 70%) at Level 5 will normally be counselled to transfer to the BEng (Hons) Mechanical Engineering programme.

MDes (Hons) Product Design

All applicants

All applicants who are accepted on the Integrated Masters programme will be required to complete the BSc or BA (Hons) Product Design part of the programme with an upper second class or first class profile in order to continue to the final level of the programme.

Entry to Level 7

Applicants to Level 7 require an upper second class or first class BSc or BA (Hons) Product Design degree from Bournemouth University accredited by the IED to MIED or RProdDes level. Students returning to study at Level 7 must normally have achieved an upper second or first class degree. Entry for applicants who are no longer registered as BU students will be assessed according to the principles set out in 3P - Recognition of Prior Learning (RPL) and UK Credit Transfer (UKCT): Policy and Procedure.

MSc Product Design

Applicants who wish to meet the Chartered Technological Product Designer registration requirements (standard route applicants) for the Masters programmes Product Design require a degree accredited by IED to MIED or RProdDes level

All applicants to the programme will be interviewed to determine if they are standard or non-standard route applicants. It will be ensured that non-standard route applicants will be made fully aware that they will not be entitled to use the MSc Product Design qualification to meet the academic requirements for professional registration.
13 ASSESSMENT REGULATIONS

The regulations for this framework are the University’s Standard Undergraduate, Postgraduate and Integrated Masters Assessment Regulations with the following approved exceptions:

13.1 Integrated Masters programmes only

13.1.1 MEng (Hons) Engineering

PROGRESSION
To proceed to Level 7, students must normally achieve 120 Level 6 credits, and will be required to complete the BEng (Hons) part of the programme with an upper second class or first class profile. Where appropriate, students must successfully complete the specified work experience.

CLASSIFICATION
Please refer to the Standard Assessment Regulations for Integrated Masters provision.

13.1.2 MEng (Hons) Mechanical Engineering

PROGRESSION
To proceed to Level 7, students must normally achieve 120 Level 6 credits, and will be required to complete the BEng (Hons) part of the programme with an upper second class or first class profile. Where appropriate, students must successfully complete the specified work experience.

CLASSIFICATION
Please refer to the Standard Assessment Regulations for Integrated Masters provision.

13.1.3 MDes (Hons) Product Design

PROGRESSION
To proceed to Level 7, students must normally achieve 120 Level 6 credits, and will be required to complete the BA or BSc (Hons) part of the programme with an upper second class or first class profile. Where appropriate, students must successfully complete the specified work experience.

CLASSIFICATION
For Integrated Masters, Level 7 units will normally have a weighting of 45% towards final degree classification, with 40% weighting for Level 6 units and 15% weighting for Level 5.

https://staffintranet.bournemouth.ac.uk/aboutbu/policiesprocedures/academicregulationspoliciesprocedures/#

or the University Sharepoint site at:
https://intranetsp.bournemouth.ac.uk/Documents/arpp61.aspx
14 PROGRAMME PROFILES
### BSc (Hons) Design Engineering

**Date Profile Completed:** 06.07.17

**Originating Institution(s):** Bournemouth University  
**Place(s) of Delivery:** Bournemouth University

**Framework Title (in full):** Design and Engineering Framework

**Programme Award and Title:** BSc (Hons) Design Engineering

**Interim Award and Titles & required credits:**  
Cert HE Design Engineering (Requires 120 Level 4 credits)  
Dip HE Design Engineering (Requires 120 Level 5 credits and 120 Level 4 credits)

**Mode(s) of study:**  
FT = 3 years  
FTSW = 4 years  
PT = 6 years

**Expected Length of study:**  
BU Credit Structure & ECTS:  
Level 6 120 (60 ECTS);  
Level 5 120 (60 ECTS);  
Level 4 120 (60 ECTS);

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| Diploma Supplement Statement regarding PRSB accreditation ³¹:  This course is accredited by the Institution of Engineering Designers and fully meets the Engineering Council registration requirements for IEng registration.  
This course is accredited by the Institution of Mechanical Engineers and the BSc (Hons) fully meets the exemplifying academic benchmark requirements for registration as an Incorporated Engineer (IEng). |
### 14.2 BEng (Hons) Mechanical Engineering (Full time/Sandwich)

**Date Profile Completed: 06.07.17**

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**Effective from**: 9 Prog Year / Month / Year

**Contact in School**:
Dr Philip Sewell 61294

**Date approved**: 5/7/17  

**Programme Specification version** no. 11: 4.0-0917

**Placement**: Optional minimum 30 weeks

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**Name of Professional, Statutory or Regulatory Body (if appropriate)**:
Institution of Engineering Designers
Institute of Mechanical Engineers

**Diploma Supplement Statement regarding PRSB accreditation**:
This course is accredited by the Institution of Engineering Designers and fully meets the Engineering Council registration requirements for IEng registration.

This course is accredited by the Institution of Mechanical Engineers and will meet, in part, the exemplifying academic benchmark requirements for registration as a Chartered Engineer and students will need to complete an approved format of further learning pursuant to the requirements of UK-SPEC. The BEng (Hons) will also automatically meet the exemplifying academic benchmark requirements for registration as an Incorporated Engineer (IEng).
### 14.3 MEng (Hons) Mechanical Engineering (Full time/Sandwich)

**Date Profile Completed:** 06.07.17

**Originating Institution(s):** Bournemouth University

**Place(s) of Delivery:** Bournemouth University

**Framework Title (in full):** Design and Engineering Framework

**Programme HESA JACS code:** H150 H100

**Programme Award and Title:** Integrated MEng (Hons) Mechanical Engineering

**Interim Award and Titles & required credits:**
- CertHE Mechanical Engineering (Requires 120 Level 4 credits)
- DipHE Mechanical Engineering (Requires 120 Level 5 credits)
- BEng (Hons) Mechanical Engineering (Requires 120 Level 4 credits, 120 Level 5 credits and 120 Level 6 credits)

**Mode(s) of study:** FTSW, FT

**Expected Length of study:**
- FT = 4 years
- FTSW = 5 years

**BU Credit Structure & ECTS:**
- Level 7 120 (60 ECTS);
- Level 6 120 (60 ECTS);
- Level 5 120 (60 ECTS);
- Level 4 120 (60 ECTS)

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Effective from: 9 Prog Year / Month / Year

Contact in School: Dr Philip Sewell 61294

Date approved: June 2015

Programme Specification version no.: v3.12-0917

Placement: Optional minimum 30 weeks

Name of Professional, Statutory or Regulatory Body (if appropriate):
Institution of Engineering Designers and Institution of Mechanical Engineers

Diploma Supplement Statement regarding PRSB accreditation:

**BEng (Hons) Mechanical Engineering:**
This course is accredited by the Institution of Engineering Designers and fully meets the Engineering Council registration requirements for IEng registration.

This course is accredited by the Institution of Mechanical Engineers and will meet, in part, the exemplifying academic benchmark requirements for registration as a Chartered Engineer and students will need to complete an approved format of further learning pursuant to the requirements of UKSPEC. The BEng (Hons) will also automatically meet the exemplifying academic benchmark requirements for registration as an Incorporated Engineer (IEng).

**MEng (Hons) Mechanical Engineering:**
This course is accredited by the Institution of Engineering Designers and fully meets the Engineering Council registration requirements for CEng registration.

This course is accredited by the Institution of Mechanical Engineers and will meet, in part, the exemplifying academic benchmark requirements for registration as a Chartered Engineer and students will need to complete an approved format of further learning pursuant to the requirements of UKSPEC.
### 14.4 BEng (Hons) Engineering (Part time and Flexible Learning)

**Date Profile Completed:** 06.07.17

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**Students who undertake the BEng (Hons) Engineering or MEng (Hons) Engineering part-time/flexible learning awards may do so in order to meet the academic requirements of the Product Design and Development Engineer or Manufacturing Engineer degree apprenticeship route.**

**Mode(s) of study:** PT (flexible learning)

**Expected Length of study:**
- PT = 2 years

**BU Credit Structure & ECTS:**
- Level 6 120 (60 ECTS)

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**Effective from:**
- **Yr 1:** Sept 2018
- **Yr 2:** Sept 2019

**Contact in School:**
- Dr Philip Sewell 61294

**Date Approved:** 05.07/17

**Programme Specification version no.:** 4.0-0917

**Placement:**
- No

**Name of Professional, Statutory or Regulatory Body (if appropriate):**
- Institution of Engineering Designers

**Diploma Supplement Statement regarding PRSB accreditation:**
- This course is accredited by the Institution of Engineering Designers and fully meets the Engineering
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For students commencing in September 2016 and 2017

14.5 MEng (Hons) Engineering (Part time and Flexible Learning)

Date Profile Completed: 25.03.17

Place(s) of Delivery: Bournemouth University & Bournemouth and Poole College

Framework Title (in full): Design and Engineering Framework

Programme HESA JACS code: H150 H100

Interim Award and Titles & required credits: BEng (Hons) Engineering (Requires 120 Level 4 credits, 120 Level 5 credits and 120 Level 6 credits)

Mode(s) of study: PT (Level 7), PT (flexible learning – all levels)

Expected Length of study: PT = 4 years

BU Credit Structure & ECTS:
- Level 7 120 (60 ECTS)
- Level 6 120 (60 ECTS)

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**Name of Professional, Statutory or Regulatory Body (if appropriate):**
Institution of Engineering Designers and Institution of Mechanical Engineers

**Programme Specification version number:** v3.12-0917

**Placement:** No

**Date approved:** June 2015

**Contact in School:** Dr Philip Sewell 61294

**Effective from:** Prog Year / Month / Year

---

**Diploma Supplement Statement regarding PRSB accreditation**:  
**BEng (Hons) Engineering:**  
This course is accredited by the Institution of Engineering Designers and fully meets the Engineering Council registration requirements for IEng registration.

This course (for students progressing from the FdEng Engineering (Mechanical Design) only) is accredited by the Institution of Mechanical Engineers and will meet, in part, the exemplifying academic benchmark requirements for registration as a Chartered Engineer and students will need to complete an approved format of further learning pursuant to the requirements of UK-SPEC. The BEng (Hons) will also automatically meet the exemplifying academic benchmark requirements for registration as an Incorporated Engineer (IEng).

**MEng (Hons) Engineering:**  
This course is accredited by the Institution of Engineering Designers and fully meets the Engineering Council registration requirements for CEng registration.

This course (for students progressing from the FdEng Engineering (Mechanical Design) only) is accredited by the Institution of Mechanical Engineers and will meet, in part, the exemplifying academic benchmark requirements for registration as a Chartered Engineer and students will need to complete an approved format of further learning pursuant to the requirements of UK-SPEC.
For students commencing from September 2018 onwards

### 14.6 MEng (Hons) Engineering (Part time and Flexible Learning)

**Date Profile Completed:** 25.03.17

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<th>Framework Title (in full):</th>
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Programme Award and Title:
Integrated MEng (Hons) Engineering

Interim Award and Titles & required credits:
BEng (Hons) Engineering
(Requires 120 Level 4 credits, 120 Level 5 credits and 120 Level 6 credits)

Students who undertake the BEng (Hons) Engineering or MEng (Hons) Engineering part-time/flexible learning awards may do so in order to meet the academic requirements of the Product Design and Development Engineer or Manufacturing Engineer degree apprenticeship route.

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Effective from: 9
Prog Year / Month / Year: Date approved: June 2015
Programme Specification version no.: v3.12-0917
Placement: No

Contact in School: Dr Philip Sewell 61294

Name of Professional, Statutory or Regulatory Body (if appropriate): Institution of Engineering Designers and Institution of Mechanical Engineers

Diploma Supplement Statement regarding PRSB accreditation:

**BEng (Hons) Engineering:**
This course is accredited by the Institution of Engineering Designers and fully meets the Engineering Council registration requirements for IEng registration.

This course (for students progressing from the FdEng Engineering (Mechanical Design) only) is accredited by the Institution of Mechanical Engineers and will meet, in part, the exemplifying academic benchmark requirements for registration as a Chartered Engineer and students will need to complete an approved format of further learning pursuant to the requirements of UK-SPEC. The BEng (Hons) will also automatically meet the exemplifying academic benchmark requirements for registration as an Incorporated Engineer (IEng).

**MEng (Hons) Engineering:**
This course is accredited by the Institution of Engineering Designers and fully meets the Engineering Council registration requirements for CEng registration.

This course (for students progressing from the FdEng Engineering (Mechanical Design) only) is accredited by the Institution of Mechanical Engineers and will meet, in part, the exemplifying academic benchmark requirements for registration as a Chartered Engineer and students will need to complete an approved format of further learning pursuant to the requirements of UK-SPEC.
### 14.7 BA (Hons) Industrial Design

**Date Profile Completed: 25.03.17**

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Diploma Supplement Statement regarding PRSB accreditation: This course is accredited by the Institution of Engineering Designers and fully meets the requirements for RProdDes registration.
For students repeating from September 2019 onwards

14.8 BA (Hons) Industrial Design (transitional arrangements)

Date Profile Completed: 02.06.18

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### Unit Details

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**Assessment:**

| TBA | Design Projects 1 | W240 | 143 | 100 | 1 | 1 or 2 | C | 20 | 4 | 100% |
| TBA | Design Projects 2A | W200 | 143 | 100 | 2 | 3 or 4 | C | 20 | 5 | 100% |
| TBA | Design Projects 2B | W200 | 143 | 100 | 2 | 3 or 4 | C | 20 | 5 | 100% |
| TBA | Design Futures Projects 2 | W200 | 143 | 100 | 2 | 3 or 4 | C | 20 | 5 | 100% |
| TBA | Design Futures Projects 2A | W200 | 143 | 100 | 2 | 3 or 4 | C | 20 | 5 | 100% |
| TBA | Design Futures Projects 2B | W200 | 143 | 100 | 2 | 3 or 4 | C | 20 | 5 | 100% |
| TBA | Manufacturing and Technology | H100 | 115 | 50 | 2 | 3 or 4 | C | 20 | 5 | 50% |
| TBA | Manufacturing and Technology | H700 | 115 | 50 | 2 | 3 or 4 | C | 20 | 5 | 50% |
| TBA | Management and Commercialisation | N200 | 115 | 100 | 2 | 3 or 4 | C | 20 | 5 | 100% |

**Notes:**

- TBA: Design Projects 1
- TBA: Design Projects 2A
- TBA: Design Projects 2B
- TBA: Design Futures Projects 2
- TBA: Design Futures Projects 2A
- TBA: Design Futures Projects 2B
- TBA: Manufacturing and Technology
- TBA: Management and Commercialisation
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**Effective from:** 2019

**Contact in School:**
Dr Philip Sewell 61294

**Date approved:** June 2018

**Programme Specification version no.** 1.0-0919

**Placement:** Option minimum 30 weeks

**Name of Professional, Statutory or Regulatory Body (if appropriate):** Institution of Engineering Designers

**Diploma Supplement Statement regarding PRSB accreditation:**
This course is accredited by the Institution of Engineering Designers and fully meets the requirements for RProdDes registration.
### 14.9 BA/BSc (Hons) Product Design

**Date Profile Completed:** 25.03.17

**Place(s) of Delivery:** Bournemouth University

**Framework Title (in full):** Design and Engineering Framework

**Programme Award and Title:** BA/BSc (Hons) Product Design

**Interim Award and Titles & required credits:**
- Cert HE Product Design (Requires 120 Level 4 credits)
- Dip HE Product Design (Requires 120 Level 5 credits and 120 Level 4 credits)

**Mode(s) of study:**
- FTSW, FT, PT

**Expected Length of study:**
- FT = 3 years
- FTSW = 4 years
- PT = 6 years

**BU Credit Structure & ECTS:**
- Level 6 120 (60 ECTS);
- Level 5 120 (60 ECTS);
- Level 4 120 (60 ECTS);

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### 14.10 MDes (Hons) Product Design

**Date Profile Completed:** 25.03.17

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### BU Credit Structure & ECTS:

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**Effective from**

**Yr. 1** Sept 2015

**Yr. 2** Sept 2016

**Yr. 3** Sept 2017

**Yr. 4** Sept 2017 or 2018

**Contact in School:**

Dr Philip Sewell  61294

**Date approved:**

June 2015

**Programme Specification version no.**

v3.12-0917

**Placement:**

Option minimum 30 weeks

**Name of Professional, Statutory or Regulatory Body (if appropriate):**

Institution of Engineering Designers

**Diploma Supplement Statement regarding PRSB accreditation:**

BA and BSc (Hons) Product Design:

This course is accredited by the Institution of Engineering Designers and fully meets the requirements for RProdDes registration.

MDes (Hons) Product Design:

This course is accredited by the Institution of Engineering Designers and fully meets the requirements for CTPD registration.
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Effective from 9
Prog Year / Month / Year: Yr. 1

Contact in School: Dr Philip Sewell 61294

Date approved: June 2015

Programme Specification version no.: v3.12-0917

Placement:

Diploma Supplement Statement regarding PRSB accreditation:
This course is accredited by the Institution of Engineering Designers and Institution of Mechanical Engineers and the BSc (Hons) Design Engineering (Top-up) fully meets the Engineering Council registration requirements for and as an Incorporated Engineer (IEng).
# 14.12 MSc Mechanical Engineering Design

**Date Profile Completed:** 25.03.17

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**School:**
- Faculty of Science and Technology

**Partner institution:**
- N/A:

**Programme HESA JACS code:**
- W200
- H300
- H100

**Interim Award and Titles & required credits:**
- PG Cert Design (60 Level 7 credits)
- PG Dip Mechanical Engineering Design (120 Level 7 credits)

**Expected Length of study 2:**
- FT 1 yr; with placement 2 yrs
- PT 2 yrs; with placement 3 yrs

**BU Credit Structure & ECTS 3:**
- Level 7 180 (90 ECTS)

## Program Details

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**Effective from 4:**
- Prog Year / Month / Year: 2015

**Contact in School:**
- Dr Philip Sewell

**Date approved:**
- June 2015

**Programme Specification version no.:**
- V3.12-0917

**Yr. 1**
- Sept 2015

**Yr. 2**
- Name of Professional, Statutory or Regulatory Body (if appropriate): Institution of Engineering Designer and Institution of Mechanical Engineers

**Diploma Supplement Statement regarding PRSB accreditation:**
- This course is accredited by the Institution of Engineering Designers for further Learning to CEng. **NOTE:** Only certain students are eligible to have this wording. The programme support officer will tell Student Administration who these students are each year.

- This course is accredited by the Institution of Mechanical Engineers and will meet in part, the exemplifying academic benchmark requirements for registration.
<table>
<thead>
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<th>Yr. 3</th>
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| Yr. 4 | as a Chartered Engineer. Accredited MSc graduates who also have a BEng (Hons) accredited for CEng will be able to show that they have satisfied the educational base for CEng registration.

It should be noted that graduates from an accredited MSc programme who do not also have an appropriately accredited Honours degree will not be regarded as having the exemplifying qualifications for professional registration as a Chartered Engineer with the Engineering Council; they will need to have their first qualification individually assessed through the Individual Case Procedure if they wish to progress to CEng.
## 14.13 MSc Engineering Project Management

**Date Profile Completed:** 10.06.15

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### Effective from

- Yr. 1: Sept 2015
- Yr. 2
- Yr. 3
- Yr. 4

### Contact in School

- Dr Philip Sewell

### Date approved

- July 2011

### Programme Specification version

- v3.12-0917

### Placement

- Optional minimum 30 weeks
## 14.14 MA Industrial Design

**Date Profile Completed:** 10.06.15

**Originating Institution(s):** Bournemouth University

**Place(s) of Delivery:** Bournemouth University

**Framework Title (in full):** Design and Engineering Framework

**Programme Award and Title:** MA Industrial Design

**Programme HESA JACS code:** W200

**Interim Award and Titles & required credits:**
- PG Cert Design (60 Level 7 credits)
- PG Dip Industrial Design (120 Level 7 credits)

**Mode(s) of study:**
- FT, FT + Placement, PT, PT + Placement

**Expected Length of study:**
- FT 1 yr; with placement 2 yrs
- PT 2 yrs; with placement 3 yrs

**BU Credit Structure & ECTS:** Level 7 180 (90 ECTS)

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**Industrial Placement**

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**Effective from:**

- Prog Year: 1
- Month: Sept
- Year: 2015

**Contact in School:** Dr Philip Sewell

**Date approved:** June 2015

**Programme Specification version no.:** v3.12-0917

**Placement:**
- Optional minimum 30 weeks

**Name of Professional, Statutory or Regulatory Body (if appropriate):**

**Diploma Supplement Statement regarding PRSB accreditation:**
### 14.15 MSc Product Design

**Date Profile Completed:** 25.03.17

**Originating Institution(s):**
- Bournemouth University

**School:**
- Faculty of Science and Technology

**Partner institution:**
- N/A

**Place(s) of Delivery:**
- Bournemouth University

**Framework Title (in full):**
- Design and Engineering Framework

**Programme Award and Title:**
- MSc Product Design

**Interim Award and Titles & required credits:**
- PG Cert Design (60 Level 7 credits)
- PG Dip Product Design (120 Level 7 credits)

**Mode(s) of study:**
- FT, FT + Placement, PT, PT + Placement

**Expected Length of study:**
- FT 1 yr; with placement 2 yrs
- PT 2 yrs; with placement 3 yrs

**BU Credit Structure & ECTS:**
- Level 7 180 (90 ECTS)

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<th>HESA JACS Subject Code</th>
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</table>

**Contact in School:**
- Dr Philip Sewell

**Date approved:**
- June 2015

**Programme Specification version no.:**
- v3.12-0917

**Placement:**
- Optional minimum 30 weeks

**Name of Professional, Statutory or Regulatory Body (if appropriate):**
- Institution of Engineering Designers

**Placement Statement regarding PRSB accreditation:**
- This course is accredited by the Institution of Engineering Designers for
further Learning to CTPD. **NOTE:** Only certain students are eligible to have this wording. The programme support officer will tell Student Administration who these students are each year.
APPENDIX A - ENGINEERING DESIGN SPECIFIC LEARNING OUTCOMES FOR EC UK ACCREDITED DEGREE PROGRAMMES

Graduates from IED accredited degree programmes must achieve the following learning outcomes incorporating the key skills of knowledge and understanding, intellectual abilities, practical skills, and general transferable skills. The learning outcomes are expressed in terms of underpinning science and mathematics and associated disciplines; engineering analysis; design; economic, social and environmental context; and engineering practice. The weighting given to these different broad areas of learning will vary according to the nature and aims of the particular degree programme. In the table below the central column related to BEng (Hons) for CEng is the reference column and the columns to the left and right show limitations or enhancements to it respectively. Where no limitation or enhancement is shown the statement in the central column applies.

<table>
<thead>
<tr>
<th>1. Underpinning Science and Mathematics and Associated Engineering Disciplines (US)</th>
<th>BEng degree as limitation to BEng (Hons)</th>
<th>BEng (Hons) degree for CEng</th>
<th>Integrated MEng degree as enhancement of BEng (Hons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>US1</td>
<td>Knowledge and understanding of the scientific principles underpinning relevant technologies, to enable the modelling of routine engineering systems, processes and products and collect and interpret data and draw conclusions in the solution of practical engineering design problems.</td>
<td>US1</td>
<td>Knowledge and understanding of scientific principles and methods necessary to underpin education in engineering, to enable the modelling and analysis of non-routine engineering systems, processes and products, and collect and interpret data and draw conclusions in the solution of familiar engineering design problems, recognising the limitations.</td>
</tr>
<tr>
<td>US2</td>
<td>Knowledge and understanding of the mathematical principles necessary to support the application of key engineering design principles.</td>
<td>US2</td>
<td>Knowledge and understanding of the mathematical principles necessary to underpin education in engineering design and other disciplines to enable the identification and application of mathematical methods, tools and notations proficiently in the analysis and solution of engineering problems in a practical situation identifying inconsistencies and limitations of data extrapolation.</td>
</tr>
<tr>
<td>US3</td>
<td>Ability to apply knowledge of non-engineering disciplines in engineering design.</td>
<td>US3</td>
<td>Ability to apply and integrate knowledge and understanding of other engineering and non-engineering disciplines to support engineering design activities.</td>
</tr>
<tr>
<td>US4</td>
<td>Knowledge and understanding of the functionality of common ICT tools and able to select and apply appropriate computer-based engineering design tools to solve problems.</td>
<td>US4</td>
<td>Knowledge and understanding of the role and limitations of common ICT tools and ability to specify requirements for computer-based engineering design tools to solve unfamiliar problems.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Engineering Analysis (E)</th>
<th>BEng degree as limitation to BEng (Hons)</th>
<th>BEng (Hons) degree for CEng</th>
<th>Integrated MEng degree as enhancement of BEng (Hons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E11</td>
<td>Ability to monitor, interpret and apply the results of analysis and modeling in order to bring about continuous improvement.</td>
<td>E1</td>
<td>Understanding of engineering principles and the ability to apply them to analyze key engineering processes.</td>
</tr>
<tr>
<td>E12</td>
<td>Ability to use the results of analysis to solve engineering design problems, apply technology and implement engineering processes.</td>
<td>E2</td>
<td>Ability to identify, classify and describe the performance of products, systems and components through the use of analytical methods and modeling techniques.</td>
</tr>
<tr>
<td>E13</td>
<td>Ability to apply quantitative methods and computer software relevant to engineering design technology within a multidisciplinary context.</td>
<td>E3</td>
<td>Ability to apply quantitative methods and computer software relevant to engineering design, to solve engineering problems</td>
</tr>
<tr>
<td>E14</td>
<td>Ability to apply a systems approach to engineering design problems through the application of relevant technologies.</td>
<td>E4</td>
<td>Understanding of and ability to apply a systems approach to engineering design problem solving.</td>
</tr>
</tbody>
</table>
### 3. Design (D)

<table>
<thead>
<tr>
<th>Degree as limitation to BEng (Hons)</th>
<th>BEng (Hons) degree for CEng</th>
<th>Integrated MEng degree as enhancement of BEng (Hons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1</td>
<td>Ability to define an engineering problem and identify the constraints.</td>
<td>D1</td>
</tr>
<tr>
<td>D2</td>
<td>Ability to design solutions according to customer and user requirements, and generating a product design specification (PDS).</td>
<td>D2</td>
</tr>
<tr>
<td>D3</td>
<td>Awareness of the influence of cost drivers on engineering design decision-making.</td>
<td>D3</td>
</tr>
<tr>
<td>D4</td>
<td>Ability to generate ideas to solve problems and design new products, systems, components or processes, synthesising from those already in existence.</td>
<td>D4</td>
</tr>
<tr>
<td>D5</td>
<td>Ability to confirm fitness for purpose for engineering products including their operation and maintenance.</td>
<td>D5</td>
</tr>
<tr>
<td>D6</td>
<td>Ability to use engineering design methods and tools to adapt engineering designs to meet new purposes or applications.</td>
<td>D6</td>
</tr>
<tr>
<td>D7</td>
<td>Ability to plan and execute practical and/or simulation tests of design solutions and present reports containing analysis and discussion of the results.</td>
<td>D7</td>
</tr>
<tr>
<td>D8</td>
<td>Ability to provide visualisations such as physical prototypes or models, or computer models or renders of a product, system, component or process.</td>
<td>D8</td>
</tr>
</tbody>
</table>

### 4. Economic, Social and Environmental Context (S)

<table>
<thead>
<tr>
<th>Degree as limitation to BEng (Hons)</th>
<th>BEng (Hons) degree for CEng</th>
<th>Integrated MEng degree as enhancement of BEng (Hons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>Knowledge and understanding of the commercial and economic context of engineering processes.</td>
<td>S1</td>
</tr>
<tr>
<td>S2</td>
<td>Understanding of management and business practices that may be used to achieve engineering design objectives including finance, law, marketing, personnel and quality.</td>
<td>S2</td>
</tr>
<tr>
<td>S3</td>
<td>Understanding of the requirement for engineering activities to promote sustainable development.</td>
<td>S3</td>
</tr>
<tr>
<td>S4</td>
<td>Awareness of the framework of relevant legal requirements governing engineering activities, including personal, health, safety, and risk assessment issues.</td>
<td>S4</td>
</tr>
<tr>
<td>S5</td>
<td>Awareness and application of a high level of professional conduct and ethical responsibility including the global and social context of engineering design.</td>
<td>S5</td>
</tr>
<tr>
<td></td>
<td>Engineering Practice (P)</td>
<td></td>
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<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>PE1</td>
<td>Understanding of and ability to use relevant materials, equipment, tools, processes and products.</td>
<td>PE1</td>
</tr>
<tr>
<td>PE2</td>
<td>Knowledge and understanding of an engineering workshop and laboratory practice.</td>
<td>PE2</td>
</tr>
<tr>
<td>PE3</td>
<td>Knowledge of contexts in which engineering design knowledge can be applied to solving engineering problems.</td>
<td>PE3</td>
</tr>
<tr>
<td>PE4</td>
<td>Ability to use and apply information from a range of technical literature.</td>
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</tr>
<tr>
<td>PE5</td>
<td>Understanding and application of intellectual property rights (IPR) including patent, trade mark and principles of copyright and design registration.</td>
<td>PE5</td>
</tr>
<tr>
<td>PE6</td>
<td>Understanding of specific engineering design codes of practice and industry standards, with some knowledge of design factors and requirements for safe operation.</td>
<td>PE6</td>
</tr>
<tr>
<td>PE7</td>
<td>Awareness of quality issues in engineering design.</td>
<td>PE7</td>
</tr>
<tr>
<td>PE8</td>
<td>Understanding of the principles of engineering design projects, being able to work in a team.</td>
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</tr>
<tr>
<td>PE9</td>
<td>Ability to apply engineering design techniques, taking account of a selection of commercial and industrial constraints.</td>
<td>PE9</td>
</tr>
<tr>
<td>PE10</td>
<td>Ability to work with technical uncertainty, limited or contradictory information, being able to make value judgements in the solution of engineering design problems.</td>
<td>PE10</td>
</tr>
<tr>
<td>PE11</td>
<td>Ability to evaluate technical risks.</td>
<td>PE11</td>
</tr>
<tr>
<td>PE12</td>
<td>Ability to write, structure and present technical reports and specifications.</td>
<td>PE12</td>
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APPENDIX B - UNITS MAPPED TO EC<sup>UK</sup> REQUIREMENTS FOR IENG AND CENG

The following matrices show the mapping of design programme units to the engineering design Specific learning Outcomes for EC<sup>UK</sup> accredited degree programmes. The definitions of the Engineering design specific learning outcomes can be found in Appendix A.

**Table 1 – BSc DE unit mapping to IEng learning outcomes**
Table 2 – BEng (Hons) Mechanical Engineering (FT) unit mapping to IEng learning outcomes

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<th>Programme Title: BEng Mechanical Engineering (FT/WS)</th>
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<td>E3</td>
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<td>E4</td>
</tr>
<tr>
<td>Design</td>
</tr>
<tr>
<td>D1</td>
</tr>
<tr>
<td>D2</td>
</tr>
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<td>D3</td>
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<tr>
<td>D4</td>
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<tr>
<td>D5</td>
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<td>D6</td>
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<td>D7</td>
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<td>P10</td>
</tr>
<tr>
<td>P11</td>
</tr>
<tr>
<td>P12</td>
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</table>

Key: Unit title
- EM: Engineering Mathematics
- EP: Engineering Principles
- EEP: Electrical and Electronic Principles
- MP: Materials and Processes
- EPR: Engineering Practice
- ED: Engineering Design
- MD: Mechanical Systems Design
- ES: Engineering Simulation
- MCT: Management & Commercialisation for Technical Projects
- MP2: Manufacturing and Production
- SD: Stress and Dynamics
- FT: Fluids and Thermodynamics
- TEC: Thermofluids and Energy Conversion
- BD: Business Development
- ASV: Advanced Stress and Vibration
- CE: Computational Engineering
- BP: BEng Project
Table 3 – BEng (Hons) Engineering (PT) unit mapping to IEng learning outcomes

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<tr>
<td>P12i</td>
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</tbody>
</table>

Key | Unit Title
--- | ---
Core Units: | 
AE | Advanced Engineering
BD | Business Development
BP | BEng Project
Optional Units: | 
ASV | Advanced Stress and Vibration
CE | Computational Engineering
ME | Mechatronics
MO | Manufacturing Operations
<table>
<thead>
<tr>
<th>Programme Title: MEng Mechanical Engineering (FT/PT)</th>
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<td>Specific Learning Outcomes: Underlying Science &amp; Mathematics</td>
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<td>Unit 1</td>
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<table>
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<tbody>
<tr>
<td>Unit 1</td>
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<td>Y1</td>
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<table>
<thead>
<tr>
<th>Specific Learning Outcomes: Design</th>
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</thead>
<tbody>
<tr>
<td>Unit 1</td>
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<td>Y1</td>
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<tr>
<td>Y1</td>
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<td>Y1</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Specific Learning Outcomes: Economic, social &amp; environmental context</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit 1</td>
</tr>
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<td>Y1</td>
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<tr>
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<table>
<thead>
<tr>
<th>Specific Learning Outcomes: Engineering Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit 1</td>
</tr>
<tr>
<td>Y1</td>
</tr>
<tr>
<td>Y1</td>
</tr>
<tr>
<td>Y1</td>
</tr>
<tr>
<td>Y1</td>
</tr>
</tbody>
</table>

Table 5 – MEng (Hons) Engineering (PT – Flexible Learning) unit mapping to CEng learning outcomes

<table>
<thead>
<tr>
<th>Programme Title: MEng Engineering (PT)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Specified Learning Outcome</th>
<th>Year 1/2 (BEng (Hons))</th>
<th>Year 3/4 (MEng (Hons))</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AE  BD  BP  ASV  CE  ME  MO  PM  MP  DS  MFP  RTM  DM  MOS</td>
<td></td>
</tr>
<tr>
<td>Underpinning Science &amp; Mathematics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>US1m</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>US2m</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>US3m</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>US4m</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Engineering Analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E1m</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>E2m</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>E3m</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>E4m</td>
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<tr>
<td>Design</td>
<td></td>
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</tr>
<tr>
<td>D1</td>
<td>✓</td>
<td>✓</td>
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<td>D2</td>
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<td>D6m</td>
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<td>✓</td>
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<tr>
<td>Economic, social &amp; environmental context</td>
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<td></td>
</tr>
<tr>
<td>S1m</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>S2m</td>
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<td>✓</td>
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<tr>
<td>S3</td>
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<tr>
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<tr>
<td>S5</td>
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<td>✓</td>
</tr>
<tr>
<td>Engineering Practice</td>
<td></td>
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</tr>
<tr>
<td>P1m</td>
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<td>✓</td>
</tr>
<tr>
<td>P2m</td>
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<tr>
<td>P3</td>
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<tr>
<td>P5</td>
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</tr>
<tr>
<td>P6m</td>
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<tr>
<td>P7m</td>
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<td>P8m</td>
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<tr>
<td>P9m</td>
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<tr>
<td>P10</td>
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<tr>
<td>P11</td>
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</tr>
<tr>
<td>P12</td>
<td>✓</td>
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</tr>
</tbody>
</table>

Key to Unit Title:
- Core Units:
  - AE: Advanced Engineering
  - BD: Business Development
  - BP: BEng Project
- Optional Units:
  - ASV: Advanced Stress and Vibration
  - CE: Computational Engineering
  - ME: Mechatronics
  - MO: Manufacturing Operations
- Core Units:
  - PM: Project Management
  - MP: MEng Project
- Optional Units:
  - DS: Design Simulation
  - MFP: Materials Failure and Prevention
  - RTM: Real Time Control for Mechatronics
  - DM: Design Management
  - MOS: Materials Optimisation for Sustainability
Table 6 – MSc MED unit mapping to CEng learning outcomes

<table>
<thead>
<tr>
<th>Programme Title</th>
<th>Module Numbers</th>
<th>Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1 (MSc)</td>
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<td></td>
</tr>
<tr>
<td>Underpinning Science &amp; Mathematics</td>
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<td>Engineering Analysis</td>
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<tr>
<td>Design</td>
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<td>Advanced Design Environments</td>
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<tr>
<td>Manufacturing Systems</td>
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<td>Manufacturing Processes</td>
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<td>Manufacturing Excellence</td>
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<tr>
<td>Engineering Practice</td>
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<tr>
<td>Economic, Social &amp; Environmental Context</td>
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<td>GPP</td>
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<table>
<thead>
<tr>
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<td>U1S3m</td>
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</tr>
<tr>
<td>U1S4m</td>
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</tr>
<tr>
<td>U2S1m</td>
<td></td>
</tr>
<tr>
<td>U2S2m</td>
<td></td>
</tr>
<tr>
<td>U2S3m</td>
<td></td>
</tr>
<tr>
<td>U2S4m</td>
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<tr>
<td>U3S1m</td>
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<tr>
<td>U3S2m</td>
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<td>U3S3m</td>
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<tr>
<td>U3S4m</td>
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Table continues...
# APPENDIX C - SPECIFIC LEARNING OUTCOMES FOR IED ACCREDITED DEGREE PROGRAMMES

<table>
<thead>
<tr>
<th>Learning outcome - Bachelors degree For courses leading to MIED accreditation</th>
<th>Units where outcome met</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Design (D)</strong></td>
<td><strong>BA InD</strong></td>
</tr>
</tbody>
</table>
| **D1p** | Industrial Design Projects 1  
Industrial Design Projects 2  
Industrial Design Projects 3  
Materials and Processing  
Manufacturing and Production  
Mangmt & Comm for Tech Proj  
Interation Design |
| Ability to evaluate design solutions against relevant constraints and criteria | |
| **D2p** | Industrial Design Projects 1  
Industrial Design Projects 2  
Industrial Design Projects 3  
Mangmt & Comm for Tech Proj  
User Centred Design  
Interaction Design  
Industrial Design Studies |
| Ability to address human needs though the use of research, anthropometric data and ergonomic principles and provide design solutions according to customer and user requirements. Together with the ability to generate a product design specification (PDS) by defining requirements as separate criteria including other factors such technical aspects and legislative demands. | |
| **D3p** | Industrial Design Projects 1  
Industrial Design Projects 2  
Industrial Design Project 3  
Materials and Processing  
Manufacturing and Production |
<p>| Ability to recognise product design cost drivers for both recurring and non-recurring costs and to appreciate the cost | |</p>
<table>
<thead>
<tr>
<th>Implication</th>
<th>Course(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implications of differing production volumes</td>
<td>Mangmt &amp; Comm for Tech Proj Business Development</td>
</tr>
<tr>
<td>D4p Ability to generate a wide range of design ideas, concepts and proposals independently and in teams in response to set or self generated design briefs</td>
<td>Industrial Design Projects 1 Industrial Design Projects 2 Industrial Design Projects 3 Visual Concept Communication</td>
</tr>
<tr>
<td>D5p Ability to select, test and exploit materials and manufacturing processes in the synthesis of product design solutions</td>
<td>Materials and Processing Manufacturing and Production</td>
</tr>
<tr>
<td>D6p Ability to apply creative and logical thinking processes as well as design methodologies to the creation of design solutions</td>
<td>Industrial Design Projects 1 Industrial Design Projects 2 Industrial Design Projects 3 Design Media Industrial Design Tools Contextual Design Interaction Design Industrial Design Studies Visual Concept Communication</td>
</tr>
<tr>
<td>D7p Ability to select and use the appropriate manual drawing/construction/CAD, communication and technological media in the realisation of design ideas</td>
<td>Industrial Design Projects 1 Industrial Design Projects 2 Industrial Design Projects 3 Design Media Industrial Design Tools Visual Concept Communication</td>
</tr>
<tr>
<td>D8p Ability to demonstrate visual literacy and drawing ability appropriate to the practice of product</td>
<td>Industrial Design Projects 1 Industrial Design Projects 2 Industrial Design Projects 3 Design Media Industrial Design Tools</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>
| **D9p** | Ability to develop concepts sufficiently to provide manufacturing instructions and specifications | Industrial Design Projects 1  
Industrial Design Projects 2  
Industrial Design Projects 3  
Design Media  
Industrial Design Tools  
Manufacturing and Production  
Visual Concept Communication |
| **D10p** | Ability to employ materials, media, techniques, methods, technologies and tools associated with product design through drawing, modelling and computer visualisation using skill and imagination | Industrial Design Projects 1  
Industrial Design Projects 2  
Industrial Design Project 3  
Design Media  
Industrial Design Tools  
Visual Concept Communication |
| **D11p** | Ability to integrate Industrial Design aspects including form, texture and colour | Industrial Design Projects 1  
Industrial Design Projects 2  
Industrial Design Projects 3  
Design Media  
Industrial Design Tools  
Contextual Design  
User Centred Design  
Interaction Design  
Industrial Design Studies  
Visual Concept Communication |

### 2. Economic, Social and Environmental Context (S)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>
| **S1p** | Understanding that positive ethical and professional conduct underpins design practice. | Industrial Design Projects 1  
Industrial Design Projects 2  
Industrial Design Projects 3  
Business Development  
Mangmt & Comm for Tech Proj |
| **S2p** | Knowledge and understanding of risk issues, including health and safety, environmental | Industrial Design Projects 1  
Industrial Design Projects 2  
Industrial Design Projects 3  
Business Development  
Mangmt & Comm for Tech Proj |
and commercial risk, and
of risk assessment and
risk management

techniques.

<table>
<thead>
<tr>
<th>S3p</th>
<th>Awareness of legal requirements governing design activities, including personnel, health and safety, product liability and safety.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Industrial Design Projects 1 Industrial Design Projects 2 Industrial Design Projects 3 Business Development Mangmt &amp; Comm for Tech Proj</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>S4p</th>
<th>Knowledge and understanding of the management of the design process.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Industrial Design Projects 1 Industrial Design Projects 2 Industrial Design Projects 3 Mangmt &amp; Comm for Tech Proj Business Development</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>S5p</th>
<th>An awareness of financial, economic, social legislative and environmental factors of relevance to product design (on undergraduate masters programmes a higher level of thinking is expected)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Industrial Design Projects 1 Industrial Design Projects 2 Industrial Design Projects 3 Mangmt &amp; Comm for Tech Proj Business Development Contextual Design</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>S6p</th>
<th>Awareness of the social and environmental impact and the application of sustainable design principles.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Industrial Design Projects 1 Industrial Design Projects 2 Industrial Design Projects 3 Mangmt &amp; Comm for Tech Proj Business Development Materials and Processing Manufacturing and Production Contextual Design Industrial Design Studies</td>
</tr>
</tbody>
</table>

### 3. Design Practice (P)
<table>
<thead>
<tr>
<th>P1p</th>
<th>Ability to create new processes or products through synthesis of ideas from a wide range of sources using a broad knowledge of material and material selection principles</th>
</tr>
</thead>
</table>
|     | Industrial Design Projects 1  
|     | Industrial Design Projects 2  
|     | Industrial Design Projects 3  
|     | Materials and Processing  
|     | Manufacturing and Production  |
| P2p | Ability to practise collaborative and independent work to realise a range of practical, creative and theoretical projects |
|     | Industrial Design Projects 1  
|     | Industrial Design Projects 2  
|     | Industrial Design Projects 3  |
| P3p | Ability to initiate projects, meet deadlines, liaise with industrial collaborators, make presentations, research and synthesize information, produce reports and evaluate the design and research work of self and others |
|     | Industrial Design Projects 1  
|     | Industrial Design Projects 2  
|     | Industrial Design Projects 3  |
| P4p | Ability to analyse problems of a creative nature and to provide appropriate solutions |
|     | Industrial Design Projects 1  
|     | Industrial Design Projects 2  
|     | Industrial Design Projects 3  |
| P5p | Understanding and application of intellectual property rights (IPR) including patent search and principles of copyright and design registration. |
|     | Industrial Design Projects 2  
|     | Industrial Design Projects 3  
<p>|     | Mangmt &amp; Comm for Tech Proj  |</p>
<table>
<thead>
<tr>
<th>P6p</th>
<th>Understanding of specific engineering design codes of practice and industry standards, with some knowledge of design factors and requirements for safe operation.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Industrial Design Projects 1 Industrial Design Projects 2 Industrial Design Projects 3 Mangmt &amp; Comm for Tech Proj</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>P7p</th>
<th>Awareness of management and quality assurance issues in product design.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Industrial Design Projects 2 Industrial Design Projects 3 Mangmt &amp; Comm for Tech Proj Manufacturing and Production</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>P8p</th>
<th>Working effectively as part of a group with respect for the dignity, rights and needs of others.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Industrial Design Projects 1 Industrial Design Projects 2 Industrial Design Projects 3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>P9p</th>
<th>To develop skills associated with professional practice; time management, project management, professional level communication, self promotion, interview techniques, information gathering and use of information and communication technology as appropriate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Industrial Design Projects 1 Industrial Design Projects 2 Industrial Design Projects 3 Mangmt &amp; Comm for Tech Proj Business Development Industrial Design Tools Design Media Visual Concept Communication</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>P10p</th>
<th>Ability to evaluate technical risks and address risk in design methodology</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Industrial Design Projects 1 Industrial Design Projects 2 Industrial Design Projects 3 Manufacturing and Production</td>
</tr>
</tbody>
</table>
### 4. Underpinning Science and Mathematics

<table>
<thead>
<tr>
<th>US1p</th>
<th>Ability to consider and apply the appropriate mathematical and engineering principles to a particular product design problem (on undergraduate masters programmes a higher level of thinking is expected)</th>
</tr>
</thead>
</table>
|      | Industrial Design Projects 1  
|      | Industrial Design Projects 2  
|      | Industrial Design Projects 3  
|      | Materials and Processing  
|      | Manufacturing and Production |

### 5. Engineering Analysis (E)

<table>
<thead>
<tr>
<th>E1p</th>
<th>Ability to research, select, evaluate, manipulate and manage information relevant to the analysis and synthesis of product design solutions</th>
</tr>
</thead>
</table>
|      | Industrial Design Projects 1  
|      | Industrial Design Projects 2  
|      | Industrial Design Projects 3  
|      | Materials and Processing  
|      | Mangmt & Comm for Tech Proj  
|      | Manufacturing and Production |

<table>
<thead>
<tr>
<th>E2p</th>
<th>Ability to apply analytical skills in relation to designed objects including the ability to undertake visual analysis and to analyse designed objects in relation to their context</th>
</tr>
</thead>
</table>
|      | Industrial Design Projects 1  
|      | Industrial Design Projects 2  
|      | Industrial Design Projects 3  
|      | Materials and Processing  
|      | Mangmt & Comm for Tech Proj  
|      | Manufacturing and Production  
|      | Industrial Design Tools  
|      | Contextual Design  
|      | Interaction Design  
|      | Industrial Design Studies  
|      | Visual Concept Communication |
| E3p | Ability to apply a systematic approach to problem solving using appropriate design tools and techniques | Industrial Design Projects 1  
Industrial Design Projects 2  
Industrial Design Projects 3  
Materials and Processing |
## Learning outcomes – Bachelors degree and Masters degree

For courses leading to MIED and CTPD accreditation

<table>
<thead>
<tr>
<th>1. Design (D)</th>
<th>MDes (Hons) Product Design</th>
<th>MSc Product Design</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>D1p</strong></td>
<td>• Ability to evaluate design solutions against relevant constraints and criteria</td>
<td>Projects and Prototypes 1 Projects and Prototypes 2 Design Projects 3 Design Prototypes 3 Technological Principles Materials and Processing Applied Technology Advanced Technology Manufacturing and Production Mangmt &amp; Comm for Tech Proj</td>
</tr>
<tr>
<td></td>
<td>• Ability to evaluate complex design solutions against conflicting constraints</td>
<td>MSc Project</td>
</tr>
<tr>
<td><strong>D2p</strong></td>
<td>• Ability to address human needs through the use of research, anthropometric data and ergonomic principles and provide design solutions according to customer and user requirements. Ability to generate or challenge a product design specification (PDS) by defining requirements as separate criteria including other factors such technical aspects and legislative demands.</td>
<td>Projects and Prototypes 1 Projects and Prototypes 2 Design Projects 3 Design Prototypes 3 User Centred Design Mangmt &amp; Comm for Tech Proj Humanistic Design Studies Design Interaction</td>
</tr>
<tr>
<td><strong>D3p</strong></td>
<td>• Ability to recognise product design cost drivers for both recurring and non-recurring costs and to appreciate the cost implications of differing production volumes</td>
<td>Projects and Prototypes 1 Projects and Prototypes 2 Design Projects 3 Design Prototypes 3 Materials and Processing Manufacturing and Production</td>
</tr>
<tr>
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<td><strong>Mangmt &amp; Comm for Tech Proj</strong>&lt;br/&gt;Business Development</td>
<td><strong>Materials Optimisation of Sustainability</strong></td>
<td><strong>Materials Optimisation of Sustainability</strong></td>
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<tr>
<td><strong>D4p</strong>&lt;br/&gt;- Ability to apply cost drivers for both recurring and non-recurring costs and to design for the cost implications of differing production volumes.</td>
<td><strong>Projects and Prototypes 1</strong>&lt;br/&gt;- Projects and Prototypes 2&lt;br/&gt;- Design Projects 3&lt;br/&gt;- Design Prototypes 3</td>
<td><strong>MDes Project</strong>&lt;br/&gt;<strong>MSc Project</strong></td>
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<tr>
<td><strong>D5p</strong>&lt;br/&gt;- Ability to generate a wide range of design ideas, concepts and proposals independently and in teams in response to set or self generated design briefs</td>
<td><strong>Materials and Processing Manufacturing and Production Advanced Technology Design Prototypes 3</strong></td>
<td><strong>MDes Project</strong>&lt;br/&gt;<strong>MSc Project</strong></td>
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<tr>
<td><strong>D6p</strong>&lt;br/&gt;- Ability to select, test and exploit materials and manufacturing processes in the synthesis of product design solutions</td>
<td><strong>Projects and Prototypes 1</strong>&lt;br/&gt;- Projects and Prototypes 2&lt;br/&gt;- Design Projects 3&lt;br/&gt;- Design Prototypes 3&lt;br/&gt;- Design Media&lt;br/&gt;- Product Design Tools</td>
<td><strong>Design Interaction</strong>&lt;br/&gt;<strong>Design Simulation</strong>&lt;br/&gt;<strong>Materials Optimisation for Sustainability</strong>&lt;br/&gt;<strong>MSc Project</strong>&lt;br/&gt;<strong>Research Methods</strong></td>
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<tr>
<td><strong>D7p</strong>&lt;br/&gt;- Ability to apply creative and logical thinking processes as well as design methodologies to the creation of design solutions</td>
<td><strong>Projects and Prototypes 1</strong>&lt;br/&gt;- Projects and Prototypes 2&lt;br/&gt;- Design Projects 3&lt;br/&gt;- Design Prototypes 3&lt;br/&gt;- Design Media&lt;br/&gt;- Product Design Tools&lt;br/&gt;- Design Simulation</td>
<td><strong>Design Simulation</strong></td>
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<tr>
<td><strong>D7p</strong>&lt;br/&gt;- Ability to apply and reflect upon a wide range of creative and logical thinking processes as well as design methodologies in the creation of design solutions to complex problems</td>
<td><strong>MDes Project</strong>&lt;br/&gt;<strong>Design Interaction</strong>&lt;br/&gt;<strong>Design Simulation</strong>&lt;br/&gt;<strong>Materials Optimisation for Sustainability</strong>&lt;br/&gt;<strong>MSc Project</strong>&lt;br/&gt;<strong>Research Methods</strong></td>
<td><strong>Design Simulation</strong></td>
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<tr>
<td><strong>D7p</strong>&lt;br/&gt;- Ability to select and use the appropriate manual drawing / construction / CAD, communication and technological media in the realisation of design ideas</td>
<td><strong>Projects and Prototypes 1</strong>&lt;br/&gt;- Projects and Prototypes 2&lt;br/&gt;- Design Projects 3&lt;br/&gt;- Design Prototypes 3&lt;br/&gt;- Design Media&lt;br/&gt;- Product Design Tools&lt;br/&gt;- Design Simulation</td>
<td><strong>Design Simulation</strong></td>
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<tr>
<td>D8p</td>
<td>• Ability to demonstrate visual literacy and drawing ability appropriate to the practice of product design</td>
<td>Projects and Prototypes 1 Projects and Prototypes 2 Design Projects 3 Design Media Product Design Tools</td>
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<td>• Demonstration of complex visual literacy and advanced communication tools appropriate to the practice of product design</td>
<td>Design Simulation Design Interaction MDes Project</td>
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<tr>
<td>D9p</td>
<td>• Ability to develop and evaluate concepts sufficiently to provide manufacturing instructions and specifications</td>
<td>Projects and Prototypes 1 Projects and Prototypes 2 Design Projects 3 Design Prototypes 3 Design Media Product Design Tools Manufacturing and Production Materials Optimisation for Sustainability</td>
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<tr>
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<td>• Ability to employ materials, media, techniques, methods, technologies and tools associated with product design through drawing, modelling and computer visualisation using skill and imagination</td>
<td>Projects and Prototypes 1 Projects and Prototypes 2 Design Projects 3 Design Prototypes 3 Design Media Product Design Tools Design Simulation MDes Project</td>
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<tr>
<td>D10p</td>
<td>• Ability to integrate Industrial Design aspects including form texture and colour</td>
<td>Projects and Prototypes 1 Projects and Prototypes 2 Design Projects 3 Design Prototypes 3 Design Media Product Design Tools User Centred Design Humanistic Design Studies</td>
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<tr>
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<td>• Ability to synthesise a broad range of design aspects</td>
<td>MDes Project</td>
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<tr>
<td>D11p</td>
<td>• Ability to synthesise a broad range of design aspects</td>
<td>MDes Project</td>
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<td>• Ability to synthesise a broad range of design aspects</td>
<td>Research Methods MSc Project</td>
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<tr>
<td>2. Economic, Social and Environmental Context (S)</td>
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<td><strong>S1p</strong></td>
<td>• Understanding that positive ethical and professional conduct underpins design practice.</td>
<td>Projects and Prototypes 1 Projects and Prototypes 2 Design Projects 3 Business Development Mangmt &amp; Comm for Tech Proj</td>
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<td>• Application of a positive ethical professional conduct underpinning design practice.</td>
<td>MDes Project Group Project MSc Project Group Project</td>
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<td><strong>S2p</strong></td>
<td>• Knowledge and understanding of risk issues, including health and safety, environmental and commercial risk, and of risk assessment and risk management techniques.</td>
<td>Projects and Prototypes 1 Projects and Prototypes 2 Design Projects 3 Business Development Mangmt &amp; Comm for Tech Proj</td>
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<td>• Knowledge and understanding of risk issues, including health and safety, environmental and commercial risk, risk assessment and risk management techniques and an ability to demonstrate their effective evaluation.</td>
<td>MDes Project Group Project MSc Project Group Project</td>
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<tr>
<td><strong>S3p</strong></td>
<td>• Awareness of legal requirements governing design activities, including personnel, health and safety, product liability and safety.</td>
<td>Design Prototypes 3 Projects and Prototypes 1 Projects and Prototypes 2 Design Projects 3 Business Development Mangmt &amp; Comm for Tech Proj</td>
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<td></td>
<td>• Awareness and appropriate application of legal requirements governing design activities, including personnel, health and safety, product liability and safety in familiar and unfamiliar situations.</td>
<td>MDes Project Group Project MSc Project Group Project</td>
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<tr>
<td><strong>S4p</strong></td>
<td>• Knowledge and understanding of the management of the design process.</td>
<td>Projects and Prototypes 1 Projects and Prototypes 2 Design Projects 3 Mangmt &amp; Comm for Tech</td>
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<th>Proj</th>
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<td>• Demonstrate application of design process management</td>
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<tr>
<td>S5p</td>
<td>• An awareness of financial, economic, social legislative and environmental factors of relevance to product design.</td>
<td>Projects and Prototypes 1 Projects and Prototypes 2 Design Projects 3 Mangmt &amp; Comm for Tech Proj Business Development</td>
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<td>• Demonstrate the application of financial, economic, social legislative and environmental factors to product designs.</td>
<td>Materials Optimisation for Sustainability Group Project MDes Project</td>
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<tr>
<td>S6p</td>
<td>• Awareness of the social and environmental impact and the application of sustainable design principles.</td>
<td>Projects and Prototypes 1 Projects and Prototypes 2 Design Projects 3 Design Prototypes 3 Mangmt &amp; Comm for Tech Proj Business Development Materials and Processing Humanistic Design Studies Manufacturing and Production</td>
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<td>• Application of the social and environmental impact analysis and the application of sustainable design principles.</td>
<td>Materials Optimisation for Sustainability</td>
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3. Design Practice (P)

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<td>P1p</td>
<td>• Ability to create new processes or products through synthesis of ideas from a wide range of sources using a broad knowledge of material and material selection principles</td>
<td>Projects and Prototypes 1 Projects and Prototypes 2 Design Projects 3 Design Prototypes 3 Materials and Processing Manufacturing and Production</td>
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<td>Materials Optimisation for Sustainability MSc Project</td>
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</table>
| P2p | Ability to practise collaborative and independent work to realise a range of practical, creative and theoretical projects. | Projects and Prototypes 1  
Projects and Prototypes 2  
Design Projects 3  
Design Prototypes 3 |
| --- | --- | --- |
|  | Critical evaluation of historical and latest trends in design thinking and their appropriate application. | MDes Project  
Design Interaction  
MSc Project  
Design Interaction  
Research Methods |
| P3p | Ability to initiate projects, meet deadlines, liaise with industrial collaborators, make presentations, research and synthesise information, produce reports and evaluate the design and research work of self and others | Projects and Prototypes 1  
Projects and Prototypes 2  
Design Projects 3  
Design Prototypes 3  
MDes Project  
Project Management  
Group Project |
|  |  | MSc Project  
Project Management  
Group Project  
Research Methods |
| P4p | Ability to analyse problems of a creative nature and to provide appropriate solutions | Projects and Prototypes 1  
Projects and Prototypes 2  
Design Projects 3  
Design Prototypes 3 |
|  | Ability to analyse complex problems of a creative nature and to provide appropriate solutions | Design Interaction  
MDes Project  
MSc Project  
Design Interaction |
| P5p | Understanding and application of intellectual property rights (IPR) including patent search and principles of copyright and design registration. | Projects and Prototypes 2  
Design Projects 3  
Mangmt & Comm for Tech Proj |
| P6p | Understanding of specific engineering design codes of practice and industry standards, with some knowledge of design factors and requirements for safe operation. | Projects and Prototypes 2  
Design Projects 3  
Mangmt & Comm for Tech Proj |
|  | Application and development of specific design codes of practice and industry standards, with knowledge of design factors and requirements for safe operation. | Project Management  
Project Management |
| P7p   | • Awareness of management and quality assurance issues in product design. | Projects and Prototypes 2  
Design Projects 3  
Design Prototypes 3  
Mangmt & Comm for Tech Proj  
Manufacturing and Production |  
|       | • Application of management and quality assurance issues in product design. | Group Project  
Project Management | Group Project  
Project Management |
| P8p   | • Working effectively as part of a group with respect for the dignity, rights and needs of others. | Projects and Prototypes 1  
Projects and Prototypes 2 |  
|       | • Working effectively as part of a group with respect for the dignity, rights and needs of others and to develop an understanding of leadership.* | Group Project  
Project Management  
MSc Project |  
| P9p   | • To demonstrate skills associated with professional practice; time management, project management, professional level communication, self promotion, interview techniques, information gathering and use of information and communication technology as appropriate | Projects and Prototypes 1  
Projects and Prototypes 2  
Design Projects 3  
Mangmt & Comm for Tech Proj  
Business Development  
Product Design Tools  
Design Media  
Project Management  
MDes Project  
Group Project | MSc Project |
| P10p  | • Ability to evaluate technical risks and address risk in design methodology | Projects and Prototypes 1  
Projects and Prototypes 2  
Design Projects 3  
Design Prototypes 3  
Applied Technology  
Advanced Technology  
Manufacturing and Production | MSc Project |
| P11p  | • Ability to write a PDS, design reports and present design ideas | Projects and Prototypes 1  
Projects and Prototypes 2 |  

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<th>in a rational and coherent manner</th>
<th>Design Projects 3</th>
<th>Design Prototypes 3</th>
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- Develop and critique a PDS, design reports and present design ideas in a rational and coherent manner

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4. Underpinning Science and Mathematics (US)

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<th>US1p</th>
<th>Projects and Prototypes 1</th>
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- Ability to consider and apply the appropriate mathematical and engineering principles to a particular product design problem

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5. Design Analysis (E)

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<th>E1p</th>
<th>Projects and Prototypes 1</th>
<th>Projects and Prototypes 2</th>
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- Ability to research, select, evaluate, manipulate and manage information relevant to the analysis and synthesis of product design solutions

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<th>E2p</th>
<th>Projects and Prototypes 1</th>
<th>Projects and Prototypes 2</th>
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- Ability to apply analytical skills in relation to designed objects including the ability to undertake visual analysis and to analyse designed objects in relation to their context

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|     | Projects and Prototypes 1  
|     | Projects and Prototypes 2  
|     | Design Projects 3  
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|     | Technological Principles  
|     | Materials and Processing  
|     | Applied Technology  
|     | Advanced Technology  
|     | Design Simulation  |
|     | Design Simulation |

*This potentially requires a group project as part of the Masters programme.*