

Programme Specification and Curriculum Map for *BSc (Hons) Design Engineering (Top-up)*



1. Programme title	BSc Hons Design Engineering (Top-up)
2. Awarding institution	Middlesex University
3. Teaching institution	Middlesex University
4. Programme accredited by	
5. Final qualification	Bachelor in Engineering with Honours Design Engineering
6. Academic year	2013-2014
7. Language of study	English
8. Mode of study	FT /PT

9. Criteria for admission to the programme

This programme is aimed at applicants seeking qualify to degree level having successfully completed an HND or a Foundation Degree in a suitable subject.

International applicants whose first language is not English are required to have sufficient qualifications in English. The most common English Language requirements for international students are IELTS 6.0 or TOEFL (paper based) 550 or TOEFL (internet based) 79 with specified minimum scores for each component.

Application from mature applicants with suitable life skills and experiences are also welcomed and will be considered on an individual basis.

10. Aims of the programme

This programme aims to produce competent Design Engineers capable of playing an active role in formulating, meeting the challenges and opportunities arising in contemporary industrial and commercial practice.

Design in this programme is seen essentially as a practice both in the sense as an approach to problem solving and as a working method. Students will develop core design capabilities, which are developed and enhanced progressively through the course.

This programme explores the principles underlying the design and implementation of up-to-date digital systems needed in a variety of problem domains and provides the opportunity of realising such systems.

The programme's educational aims are:

- Instil design thinking in engineering problem solving;
- Build confidence to develop products and systems incorporating up-to-date electrical and/or mechanical components along with the associated software programmes;
- Develop confidence in the application of analytical and technical skills to undertake detail level design informed by a sound understanding and knowledge of design engineering through the concept, embodiment and validation stages of electronic product or systems development;
- Develop ability to apply these principles and methods in the practice of design engineering;
- Prepare individuals to engage meaningfully with projects both individually as well as in a team setting;
- Develop the ability to communicate ideas effectively, verbally, in reports and by means of active participation in industry sponsored live projects;
- Raise awareness of the roles and responsibilities of Professional Design Engineers and of social and commercial environments in which they work;

- Develop practical knowledge of material properties, appropriate manufacturing processes and their cost effective use in the design and improvement of engineered products, processes and system

11. Programme outcomes

A. Knowledge and understanding

On completion of this programme the successful student will have knowledge and understanding of:

1. 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 their limitations.
2. Concepts, principles and theories of the design process and an appreciation of their limitations.
3. A systems approach to solving engineering problems within the context of Design Engineering.
4. Understand analytical techniques and engineering science relevant to Design Engineering.
5. The issues involved in systems engineering and the range of approaches used in industry to manage the resulting complexity.
6. Using new technologies and applications relevant to Design Engineering.
7. User-focussed design practice.
8. Working with clients.
9. Commercial and business practices in relation to new product development.
10. Management and business practices used in engineering.
11. Professional and ethical responsibilities of engineers.

Teaching/learning methods

Students gain knowledge and understanding takes place through a combination of lectures, seminars, exercise classes, design build and test projects, forensic deconstruction, CAE and IT workshops, laboratory classes, industrial visits, group and individual project work, experimenting, constructing, analysing, assessing and discussing and self study.

Assessment Method

Students' knowledge and understanding is assessed by technical reports, coursework assignments, essays, presentations, and practical in-class tests.

B. Cognitive (thinking) skills

On completion of this programme the successful student will be able to:

1. Analyse and solve engineering problems using appropriate techniques and through critical thinking.
2. Model and analyse relevant engineering systems.
3. Engagement with the design process.
4. Use of appropriate computer based methods for solving design engineering problems.
5. Fully evaluate external influences on the design process.
6. Innovatively design appropriate systems, components or processes.

Teaching/learning methods

Students learn cognitive skills through design projects, problem solving activities and through report writing.

Assessment Method

Students' cognitive skills are assessed by the products and systems design, with particular reference to their engagement with the design process and by coursework comprised of reports and essays.

C. Practical skills

On completion of the programme the successful student will be able to:

1. Demonstrate knowledge and understanding of the role and limitations of common ICT tools and to specify requirements for computer-based engineering design tools to solve problems.
2. Ability to apply engineering design and design management techniques, taking account of a wide range of commercial and industrial constraints in engineering projects.
3. Plan, manage and undertake a design project, team or individual, including establishing user needs and technical specification, concept generation and evaluation, embodiment and detail design work, verification and review.
4. Ability to evaluate technical risk with an awareness of the limitations of possible solutions.
5. Use relevant laboratory and test equipment.

6. Use 2D and 3D CAD to prepare models.
7. Physical model making and prototyping.
8. Interfacing and system integration.

Teaching/learning methods

Students learn practical skills through design projects, specific skills inputs and set exercises.

Assessment Method

Students' practical skills are assessed by individual and group projects, lab reports, coursework assignments and practical tests.

D. Graduate Skills

On completion of this programme the successful student will be able to:

1. Communicate effectively in writing, verbally, graphically and through presentations to groups.
2. Apply mathematical methods to solving problems.
3. Demonstrate leadership skills and the ability to work effectively as a member of a team.
4. Plan and manage projects effectively
5. Write computer programmes and use CAE software and general IT tools and provide technical documentation.
6. Apply a scientific approach to the solving of problems.
7. Learn independently and to adopt a critical approach in investigation.
8. Develop initiative and creativity in problem solving.
9. Autonomous practice.
10. Design research methods.

Teaching/learning methods

Students acquire graduate skills through

Assessment method

Students' graduate skills are assessed by coursework assignments including design reports, laboratory reports, other written reports,

problems sheets, case studies, software programs, industrial placement, group and individual project reports.

12. Programme structure (levels, modules, credits and progression requirements)

12. 1 Overall structure of the programme

See page 20 for a diagram of the overall structure of the programme.

12.2 Levels and modules

Level 3 (Year 3/4)

COMPULSORY	OPTIONAL	PROGRESSION REQUIREMENTS
<p>Students must take all of the following:</p> <p>PDE3253 Design Dissertation (30 credits)</p> <p>PDE3440 Design and Innovation Management (30 credits)</p> <p>PDE3400 Design Engineering Major Project (60 credits)</p>		<p>Student must pass ALL modules to graduate.</p>

12.3 Non-compensatable modules (note statement in 12.2 regarding FHEQ levels)

Module level	Module code
3	PDE3400

13. Curriculum map

See Curriculum Map attached

14. Information about assessment regulations

Please refer to the University Regulations for generic guidance and the PDE Programme Handbook, under section “Assessment”, for additional information.

15. Placement opportunities, requirements and support (if applicable)

Thick Sandwich placement is not available for the BSc Design Engineering (Top-up)

16. Future careers (if applicable)

Whilst on the programme students are encouraged to develop a commercial approach to design engineering via supported live projects with industrial partners and industrial placements. They undertake contextual studies into the nature and contexts of the profession. They interact with a variety of guest lecturers with professional backgrounds. They are supported in developing their exit portfolio, a CV and a career entry plan.

Through these experiences they come to understand design in a commercial context, the nature of the design industries and to plan for their own career entry and development.

17. Particular support for learning (if applicable)

Meeting the learning outcomes of this programme requires active participation in the subject and the development of autonomous practice in meeting design objectives. Supporting this level of active participation and autonomous practice is achieved via regular tutorial contact with academic staff, productive and informed support from technical staff and the use of online, resource-based learning materials where appropriate.

The subject provides extensive studio, laboratory and workshop facilities where students can engage with their coursework assignments in a supported and productive environment.

18. JACS code (or other relevant coding system)

H150 – Engineering Design

19. Relevant QAA subject benchmark group(s)

Engineering

20. Reference points

The following reference points were used in designing the programme:

- Subject Benchmark Statement: Engineering, The Quality Assurance Agency for Higher Education, 2006.
- Middlesex University Regulations
- Middlesex University and School of Engineering and Information Sciences Teaching Learning and Assessment policies and strategies
- University policy on equal opportunities.

21. Other information

N/A

Please note programme specifications provide a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve if s/he takes full advantage of the learning opportunities that are provided. More detailed information about the programme can be found in the programme handbook and the University Regulations.

Curriculum map for BSc Hons Design Engineering

This section shows the highest level at which programme outcomes are to be achieved by all graduates, and maps programme learning outcomes against the modules in which they are assessed.

Programme learning outcomes

Knowledge and understanding		Practical skills	
A1	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 their limitations.	C1	Demonstrate knowledge and understanding of the role and limitations of common ICT tools and to specify requirements for computer-based engineering design tools to solve problems.
A2	Concepts, principles and theories of the design process and an appreciation of their limitations.	C2	Ability to apply engineering design and design management techniques, taking account of a wide range of commercial and industrial constraints in engineering projects.
A3	A systems approach to solving engineering problems within the context of Design Engineering	C3	Plan, manage and undertake a design project, team or individual, including establishing user needs and technical specification, concept generation and evaluation, embodiment and detail design work, verification and review.
A4	Understand analytical techniques and engineering science relevant to Design Engineering.	C4	Ability to evaluate technical risk with an awareness of the limitations of possible solutions.
A5	The issues involved in systems engineering and the range of approaches used in industry to manage the resulting complexity.	C5	Use relevant laboratory and test equipment.
A6	Using new technologies and applications relevant to Design Engineering.	C6	Use 2D and 3D CAD to prepare models.
A7	User-focussed design practice.	C7	Physical model making and prototyping.
A8	Working with clients.	C8	Interfacing and system integration.
A9	Commercial and business practices in relation to new product development.		
A10	Management and business practices used in engineering.		

Thick Sandwich Placement	PDE3250					X			X	X	X	X	X	X	X					X	X							X	X	X	X		X	X		X	
Design Engineering Major Project	PDE3400	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Design and Innovation Management	PDE3440		X			X				X	X	X					X			X		X					X			X			X			X	
Design Dissertation	PDE3253		X		X	X				X	X								X	X	X					X						X				X	