Programme Specification:
BSc Product Design and Robotics

1. Awarding institution	Middlesex University
2. Teaching institution	Middlesex University
3. Programme accredited by	Institution of Engineering Designers
4. Final qualification	BSc (Hons)
5. Programme title	Product Design and Robotics
6. JACS code (or other relevant coding system)	W240 and H671
7. Relevant QAA subject benchmark group(s)	Art and Design; Engineering
8. Academic Year	2008/9

9. Reference points

University's Regulations

University's learning and teaching policy strategy

10. Aims of the programme

This programme develops the analytical and technical skills to undertake detail level design on products informed by a sound understanding of product design and robotics through the concept, embodiment and validation stages of product development, with the principal foci of robotics and advanced CAD/CAM. A broad range of product areas are addressed which include; Smart products, mechatronics, consumer electronics, home appliances, medical products, sports, leisure and toys, etc.

Students are encouraged to develop a commercial approach to design via supported live projects with industrial partners and industrial placements.

11. Programme outcomes* - the programme offers opportunities for students to achieve and demonstrate the following learning outcomes. The highest level at which these programme outcomes are to be achieved by all graduates is shown in the curriculum map section.

A. Knowledge and understanding	**Teaching/learning methods**
On completion of this programme the successful student will have knowledge and understanding of : 1. Design process 2. Writing a brief/specification 3. How to communicate design intentions 4. Drawing standards 5. Robotics and Mechatronics 6. Computer Aided Engineering 7. Manufacturing Processes and Techniques 8. A range of 2D and 3D Computer aided design and visualisation methods. 9. Design for computer aided manufacture and automation. 10. Working with clients. 11. Commercial and business practices in relation to new product development. 12. Moral, ethical and environmental dimensions to design decisions. 13. Product Design Research Methods 14. Data Sources for Product Development	Students gain knowledge and understanding through design projects, reading, listening, visiting exhibitions and galleries, observing, experimenting, constructing, drawing, writing, assessing (peer) and discussing. **Assessment Method** Students' knowledge and understanding is assessed by exhibition of coursework, reports, presentations, dissertation and group reviews. Students on some modules are asked to assess their peers.
B. Cognitive (thinking) skills	**Teaching/learning methods**
1. Problem solving 2. Full engagement with the design process 3. Reading products 4. Critical thinking 5. Making an argument	Students develop their cognitive skills through design projects, problem solving activities and through report and dissertation writing. **Assessment** Students' cognitive skills are assessed by: The products that they design, with particular reference to their engagement with the design process, and by coursework comprised of reports, essays and a dissertation. ….
C. Practical skills	**Teaching/learning methods**
1. Graphic communications 2. Technical drawing 3. Model making 4. Prototyping 5. 2D CAD 6. 3D CAD 7. Image generation, manipulation and publishing software 8. Robotic skills inc. programming & sensor integration	Students learn practical skills through design projects, experimenting, specific skills inputs and set exercises and assignments **Assessment** Students' practical skills are assessed by coursework comprising: Projects, assignments and presentation portfolios.

D. Key skills On completion of this programme the successful student will be able to: 1. Team Work 2. Written communication 3. Verbal communication 4. Making presentations 5. Numeracy 6. Understanding themselves as a learner 7. ICT 8. Autonomous learning 9. Autonomous practice	**Teaching/learning methods** There are a range of opportunities throughout the programme for students to develop their skills and satisfy their personal targets in a range of contexts. **Assessment** Students' key skills are assessed by: Reports, essays, dissertation, presentations, team projects, placement and propositional work

12. Programme structure and requirements, levels, modules, credits and qualifications

12. 1 Overall structure of the programme

The BSc (Hons) Product Design and Robotics programme is studied over either three years full-time or four years with a placement year or six years part time. Study is undertaken at three levels.

The course is divided into study units called modules. Each module has a credit value of 30 credits, but some modules are larger units (e.g. 90 for the final Design proposition and 120 credits for the year long placement for those taking the four year option). Each 30 credit module represents approximately 300 hours of student learning, endeavour and assessment including up to a maximum of 72 hours of teaching. Each level has an equivalent of 120 credits. The year long placement module does not contribute to the final degree award; instead, successful completion will lead to the additional award of a *Diploma in Industrial Studies*.

The BSc (Hons) Product Design and Robotics programme is constructed from 8 modules: 2 at level 1, 4 at level 2 and 2 at level 3. Modules last for 1 academic year (24 weeks teaching + Assessment)

The nature of projects undertaken in the design project modules reflect the content of students' complementary studies and their emergent personal specialism. The design project modules are the principle mechanism whereby students engage in live sponsored projects with industrial partners.

12.2 Levels and modules. This section should contain a more detailed description level-by-level of the programme structure, modules and credits. All modules should be categorised as compulsory or optional.

Level 1		
COMPULSORY	OPTIONAL	**PROGRESSION REQUIREMENTS**
Students must take all of the following: PDE 1250 Computer Aided Design, Visualisation and Prototyping (30 credits) PDE 1290 Design & Engineering Practice (90 credits)		Student must pass all modules at level 1 to be able to progress on to level 2
Level 2		
COMPULSORY	OPTIONAL	**PROGRESSION REQUIREMENTS**

Students must take all of the following: PDE 2250 Design Projects (30 credits) PDE 2251 Product Design in Context (30 credits) PDE 2292 Robotics and Mechatronics (30 credits) PDE 2291 Advanced Feature-based Modelling with CAM (30 credits)		To progress on to a placement year students must pass all modules at level 2. To progress into level 3 without a placement students must pass PDE2250 and a minimum of 60 credits from the remaining modules. Additionally for progression to be granted with this credit deficit the assessment board need to be assured that the student has the wherewithal to pass the module at a second attempt with no further teaching.
Level 3 (optional extra year)		
COMPULSORY	OPTIONAL	
	Students may choose to take the year-long placement module: PDE 3250 Thick Sandwich Placement (120 credits – for Diploma of Industrial Studies)	
Level 3		
COMPULSORY	OPTIONAL	**PROGRESSION REQUIREMENTS**
Students must take all of the following: PDE 3252 Design Propositions (90 credits) PDE 3253 Dissertation, Research Methods, Articulation and Professional Practice (30 credits)		The student must pass all modules at level 3

12.3 Non-compensatable modules. Modules may additionally be designated non-compensatable.	
Module level	**Module code**

3	PDE 3253
3	PDE 3252

13. A curriculum map relating programme learning outcomes to modules

Please see Annex 3

14. Criteria for admission to the Programme

We welcome applicants with a wide variety of educational experience including: A/AS levels, AVCE, BTEC National Diploma, Access Certificates, Scottish Highers, Irish Leaving Certificates (Higher Level), International Baccalaureate and a large number of equivalent home and overseas qualifications.

Generally, we require applicants to have achieved passes in five GCSE subjects including Maths and English at grade C or above and passed at least two subjects through to six-unit Advanced GCE or Vocational Certificate of Education (VCE). Appropriate 12-unit VCE double awards are accepted - as are combinations of 6-unit GCE and VCE.

Offers made on a Tariff-point basis will take into account qualifications taken and points accumulated across both years of study. Generally, these will be at 280 Tariff points with minimum of 200 points from two 6-unit awards (for example, BB + 80)

Alternatively, successful completion of a relevant Foundation Year or any other qualification deemed by the University to be equivalent would be accepted.

A portfolio is essential and candidates should show a keen interest in design. All candidates are interviewed to assess their suitability for the programme.

Mature applicants with suitable life skills and experiences will be considered.

15. Information about assessment regulations

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

16. Indicators of quality

Student feedback, external examiner reports, feedback from industrial partners during sponsored projects and industrial placements. The development of this programme is monitored, and informed by, the Product Design and Engineering Industrial Advisory Board.

17. Specialised 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. Methods for evaluating and improving the quality and standards of learning

The programme Board of Study offers a forum for staff and students to discuss specific issues of academic provision. There are held once per semester and are made up from all members of academic staff contributing to the programmes in the subject group as well as representatives from the technical staff. Students are represented on the Board by an appropriate number (normally one per year group) of elected members from the programme. The Board also evaluates the annual monitoring report, the external examiner’s report and the student module feedback report.

External examiner reports provide a means of monitoring the appropriateness of the assessment methods and the procedures of the assessment boards. All students are encouraged to complete feedback questionnaires for every module. A monitoring report is produced annually by the programme leader whish is then incorporated into a subject annual monitoring report prepared by the Curriculum Leader. All full-time teaching staff are required to be observed once per academic session. This is normally carried out by another member of staff from the subject group.

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

Students have the option to follow this programme in Thick Sandwich (TKSW) mode. Students in TKSW mode undertake 4 years of study with the following pattern: Years 1 and 2 at the University; year 3 (36 to 48 weeks) on professional placement with an industrial partner; year 4 at the University.

Students following a TKSW placement year are supported through the process of securing a placement, which includes the legal and QAA requirements for placement learning, via tutorial support and the University Placement office.

Whilst on placement, each student is allocated a University placement tutor and a company workplace supervisor who provide the necessary support for a student to undertake a successful placement.

20. Future careers: how the programme supports graduates' future career development (if applicable)

Whilst on the programme students are encouraged to develop a commercial approach to design 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.

21. Other information

Please note: this specification provides 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 can be found in the main content of the student programme handbook and the University Regulations.

Curriculum map for BSc Product Design and Robotics

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 outcomes – highest level to be achieved by all graduates																																	
A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	C6	C7	D1	D2	D3	D4	D5	D6	D7	D8	D9
3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	1	3	3	3

Module	Module Code by Level	Programme outcomes																																	
		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	C6	C7	D1	D2	D3	D4	D5	D6	D7	D8	D9
	Level 1																																			
Computer Aided Design, Visualisation and Prototyping	PDE 1250															X	X		X	X	X	X	X	X	X	X	X					X		X	X	X
Design and Engineering Practice	PDE 1290	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
	Level 2																																			
Design Projects	PDE 2250	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
Product Design in Context	PDE 2251							X		X		X	X	X	X			X	X	X							X		X					X	X	X
Robotics and Mechatronics	PDE 2292	X		X	X	X		X							X	X	X		X	X	X	X	X	X				X	X	X	X	X		X	X	X
Advanced Feature Based Modelling and CAM	PDE 2291	X		X	X		X	X	X	X					X	X	X		X	X	X	X	X	X	X	X	X					X		X	X	X
	Level 3																																			
Industrial Placement	PDE 3250															X			X									X	X	X	X	X		X	X	X
Dissertation	PDE 3253													X	X	X	X	X	X	X									X					X	X	X
Proposition Module	PDE 3252	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

Programme learning outcomes BSc (Hons) Product Design and Robotics

Knowledge and understanding		**Practical skills**	
A1	Design process	C1	Graphic communications
A2	Writing a brief/specification	C2	Technical drawing
A3	How to communicate design intentions	C3	Model making
A4	Drawing standards	C4	Prototyping
A5	Mechatronics	C5	2D CAD
A6	Computer Aided Engineering	C6	3D CAD
A7	Manufacturing processes and techniques	C7	Image generation, manipulation and publishing software
A8	A range of 2 and 3D computer aided design and visualisation methods		
A9	Design for computer aided manufacture and automation		
A10	Working with clients		
A11	Commercial and business practices in new product development		
A12	Moral, ethical and environmental dimensions to design decisions		
A13	Product Design Research Methods		
A14	Data Sources for Product Development		
Cognitive skills		**Key skills**	
B1	Problem solving	D1	Team work
B2	Full engagement with the design process	D2	Written communication
B3	Reading products	D3	Verbal communication
B4	Critical thinking	D4	Making presentations
B5	Making an argument	D5	Numeracy
		D6	Understanding themselves as a learner
		D7	ICT
		D8	Autonomous learning
		D9	Autonomous practice