Programme Specification and Curriculum Map for *MSc Robotics*

1. Programme title	MSc / PGDip / PGCert Robotics
2. Awarding institution	Middlesex University
3. Teaching institution	Middlesex University
4. Programme accredited by	
5. Final qualification	MSc / PGDip / PGCert Robotics
6. Academic year	2020-21
7. Language of study	English (UK)
8. Mode of study	Full time

9. Criteria for admission to the programme

An Honours degree normally classified 2.2 or above, or equivalent, in engineering, computer science or a related area. Mature students and applicants with other relevant qualifications at a suitable level will also be considered.

Successful applicants must have competence in English language. For international applicants whose first language is not English the requirement is that they have IELTS 6.5 (with minimum 6.0 in each components) or TOEFL internet based 87 (with at least 21 in listening & writing, 22 in speaking and 23 in reading).

10. Aims of the programme

The programme aims to:

- provide students with a thorough grounding in software and hardware skills and techniques within the context of robotics;
- develop advanced skills in designing, implementing and analysing robotics systems.
- provide students with the technical and practical skills sought by employers.

11. Programme outcomes

A. Knowledge and understanding

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

A1 modern techniques and technologies on which robotics products and systems are based;

A2 current theory, practice and design methods;

A3 the strengths and limitations of robotics techniques in industry and in everyday life;

A4 principles, techniques and practice underlying robotic machines and research .

Teaching/learning methods

Students will gain knowledge and understanding through a combination of lectures and practical lab sessions delivered either online or on campus, directed reading, independent study, coursework and research.

Assessment Methods

Students' knowledge and understanding is assessed by a combination of individual and team coursework, project work and presentations.

B. Cognitive (thinking) skills

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

B1 critically evaluate advanced engineering concepts, theories, models and techniques;

B2 systematise a problem, recognise its constraints, and design an effective mechanism to solve it;

B3 analyse complex, unstructured and ill-defined engineering design problems and opportunities and develop methods and approaches to solve them effectively;

B4 critically evaluate the performance of a robotics system and modify it accordingly;

B5 recognise development opportunities and generate new design propositions.

Teaching/learning methods

Students learn cognitive skills through a combination of lectures and practical lab sessions, delivered either online or on campus, directed reading, independent study, facilitated discussion, coursework and research.

Analyses and critical thinking are strengthened through participation in discussions, and independent study. Formative and post-assessment feedback is provided on all assessed coursework.

Assessment Methods

Students' cognitive skills are assessed by a combination of individual and collaborative coursework, project work and presentations.

C. Practical skills

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

C1 use a range of key software and hardware robotics skills;

C2 deploy a range of skills to communicate constructive ideas effectively;

C3 undertake substantial research in the field of robotics.

Teaching/learning methods

Students learn practical skills through lectures, practical project work participation in workshops, seminars, delivered either online or on campus, and through guided discussions, individual and collaborative work and independent study.

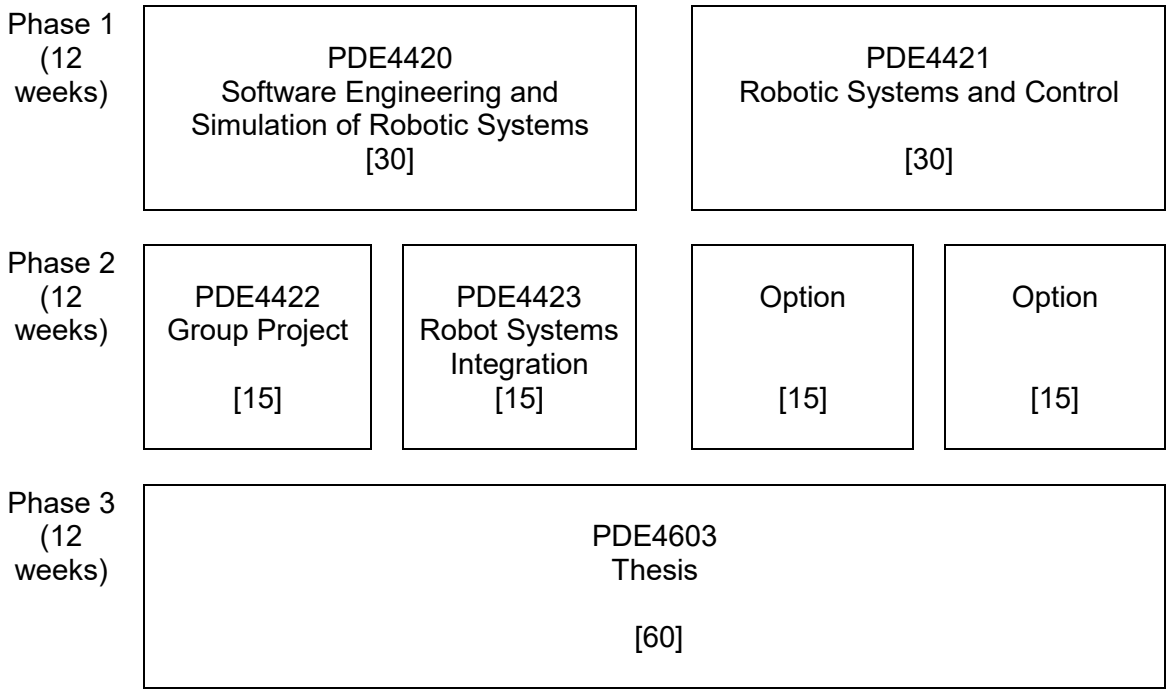
Assessment Methods

Students' practical skills are assessed by individual coursework, presentations, lab coursework and project work.

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

12. 1 Overall structure of the programme

MSc Robotics programme structure diagram



Options:

PDE4424 Industrial Manipulators
-
PDE4426 Mobile Robotics
PDE4427 Artificial Intelligence in Robotics

Students completing 120 credits are eligible for PGDip Robotics.
Students completing 60 credits are eligible for PGCert Robotics.

12.2 Levels and modules		
Level 7		
COMPULSORY	OPTIONAL	PROGRESSION REQUIREMENTS
PDE4420 PDE4421 PDE4422 PDE4423 PDE4603	Students must also choose two from the following: PDE4424 - PDE4426 PDE4427	Students must pass 120 credits to progress to the final major individual 60 credit project .

12.3 Non-compensatable modules (note statement in 12.2 regarding FHEQ levels)	
Module level	Module code
7	PDE4603

13. Curriculum map
See Curriculum Map attached

14. Information about assessment regulations

Middlesex University Assessment Regulations apply to this programme, without exception.

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

N/A

16. Future careers (if applicable)

Robotics plays a large and increasing role in manufacturing, space exploration, the office and the home, with products including: driverless cars, unmanned air vehicles (UAVs), 3D printers, cash dispenser machines, robot floor cleaners, pharmaceuticals, toys etc. Graduates of the programme will be well equipped for careers as robotics engineers in a range of industries and SMEs, from advanced manufacturing to oil and gas exploration, nuclear energy to railways and automotive, healthcare to defence.

17. Particular support for learning

- Dedicated robotics and mechatronics facilities equipped with the latest industrial automation equipment and an integrated flexible manufacturing system
- Virtual Learning Environment and dedicated CAD/CAM equipment, electronics manufacturing and prototyping facilities
- inspiring guest speakers from industry
- Induction and orientation programme
- English Language Support and Numeracy support offered by the Learner Development Unit
- Access to student counsellors

Access to campus-based facilities will depend on Covid-19 related restrictions in place at the time, and in some instances online facilities may be used instead.

18. JACS code (or other relevant coding system)

H671

19. Relevant QAA subject benchmark group(s)
Engineering

20. Reference points

- QAA Guidelines for programme specifications 2013
- QAA Qualifications Framework 2008
- Middlesex University Regulations
- Middlesex University Learning Framework – Programme Design Guidance, 2012

21. Other information

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 *MSc 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 learning outcomes

Knowledge and understanding	
A1	modern techniques and technologies underpinning robotics products and systems
A2	theory, practice and design methods
A3	the capabilities and limitations of robotics techniques in industry and in everyday life
A4	methods, techniques and theoretical perspectives deployed in robotics practice and research
Cognitive skills	
B1	critically evaluate advanced robotics concepts, technologies , models and techniques
B2	systematise problems, recognise their constraints and design effective methods to solve them
B3	analyse complex, unstructured and ill-defined engineering design problems and develop methods and proposals to solve them effectively
B4	critically evaluate the performance of a robotics system and modify and develop it accordingly
B5	recognise development opportunities and generate new design proposals
Practical skills	
C1	use a range of key software and hardware robotics design and construction skills
C2	deploy a range of skills to communicate good, constructive ideas effectively
C3	undertake substantial research in the field of robotics

Programme outcomes													
Highest level achieved by all graduates													
A1	A2	A3	A4		B1	B2	B3	B4	B5		C1	C2	C3
7	7	7	7		7	7	7	7	7		7	7	7

Module Title	Module Code and Level	Programme outcomes												
		A1	A2	A3	A4		B1	B2	B3	B4	B5		C1	C2	C3
Core															
Software Engineering and Simulation of Robotic Systems	PDE4420	X	X	X	X		X		X	X			X		
Robotic Systems and Control	PDE4421	X	X	X	X		X	X	X	X				X	
Group Project	PDE4422	X	X	X			X	X	X				X	X	
Robot Systems Integration	PDE4423	X		X			X	X					X	X	
Thesis	PDE4603	X		X	X		X								X
Options															
Industrial Manipulators	PDE4424	X	X	X	X			X		X	X				
-	-	-	-	-			-	-	-		-		-	-	
Mobile Robotics	PDE4426	X	X	X	X		X	X	X	X	X		X	X	
Artificial Intelligence in Robotics	PDE4427	X	X		X		X	X	X	X			X		