Programme Specification

1. Programme title	MSc/PGDip Computational Neuroscience
2. Awarding institution	Middlesex University
3. Teaching institution	Middlesex University Hendon Campus
4. Details of accreditation by professional/statutory/regulatory body	N/A
5. Final qualification(s) available	MSc Computational Neuroscience PGDip Computational Neuroscience PGCert Computational Neuroscience PGCert Neuroscience
6. Year of validation	2020 - 2021
7. Language of study	English
8. Mode of study	Full-time/Part-time

9. Criteria for admission to the programme

- Applicants must have a minimum of a 2:2 undergraduate degree in biology, biomedical science, computer science, engineering, mathematics, neuroscience or psychology. Students whom English is a second language must have achieved IELTS 6.5 or above, with at least a grade 6.0 in written English.
- Applicants with other qualifications and / or substantial relevant work experience with clear evidence of actual learning can make a claim for recognition of prior learning (RPL). A claim is considered by the faculty RPL committee and the successful candidate may receive exemption from as much as two thirds of the total credits required for the qualification.
- Applicants with a disability can enter the programme following assessment to determine if they can work safely in the laboratory. The programme team have

experience of adapting teaching provision to accommodate a range of disabilities and welcome applications from students with disabilities.

10. Aims of the programme

The PGDip or MSc aims to:

1. Give students an understanding of neuronal organisation, functional circuits and neuronal networks as prototypes for computational models.
2. Enable students to acquire an understanding of the basic techniques as well as advanced computational methods applied in electrophysiology and neuroimaging.
3. Provide students with the ability to apply computational methods to select the most appropriate neural recording technique, to process and interpret neural data.
4. Give students an understanding of statistical programming languages.
5. Provide students with the ability to critically evaluate current research in computational neuroscience.
6. Enable students to identify fundamental questions in computational neuroscience and to propose solutions
7. Produce ethical scientists.

In addition, the MSc aims to:

8. Provide students with the knowledge and skills to design and carry out an individualised research project to address a fundamental question in computational neuroscience.

11. Programme outcomes*

A. Knowledge and understanding

On completion of the PGDip or MSc, the successful student will be able to demonstrate an advanced knowledge and a deep understanding of:

1. Neurones and their organisation into functional networks and circuits for computational modelling.
2. The complex relationship between the brain and behaviour.
3. Statistical theory and methods.
4. Neurophysiological or neuroimaging techniques with computational methods for research and healthcare.
5. Storage, analysis and visualisation of neural data.
6. Programming methods used in computational neuroscience.
7. The ethical and legal issues related to the collecting, handling and storing of data.

Teaching/learning methods

Students gain knowledge and understanding through:

- Attending lectures on campus or online
- Participatory seminars
- Small group discussions
- Directed learning
- Group and individual exercises
- Laboratory sessions

An understanding of the subject is assessed by both formative and summative assessments.

Assessment methods

Students' knowledge and understanding is assessed by seminar presentations, resource design, written assignments, and project work.

11. Programme outcomes*	
B. Skills On completion of the PGDip or MSc, the successful student will be able to: 1. Propose solutions to fundamental questions in computational neuroscience. 2. Analyse a dataset of behaviour or neural recordings applying computational methods. 3. Present and interpret data using the most appropriate visualisation techniques. 4. Analyse complex problems systematically and implement effective solutions. In addition, on completion of the MSc the successful student will be able to: 5. Carry out an original research project in the field of computational neuroscience, present and critically evaluate the research findings.	**Teaching/learning methods** Students learn skills through; • Lectures on campus or online • Group discussions • Formative assessment • Peer- review of seminar presentations and laboratory practice • Directed reading • Individual project **Assessment methods** Students' skills are assessed by written assignments, peer and self-assessment, case studies and project work.

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

12. 1 Overall structure of the programme

PGCert/ PGDip/MSc Computational Neuroscience (FULL-time) October Start

Term 1 (Autumn term - October)	Term 2 (Winter term - January)	Term 3 (Summer term - June)
CST4167 Neuroinformatics 30 credits		BMS4997 Research Project 60 credits
BMS4887 Experimental design and statistics 15 credits	BMS4177 Aquisition and Analysis of Neural Data 15 credits	
BMS4157 Neurobiology 15 credits	CST4157 Computational Neural Modelling 15 credits	
PSY4157 Fundamentals of Neuropsychology 15 credits	Options: BMS4167 Neuropathology 15 credits or BMS4047 Peripheral Neurophysiology 15 credits	

PGCert/ PGDip/MSc Computational Neuroscience (PART-time) October Start

Term 1 (Autumn term - October)	Term 2 (Winter term - January)	Term 3 (Summer term - June)
Year 1		
BMS4157 Neurobiology 15 credits	BMS4177 Aquisition and Analysis of Neural Data 15 credits	
PSY4157 Fundamentals of Neuropsychology 15 credits	Options: BMS4167 Neuropathology 15 credits or BMS4047 Peripheral Neurophysiology 15 credits	
Year 2		
CST4167 Neuroinformatics 30 credits		BMS4997 Research Project 60 credits
BMS4887 Experimental design and statistics 15 credits	CST4157 Computational Neural Modelling 15 credits	

The total number of credits required for each award is as follows:

PGCert Computational Neuroscience/Neuroscience– 60 credits

PGDip Computational Neuroscience – 120 credits

MSc Computational Neuroscience – 180 credits

For a PGCert in computational neuroscience, a student must pass CST4167, BMS4887 and CST4157 and achieve between 60 and 105 credit points. Any other combination of modules, the student will be eligible for a PGCert in neuroscience. Both PGCerts are only exit awards; students cannot apply to study for either of them.

12.2 Levels and modules

Level 7

COMPULSORY	OPTIONAL	PROGRESSION REQUIREMENTS
Students must take all of the following: BMS4157 Neurobiology BMS4177 Analysis and Parameter extraction of Neural Data CST4167 Neuroinformatics BMS4887 Experimental Design and Statistics BMS4997 Research Project CST4157 Computational Neural Modelling PSY4157 Fundamentals of Neuropsychology	Students must also choose one from the following: BMS4047 Peripheral Neurophysiology BMS4167 Neuropathology	For the MSc, students must pass all taught modules before they can progress onto the project stage.

12.3 Compensatable modules - NONE

13. Information about assessment regulations

Assessment regulations are followed as approved by Middlesex University:
https://unihub.mdx.ac.uk/study/assessment/regulations

To pass modules with multiple assessment components, students must achieve an aggregate grade of at least 16 with no lower than a grade 18 for any component, except for CST4167. For CST4167, an aggregate pass for coursework 1 and pass for coursework 2 are required to achieve an overall pass in the module.

14. Placement opportunities, requirements and support

Not applicable

15. Future careers / progression

Both the PGDip and MSc are designed to help students to pursue careers as a data scientist, particularly in the field of neuroscience. The programme provides networking opportunities within academia as well as related industries both nationally and internationally for wider career opportunities that include working as a neuroscience researcher in academia, or in biotechnology, healthcare or pharmaceutical sector. In addition, students, who exit with an MSc, will be equipped to progress to PhD studies in either neuroscience or data science.

16. Particular support for learning (if applicable)

- All new students go through an induction programme and some have early diagnostic numeric and literacy testing before starting their programme. The Learner Enhancement Team (LET) provide one-to- one tutorials and workshops for those students needing additional support in these areas.
- High quality specialist laboratories equipped with industry standard software and hardware where appropriate, for formal teaching as well as self-study.
- Research activities of academic staff feed into the teaching programme, which can, on some occasions, provide an opportunity for students to work with academics on some aspect of research or to engage in projects related to the industry

17. JACS code (or other relevant coding system)	B140 and I430
18. Relevant QAA subject benchmark group(s)	Neuroscience and Computing

19. Reference points

Internal documentation

Middlesex University (2006) *Learning Framework Document*. London, MU

Middlesex University (2019) *Middlesex University Regulations.* London, MU

Middlesex University (2019) *Learning and Quality Enhancement Handbook.* London, MU

Middlesex University (2019) *Medical Science and Technology Learning, Teaching and Assessment Strategy.* London, MU

External documentation

Quality Assurance Agency (2008) *Framework for Higher Qualification.* London, QAA

Quality Assurance Agency (2015) *Characteristics Statement. Master's Degree. London*, QAA

20. Other information

Not applicable

Curriculum map for MSc Computational Neuroscience

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	Neurones and their organization into functional circuits that process information and control behaviour.
A2	The complex relationship between the brain and behaviour.
A3	Statistical theory and methods.
A4	Neurophysiological or neuroimaging techniques used in research and healthcare.
A5	Storage, analysis and visualisation of neural data.
A6	Programming methods used in computational neuroscience.
A7	The ethical and legal issues related to the collecting, handling and storing of data.
Skills	
B1	Propose solutions to fundamental questions in computational neuroscience.
B2	Analyse a dataset of behaviour or neural recordings.
B3	Present data using the most appropriate visualisation techniques.
B4	Analyse complex problems systematically and implement effective solutions.
B5	Carry out an original research project, present and critically evaluate the research findings.

Programme outcomes														
A1	A2	A3	A4	A5	A6	A7	B1	B2	B3	B4	B5	B6	B7	B8
Highest level achieved by all graduates														
7	7	7	7	7	7	7	7	7	7	7	7	7	7	7

Module Title	Module Code by Level	A 1	A 2	A 3	A 4	A 5	A 6	A 7	B 1	B 2	B 3	B 4	B 5
Neurobiology	BMS4157	X											
Neuropathology	BMS4167		X										
Peripheral Neurophysiology	BMS4047				X					X			
Acquisition and Analysis of Neural Data	BMS4177				X	X	X	X		X	X		
Experimental Design and Statistics	BMS4887			X		X					X		
Research Project	BMS4997			X					X			X	X
Neuroinformatics	CST4167						X		X		X	X	
Computational Neural Modelling	CST4157	X					X						
Fundamentals of Neuropsychology	PSY4157		X										