Year of entry: 2021/22

Programme Specification

1	**Awarding body**	University of London									
2	**Teaching Institution**	**Birkbeck College**									
3	**Programme Title(s)**	**MSc / MA Cognition and Computation**									
4	**Programme Code(s)**	TMSCOGCO_C TMACOGCO_C									
5	**UCAS code**	N/A									
6	**Home Department**	Psychological Sciences									
7	**Exit Award(s)**	PG Cert; /PG Dip									
8	**Duration of Study (number of years)**	1 year FT; 2 years PT									
9	**Mode of Study**	FT	X	PT	X	DL					
10	**Level of Award (FHEQ)**	7									
11	**Other teaching depts or**	N/A									
12	**Professional, Statutory Regulatory Body(PSRB) details**	N/A									
13	**QAA Benchmark Statement**	N/A									

14	**Programme Rationale & Aims**
	The aim of this programme is to offer a detailed introduction to the methods and findings from modern Cognitive Science, with an emphasis on computational approaches to understanding mind. The programme will enable students from a variety of backgrounds to appraise these findings and carry our independent research projects appropriately. A range of distinct computational approaches will be covered, including symbolic modelling, connectionist modelling, production systems, cognitive architectures, and neural computation. While the primary method is computational, experimental psychological methods will also be covered, and students will be given some exposure to the range of approaches now common in related areas, including biological, neuroimaging and genetic approaches The programme is designed to be accessible for graduates with a background in both psychology and computation, and for both full-time students over 1 year and part-time students over 2 years.

15	**Entry Criteria**
	Candidates are normally expected to have a second-class honours degree (2:2) or above in psychology, neuroscience, computer science, engineering, mathematics or a related discipline.

16	**Learning Outcomes**
	On successful completion of this programme a student will be expected to be able to:

Subject Specific:

1. Knowledge of the different theoretical positions and debates underlying a range of areas within cognitive science
2. Practical knowledge of all phases of developing, conducting and reporting a computational research project
3. Understanding of conventions in psychological report writing and the purpose of each section within a research report
4. Understanding the similarities and differences between a range of computational approaches to psychological processes, including symbolic, connectionist, production system and cognitive architectures
5. Understanding how computational approaches may be applied in a range of domains within cognitive science, including action selection, memory, attention, cognitive development, higher-level cognition
6. Understanding the relation between computational approaches and research questions /methodologies
7. An understanding of programming for experimental and simulation purposes, or of the breadth of and key issues in contemporary cognitive psychology
8. Knowledge of a wide range of parametric and non-parametric univariate and multivariate statistical procedures, the conditions under which they may reasonably be applied, and how to interpret the results of the procedures
9. Understanding the ethical guidelines of the British Psychological Society and ramifications of ethical practice

Intellectual:

10. Understanding and being able to evaluate the logical flow of a scientific argument
11. Ability to articulate some similarities and differences between computational methods and to evaluate the arguments presented for and against different computational methodologies
12. A critical appreciation of contemporary cognitive research and research methodologies across a number of areas within the Cognitive Sciences
13. Understanding alternative ways of addressing a research question and how to advance reported research
14. Critical thinking skills in relation to: presenting and critiquing an argument; evaluating theoretical assumptions underlying contemporary Cognitive Science; and reviewing and assimilating existing topic-specific literature and formulating a research question
15. The ability to formulate and test hypotheses
16. An ability to study a problem in-depth
17. Logical thinking (e.g., in relation to hypothesis testing)
18. Evaluation skills

Practical:

19. Enhanced essay and report writing
20. Enhanced numeracy in relation to understanding numerical data
21. General IT skills, including use of web browsers for research, email, Word, PowerPoint, referencing software

	22. Subject specific IT skills (familiarity with SPSS and MatLab) 23. Ability to conduct literature reviews using electronic search tools, electronic journals and databases (PsycInfo) 24. Ability to summarise and assess contemporary research succinctly 25. An ability to apply a range of computational methods to specific research questions 26. Data collection and analysis skills 27. Ability to present data in a meaningful way, and to transform it into different presentational formats 28. Planning and organizational skills **Personal and Social:** 29. Ability to work with others in small groups on practical research tasks 30. Ability to work independently 31. To effectively plan and organize substantive, medium-term, projects 32. Time management skills 33. To communicate effectively through both written reports and verbal presentations 34. An enhanced ability to appreciate (and formulate) a structured argument and to appreciate the theoretical assumptions underpinning such arguments 35. An understanding of the relevance of scientific research as reported in the media to everyday questions 36. An increased awareness of ethical issues and ethical practice

17	**Learning, teaching and assessment methods**
	The programme includes lecture-based theory modules, practical laboratory modules and either a supervised project (MSc) or a directed critical literature review (MA). The teaching styles are matched to the content, and class sizes are kept small or moderate (10–40) to encourage student participation, even in lecture-based modules. One module (Generic Research Skills) involves small group collaborative learning. The module includes both lectures and sessions where the class is split into smaller groups and each group will under the direction of the instructor explore solutions to generic organisational issues such as time management, IPR, organising large amounts of literature. It also involves presenting orally an outline of the student's possible research topic. One module (Advanced Quantitative Methods) features lectures with laboratory/practical session. These provide students with hands-on experience of using statistical software in a relatively self-contained setting. Six modules (Fundamental Debates in Cognitive Science, Computational Approaches to Mind, Case Studies in Computational Modelling, Introduction to MatLab Programming, Cognitive Affective and Social Neuroscience, and Sensorimotor Processes) feature lecturing as well as guided discussion led by one member of academic staff. Students are encouraged to also contribute to the discussion. This provides students with an opportunity to raise questions about specific issues or debates within the area and to understand the motivation for different computational methods when addressing different aspects of cognitive processing. There are no options or streams – all students will follow the same curriculum. While it is envisaged that students will come into the programme with different strengths (e.g.,

	computing versus psychology), experience has shown that *all* students benefit from the material in all modules. All modules also involve self-directed learning in the form of self-paced reading and preparation for each of the sessions. For MSc students, the dissertation – a supervised research project – is carried out under the supervision of a member of academic staff with expertise in computation and research interests in the area of the project. This provides students with access to a specialist in their project area who can provide expert advice on all aspects of the research. The project also ensures that taught skills are exercised within a constructive environment during the course. For MA students, the dissertation (a directed critical literature review) similarly is supervised by a subject expert. Assessment procedures ensure that students develop a portfolio of work over the duration of the programme, and feedback on coursework for those modules that require it encourages personal development.

18	**Programme Description**
	Students on this programme will complete the following eight modules: • PSYC0062H7 (Generic Research Skills). This module is based on Research Council expectations for postgraduate training and includes topics such as utilising library resources, time management, conference presentation, writing literature reviews, research papers and funding applications. The module is assessed by an oral presentation. • PSYC077H7 (Advanced Quantitative Methods). This module covers advanced statistical procedures as employed in experimental psychology. The module is assessed through a series of written worksheets. • PSYC105H7 (Fundamental Debates in Cognitive Science). This module covers topics such as scientific progress and the scientific method, the mind/body debate, the nature / nurture debate, the rules / associations debate, the levels of description debate, etc. These debates are foundational to contemporary cognitive science. The module is assessed by one essay. • PSYC107H7 (Computational Approaches to Mind). This module covers popular techniques in computational modelling, including various connectionist modelling techniques, symbolic and production system modelling techniques and mathematical modelling approaches. The module is assessed by one essay. • PSYC111H7 (Case Studies in Computational Modelling). This module comprises a series of case studies of contemporary computational modelling. The specific case studies discussed in any year will reflect contemporary research, but topics might include: models of categorisation; models of reasoning; models of memory; models of action selection and its breakdown following neurological damage. The module is assessed by a combination of discursive work and a computer programming exercise. • PSYC003H7 (Sensorimotor Processes and Attention) and PSYC004H7 (Cognitive, Affective and Social Neuroscience). These two modules provide students (from all

backgrounds) with essential background in cognitive psychology and related areas. The coverage is quite broad, but each 10 lectures on each module goes into considerable depth on one specific topic (e.g., executive function, or memory, etc.) The modules also form part of the MSc in Cognitive Neuroscience and Neuropsychology. Each module is assessed by one 2500 word essay.

- SPCS166H7 (Introduction to MatLab Programming). This module introduces students to computing programming using MatLab. The expectations here are high but students are well supported through a high ratio of teaching assistants to students. Classes combine lectures with practical exercises, and weekly "homework". Assessment is via two pieces of coursework.

All of the above modules are level 7 and each is 15 credits.

The final component of the programme is the 60 credit dissertation module. MSc students will be required to complete a research project in cognitive science with a computational element and write this up as a report of approximately 10,000 words. MA students will be required to complete a critical literature review on a topic related to computational cognitive modelling and as agreed by their supervisor. This critical review should also be approximately 10,000 words in length. In all cases, the dissertation must be supervised by an academic member of the Department of Psychological Sciences.

Full time students will normally complete the programme in one year and attend lectures on two days per week. It is expected that they will spend up to three days per week completing directed reading and coursework. Part time students will normally complete the programme in two years and attend lectures on one day per week. It is expected that they will spend similar time (pro rata) completing directed reading and coursework.

19 **Programme Structure**

Full-Time programme – 1 year

Year 1

Level	Module Code	Module Title	Credits	Status*
7	PSYC105H7	Fundamental Debates in Cognitive Science	15	Compulsory
7	PSYC107H7	Computational Approaches to Mind	15	Core
7	PSYC111H7	Case Studies in Computational Modelling	15	Core
7	SCPS166H7	Introduction to Matlab Programming	15	Core
7	PSYC062H7	Generic Research Skills	15	Core
7	PSYC077H7	Advanced Quantitative Methods	15	Core (for MSc) Compulsory (for MA)
7	PSYC003H7	Sensorimotor Processes and Attention	15	Compulsory
7	PSYC004H7	Cognitive, Affective and Social Neuroscience	15	Compulsory
7	PSYC078H7	MSc Dissertation (MSc only)	60	Core
7	SCPS008D7	MA Dissertation (MA only)	60	Core

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Part-Time programme – 2 years				
Year 1				
Level	**Module Code**	**Module Title**	**Credits**	**Status***
7	PSYC105H7	Fundamental Debates in Cognitive Science	15	Compulsory
7	PSYC107H7	Computational Approaches to Mind	15	Core
7	PSYC111H7	Case Studies in Computational Modelling	15	Core
7	SCPS166H7	Introduction to Matlab Programming	15	Core
Year 2				
Level	**Module Code**	**Module Title**	**Credits**	**Status***
7	PSYC062H7	Generic Research Skills	15	Core
7	PSYC077H7	Advanced Quantitative Methods	15	Core (for MSc) Comp (for MA)
7	PSYC003H7	Sensorimotor Processes and Attention	15	Compulsory
7	PSYC004H7	Cognitive, Affective and Social Neuroscience	15	Compulsory
7	PSYC078H7	MSc Dissertation (MSc only)	60	Core
7	SCPS008D7	MA Dissertation (MA only)	60	Core

Status*

CORE – Module must be taken and passed by student; COMPULSORY – Module must be taken, mark can be reviewed at sub-exam board; OPTIONAL – Student can choose to take this module

20	**Programme Director**	Professsor Rick Cooper
21	**Start Date** ***(term/year)***	October 2011
22	**Date approved by TQEC**	Spring 2011
23	**Date approved by Academic Board**	Summer 2011
24	**Date(s) updated/amended**	June 2018 (for 2019/20)