MSc Brain Imaging & Cognitive Neuroscience Modules 2018/19

Disclaimer: The information contained in this document provides general guidance only. While every care has been taken to provide correct information at the date of authoring (August 2018), information may be subject to revision from time to time.

Course Structure (Full-time)

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<tr><th>Credits</th><th>Term 1</th><th>Term 2</th><th>Term 3</th></tr>
<tr><td rowspan="6">10</td><td>Applications in Brain Imaging and Cognitive Neuroscience</td><td rowspan="4">Current Research in Psychology</td><td rowspan="7">MSc Research Project</td></tr>
<tr><td>MatLab Programming</td></tr>
<tr><td>Research Practical</td></tr>
<tr><td>Introduction to Neuroscientific Methods</td></tr>
<tr><td colspan="2">Choose ONE of the following 10 credit modules:</td></tr>
<tr><td>Design & Analysis 1</td><td>Design & Analysis 2</td></tr>
<tr><td rowspan="2">20</td><td rowspan="2">Fundamentals in Brain Imaging</td><td>Advanced Brain Imaging</td></tr>
<tr><td>Proposing Research in Psychology</td></tr>
<tr><td>Total</td><td>Minimum 60</td><td>60</td><td>60</td></tr>
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Typically, part-time students take the some taught modules in Year 1 and complete the research modules (Proposing Research in Psychology and MSc Research Project) in Year 2. There are some restrictions to how the modules are organised (e.g., Proposing Research must be studied before or at the same time as the MSc Research Project). At the beginning of the academic year, part-time students meet with their Course Director to discuss their study plan.

Compulsory Modules

Module title:	**Applications of Brain Imaging in Cognitive Neuroscience**
Module code:	03 28333
Module Lead:	Dr Davinia Fernández-Espejo
Term:	1
Credit value:	10
Delivery method:	Lectures and Seminars
Assessment method:	Seminar diary (10%), critical essay (1700 words) (90%)
Marks required to pass module: 50%	
Aims and learning objectives of this module: Lectures will cover the main areas of current research in cognitive neuroscience, including neuropsychology & brain mapping, plasticity and learning, vision, attention, touch, motor control, pain, language, memory, emotion (some variations will occur due to availability of lecturers). In each case, the material will be presented with reference to brain mapping techniques.	
Learning outcomes: By the end of the module students should be able to: critically discuss the role that neuroimaging has played in the field of cognitive neuroscience; Analyze and critically evaluate the methods and results of published papers in the areas covered by the module; describe and explain the main applications of the different neuroimaging techniques in the areas covered by the module.	
Recommended reading list: A reading list will be available at beginning of module.	

Module title:	**Matlab Programming**
Module code:	03 20516
Module Lead:	Dr Peter Hansen
Term:	1
Credit value:	10
Delivery method:	Computer-based seminar/workshops
Assessment method: Structured programming exercise (100%)	
Marks required to pass module: 50%	
Aims and learning objectives of this module: The module will provide an introduction to the Matlab package. Topics covered will include: what exactly is Matlab, and why it is so useful; interacting with the Matlab IDE and command line environment; basic Matlab concepts (commands, data structures including vectors and matrices, calculations, programming); Matlab programming techniques (flow control, modules, functions and .m files, file input/output, graphics), and finally, students will complete a structured programming exercise, aimed at producing a simple visual experiment in Matlab. This will form the basis of the course assessment.	
Learning outcomes: By the end of the module the student should be able to: demonstrate a working knowledge of Matlab, including the ability to build and use simple functions to manipulate and display data.	
Recommended reading list: A reading list will be available at beginning of module.	

Module title:	**Research Practical**
Module code:	03 30807
Module Lead:	tbc
Term:	1
Credit value:	10
Delivery method:	Lectures, practical classes, project supervision, and computer-based exercises
Assessment method: 2,000-word research report (80%) and online assessment of key skills and issues (20%)	
Marks required to pass module: 50%	
Aims and learning objectives of this module: This module will cover how to systematically approach conducting research. Topics will include methods and analysis techniques; reporting research effectively in writing; training in IT and administrative skills useful for research activities (e.g., file management); and key ethical, legal, health and safety issues in psychology and neuroscience research	
Learning outcomes: By the end of the module, students should be able to: Design a research project(s) using methods relevant to specific research area(s); write a research report using professionally accepted formats; demonstrate a working knowledge of IT and administrative skills and ethical, legal, and health and safety issues when conducting psychology and neuroscience research	
Recommended reading list: A reading list will be provided at the start of the module.	

Module title:	**Introduction to Neuroscientific Methods**
Module code:	03 30806
Module Lead:	Dr Wieske van Zoest
Term:	1
Credit value:	10
Delivery method:	Lectures, workshops, and computer-based exercises
Assessment method: Time-limited assignment (120-minutes) (50%) and workshop-based exam (60-minutes) (50%)	
Marks required to pass module: 50%	
Aims and learning objectives of this module: This module will cover the main techniques of brain mapping used in cognitive neuroscience (e.g., MRI, fMRI, DTI, EEG, TMS, MEG). Topics will also include the physics of NMR and MRI, introduction to fMRI experimental design and analysis. Students will have computer based training in data analysis and seminar-based workshop sessions discussion imaging methods	
Learning outcomes: By the end of the module the student should be able to: demonstrate a broad knowledge of the main methods used for mapping brain functions in cognitive neuroscience; show an appreciation of the design and analysis of fMRI experiments; and, understand the methods used in published imaging papers, and be able to design simple imaging experiments	
Recommended reading list: A reading list will be provided at the start of the module	

Module title:	**Current Research in Psychology**
Module code:	03 25728
Module Lead:	Dr Robin Thompson
Term:	2
Credit value:	10
Delivery method:	Lectures and Seminars
Assessment method: Two 500-word diary entries of seminars attended (each contributes 35% towards module mark); one 500-word press release (contributes 30%); seminar attendance log (contributes 0%, but must be submitted)	
Marks required to pass module: 50%	
Aims and learning objectives of this module: Lectures will provide an overview of current research in psychology. The lectures will an overview on and current theoretical debates and methodologies in a variety of Psychology areas. Guidance will be provided on writing for different audiences, including the broader public	
Learning outcomes: By the end of the module the student should be able to: demonstrate a broad knowledge of current research in psychology; understand the current theoretical debates; understand the methodologies employed in current research; and, write a summary of current research in a style for public understanding.	
Recommended reading list: For this module, there is no set reading list. Instead, students are advised to engage in general study of the key scientific thinking, writing, and presentation skills (see above), and to engage in critical reading of academic sources for the subject-specific content. Some academic sources will be recommended by the module lead.	

Module title:	**Fundamentals in Brain Imaging**
Module code:	03 30124
Module Lead:	Dr Peter Hansen
Term:	1
Credit value:	20
Delivery method:	Lectures, and workshops
Assessment method: 1,500-word critical review (30%) and data analysis (70%)	
Marks required to pass module: 50%	
Aims and learning objectives of this module: Lectures will cover the main techniques of brain mapping using MRI with emphasis on functional MRI. Topics will also include the physics of NMR and MRI, introduction to fMRI experimental design and analysis. Students will have computer-based training in analysis of brain images, including processing of basic fMRI studies.	
Learning outcomes: By the end of the module students should be able to: demonstrate a broad knowledge of the strengths and weaknesses of MRI for mapping brain functions in cognitive neuroscience; show an appreciation of the design and analysis of fMRI experiments, and be able to design and analyse simple imaging experiments.	
Recommended reading list: A reading list will be available at beginning of module.	

Module title:	**Proposing Research in Psychology**
Module code:	03 26539
Module Lead:	Dr Fay Julal
Term:	1
Credit value:	20
Delivery method:	Lectures, tutorials
Assessment method: A written research proposal of 3000 words in two parts. Part 1 will be formative and Part 2 summative (contributes 100% to module mark)	
Marks required to pass module: 50%	
Aims and learning objectives of this module: Lectures will provide an overview of the process of planning and proposing research projects (e.g., grant writing) and ways in which research can be reported (e.g., oral and poster presentations). Students will also develop relevant IT, administrative, and research skills. Students will work in small groups or one-to-one with a staff member to develop and write a research proposal. The proposal will typically involve pilot studies and require a lab placement with a staff member.	
Learning outcomes: By the end of the module students should be able to: write a research proposal; demonstrate a working knowledge of the key skills and issues useful for research; visually present research in a concise and clear manner, in the form of a professional conference-style poster presentation; and understand the methodologies and background knowledge relevant to specific research area.	
Recommended reading list: For this module, there is no set reading list. Instead, students are advised to engage in general study of the key scientific thinking, writing, and presentation skills (see above), and to engage in critical reading of academic sources for the subject-specific content. Some academic sources will be recommended by the module lead.	

Module title:	**MSc Research Project**
Module code:	03 28503
Module Lead:	Dr Fay Julal
Term:	3
Credit value:	60
Delivery method:	Student-centred research dissertation
Assessment method: Written dissertation (6,000 words max) (100%contributes 80% to module mark); poster presentation, with oral walk-through (contributes 20%)	
Marks required to pass module: 50%	
Aims and learning objectives of this module: Students will conduct a substantial empirical inquiry, with some aspect of originality, into a topic under supervision. Students will be assigned to a research supervisor, with whom the student will negotiate a contract setting out the project's aims, the relevant knowledge and skills, and milestones for conducting the research.	
Learning outcomes: By the end of the module students should be able to: systematically conduct a substantial empirical inquiry using research methods and analysis techniques appropriate to the field of research and level of study; communicate effectively in writing, using professionally accepted protocols, to a standard that would be suitable for publication in a research journal; visually and orally present research in a concise and clear manner; develop a research project that entails some aspect of originality, and show independence in managing the research project.	
Recommended reading list: Baumeister, R. F., & Leary, M. R. (1997). Writing narrative literature reviews. Review of General Psychology, 1, 311–320. Beins, B. C., & Beins, A. M. (2008). Effective writing in psychology: Papers, posters, and presentations. Blackwell: Oxford. Cooper, H., & Shoolbred, M. (2016). Where's your argument? Pocket study skills. Palgrave Macmillan. Hartley, J. (2008). Academic writing and publishing: A practical handbook. Abingdon: Routledge. Smyth, T. R. (2004). The principles of writing in psychology. Basingstoke: Palgrave Macmillan. Wood, C., Giles, D., & Percy, C. (2012). Your psychology project handbook: Becoming a researcher (2nd ed.). Essex: Pearson Education Limited. * For this module, you will also be expected to engage in extensive, critical reading of the academic sources underpinning your research. Your research supervisors will often provide you with some seed references to get you started.	

Optional Modules

Choose **ONE** from the following: Design and Analysis 1, Design and Analysis 2

Module title:	**Design & Analysis 1**
Module code:	03 14416
Module Lead:	Dr Dietmar Heinke
Term:	1
Credit value:	10
Delivery method:	Lectures
Assessment method: Workshop-based exam (100%)	
Marks required to pass module: 50%	
Aims and learning objectives of this module: Topics typically include: questionnaire design and analysis; discriminant function analysis; descriptive statistics; hypothesis testing: z-scores; t-tests and ANOVAs with factorial, repeated measures and mixed designs; planned and post-hot comparisons; correlation, linear and non-linear regression; multiple regression; tuition in SPSS.	
Learning outcomes: Students should be able to: choose an appropriate statistical test for a given type of data and research question; to enter data into SPSS in an appropriate format; to carry out the statistical tests covered in the course using calculators and statistical, or SPSS as appropriate, and to interpret the results of the statistical tests covered in the course.	
Recommended reading list: Dancey, C. & Reidy, J. (2014). Statistics without Maths for Psychology. Pearson.	

Module title:	**Design & Analysis 2**
Module code:	03 14417
Module Lead:	Dr Dietmar Heinke
Term:	2
Credit value:	10
Delivery method:	Lectures
Assessment method: Written exam (100%)	
Marks required to pass module: 50%	
Aims and learning objectives of this module: Research methods and analyses will typically include: advanced regression techniques (log-linear analysis, logistic regression, simple path analysis); mathematical models; qualitative analysis; survey methods; power calculations and direct observation of behaviour.	
Learning outcomes: Students should be able to: choose an appropriate statistical test or analysis tool for a given type of data (qualitative or quantitative) and a research question; to carry out the quantitative statistical tests covered in the course using SPSS; to interpret the results of the statistical tests covered in the course, and to carry out and interpret a thematic analysis of selected newspaper articles.	
Recommended reading list: Field, A. (2013). Discovering Statistics Using SPSS. Sage. Howell, D. (2011). Statistical Methods for Psychology, 8th Edition. Cengage. Kline, R. B. (2010). Principles and Practice of Structural Equation Modelling. Guilford Press.	

Module title:	**Advanced Brain Imaging Methods**
Module code:	03 30120
Module Lead:	Professor Uta Noppeney
Term:	2
Credit value:	20
Delivery method:	Lectures, workshops and computer-based exercises
Assessment method: Written exam (100%)	
Marks required to pass module: 50%	
Aims and learning objectives of this module: Lectures will cover advanced methods of data analysis and statistics for MRI and M/EEG. In addition, students will perform computer-based data analysis. The data analysis will be predominantly based on Matlab and the academic software package SPM. http://www.fil.ion.ucl.ac.uk/spm/software/spm8/.	
Learning outcomes: By the end of the module the student should be able to: design and analyse functional imaging experiments to address experimental questions in neuroscience; understand univariate and multivariate analysis approaches, and describe functional and effective connectivity methods.	
Recommended reading list: A reading list will be available at beginning of module.	