

Module code: MOD002536	Version: 5 Date Amended: 10/May/2023
-------------------------------	--

1. Module Title
Imaging and Diagnostics in Cognitive Neuroscience

2a. Module Leader
Sharon Geva

2b. School
School of Psychology, Sport and Sensory Sciences

2c. Faculty
Faculty of Science and Engineering

3a. Level
7

3b. Module Type
Standard (fine graded)

4a. Credits
30

4b. Study Hours
300

5. Restrictions			
Type	Module Code	Module Name	Condition
Pre-requisites:	None		
Co-requisites:	None		
Exclusions:	None		
Courses to which this module is restricted:	MSc Cognitive and Clinical Neuroscience		

LEARNING, TEACHING AND ASSESSMENT INFORMATION

6a. Module Description

In this of module, you will learn about the methodological foundations of cognitive neuroscience, including neuropsychological assessment and neuroimaging. Strengths and limitations of the various techniques currently available to investigate the relationship between mind and brain will be discussed. You will learn about commonly used brain imaging techniques, including functional and structural Magnetic Resonance Imaging (MRI) Positron Emission Tomography (PET), electroencephalography (EEG), and magnetoencephalography (MEG). The importance combining methods when addressing key theoretical issues will be highlighted.

There will be lectures and practical lab work on experimental design and analysis of MRI and EEG data. Example data sets will be provided and analysed. The assumptions and application of statistical methods will be outlined, including the pre-processing of MRI data, construction of models and subsequent analysis.

Students will be required to analyse data sets independently and submit these for assessment. The module will equip students with a wide range of highly useful research and analysis skills of particular relevance to further doctoral studies or employment in the field of human neuroscience such as within a dedicated research unit, a university or teaching hospital.

6b. Outline Content

- Methodological foundations of cognitive neuroscience - Brain anatomy and connectivity - Method: Neuropsychological assessment - Method: Positron emission tomography (PET) - Method: Structural and functional magnetic resonance imaging (fMRI and MRI) - Method: Electroencephalography and magnetoencephalography (EEG and MEG) - Analysis: MRI data - Analysis: EEG data - Use of multiple converging methodologies

6c. Key Texts/Literature

The reading list to support this module is available at: <https://readinglists.aru.ac.uk/>

6d. Specialist Learning Resources

It is essential that a dedicated computer laboratory is available for this module, with sufficient PCs to allow one student per PC in each practical session. Each PC should be equipped with Matlab and Statistical Parametric Mapping (SPM) software, MRICron, and MRICroGL, as well as standard software such as Microsoft Word, Excel and SPSS. There should be space in the laboratory to allow students to work in groups or individually on experimental design, and the processing of neuroimaging and ERP data. The module should be run within the context of a department with a variety of research laboratories to support group projects, with access to a range of equipment (including EEG and eye tracker equipment), and appropriate psychological tests to be used under supervision.

7. Learning Outcomes (threshold standards)		
No.	Type	On successful completion of this module the student will be expected to be able to:
1	Knowledge and Understanding	Understand and critically evaluate the methodological foundations of human neuroscience.
2	Knowledge and Understanding	Demonstrate detailed knowledge of neuroanatomy and the strengths and weaknesses of methods employed to investigate it.
3	Knowledge and Understanding	Construct theoretically informed experimental approaches for investigating the neural basis of cognition.
4	Intellectual, practical, affective and transferrable skills	Design highly controlled functional neuroimaging experiments
5	Intellectual, practical, affective and transferrable skills	Process, analyse and interpret neuroimaging and neuropsychological data for clinical diagnostic and research purposes
6	Intellectual, practical, affective and transferrable skills	Present written research findings in an appropriate academic style

8a. Module Occurrence to which this MDF Refers				
Year	Occurrence	Period	Location	Mode of Delivery
2026/7	ZZF	Template For Face To Face Learning Delivery		Face to Face

8b. Learning Activities for the above Module Occurrence			
Learning Activities	Hours	Learning Outcomes	Details of Duration, frequency and other comments
Lectures	0	None	None
Other teacher managed learning	24	1-5	12 x 2 hour sessions: Lectures and computer based practical sessions
Student managed learning	276	1-6	140 hours preparation and writing up computer assignments 138 hours revision and writing up of essays
TOTAL:	300		

9. Assessment for the above Module Occurrence					
Assessment No.	Assessment Method	Learning Outcomes	Weighting (%)	Fine Grade or Pass/Fail	Qualifying Mark (%)
010	Coursework	2-6	50 (%)	Fine Grade	40 (%)
Portfolio (3000 words)					
Assessment No.	Assessment Method	Learning Outcomes	Weighting (%)	Fine Grade or Pass/Fail	Qualifying Mark (%)
011	Coursework	1-6	50 (%)	Fine Grade	40 (%)
Coursework (2000 words)					

In order to pass this module, students are required to achieve an overall mark of 40% (for modules at levels 3, 4, 5 and 6) or 50% (for modules at level 7*).

In addition, students are required to:

- (a) achieve the qualifying mark for each element of fine graded assessment as specified above
- (b) pass any pass/fail elements

[* the pass mark of 50% applies for all module occurrences from the academic year 2024/25 – see Section 3a of this MDF to check the level of the module and Section 8a of this MDF to check the academic year]