Neuroscience

Programme Requirements:

Neuroscience - MRes
30 credits from Module List:PN5000-PN5001 30 credits from Module List: PN3313, 4230-4231, 4234-4235, PS4065, 4071, 4079, 4089, 4091, 4096-4097, BL4232, 4224-4225, 4274, 4280, 4282, 4285 **and** PN5099 (120 credits) Additional PS - , PN - and BL - coded modules may be taken with approval of the programme coordinator and relevant module coordinator

Compulsory modules:

PN5000 Neuroscience Research Design Reading Party

SCOTCAT Credits:	10	SCQF Level 11	**Semester**	Summer Holiday before start of session
Academic year:	2018/9			
Availability restrictions:	Available only to students on MRes in Neuroscience.			
Planned timetable:	n/a			
An introductory week-long module designed to provide an intensive introduction to designing and carrying out neuroscience research at the postgraduate level. Throughout the module, students will have opportunities learn transferable career skills that revolve around the process of proposing and evaluating scientific research. Students will critically analyse current primary literature in neuroscience and the methodology and ethical issues underlying research proposals. Students will self-direct their own learning and work in groups to formulate research proposals which they then orally present. In response to feedback, students finally submit a written assessment that critically evaluates published primary literature or grant proposals.				
Learning and teaching methods of delivery:	**Weekly contact**: 20 hours of lectures and 20 hours of tutorials during 1 week in summer vacation 2 weeks before presessional week			
Assessment pattern:	Coursework = 100%			
Re-assessment pattern:	Resubmission of failed item(s) of coursework			
Module coordinator:	Dr S Pulver			
Module teaching staff:	Team taught			

PN5001 Techniques and Skills in Neuroscience Research

SCOTCAT Credits:	20	SCQF Level 11	**Semester**	1
Academic year:	2018/9			
Planned timetable:	n/a			

This seminar-based module offers a theoretical perspective on state-of-the-art neuroscience techniques through critical analysis of primary literature. It also provides opprotunities to learn transferrable career skills that are of importance to neuroscientists irrespective of any one area of research. Weekly seminars will involve presentations by students and /or staff that cover neurophysiological, neuropharmacological and neurogenetic approaches to understanding neural function. Seminars will also provide a framework for discussing general career skills such as grant writing, gaining ethical approval for research, using technology to enhance communication, and social networking within scientific communities. Learning will be largely self-directed with students delving into research areas and career paths that they wish to pursue. Assessment will be based on oral presentations which synthesize and critique recent advances in neuroscience.

Learning and teaching methods of delivery:	**Weekly contact**: 1.5-hour seminars (x 11 weeks)
Assessment pattern:	Coursework = 100%
Re-assessment pattern:	Resubmission of failed item(s) of coursework
Module coordinator:	Dr S Pulver
Module teaching staff:	Team taught

PN5099 Masters Thesis Research in Neuroscience

SCOTCAT Credits:	120	SCQF Level 11	**Semester**	Full Year
Academic year:	2018/9			
Planned timetable:	n/a			

The student will carry out a major piece of original and independent research under the supervision of an academic advisor. Supervision will be regular but will vary depending on the nature of the research project and the skill set of individual students. Under normal circumstances, research will be carried out during both semesters and during the summer. The aim of the module is to give students an opportunity to design, conduct and analyze neuroscience research and then learn how to present such work in writing. Assessemnt will be in the form of an oral presentation at the beginning of semester 2 and in the form of a written thesis submitted by the stated date in August.

Learning and teaching methods of delivery:	**Weekly contact**: 1 hour (x 40 weeks)
Assessment pattern:	30-minute Oral Examination = 25%, Dissertation = 75%
Re-assessment pattern:	No Re-Assessment Available
Module coordinator:	Dr S Pulver
Module teaching staff:	various

Optional modules:

PN3313 Neuroscience

SCOTCAT Credits:	20	SCQF Level 9	**Semester**	1
Academic year:	2018/9			
Planned timetable:	Lectures: 12.00 am Mon, Tue and Wed Practicals: to be arranged.			
This module covers biochemical, cellular and behavioural aspects of the nervous system in health and disease. It starts with the basic biochemistry of neural membrane proteins such as receptors and channels, and considers the cellular mechanisms of action potential generation and propagation, and synaptic transmission. The physiology of sensory perception is illustrated by examining the visual system, while motor control is considered in terms of vertebrate locomotion. Selected aspects of learning and memory processes are also examined. Students are given extensive hands-on experience of computer simulation as a learning tool in this course. The associated practical work illustrates the lecture course through experiments on the nerve impulse, and mechanisms of neuronal cell loss.				
Pre-requisite(s):	Before taking this module you must pass BL2301 and pass BL2305			
Anti-requisite(s)	You cannot take this module if you take BL3313			
Learning and teaching methods of delivery:	**Weekly contact**: 29 hours of lectures or tutorials in total, 3 x 3-hour practicals and 4 hours of labs during the semester.			
Assessment pattern:	3-hour Written Examination = 60%, Coursework = 40%			
Re-assessment pattern:	3-hour Written Examination = 100%			
Module coordinator:	Dr G B Miles			
Module teaching staff:	Prof F Gunn-Moore, Prof K Sillar, Dr S Pulver, Dr G Miles, Dr W Heitler, Dr W Li, Dr G Doherty			

PN4230 Neurodegeneration and Aging

SCOTCAT Credits:	15	SCQF Level 10	**Semester**	1
Academic year:	2018/9			
Availability restrictions:	BSc Hons Neuroscience students have priority on this module			
Planned timetable:	Seminars: 3.00 pm - 4.00 Mon, 1.00 pm - 2.00 pm Thu (weeks 1-5); Seminars: 12.00 pm - 2.00 pm Thu (weeks 7 and 9-11); Labs: 2.00 pm - 5.00 pm Tues, Wed (week 8)			
In this module, students will develop a detailed understanding of molecular neuroscience. Work will focus at the biochemical and molecular level, so that detailed knowledge of signalling pathways will be gained.The module concentrates on three key areas relating to neurodegenerative processes. 1) How neurons stay alive 2) The aging nervous system: Changes that can 'prime' neurons for degeneration, degenerative disorders - risks, pathology, treatments. Including a practical session 3) How the nervous system responds to neurodegenerative diseases, with particular focus on Alzheimer's disease.				
Pre-requisite(s):	Before taking this module you must pass PN3313 and pass BL3303			
Anti-requisite(s)	You cannot take this module if you take BL4230			
Learning and teaching methods of delivery:	**Weekly contact**: Seminars: up to 2 hours per week (to a total of 18 hours) and 2 x 3-hour practicals during the semester.			
Assessment pattern:	2-hour Written Examination = 66%, Coursework = 34%			
Re-assessment pattern:	2-hour Written Examination = 100%			
Module teaching staff:	Prof F Gunn-Moore, Dr G Doherty, Dr M Andrews			

PN4231 Neuromodulation

SCOTCAT Credits:	15	SCQF Level 10	**Semester**	2
Academic year:	2018/9			
Availability restrictions:	BSc Hons Neuroscience students have priority on this module			
Planned timetable:	Lectures: 11.00 am - 12.00 noon Tue and 10.00 am - 11.00 am Fri. Practicals to be arranged.			
Until recently the nervous system was viewed as a black and white world in which neuronal networks carried out tasks using fast chemical synaptic transmission to produce an appropriate network output. However the output of neuronal networks is not fixed but instead is modifiable under different behavioural or developmental circumstances. A major source of flexibility in the output neuronal networks derives from neuromodulation; a process in which the basic operation of the networks remains the same but the strengths of synaptic connections and the integrative electrical properties of neurons in the networks are changed by the actions of a range of neuromodulators. This module explores the diverse range of neuromodulatory mechanisms and outlines their importance in information processing in the nervous system.				
Pre-requisite(s):	Before taking this module you must pass PN3313			
Anti-requisite(s)	You cannot take this module if you take BL4231			
Learning and teaching methods of delivery:	**Weekly contact**: 2 seminars.			
Assessment pattern:	1.5-hour Written Examination = 50%, Coursework = 50%			
Re-assessment pattern:	1.5-hour Written Examination = 100%			
Module coordinator:	Dr S Pulver			
Module teaching staff:	Dr S Pulver, Prof K Sillar, Dr G Miles, Dr W Li, Dr W Heitler			

PN4234 Synaptic Transmission

SCOTCAT Credits:	15	SCQF Level 10	**Semester**	2
Academic year:	2018/9			
Availability restrictions:	BSc Hons Neuroscience students have priority on this module			
Planned timetable:	Lectures: 11.00 am - 12:30 pm Wed and 12.00 noon - 1.00 pm Fri. Practicals to be arranged.			
Extensive and versatile communication between nerve cells using special junctions called synapses endows the nervous system with many complex functions like learning and memory. This module will cover important recent progress in understanding the morphology and ultrastructure of synapses, neurotransmitter corelease and recycling mechanisms, retrograde signalling, synaptic plasticity, the role of glial cells and the development of neurotransmission. Some laboratory work will provide students with hands-on experience of advanced research methods.				
Pre-requisite(s):	Before taking this module you must pass PN3313			
Anti-requisite(s)	You cannot take this module if you take BL4234			
Learning and teaching methods of delivery:	**Weekly contact**: A total of 6 x 1.5 hour seminars, 7 x 1 hour lectures and 2 x 3 hour practicals over 10 weeks			
Assessment pattern:	2-hour Written Examination = 60%, Coursework = 40%			
Re-assessment pattern:	2-hour Written Examination = 100%			
Module coordinator:	Dr W Li			
Module teaching staff:	Dr W Li, Dr S Pulver, Dr G Miles			

PN4235 Motoneurons: From Physiology to Pathology

SCOTCAT Credits:	15	SCQF Level 10	**Semester**	1
Academic year:	2018/9			
Availability restrictions:	BSc Hons Neuroscience students have priority on this module			
Planned timetable:	Lectures : 2.00 pm - 3.00 pm Mon and 9.00 am - 10.30 am Fri. Practicals to be arranged.			
This module aims to provide in depth knowledge of key aspects of neuronal function and potential dysfunction by focussing on one of the most studied and best characterised classes of neurons in the central nervous system, motoneurons. The module will cover topics such as: the history of motoneurons in neuroscience research; the genetics controlling motoneuron development, the intrinsic electrical properties of motoneurons; synaptic inputs received by motoneurons; motoneuron recruitment; and motoneuron disease.				
Pre-requisite(s):	Before taking this module you must pass PN3313			
Anti-requisite(s)	You cannot take this module if you take BL4235			
Learning and teaching methods of delivery:	**Weekly contact**: 10 hours of seminars, 6 hours of lectures and 6 hours of practical over the semester.			
Assessment pattern:	2-hour Written Examination = 60%, Coursework = 40%			
Re-assessment pattern:	2-hour Written Examination = 100%			
Module coordinator:	Dr G B Miles			
Module teaching staff:	Dr W Li, Prof K Sillar, Dr G Miles, Dr W Heitler			

PS4071 Behavioural Neuroscience

SCOTCAT Credits:	15	SCQF Level 10	**Semester**	1
Academic year:	2018/9			
Availability restrictions:	UG - Available only to students in the second year of the Honours Programme.			
Planned timetable:	11.00 am - 1.00 pm Thu			
The overall aim of this module is to allow students access to current research in the area of behavioural neuroscience. Possible topics include motivation, learning and attention. Past themes explored in the module include: the relationship between 'normal' learning and addiction; the transition from goal-directed action to stimulus-response habit; the neural basis of compulsive gambling; the efficacy of biological treatments of addiction; and the behavioural and neural effects of MDMA ('ecstasy'). Results from both human and animal research will be considered in parallel, with examples of papers ranging from molecular neuroscience to neuropsychology. The format of the module will include lectures (which are designed to provide the students with the background necessary to read research articles); guided seminars and student presentations summarising research articles. In order to maximise the benefits of the students' presentations, each student will meet with the lecturer at least twice to discuss the topic and content of their talk.				
Pre-requisite(s):	Module prerequisites may be waived for students with entry into honours psychology. Before taking this module you must pass PS2002			
Learning and teaching methods of delivery:	**Weekly contact**: 2-hour seminars plus office hour.			
Assessment pattern:	2-hour Written Examination = 75%, Coursework = 25%			
Re-assessment pattern:	2-hour Written Examination = 75%, Coursework = 25%, Re-assessment applies to failed components only			
Module coordinator:	Dr E M Bowman			

PS4079 Sex Differences and Gender Development

SCOTCAT Credits:	15	SCQF Level 10	**Semester**	2
Academic year:	2018/9			
Availability restrictions:	Available only to students in the second year of the Honours Programme			
Planned timetable:	11.00 am - 1.00 pm Fri			
This advanced-level module will examine the evidence for sex differences in human behaviour and explore how gender develops across the lifespan. Students will learn how hormones, such as testosterone and estrogen, influence brain function and behaviour in non-human animals and will apply this knowledge to human data. Example topics include sexual behaviour (including sexual orientation), aggression, memory, sex differences in mental health, and the evolution of sex differences. Teaching will be based on student-led seminars with supporting lectures. Emphasis will be placed on critical evaluation and the ability to relate scientific data to broader debates regarding sex differences in behaviour.				
Pre-requisite(s):	Before taking this module you must pass PS2002. Module prerequisites may be waived for students with entry into honours psychology			
Learning and teaching methods of delivery:	**Weekly contact**: 2-hour seminar plus office hour.			
Assessment pattern:	Coursework = 100%			
Re-assessment pattern:	Coursework = 100%			
Module coordinator:	Dr G R Brown			
Module teaching staff:	Dr G Brown			

PS4089 Neural Basis of Episodic Memory

SCOTCAT Credits:	15	SCQF Level 10	**Semester**	1
Academic year:	2018/9			
Availability restrictions:	Available only to students in the second year of the Honours Programme			
Planned timetable:	11.00 am - 1.00 pm Tue			
This module will examine how the brain enables us to remember information from our personal experience. It will present students with cutting edge research using both humans and animals that gives us an insight into how the psychological components of episodic memory can be represented and processed by the brain. We will go on to look at how this type of research is applied in fields such as future thinking and memory decline in dementia. The course will include lectures and student presentations based around current research articles in the field.				
Pre-requisite(s):	Before taking this module you must pass PS2002			
Learning and teaching methods of delivery:	**Weekly contact**: 2-hour seminars plus office hour.			
Assessment pattern:	Written Take Home Examination = 75%, Coursework = 25%			
Re-assessment pattern:	Coursework = 100%			
Module coordinator:	Dr J A Ainge			

PS4091 Computer-aided Research

SCOTCAT Credits:	15	SCQF Level 10	**Semester**	1
Academic year:	2018/9			
Availability restrictions:	Available only to students in the second year of the Honours Programme, or Research Methods in Psychology (MSc)			
Planned timetable:	9.00 am - 11.00 am Tue			
As research becomes ever more computationally intense, the ability to use modern research software is becoming indispensable. This practical module will offer an introduction to computational modelling and provide you with the skills necessary to apply it in your research. Emphasis will be put on using scientific scripting languages in a research context. This module will build on the statistical techniques learned in previous modules and introduce modelling techniques, and imaging, stimulus presentation, and data visualisation.				
Pre-requisite(s):	Module prerequisites may be waived for students with entry into honours psychology. Prerequisites PS3021 and PS3022 are applicable to ug students only. . Before taking this module you must pass PS3022			
Learning and teaching methods of delivery:	**Weekly contact**: 1 lecture and 1 seminar plus office hour.			
Assessment pattern:	Coursework = 100%			
Re-assessment pattern:	Coursework = 100%			
Module coordinator:	Dr T Otto			

PS4096 Mechanisms of Behaviour: integrating psychological and neuroscience perspectives

SCOTCAT Credits:	15	SCQF Level 10	**Semester**	2
Academic year:	2018/9			
Availability restrictions:	Available only to students in the second year of the Honours programme			
Planned timetable:	12.00 noon - 2.00 pm Tue			
The aim of this module is to explore some of the many physiological and neural systems that modulate patterns of behaviour in a range of species, including humans. It will highlight the importance of integrating information from psychology and neuroscience disciplines in order to further our understanding of how and why animals and humans behave the way they do in different situations. The module will deal with examples of mechanisms across different levels of complexity (from genes to physiology). The module will include lectures and student presentations/journal club discussions based around current research articles in the field and a practical session with hands on experience of a physiological technique.				
Pre-requisite(s):	Before taking this module you must pass PS2002			
Learning and teaching methods of delivery:	**Weekly contact**: 2-hour lecture (x 10 weeks), 1 practical class (x 4 weeks) plus office hour.			
Assessment pattern:	Coursework (including presentation) = 100%			
Re-assessment pattern:	Coursework = 100%			
Module coordinator:	Dr K A Spencer			
Module teaching staff:	Dr K Spencer			

PS4097 Research Methods in Cognitive Neuroscience

SCOTCAT Credits:	15	SCQF Level 10	**Semester**	2
Academic year:	2018/9			
Availability restrictions:	Available only to students in the second year of the Honours programme			
Planned timetable:	9.00 am - 11.00 am Tue			
Tremendous progress in technology allows now to observe the brain in action to understand the physical bases of behaviour. This module showcases this state of the art approach. Guided by a team of lecturers with first-hand expertise in trans cranial magnetic stimulation, neurophysiology, electrophysiology, behavioural modelling, neuropsychology and functional magnetic resonance imaging the students will develop their ability to evaluate and propose cutting edge research. The course includes lectures and student led discussions of current research topics.				
Pre-requisite(s):	Before taking this module you must pass PS2002			
Learning and teaching methods of delivery:	**Weekly contact**: 1 lecture, 1 seminar plus office hour.			
Assessment pattern:	Coursework = 100%			
Re-assessment pattern:	Coursework = 100%			
Module coordinator:	Dr D Balslev			
Module teaching staff:	Dr D Balslev, Dr T Otto, Dr J Ales, Dr G Miles			

BL4224 Molecular Mechanisms of Membrane Trafficking

SCOTCAT Credits:	15	SCQF Level 10	**Semester**	2
Academic year:	2018/9			
Planned timetable:	To be arranged.			
Membrane trafficking mediates the transport of substances between different cellular organelles and the secretion of substances from cells. As such, regulation of membrane trafficking is applicable to all cell types, but especially to specialised secretory cells such as neurons, which secrete neurotransmitters and pancreatic beta-cells which secrete insulin. This module will consider how molecules control the movement of substances through the secretory pathway, but will focus on how cells regulate the release of contents. Within the module you will look at the proteins involved, the different experiments used to study the process and how model organisms are enhancing our understanding.				
Pre-requisite(s):	Before taking this module you must pass BL3303			
Learning and teaching methods of delivery:	**Weekly contact**: 1 x 2-hour seminar (x 11 weeks)			
Assessment pattern:	2-hour Written Examination = 50%, Coursework = 50%			
Re-assessment pattern:	2-hour Written Examination = 50%, Existing Coursework = 50%			
Module coordinator:	Dr G R Prescott			
Module teaching staff:	Dr G Prescott, Dr J Tilsner			

BL4274 Evolutionary Developmental Biology

SCOTCAT Credits:	15	SCQF Level 10	**Semester**	1
Academic year:	2018/9			
Planned timetable:	To be arranged.			
Evolution of new morphologies involves changes to the development of organisms. The field of evolutionary developmental biology is thus becoming established as a major and essential component of any comprehensive understanding of evolutionary biology. This module aims to cover some of the main, current themes in evolutionary developmental biology. Since animal life evolved in the sea, much of what we can learn about the major events in animal evolution can be obtained from studying marine invertebrates. Consequently the examples covered in this module will tend to be drawn from these organisms.				
Pre-requisite(s):	Permission of biology honours adviser required			
Learning and teaching methods of delivery:	**Weekly contact**: 1 x 2-hour seminar (x 10 weeks).			
Assessment pattern:	Coursework = 100%			
Re-assessment pattern:	Resubmission of failed item(s) of Coursework			
Module coordinator:	Dr D E K Ferrier			
Module teaching staff:	Dr D Ferrier, Dr I Somorjai			

BL4280 Evolution and Human Behaviour

SCOTCAT Credits:	15	SCQF Level 10	**Semester**	1
Academic year:	2018/9			
Planned timetable:	To be arranged.			
Evolutionary biologists, anthropologists and psychologists have taken evolutionary principles and used them to explain a range of human characteristics, such as homicide, religion and sex differences in behaviour. Other researchers are sceptical of these interpretations, and critical of the methods. Moreover, researchers disagree as to the best ways to use evolution to explore humanity, and a number of schools of thought have emerged. This module will introduce and critically evaluate the main evolutionary approaches currently being used, including socio-biology, evolutionary psychology, behavioural ecology and gene-culture co-evolution.				
Pre-requisite(s):	Permission of biology honours adviser required			
Learning and teaching methods of delivery:	**Weekly contact**: 1 x 2-hour seminar (x 10 weeks).			
Assessment pattern:	1.5-hour Written Examination = 40%, Coursework = 60%			
Re-assessment pattern:	1.5-hour Written Examination = 40%, Existing Coursework = 60%			
Module coordinator:	Dr M M Webster			
Module teaching staff:	Dr M Webster. Dr K Cross, Dr L Dean, Dr C Evans, Dr A Navarrete			