UCL
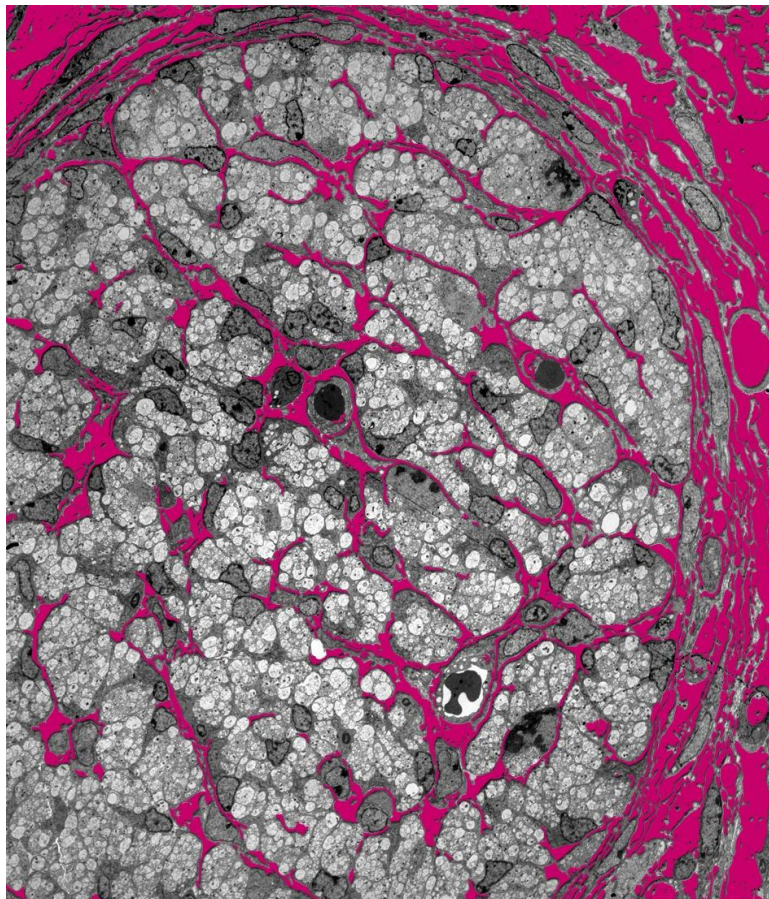
Programme Handbook 2017/18

BSc Honours Neuroscience Students (UBSANASNEU05)
MSci Honours Neuroscience Students (UMSANASNEU05)
IBSc Honours Neuroscience Students (UBIMEDWNEU01)

Section through the sciatic nerve of a fetal rat with the connective tissue spaces highlighted

UNDERGRADUATE NEUROSCIENCE AT UCL

INTRODUCTION

The **BSc, MSci and Integrated BSc in Neuroscience** are three of many undergraduate programmes administered by the Division of Biosciences within the Faculty of Life Sciences at UCL. The following pages contain **detailed information about matters specific to these programmes**, including contact details for tutors and administrators, programme-specific and year-specific requirements, and descriptions of core and optional modules for these programmes. The BSc and MSci programmes are identical until the end of Year 2.

Note that the term **'course'**, in common usage, can mean either a whole degree programme or a specific component of that programme. To avoid this ambiguity, UCL prefers us to use the term **'module'** when referring to a programme component, and we shall use that term here. Note, though, that most of the staff who run individual 'modules' still think of them as 'courses' and of themselves as 'course organisers'.

These pages **must** be read in conjunction with the **Divisional Handbook** that is available on Moodle to all undergraduate students in the Division of Biosciences. That document contains **essential information and advice** that applies equally to all Biosciences students, regardless of degree programme, including information about:

- The Division of Biosciences
- The Biosciences Teaching Office
- The Faculty of Life Sciences
- Registration and module enrolment
- Library and IT facilities
- Facilities for students with disabilities
- Portico, the UCL student information service
- The UCL Online Common Timetable and its block structure
- Moodle, UCL's virtual learning environment
- Tuition fees and sources of student support
- The academic year and term dates
- Attendance requirements, regulations and marking schemes
- Regulations about assessed coursework, including penalties for late submission, exceeding word limits and various forms of plagiarism
- Examination procedures and regulations
- Regulations for the award of degrees
- Student representation, student feedback and complaints procedures
- The Data Protection Act, Health and Safety and the Careers service
- ... and much more

Some of the issues listed here are more urgent than others: in particular, it is **crucial** that you understand not only the obvious kind of plagiarism (passing off the work of others as your own) but also the concept of 'self-plagiarism', which has caught out even well-intentioned students in the past, but is open to the same serious penalties as copying the work of others." For details, please see: http://www.ucl.ac.uk/current-students/guidelines/plagiarism

Further information can be found by referring to the College and Examination Regulations in the UCL Academic Manual, which can be found at: http://www.ucl.ac.uk/registry/acd_regs

Other support information can be found at: http://www.ucl.ac.uk/current-students/

KEY NEUROSCIENCE PROGRAMME CONTACTS

Academic Staff

Professor Paola Pedarzani p.pedarzani@ucl.ac.uk	Programme Tutor for the BSc/MSci in Neuroscience
Dr Marco Beato m.beato@ucl.ac.uk	First Year Tutor for the BSc/MSci in Neuroscience
Dr Francesca Cacucci f.cacucci@ucl.ac.uk	Second Year Tutor for the BSc/MSci in Neuroscience
Professor Stephen Price stephen.price@ucl.ac.uk	Third Year Tutor for the BSc/MSci in Neuroscience and Tutor for NEUR3903 BSc Projects
Professor Maria Fitzgerald m.fitzgerald@ucl.ac.uk	Fourth Year Tutor for the MSci in Neuroscience and Tutor for NEURM901 and NEURM030 MSci projects
Professor Talvinder Sihra t.sihra@ucl.ac.uk	Tutor for NEUR3904 BSc/MSci Library Projects
Professor Christopher Yeo c.yeo@ucl.ac.uk	Tutor for the Integrated BSc in Neuroscience
Dr Martina Wicklein m.wicklein@ucl.ac.uk	Deputy Tutor for the Integrated BSc in Neuroscience

Administrative Staff

Mr Nick Clarke n.m.clarke@ucl.ac.uk	Undergraduate Neuroscience Teaching Administrator Room G10, Medawar Building; internal extn. 33751

CONTACTING STAFF FOR HELP AND ADVICE

The most reliable, and often quickest, way to contact members of the academic staff is by e-mail because many of them spend rather little time in their offices, although some advertise 'office hours' during which they can be visited. E-mail addresses and other contact information can be found from

the UCL Directory at http://www.ucl.ac.uk/directory/.

The Teaching Office is open 09.30 am - 4.00 pm Monday to Friday for any manner of student enquiries. Holiday opening hours are 10am-12pm and 2pm-4pm. This is where you will submit and collect the majority of your hard-copy coursework. The office is also available for any general enquiries you may have such as timetabling, locating module organisers etc.

Module Organisers (Course Organisers) have overall responsibility for organising individual modules. If you have a general enquiry about a module you should contact the Module Organiser. If you have an enquiry about a particular lecture within a module then it might be more appropriate to contact the particular lecturer concerned. You should be able to obtain enough information about each lecturer from the relevant module page on Moodle to find their contact details using the UCL directory (see above).

You are almost certain to require references from your tutors for accommodation, voluntary work, summer jobs or lab placements, vacation studentships, permanent jobs, or further study. Your **Personal Tutor** will normally be your main referee for such purposes, and your Year Tutor can also advise you about suitable referees. It is always courteous to discuss the matter with your potential referee **before** giving his or her name on an application. An e-mail should be sufficient, but you do need to supply clear information about what you are applying for and why, and when the reference may be needed. Please allow plenty of time – references take time to research and write and time to print and mail or submit online. A reference that has been hastily cobbled together is not in your own interest.

For any information or advice that goes beyond the remit of a particular module, including personal problems, your Personal Tutor or Year Tutor (for IBSc students, the IBSc tutor) should normally be your first point of contact.

If for any reason you prefer to seek help outside the Faculty, there are the following sources of support:
Student Union Rights and Advice Centre is located at 25 Gordon Street, London, WC1H 0AY. Tel: 020 7679 2998

UCL Student Disability Services provide a comprehensive range of support services for students who have a disability which impacts upon their studies at UCL. Location: level 4, UCL Institute of Education, 20 Bedford Way, London, WC1H 0AL. Email: disability@ucl.ac.uk

UCL Student Psychological Services is dedicated to helping UCL students with personal, emotional and psychological concerns. Location: Ground Floor, 3 Taviton Street, London WC1H 0BT. Tel: 020 7679 1487. E-mail: g.nandagopal@ucl.ac.uk (Gopiha Nandagopal, Senior Executive Officer)

The Student Centre is located on the ground floor of the Chadwick Building on the Gower Street Campus and is open from 10:00 – 16:00, Monday, Tuesday, Thursday and Friday. On Wednesdays the Student Centre is open 11:00 to 17:00.

Ridgmount Practice (formerly Gower Place Practice) is the UCL Health Centre. Registered students can make appointments or attend the walk-in surgery which operates from Monday – Friday between 9.30am to 10.30am and 2.30pm to 3.30pm. Ridgmount Practice is located at 8 Ridgmount Street.

UCL Student Support and Wellbeing is working in partnership with Care first to provide students with an out of hours support and information helpline. Information and counselling are provided via telephone from Monday to Friday from 5pm to 9am, at weekends and during Bank Holidays and College closure periods.

Keeping up with changes — notice boards and student e-mail

Physical notice boards for 1st, 2nd and 3rd year students are placed outside the Divisional Teaching Office on the ground floor of the Medawar Building. It is the responsibility of students to check these notice boards regularly for information about their modules, although increasingly e-mail and Moodle are being used to notify changes (see below). You will also find other useful information there, such as careers notices.

Students are expected to check their UCL e-mail accounts frequently and regularly. Important information is often disseminated by this route exclusively, sometimes at short notice. When you enrol you will be allocated a UCL e-mail address – this is the address which will be used by College and all staff; they will **NOT** normally correspond with private e-mail addresses. Sometimes students prefer to have information forwarded to their private e-mail address; if you choose to do this it is your responsibility to ensure that the forwarding arrangements are effective, or you may miss important messages. Information on how to do this can be found at http://www.ucl.ac.uk/isd/ .

It is your responsibility to update your personal information (addresses, landline and mobile telephone numbers etc.) on the College 'Portico' system whenever there are changes.

THE NEUROSCIENCE DEGREE PROGRAMMES

Aims

The Neuroscience degree programmes at UCL aim to produce graduates with a secure foundation in the current knowledge base and common methodologies of Neuroscience and in the analytical, critical, problem-solving, informatics and communication skills that are needed both for advanced study and for careers in the private or public sector. UCL and its associated institutes together embody the greatest critical mass of neuroscience researchers in Europe and have a world-wide reputation for neuroscience research. Thus, the structure of this degree programme puts particular emphasis on current research across a wide range of specialist disciplines, in both taught options and individually-supervised, laboratory-based research projects.

Learning objectives

To obtain a BSc, MSci or IBSc in Neuroscience at UCL, a student must be able to:–

- Compile and critically evaluate information about any aspect of the Life Sciences from a wide range of paper-based and online electronic sources *(study and IT skills)*.

- Perform a wide range of laboratory techniques competently and safely, as part of a team or individually with minimal supervision *(practical, cooperative and decision-making skills)*.

- Explain and apply general principles, common facts and standard techniques of Anatomy, Biochemistry, Developmental Biology, Molecular Biology, Physiology, Pharmacology and Quantitative Analysis as they concern the nervous system *(general subject knowledge)*.

- Compile, present and defend, in writing and orally, a detailed report on a piece of original experimental research that they have personally conducted *(specific subject knowledge, and skills in experimental techniques, report writing and oral presentation)*.

- Satisfy external examiners, in specialist Neuroscience subjects offered at the final examination, that they are familiar with current research issues, can describe a representative selection of recent and historically significant experiments, and can appreciate their contextual significance *(specific subject knowledge and skills in evaluation of evidence and writing under time constraint)*.

PROGRAMME STRUCTURE AND COMPONENTS

All undergraduate programmes at UCL are made up of **modules.** Each module has a value of 0.5, 1.0, 1.5, 2.0 or 3.0 **course-units** (CU) and all students must enrol for a total of 4.0 CU in each academic year, combining modules of different value as necessary. For the first two years of the BSc/MSci in Neuroscience you will normally study between six and eight modules spread across Terms 1 and 2 of each year, taking their examinations in Term 3; some of these modules will be compulsory ('core' modules) and others will be optional. In the final years you will take fewer taught modules because projects will supply a large fraction of your workload.

A full-unit module typically has 40-50 hours of lectures and a total workload (including private reading, preparation of coursework and revision) of 375 hours. A half-unit module should have about half of this workload, but in practice two half-unit modules can be more demanding than a single full-unit module. Each has its own pattern of assessment, which usually includes an examination and may also include formally assessed coursework. Details of the percentages of marks allocated to coursework and the examination can be found in module handbooks, on Moodle and in the Life Sciences Undergraduate Module Database at http://www.ucl.ac.uk/lifesciences-faculty-php/courses/search.php

Although you must take modules to the value of 4.0 CU each year, you do not necessarily have to pass every module to progress from one year to the next. However, you may still need to resit and pass a failed examination in the following year in order to be awarded your degree at the end of the

programme. In outline, all students in the Faculty of Life Sciences must pass at least 3.0 CU to progress to Year 2, and at least 7.0 CU to progress to Year 3. They must then have completed a total of 12.0 CU and passed 11.0 CU to be awarded a BSc Honours degree. In order to progress from Year 3 to Year 4, MSci students must have completed 4.0 CU from Year 1 and 4.0 CU from Year 2, and have passed at least 11.0 CU. To be awarded the MSci, they must have completed 16.0 CU and passed at least 14.5 CU. Full details about the **general requirements for progression and the award of degrees** can be found in the Division of Biosciences student handbook.

Progression in the MSci degree course is first assessed at the end of year 2. Students who do not achieve an overall year 2 average mark (calculated over 4 CU) of at least 60% will be advised to switch to the BSc. If they cannot change for VISA reasons or decide to stay on the MSci course, their performance will be assessed at the end of year 3. Only students who obtain an overall year 3 average mark (calculated over 4 CU) of 60% or above will be allowed to progress into year 4 of the MSci course. Students with an overall year 3 average mark (calculated over 4 CU) below 60% will finish their studies and receive a BSc degree.

In all years of the BSc and MSci in Neuroscience, except Year 1, there are also optional modules from which to choose. **In all cases your Year/Programme Tutor must approve your choice of optional modules.** In addition, the Biosciences Divisional Teaching Office must approve your enrolment as there may be constraints imposed by subject pre-requisites, student numbers (especially where practical classes are involved) or clashes within the timetable.

The core modules for the BSc/MSci in Neuroscience are listed in later pages of this handbook, together with some optional modules for each year.

THE INTEGRATED BSC IN NEUROSCIENCE

Introduction

The integrated BSc degree (IBSc) in Neuroscience provides an opportunity to study in one of the leading neuroscience research universities in the world. The degree has a modular course structure. You can draw from a very extensive range of third year modules that cover almost every aspect of neuroscience including developmental, sensory systems, motor systems, cognition, and their clinical relevance.

In your IBSc you will join a cohort of BSc and MSci students also studying their third or fourth year in one of a range of degree programmes that include Neuroscience, Biomedical Sciences, Physiology, Pharmacology and Psychology. This is an opportunity to learn from and exchange ideas with colleagues from these other programmes and it has proven to be a useful experience for all students.

This Neuroscience handbook contains information for students in all years of study, so you will find the section on Year 3 (page 30-31) most useful for information on course components (modules). You are asked also to read carefully the Biosciences Divisional Handbook, which supplies important information relevant to all Biosciences degree programmes.

The Programme Tutor is Prof. Christopher Yeo (c.yeo@ucl.ac.uk) who will advise and approve your project and module choices and will advise you on all matters academic through the IBSc year. Dr. Martina Wicklein (m.wicklein@ucl.ac.uk) is the Deputy Tutor

Shaping your IBSc Year

The Advanced Experimental Research Project (module code NEUR3903) is a particularly important part of your programme and you should be careful to choose taught modules that complement the project. You will find full details of this module in the guidelines to students and supervisors on the NEUR3903 Moodle site.

Not all potential supervisors will have seen the current guidelines before you contact them, so it can

be useful to familiarise yourselves with the details and <u>pass them on!</u>

You must study modules with a total value of 4.0 course-units (CU) within the year. The research project (NEUR3903) is an integral part of the programme and has a value of 1.5 CU. So you will choose additional taught modules with a total value of 2.5 CU; and individual modules may have values of 0.5 or 1.0 CU. A list of popular Year 3 Neuroscience modules can be found later in this handbook but you may select modules from a very wide range within UCL, subject to approval by the IBSc Programme Tutor.

A note on module prefixes. Prefixes such as ANAT, PHOL, PHAR, PSYC, BIOC, BIOS simply indicate departments that either previously oversaw or currently administer these modules and you are free to select from the entire range. Some modules that were previously coded as ANAT, PHOL or BIOS now have a NEUR prefix but will be similar to their predecessors in all other respects. You may select a project and supervisor from the full range of departments offering neuroscience projects. There is a very useful resource for locating neuroscience researchers at UCL. The 'UCL Neuroscience' website gathers together listings of all research laboratories that are part of UCL: http://www.ucl.ac.uk/neuroscience
You may investigate potential projects other than those outlined in the UCL Neuroscience links above but please be aware that all project arrangements are subject to approval and agreement by the IBSc Programme Tutor. It is a very good idea to have a potential project defined before the start of the session. In making your choice, there should be a sensible balance with your taught modules. You should consult your potential project supervisor about suitable accompanying modules – supervisors may have specific requirements for students who are to undertake projects in their laboratories.

Be aware that the NEUR3903 project should begin as soon as possible in Term 1 and will run throughout Terms 1 and 2.   The project will require an average of about two days of work per week throughout this time.

Assessment

Your Research Project will be assessed by your supervisor and an independent second marker who will also read the dissertation in detail. Additionally, you will give a short research presentation at the end of the project. This presentation will be assessed by the second marker and another independent examiner. Your laboratory work, dissertation and research presentation will all be assessed (see pp 33-35 for details).

Some taught modules have dissertation components, and these are assessed by the Module Organiser and an external examiner. All other modules are examined by a written paper at the end of the module and some have assessed coursework components. Full details of module assessment can be found at: http://www.ucl.ac.uk/lifesciences-faculty-php/courses/search.php

For the final IBSc degree award, the weighting of marks obtained in Years 1, 2 and 3 (the IBSc year) will be in the ratio 1:1:6.

Induction Week

There are some important dates in the first week of term – Induction Week. An introductory talk and questions and answers session by the IBSc Programme Tutors will give you an overview of the year and allow you to think about your project and taught module options. You will already have selected your taught module options but this will be an opportunity to review them. Students who will need detailed advice about their projects and taught modules, including whether module changes are possible, will be invited to sign up for individual interviews with the Programme Tutors during the week.. Additionally, there will be important introductory sessions. As part of your research project you will be working in research laboratories, and our safety briefing session is **compulsory** for research work to begin. Additional sessions will provide you with important information about how to approach your research project and your taught modules in this third year.

NEUROSCIENCE YEAR BY YEAR

The remaining pages of this booklet set out the structure of your degree programme and the main modules (core and optional) that are available to you in each year.

You may find more detailed information about individual modules by referring to various websites; listed below are the ones you should find most useful when you are deciding which modules to take.

Faculty of Life Sciences: http://www.ucl.ac.uk/lifesciences-faculty/

Life Sciences Undergraduate Module Database:
http://www.ucl.ac.uk/lifesciences-faculty-php/courses/search.php

This database has information about all modules within the Faculty of Life Sciences.

Portico: www.ucl.ac.uk/portico
Portico contains module information including assessment details. From Year 2 onwards you will need to use Portico to enter your module choices. Further information about how to do this can be found in the Biosciences Divisional Handbook.

Timetables: www.ucl.ac.uk/timetable
This handbook has been prepared before the start of term so you should **confirm all timetables** and venues by checking the above link. Do this regularly, in case times or, particularly, venues are changed. Not uncommonly, a class has to move because of its size.

COMMON TIMETABLE TEACHING BLOCKS

	Monday	Tuesday	Wednesday	Thursday	Friday
9am–11am	Block A	Block B	Block C	Block D	Block E
11am–1pm	Block C	Block D	Block E	Block A	Block B
1pm–2pm	*Lunch break*	*Lunch break*	*Lunch break*	*Lunch break*	*Lunch break*
2pm–6pm	Block F	Block G	***Normally*** *no classes on Wednesday afternoons – but there are a few exceptions*	Block H	Block I

YEAR 1 STRUCTURE FOR NEUROSCIENCE

	Module Code	Module Title	Unit Value	Term, Block
Core Compulsory: must be completed for award of the BSc or MSci in Neuroscience	NEUR1004	Introduction to Neuroscience	0.5	1+2, G
	NEUR1005	Foundations of Neurobiology	1	1, C/E/F 2, C/E/F/B
	CHEM1602	Chemistry for Biology Students	0.5	1, D/H
	BIOC1001	Biochemistry and Molecular Biology	0.5	1, A/I*
	CELL1001	Cells and Development	0.5	2 A/I* + some Wed
	PHOL1002	Mammalian Physiology	0.5	2, C/H
	BIOL1005	Introduction to Genetics	0.5	2, E* + tutorials

Blocks marked * are only partially used: see the Online Timetable for details.

**There is a Reading Week halfway through each of the autumn and spring terms.
You are required to be at UCL for any special tests, tutorials or lectures that may take place during Reading Week. There will be some Chemistry tests during reading weeks.**

YEAR 1 CORE MODULES

All Lecture, Practical and Tutorial times and venues are subject to change. Always check them beforehand using the Online Common Timetable.

NEUR1004 Introduction to Neuroscience

Value: 0.5 Unit

Organisers: Dr. Martina Wicklein, Prof. Paola Pedarzani

E-mail: m.wicklein@ucl.ac.uk; p.pedarzani@ucl.ac.uk

Class size: Neuroscience BSc/MSci intake

Year: 1

Pre-requisites: Limited to, and mandatory for, Year 1 BSc/MSci Neuroscience

Module outline:

This workshop-based 0.5 CU module is mandatory for Year 1 students on the BSc and MSci Neuroscience degree programmes and is not available to other students. This module is taught though lectures and workshops. Students analyse data that they generated themselves, learn and apply statistical tests, work with state-of-the-art databases, write guided reports, learn to read, analyse and critique primary scientific literature, prepare and deliver oral presentations on a range of neuroscience topics.The submission of written work is a major and important component: the diversity of the writing tasks, which include guided reports, essays and short answer questions, provides a solid foundation for intermediate and advanced level modules.Regular participation in the workshops and preparation and delivery of an oral presentation to the group are module requirements, the written work forms part of the assessment scheme.

Module Aims:

The primary aims are:

(1) To complement other first-year teaching on the structure and function of nerves and brains, and to provide additional support for NEUR1005 Foundations of Neurobiology.

(2) To develop the key personal study skills of independent study, selective reading, scientific writing in a variety of formats, oral presentation, peer review and discussion with peers and tutors.

(3) To provide a philosophical and historical perspective on Neuroscience that focuses on key concepts and questions, the kinds of paradigm shift that were needed even to ask these questions, and the kinds of evidence that were needed in the past, and will be needed in the future, to answer them. In addition, a deeper focus on some of the key current topics in neuroscience, including Alzheimer, pain and neurobiology of mental disorders, will be provided.

(4) To encourage and expand the particular enthusiasm for Neuroscience that causes students to choose this specialized degree programme

Coursework: *Best five marks from six written assignments*

Assessment: *Exam (70%) Coursework (30%)*

Timetable: *See Online Timetable for details of dates and venues:*

https://timetable.ucl.ac.uk/tt/moduleTimet.do?firstReq=Y&moduleId=NEUR1004

NEUR1005 Foundations of Neurobiology

Value: 1 Unit

Organisers: Dr Martina Wicklein, Prof. Paola Pedarzani

E-mail: m.wicklein@ucl.ac.uk; p.pedarzani@ucl.ac.uk

Class size: Neuroscience BSc/MSci intake

Year: 1

Pre-requisites: Limited to, and mandatory for, Year 1 BSc/MSci Neuroscience

Outline: This course provides an overview on the development, structure and function of the nervous system, from its molecular and cellular components to more complex motor and sensory system functions. It comprises basic concepts of developmental neurobiology, neuroanatomy, neurophysiology and neuropharmacology that provide an essential foundation for intermediate and higher level courses in molecular, cellular developmental and systems neuroscience. The majority of this module will be taught as a combination of lectures and tutorials building on the content delivered in the lecture. There will also be a laboratory component, focused on neuroanatomy, neurophysiology and neuropharmacology, to support the three main blocks of lectures forming the core of the course. This will be assessed by multiple choice exams during the course and an essay based end of year exam.

Aims: To give an understanding of basic neurobiology that provides a solid foundation for intermediate and advanced level courses in neurophysiology, neuroanatomy, developmental neurobiology, systems neuroscience and neuropharmacology.

To provide a first set of laboratory skills that will be useful for further practical work on 2nd, 3rd and 4th year courses in neuroanatomy, neurophysiology and neuropharmacology.

Objectives: To understand the basic principles underlying how cells in the nervous system originate, form various structures and connect to each other; To understand how the gross anatomy of the nervous system evolves during development; To achieve a solid knowledge of all major nervous system parts and regions in anatomical terms; To understand how nerve cells encode and transmit information; To understand the basic structure and function of the major motor systems; To understand the basic structure and function of sensory systems; To understand basic concepts of drug action in neurons; To achieve a first overview on major neurological and mental disorders and some of the therapeutic strategies used to treat them.

Assessment: *MCQs (30%); Unseen three-hour written examination (70%).*

Timetable: *See Online Timetable for details of dates and venues:*

https://timetable.ucl.ac.uk/tt/moduleTimet.do?firstReq=Y&moduleId=NEUR1005

BIOL1005 Introduction to Genetics

Credit value: 0.5 Unit

Module organiser: Prof Steve Jones and Dr Lawrence Bellamy

Organiser's email: l.bellamy@ucl.ac.uk

Year: 1

Outline: An introduction to the genetics of a variety of creatures from peas to humans. Mendelism, linkage, genetic ratios, linkage maps, chromosomes, mitochondrial inheritance, mutation, quantitative genetics, family structure, evolutionary genetics and natural selection.

Aims: To introduce modern genetics in a specifically non-molecular context in the hope that students will see that molecular biology has the potential to answer larger and more important questions rather than being simply an end in itself.

Objectives: At the end of the course the student should be able to analyse pedigrees, construct simple genetic maps, analyse quantitative characters and the distribution of genes in populations, understand the nature of mutation and have developed some insight into the sort of "genetical thinking" - from Mendel to McClintock - that has the potential to illuminate the important problems of molecular and cellular biology today.

Assessment: Unseen two-hour written examination (60%), One essay and group assignment (40%).

BIOC1001 Biochemistry and Molecular Biology A

Value: 0.5 Unit

Organiser: Dr Christopher Taylorson with Dr Amanda Cain

E-mail: c.taylorson@ucl.ac.uk; amanda.cain@ucl.ac.uk

Class size: 250+

Year: 1, 2

Pre-requisites: A or AS level Chemistry or equivalent

Outline: BIOC1001 provides a general introduction to cell biology, nucleic acids, protein structure, metabolic biochemistry, cell physiology, cell signalling, and immunology. It is a pre-requisite for several second year modules and is normally taken in year 1.

Aims: To introduce students to the ideas and techniques of cellular and molecular biology that are essential for a basic understanding of modern biology. This module provides the foundation for second year study and supplements other course units.

To introduce students to the requirements of university study in the biological sciences and to encourage them to develop the skills they will need to succeed in their studies.

Assessment: *Unseen two-hour written examination 65.00%, In-class test (one hour) 35.00%*

NOTE 1: There is an introductory lecture during induction week which all students must attend — see your Induction Week timetable for details.

NOTE 2: For practicals you can choose between Wednesdays or Fridays, although normally once a choice is made you continue with that day throughout the year.

https://timetable.ucl.ac.uk/tt/moduleTimet.do?firstReq=Y&moduleId=BIOC1001

CELL1001 Cells and Development

Value: *0.5* Unit

Organiser: Prof. Sandip Patel

E-mail: patel.s@ucl.ac.uk

Class size: >100

Year: 1, 2

Pre-requisites: BIOC1001

Outline: The module provides a general introduction to cell biology, developmental biology and tissue structure. Topics will include: Membrane structure and function, cellular organelles, cytoskeleton, cell signalling, cell division, cell physiology, basic principles of embryonic development, cell fate, cell differentiation, and tissue architecture (histology). There are practicals on tissue architecture, developmental biology, and cell physiology.

Aims: The module provides an introduction to significant aspects of cell and developmental

biology. Its aim is to prepare students for more advanced modules that they may wish to pursue in 2nd year, such as CELL2006 (Cell Biology), CELL2007 (Principles of Cellular Control), CELL2008 (Integrative Cell Biology), and BIOL2010 (The Biology of Development).

Objectives: At the end of the module students will have a basic understanding of cell biology and developmental biology. To understand how cells function and how they integrate to form complex tissues and organs.

Assessment: *Three practical reports (10% each) 30%, Two unseen computer-based examinations (35% each) 70%.*

Timetable: *See Online Timetable for details of dates and venues:*

https://cmis.adcom.ucl.ac.uk:4443/timetabling/moduleTimet.do?firstReq=Y&moduleId=CDEV1001

PHOL1002 Mammalian Physiology

Value: 0.5 Unit

Organiser: Dr Richard Tunwell

E-mail: r.tunwell@ucl.ac.uk

Class size: 125

Year(s): 1, 2

Outline: A half course unit introductory module in systems Physiology.

Aims: This module aims to provide an understanding of the essential concepts in physiology: The importance of homeostasis; how cells communicate; ways of monitoring both the internal and the external environment; the resting membrane potential; initiation and propagation of action potential. These concepts will be applied to explain functioning of specific tissues. Students should also gain an understanding of some of the experimental approaches used to investigate physiological functions and learn how to access information in this area.

Assessment: *two online tests (5% each); two practical reports (5% each); unseen 2-hour examination in summer (80%)*

Timetable: *See Online Timetable for details of dates and venues:*

https://timetable.ucl.ac.uk/tt/moduleTimet.do?firstReq=Y&moduleId=PHOL1002

CHEM1602 Chemistry for Biology Students

Value: 0.5 Unit

Organiser: Prof. Andrea Sella

E-mail: chem160x@ucl.ac.uk

Class size: 100

Year: 1

Pre-requisites: A-level Chemistry or equivalent

Outline, **aims** and **objectives:** Please see the Chemistry Department's website.

The aim of this course is to provide students with the key foundations in chemistry needed to develop an understanding of biological systems at a molecular level. The course has a good balance of physical and organic chemistry. Students expecting to take higher level courses in chemistry and in biochemistry/molecular biology, pharmacology or neuroscience should take this course. It is highly recommended for other Life Science students.

Assessment: Final exam: 60 % (2 hours); Laboratory: 20 % (Based on: attendance, 50%, and one open book online lab test 50%); Coursework: 20 % (3 closed book in-class online tests)

Timetable: *See Online Timetable for details of dates and venues:*

NOTE: There is an introductory lecture during Induction Week which all students taking CHEM1602 must attend (Thursday 28th September 2017, 9:00 – 11:00, Christopher Ingold Building XLG2 Chemistry Auditorium): see your Induction Week timetable for details.

https://cmis.adcom.ucl.ac.uk:4443/timetabling/moduleTimet.do?firstReq=Y&moduleId=CHEM1602

YEAR 2 STRUCTURE FOR NEUROSCIENCE

	Module Code	Module Title	Unit	Term, Block
Core Compulsory: must be taken and completed for the award of the BSc or MSci in Neuroscience)	ANAT2010	Human Neuroanatomy	0.5	2, A/G*
	BIOC2003	Essential Molecular Biology	0.5	1
	NEUR2001	Molecular Biology for Neuroscientists	0.5	1
	NEUR2006	Cellular Neurophysiology	0.5	2, E/G/I
Core (continued) Select **either** PHAR2007 **or** PHAR2005 (optional)	PHAR2007	Intermediate Pharmacology	1.0	1+2, D/F
	PHAR2005	Introductory Pharmacology	0.5	1+2, D/F
Plus: **Restricted Option Set** (select 1 or 2 modules to bring your total to 3.5 CU) If you choose PHAR2007 and still wish to take a second module from this set you may choose it as your free option. **NB:** ANAT2008 is incompatible with CELL2007 in the timetable. PSYC2212 is incompatible with MATH6105. Select **either** MATH6105 (if you have done A-level Maths or as a high level topic at IB) **or** MATH6103 (if you have NOT done A-level or HL Maths).	ANAT2008	Developmental Neurobiology	0.5	2, C/F*
	PHOL2003	Systems Neuroscience	0.5	2, B/H
	CELL2007	The Principles of Cellular Control	0.5	2, C plus much of Reading Week
	PSYC2212	Perception	0.5	1
	MATH6105	Mathematics for Science 1	0.5	1
	MATH6103	Differential and Integral Calculus	0.5	1
Free Option		Free Option from across UCL (to be agreed with Year Tutor)	0.5	*check carefully for timetable compatibility*

Blocks marked * are only partially used: see the Online Timetable for details.

You must select modules to the value of 4.0 CU.

There is a Reading Week halfway through each of the autumn and spring terms.
You are required to be at UCL for any special tests, tutorials or lectures that may take place during Reading Week, and an important part of CELL2007 is timetabled then.

YEAR 2 CORE MODULES

All Lecture, Practical and Tutorial times and venues are subject to change. Always check them beforehand using the Online Common Timetable.

ANAT2010 Human Neuroanatomy

Value: 0.5 Unit.

Organiser: Prof. Patrick Anderson

E-mail: p.anderson@ucl.ac.uk

Class size: 80

Year: 2

Pre-requisites: None

Outline: There is a bias towards medically relevant information and the material covered is broadly similar to that in the neuroanatomy section of the medical curriculum. The first part of the module is an overview of the structure and function of the various regions of the CNS, its blood supply, and the cerebrospinal fluid. This is followed by a series of lectures that cover the major somatosensory and motor pathways, the thalamus, the cerebellum, the basal ganglia, the cerebral cortex, the limbic system, the control of autonomic and endocrine functions, and special sense pathways. There are also lectures on how movements are controlled, learning and memory, the biological basis of neurodegenerative disease, and regeneration in the nervous system. The module provides sufficient neuroanatomical background for students to take any of the third year Neuroscience modules offered by the Division of Biosciences. Practical work involves examining brains in the dissecting room.

Aims: The aim of this module is to familiarize students with the structure of the human central nervous system, in particular axonal pathways, and relate that to its function.

Assessment: *One 2-hour unseen written examination (67%) and one 2-hour practical examination (33%) in the main examination period*

Timetable: *See Online Timetable for details of dates and venues:*

https://cmis.adcom.ucl.ac.uk:4443/timetabling/moduleTimet.do?firstReq=Y&moduleId=ANAT2010

BIOC2003 Essential Molecular Biology

Value: 0.5 Unit

Organiser: Prof. S. J. Perkins

E-mail: s.perkins@ucl.ac.uk

Class size: ?

Year: 2

Prerequisites: BIOC1001

Outline: This half-unit course, intended for students not specialising in Biochemistry, is a lecture course with tutorials. It covers topics in molecular biology.

Aims: - Building on the basic knowledge of biochemistry established in BIOC1001 or BIOC1002 in the first year, students will acquire a deeper knowledge of biochemistry in a selected range of four further topics, the theme of which addresses molecular biology.

Objectives: Major aspects of modern molecular biology will be covered: 1) Molecular biology – part 1 2) Molecular biology – part 2 3) Protein Trafficking 4) Signalling and Oncogenes

Assessment: *Moodle test (20%); 2-hour unseen written examination (80%)*

Timetable: *See Online Timetable for details of dates and venues:*

https://timetable.ucl.ac.uk/tt/moduleTimet.do?firstReq=Y&moduleId=BIOC2003

NEUR2001 Molecular Biology for Neuroscientists

Value: 0.5 Unit

Organiser: Prof. R. Schoepfer and Dr M. Stocker

E-mail: r.schoepfer@ucl.ac.uk / m.stocker@ucl.ac.uk

Class size: Neuroscience BSc/MSci intake

Year: 2

Prerequisites: BIOC1001

Outline: This 0.5 CU module with a substantial practical component is mandatory for Year 2 students on the BSc and MSci Neuroscience degree programmes and is not available to other students. You will work for five days in consecutive week in the laboratory on a set of interconnected experiments (research project). These practical sessions are accompanied by lectures and workshops.

The main objective of this course is to provide you with a range of practical and intellectual skills necessary to purse a career in molecular biology or related area. This module will also provide students with an appropriate range of transferable skills.

Coursework: *Online test; write-up of experiments*

Assessment: *Online test (40%); Write-up of experiments (60%)*
Timetable: *See Online Timetable for details of dates and venues:*

NEUR2006 Cellular Neurophysiology

Value: **0.5 Unit**

Organiser: Dr Martin Stocker

E-mail: m.stocker@ucl.ac.uk

Class size*:* 80

Year*:* 2

Aims & Outline*:* The aim of the module is to provide an introduction to the production, transmission and integration of signals within the nervous system. The biophysics of neural membranes and membrane proteins is considered along with the physiology and pharmacology of synaptic transmission. Problems in cell signaling, and neurogenetics will also be discussed.

Objectives: The main objective is to provide essential background knowledge for the understanding of basic cellular neurophysiology.

Assessment: *Coursework one (practicals) (20%), Coursework two (tutorials) (10%), Unseen 2-hour written examination (70%)*

Timetable: *See Online Timetable for details of dates and venues:*

PHAR2007 Intermediate Pharmacology

Value: 1.0 Unit

Organiser: Prof Talvinder Sihra

E-mail: t.sihra@ucl.ac.uk

Class size: 20+

Year: 2

Outline: A comprehensive lecture course designed for students from biomedical programmes including Neuroscience, Physiology, Physiology/Pharmacology (joint), Natural Sciences (Biomedical Sciences stream) and Medicinal Chemistry. The course covers the mechanisms of action and uses of the major groups of drugs and important aspects of pharmacokinetics and drug toxicity. Students must have a sound knowledge of physiology and biochemistry. The course is co-taught with PHAR2002 General and Systematic Pharmacology, which is aimed at the specialist Pharmacology programmes and the Biomedical Science (Drug Mechanisms stream only). The PHAR2007 Intermediate Pharmacology module content is therefore the same as PHAR2002, but the nature of the coursework assessments differs.

Aims:

1.To provide a sound knowledge of the actions of many of the important groups of drugs used in medicine. 2.In particular, to emphasise, insofar as is known, the detailed mechanism of action of drugs at the molecular, cellular or tissue level, citing wherever possible experimental evidence. 3.To show how drugs (and toxins) may be of use in elucidating physiological processes. 4.To provide an understanding of how the time-course of drug action may depend on the processes of drug absorption, distribution, metabolism and excretion, and how changes in the concentrations of drugs

in the body can be described quantitatively (pharmacokinetics). 5.To show how the activity of a drug is related to its chemical structure and how structural changes can modify therapeutic efficacy or toxicity. 6.To consider the problems of designing, developing and conducting clinical trials of new drugs.

Objectives: On completion of the course, students will be able to solve quantitative problems, analyse data and answer targeted questions relating to the following topics. 1. Receptor / transduction mechanisms. 2. Drug action in the peripheral nervous system (PNS) and on tissues innervated by the PNS. 3. Drug action in the cardiovascular, renal & respiratory systems. 4. Chemotherapy: drugs used in cancer & in viral, bacterial or fungal infection. 5. Drug action in inflammation; diabetes; the control of fertility. 6. Drug action on neurotransmission in the central nervous system (CNS). 7. Drugs in schizophrenia, Parkinsons disease, epilepsy, anxiety, depression, general anaesthesia and analgesia. Drug dependence 8.Design, & development of new drugs; relation of drug structure to pharmacological activity. Drug toxicity; clinical trials of new drugs. 9. The time course of drug action and the factors determining the plasma concentration-time relationships of clinically important drugs. 10.The solution of elementary problems in pharmacokinetics given the appropriate physico-chemical, distribution and clearance data of example drugs.

Assessment: *In-course assessment one (60 minutes) 10.00%. Pharmacokinetic problem solving paper (60 minutes) 10.00%. Unseen three-hour written examination 75.00%. In-course assessment two (60 minutes) 5.00%.*

Timetable: *See Online Timetable for details of dates and venues:*

https://timetable.ucl.ac.uk/tt/moduleTimet.do?firstReq=Y&moduleId=PHAR2007

PHAR2005 Introductory Pharmacology

Value: 0.5 Unit

Organiser: Prof Talvinder Sihra

E-mail: t.sihra@ucl.ac.uk

Year: 2

Outline: To provide students with a knowledge of the actions and uses of a range of important drugs with an emphasis on the mechanisms of action.

Aims:

•To provide non-pharmacology students with a substantive knowledge of the actions and uses of a range of important drugs
•To emphasise the mechanism of action of drugs at the molecular, cellular and tissue level.

Objectives: On completion of the module, students will be able to give knowledgeable accounts of the following topics.

•Receptor/transduction mechanisms
•Drug action in the peripheral nervous system (PNS) and on tissues innervated by the PNS
•Drug action in the cardiovascular, renal & respiratory systems
•Drug action in inflammation; the control of fertility
•Drug action on neurotransmission mechanisms with particular consideration of drug use in schizophrenia, Parkingson"s disease, epilepsy, anxiety, depression, general anaesthesia and analgesia. Drug abuse.

Coursework: *2 essays each approximately 1,200 words long (10% each)*

Assessment: *Coursework (2 MCQ tests) 10%; Unseen 2-hour examination (short answer and essay questions) 90%.*

Timetable: *See Online Timetable for details of dates and venues:*

https://timetable.ucl.ac.uk/tt/moduleTimet.do?firstReq=Y&moduleId=PHAR2005

YEAR 2 RESTRICTED OPTIONS

All Lecture, Practical and Tutorial times and venues are subject to change. Always check them beforehand using the Online Common Timetable.

ANAT2008 Developmental Neurobiology

Value: 0.5 Unit

Organiser: Prof. Patricia Salinas and Dr Masa Tada

E-mail: p.salinas@ucl.ac.uk; m.tada@ucl.ac.uk

Class size: 50

Year*: 2

Outline: The module is an introduction to development in the nervous system, from the earliest embryonic events to the development of perception and complex behaviour in the neonate. The emphasis is experimental, that is, less on the facts than on how they were found out and where they lead next.

Aims and Objectives:

1. To show the topology of early neural development - how the embryonic neuroepithelium is sculpted into the future divisions of the nervous system and to outline the shifting patterns of gene expression, intercellular signalling and cell behaviour that demarcate its future parts of the brain.

2. To describe how the cell populations of the nervous system are produced, and to outline the principles of signalling and gene regulation that underlie their diversity.

3. To describe how neural circuits are formed by targeted cell migrations, guided axonal outgrowth and the selective proliferation and death of neural precursor cells, and to outline the underlying molecular mechanisms.

4. To examine the neurotrophic theory, to show how synapses and reflex circuits are formed, and how behaviour develops. To describe mechanisms of development in the main sensory pathways and to show how patterns of neural connectivity are refined by function during later development, underlying the emergence of perception and complex behaviour post-natally.

5. To summarise the state of the art in developmental neuroscience, and to encourage, through tutorials and essays, critical evaluation of experiments and concepts in the literature.

6. To present, as a basis for advanced Year 3 studies, the study of development as a pre-requisite for understanding the organisation, function and pathology of the nervous system.

Assessment: *Unseen 2-hour written examination in summer (70%); Coursework (20%); Practical write-up(s) (10%).*

Timetable: *See Online Timetable for details of dates and venues:*
https://timetable.ucl.ac.uk/tt/moduleTimet.do?firstReq=Y&moduleId=ANAT2008

PHOL2003 Systems Neuroscience

Value: 0.5 Unit

Organiser: Dr Margaret Mayston

E-mail: m.mayston@ucl.ac.uk

Year: 2

Aims:

1. For students to increase their knowledge of skeletal muscle, including the cortical control of movement, feedback from muscle spindles, local regulation of contractility, and provision of power for contraction.

2. For students to increase their knowledge of special senses - including vision, hearing smell and touch.

3. For students to become competent in using the facilities in the library, to access modern journals of neuroscience and neurophysiology.

4. To introduce students to experimental design and research in physiology.

Objectives:

1. Knowledge of the neurophysiological mechanisms involved in control of movement.

2. Knowledge of the neurophysiological mechanisms involved in somatosensory and visceral perception.

3. Ability to research the literature for information on physiology and related subjects.

4. Ability to plan experiments to tackle specific research problems.

Assessment: *Unseen 3-hour written examination in summer (65%); Group presentation 10.00%; and two online MCQ tests (25%).*

Timetable: *See Online Timetable for details of dates and venues:*

https://timetable.ucl.ac.uk/tt/moduleTimet.do?firstReq=Y&moduleId=PHOL2003

CELL2007 The Principles of Cellular Control

Value: 0.5 Unit

Organiser: Prof. Geraint Thomas

E-mail: g.thomas@ucl.ac.uk

Year: 2

Outline: This course will provide a strong introduction to the principles of cellular regulation and range across molecular and cellular scales. Using key examples students will learn how molecular mechanisms orchestrate cellular processes. In a wider context cell signaling will serve as a vehicle for students to discover how to fuse an understanding of molecular concepts with macroscopic biology. Lectures will concentrate on: the molecular properties of different classes of receptors; the structure-function relationships of kinases, small and heterotrimeric G-proteins; second messenger molecules and the enzymes that generate them, structure-function in the recognition and binding of phosphoproteins and second messengers; signalling through polyphosphoinositides; integration of molecular-scale information into an understanding of major signaling pathways; adrenalin, insulin and EGF and the Wnt/catenin signaling pathways in example processes like energy metabolism, cancer biology, circadian rhythmicity and tissue differentiation.

Aims: To provide an introduction to the principles of cellular regulation. Using examples, students will understand how molecular-scale mechanisms orchestrate cellular process and events. The component will also enhance the learning provided by the immediately preceding CELL2006 Cell Biology course and prepare students for more specialized 3rd year study. However you will not be permitted to study both CELL2006 and CELL2007 as two separate courses - to combine them you must study CELL2008 Integrative Cell Biology.

Objectives:

Cell signaling will serve as a vehicle for students to discover how to fuse an understanding of molecular scale concepts and mechanisms with cell biological, metabolic and developmental consequences. In this way, comprehension of both the scope and the limitations of molecular genetic and biochemical interventions in the investigation of the processes of life will be arrived at.

Assessment: *Unseen 2-hour written examination in summer (75%); Data analysis coursework exercise (one hour) (25%).*

Timetable: *See Online Timetable for details on dates and venues:*

https://timetable.ucl.ac.uk/tt/moduleTimet.do?firstReq=Y&moduleId=CELL2007

PSYC2212 Perception

Value: 0.5 Unit

Organiser: Dr Anna Hughes

E-mail: anna.hughes@ucl.ac.uk

Year: 2

The course aims to provide students with a basic understanding of core theoretical issues and experimental findings in the study of a) the representation of events in the outside world through neural activity, b) the processing of information in the auditory and visual sensory systems and c) the effects of attention on visual and auditory perception.
By the end of the course students should: * understand how the activity of neural systems encodes information about the external world * be able to describe and compare theoretical perspectives on how we might best understand the processes involved in perception and attention * have a basic understanding of the signal processing techniques used to study sensory processing in the brain * understand the role of attention in perception of visual and auditory events * understand what is meant by a computational theory in relation to perception.
Coursework: *Essay (2000 words)*

Assessment: *In-course essay (50%); 2-hour unseen written examination (50%).*

Timetable: *See Online Timetable for details of dates and venues:*

https://timetable.ucl.ac.uk/tt/moduleTimet.do?firstReq=Y&moduleId=PSYC2212

MATH6105 Mathematics for Science 1 (see Note below)

Value: 0.5 Unit

Organiser: Dr Ceclilia Busuioc

E-mail: c.busuioc@ucl.ac.uk

Year: 2

Prerequisites: A-level or HL Maths

The course presents the type of mathematics useful in physical sciences. It focuses on revising and extending A-level work, aimed at those with a high pass (A or B) in A level mathematics. It includes:
− Calculus, differentiation of simple functions and inverse functions. Integration by parts, integration by substitution, partial fractions and reduction formulae. First and second order differential equations.
− Curve sketching, stationary points, vertical and horizontal asymptotes.
− Complex numbers, complex arithmetic, De Moivre's theorem, roots of unity and complex roots in general.
− Series and sequences, convergence of series, the ratio and comparison test, Maclaurin expansions.
− Introduction to matrices, matrix multiplication and addition, inverses and determinants.

Coursework: *Weekly assessed coursework.*

Assessment: *Written final examination (90%); weekly assessed coursework (10%).*

Timetable: *See Online Timetable for details of dates and venues:*

https://timetable.ucl.ac.uk/tt/moduleTimet.do?firstReq=Y&moduleId=MATH6105

*** Note: some additional Math/Statistics modules may be prerequisites for entry into computational neuroscience modules in Year 3 and 4. If you are interested in these, please contact Dr Martina Wicklein for advice.

MATH6103 Differential and Integral Calculus

Value: 0.5 Unit

Organiser: Dr Eleanor Doman

E-mail: eleanor.doman.12@ucl.ac.uk

Year: 2

Prerequisites: Good GCSE mathematics (or a weak A-level pass: C, D)

This course provides a fairly rapid introduction to calculus. Calculus underlies almost all areas
of mathematics and a great deal of science and engineering. The aim of the course will be to
provide a solid grounding in this fundamental branch of mathematics for students who have a limited
mathematical background. It includes:
1- Functions & Graphs;
2- Differentiation: Rates of change. Gradients;
3- Exponential functions;
4- Logarithmic functions;
5- Integration;
6- Approximate or numerical integration;
7- Simple differential equations and applications.

Coursework: *Weekly assessed coursework.*

Assessment: *Written final examination (90%); weekly assessed coursework (10%).*

Timetable: *See Online Timetable for details of dates and venues:*

https://timetable.ucl.ac.uk/tt/moduleTimet.do?firstReq=Y&moduleId=MATH6103

YEAR 3 STRUCTURE FOR BSc NEUROSCIENCE

Final year BSc Neuroscience students undertake a compulsory experimental lab project (NEUR 3903) worth 1.5CU.   Students with less than 60% in their 2nd year will normally do a compulsory library project (NEUR 3904) worth 1.0CU.   A student may opt to do a library project rather than a lab project, but they need permission from their Year 3 Neuroscience Tutor, Professor Stephen Price.

The project is combined with a wide range of optional taught modules (up to a total value of 2.5CU with a lab project or 3.0CU with a library project).

The details of these modules and how to choose them are given below in the Section entitled BSc AND MSci NEUROSCIENCE: CHOOSING YOUR MODULES IN YEAR 3 AND 4.

	Module	Title	Credit
Either of:	NEUR3903	Extended Experimental Project	1.5
	NEUR3904	Advanced Library Project	1
LIST - 1 1.5 CU must come from this list			
	NEUR3003	Metabolic Neuroscience	0.5
	NEUR3018	Neural Basis of Motivation and Learning	0.5
	NEUR3025	Integrative Systems Neuroscience	0.5
	NEUR3031	The Control of Movement	0.5
	NEUR3041	Neural Computation: Models of Brain Function	0.5
	NEUR3045	Visual Neuroscience	0.5
	PHAR3002	Neuropharmacology	0.5
	PHOL3006	The Cellular Basis of Brain Function	1
	NEUR3004	Neurobiology of Brain Injury and Disease Extended	1
	NEUR3005	Neurobiology of Brain Injury and Disease I	0.5
	NEUR3006	Neurobiology of Brain Injury and Disease II	0.5
	NEUR3008	Topics in Neurobiology of Brain Disease and Injury	0.5
LIST - 2 0.5 CU (with lab project) or 1.0 CU (with library project) must come from this list	All modules in LIST - 1		
	ANAT3040	Molecular Basis of Neuropsychiatric Disorders	0.5
	ANAT3042	Pain	0.5
	BIOL3012	Sex, Genes and Evolution	0.5
	BIOL3017	Biology of Ageing	0.5
	BIOS3016	Genes to Disease	0.5
	CELL3001	Stem Cells and Regenerative Medicine	0.5
	CELL3002	Functional Genetics of Model Systems	0.5
	CELL3005	Mechanisms of Development	1
	CELL3005A	Mechanisms of Development A	1
	CELL3006	Dynamic Biological Systems	0.5
	CELL3030	Cellular and Developmental Neurobiology	0.5
	CELL3105	Clocks, Sleep and Biological Time	0.5
	PHAR3001	Neuropharmacology	1
	PHAR3003	Molecular Pharmacology	0.5
	PHAR3004	Receptor Mechanisms	0.5
	PHAR3008	Psychopharmacology	0.5
	PHAR3011	Synaptic Pharmacology: The Synapse - A Major Site for Disease and Drug Action	0.5
	PHOL3004	Cell Signalling in Health and Disease	1

	Module	Title	Credit
	PHOL3011	Autonomic and Central Control of Cardiorespiratory Function	0.5
Free choice pending Year 3 Tutor approval	ALLUG	All UG Modules	0.5

YEAR 3 STRUCTURE FOR MSCI NEUROSCIENCE

Year 3 MSci Neuroscience students undertake a compulsory library-based research project (NEUR 3904) worth 1.0CU and so can choose more taught courses (up to a total value of 3.0CU). The same modules are available to third year MSci Neuroscience students as for BSc and IBSc Neuroscience students. The details of these modules and how to choose them are given below in the Section entitled BSC AND MSCI NEUROSCIENCE: CHOOSING YOUR MODULES IN YEAR 3 AND 4.

	Module	Title	Credit
	NEUR3904	Advanced Library Project	1
LIST - 1 1.5 CU must come from this list	NEUR3003	Metabolic Neuroscience	0.5
	NEUR3018	Neural Basis of Motivation and Learning	0.5
	NEUR3025	Integrative Systems Neuroscience	0.5
	NEUR3031	The Control of Movement	0.5
	NEUR3041	Neural Computation: Models of Brain Function	0.5
	NEUR3045	Visual Neuroscience	0.5
	PHAR3002	Neuropharmacology	0.5
	PHOL3006	The Cellular Basis of Brain Function	1
	NEUR3004	Neurobiology of Brain Injury and Disease Extended	1
	NEUR3005	Neurobiology of Brain Injury and Disease I	0.5
	NEUR3006	Neurobiology of Brain Injury and Disease II	0.5
	NEUR3008	Topics in Neurobiology of Brain Disease and Injury	0.5
LIST - 2 1.0 CU must come from this list	All modules in LIST - 1		
	ANAT3040	Molecular Basis of Neuropsychiatric Disorders	0.5
	ANAT3042	Pain	0.5
	BIOL3012	Sex, Genes and Evolution	0.5
	BIOL3017	Biology of Ageing	0.5
	BIOS3016	Genes to Disease	0.5
	CELL3001	Stem Cells and Regenerative Medicine	0.5
	CELL3002	Functional Genetics of Model Systems	0.5
	CELL3005	Mechanisms of Development	1
	CELL3005A	Mechanisms of Development A	1
	CELL3006	Dynamic Biological Systems	0.5
	CELL3030	Cellular and Developmental Neurobiology	0.5
	CELL3105	Clocks, Sleep and Biological Time	0.5
	PHAR3001	Neuropharmacology	1
	PHAR3003	Molecular Pharmacology	0.5
	PHAR3004	Receptor Mechanisms	0.5
	PHAR3008	Psychopharmacology	0.5
	PHAR3011	Synaptic Pharmacology: The Synapse - A Major Site for	0.5

		Disease and Drug Action	
	PHOL3004	Cell Signalling in Health and Disease	1
	PHOL3011	Autonomic and Central Control of Cardiorespiratory Function	0.5
Free choice pending Year 3 Tutor approval	ALLUG	All UG Modules	0.5

YEAR 4 STRUCTURE FOR MSCI NEUROSCIENCE

Fourth year MSci Neuroscience undertake a compulsory Masters level experimental lab research project worth 2.0CU (NEURM901) or 3.0CU (NEURM030) and must choose Masters level taught courses up to a value of 2.0CU or 1.0CU respectively.

	Module Code	Module Title	Unit	Term, Block
Experimental project	NEURM901	MSci Research Project	2.0	1 + 2
	NEURM030	MSci Research Project	3.0	1 + 2
Options	Modules only available in year 4: NEURM011 - Human Neurophysiology: Danger Detection and Body Protection NEURM012 - Foundations of Neuroinformatics			
	Wide range of Masters level (M) NEUR, PHOL, PHAR, ANAT, CELL & BIOL (see section below on choosing modules)			

YEAR 3 STRUCTURE FOR INTEGRATED BSc NEUROSCIENCE

IBSc Neuroscience students are fully integrated with the final year BSc Neuroscience students. There are many modules available; some of the most popular are listed here. Further details of these modules and many others can be found on the Faculty of Life Sciences Module Database at http://www.ucl.ac.uk/lifesciences-faculty-php/courses/. All students must select modules to the value of **4.0 CU, of which 1.5 CU will normally be the experimental research project.** Your tutor will guide you in your module choices **and must approve them**. In some cases BSc Neuroscience students *may* be permitted to take the NEUR3904 Advanced Library project (1.0 CU) in place of NEUR3903. You *must* discuss this with your Year Tutor.

Selection	Module	Title	Credit
	NEUR3903	Extended Experimental Project	1.5
LIST - 1 1.5 CU must come from this list	NEUR3003	Metabolic Neuroscience	0.5
	NEUR3018	Neural Basis of Motivation and Learning	0.5
	NEUR3025	Integrative Systems Neuroscience	0.5
	NEUR3031	The Control of Movement	0.5
	NEUR3041	Neural Computation: Models of Brain Function	0.5
	NEUR3045	Visual Neuroscience	0.5
	PHAR3002	Neuropharmacology	0.5
	PHOL3006	The Cellular Basis of Brain Function	1
	NEUR3004	Neurobiology of Brain Injury and Disease Extended	1
	NEUR3005	Neurobiology of Brain Injury and Disease I	0.5
	NEUR3006	Neurobiology of Brain Injury and Disease II	0.5
	NEUR3008	Topics in Neurobiology of Brain Disease and Injury	0.5

	All modules in LIST - 1		
	ANAT3040	Molecular Basis of Neuropsychiatric Disorders	0.5
	ANAT3042	Pain	0.5
	BIOL3012	Sex, Genes and Evolution	0.5
	BIOL3017	Biology of Ageing	0.5
	BIOS3016	Genes to Disease	0.5
	CELL3001	Stem Cells and Regenerative Medicine	0.5
	CELL3002	Functional Genetics of Model Systems	0.5
LIST - 2	CELL3005	Mechanisms of Development	1
0.5 CU must	CELL3005A	Mechanisms of Development A	1
come from	CELL3006	Dynamic Biological Systems	0.5
this list	CELL3030	Cellular and Developmental Neurobiology	0.5
	CELL3105	Clocks, Sleep and Biological Time	0.5
	PHAR3001	Neuropharmacology	1
	PHAR3003	Molecular Pharmacology	0.5
	PHAR3004	Receptor Mechanisms	0.5
	PHAR3008	Psychopharmacology	0.5
	PHAR3011	Synaptic Pharmacology: The Synapse - A Major Site for Disease and Drug Action	0.5
	PHOL3004	Cell Signalling in Health and Disease	1
	PHOL3011	Autonomic and Central Control of Cardiorespiratory Function	0.5
Free choice pending Year 3 Tutor approval	ALLUG	All UG Modules	0.5

There is a Reading Week halfway through each of the autumn and spring terms.
You are required to be at UCL for any special tests, tutorials or lectures that may take place during Reading Week.

BSc AND MSci NEUROSCIENCE: CHOOSING MODULES IN YEAR 3

Introduction

As an advanced or masters BSc/MSci student reading Neuroscience, the majority of your modules must be in the broad area of neuroscience run by the Division of Biosciences (NEUR, PHOL, PHAR, ANAT). However, we appreciate that modules in other relevant biological areas in the Division of Bioscience (BIOL, BIOS, CELL) may also be of interest to you. To that end, we have created the two lists of modules that you should choose the majority of your courses from. This gives you considerable flexibility to focus on your interests, whilst also becoming a rounded neuroscientist. You also will have some free choice in module selections (more of which later). This includes some modules run by the Psychology and Language Science Division, but normally only PSYC3207 Human Learning and Memory , PSYC3209 Cognitive Neuroscience , and PSYC3210 Brain in Action.

For more information, all Divisions of Biosciences and Psychology modules can be explored on:
www.ucl.ac.uk/lifesciences-faculty-php/courses/search.php(use the keyword search options to view relevant modules (there are a lot of them!))

Modules 'outside' the Division of Bioscience or Psychology, such as Stats/Maths/Computing, a language or even quite different areas such as Management science are also allowed for your free choice, but only at the discretion of your year tutor, Prof Stephen Price or Prof Maria Fitzgerald. She/he will need to be convinced that you have sound reasons for choosing such a course and that taking it is in your best interest. **Please note that all of your module choices should be at the appropriate year 3 or year 4 level.** It is not normally possible to do more than 0.5CU of such 'outside' modules in your 3rd and 4th year.

Note: You must get all your modules choices approved by your year tutor, Prof Maria Fitzgerald or Prof Stephen Price

<mark>FREE CHOICE IN YEAR 3</mark> - *Pending Year 3 Tutor approval (0.5 CU)
This free choice includes all modules in LIST-1 and LIST-2.
Other ANAT, CELL, BIOC, BIOL, BIOS, PHAR, PHOL modules.

Modules offered by other Faculties (e.g. COMP, PSYC, PALS, HPSC) may also be acceptable for your free choice (see below for further advice). Module prerequisites must be satisfied and your free choice should be at the appropriate level.
 (Note: PSYC3207 Human Learning and Memory cannot be taken with NEUR3018 Neural Basis of Motivation and Learning)

•**Modules outside the Divisions of Biosciences and Psychology for your Free Choice**

 (i) Maths/Statistics/Computing/Medical Physics & Engineering Modules
Year 3 and 4 is **not** the time to **begin** to study the subjects covered in the Maths and Physical Sciences (MAPS) and Engineering (including Computer Science) Faculties. These divisions do run courses for students from outside degree courses but they still require stringent prerequisites. You must consult the relevant course organiser who will determine whether you have the necessary academic prerequisites.

For examples see:
Statistics: 2014-15 Statistics Courses for Students from Other Departments
Maths: http://www.ucl.ac.uk/maths/courses/undergraduates (under ancillary courses).

Remember that you cannot do Introductory (Year 1) or intermediary courses in Year 3 & 4. You may only do one (0.5 CU) advanced (year 3) course in Year 4.

Examples of courses taken by Year 3 Neuroscience students:

STAT7101	Further statistical methods & computing	0.5	MAPS	STAT 6101 or 6102 as prerequisites
MATH6106	Mathematics for Science 2	0.5	MAPS	MATH 6105
COMP3058	Artificial Intelligence and Neural Computing	0.5	MAPS	Strong background in university-level maths (in particular logic)
MPHY3B21	Aspects of Bioengineering	0.5	MAPS	A level Mathematics (grade A preferred), Physics and one other A level at ABB or above). We also expect students to have taken at least one additional maths module in year 1 or 2.

Year 3 BSc or MSci students may take one <u>advanced</u> 0.5 CU language course. This is not permitted in the final MSci year. Please note that Professor Price will not to allow the choice of language modules that are in your mother tongue so please don't ask!

(iii) Modules further afield

At Professor Price's discretion, Year 3 neuroscientists who wish to pursue a career outside science may do a 0.5 CU intermediate/advanced course in such areas as Management Science (e.g. MSIN course modules) or Science and Technology (e.g. HPSC course modules): Examples can be found at:

Management Science: http://www.msi.ucl.ac.uk/undergraduate-elective-modules
Science and Technology Studies: http://www.ucl.ac.uk/sts/study/hpsc

- **Disclaimer**:

This is a guide to help you choose your Advanced level taught modules. Since modules change from year to year, the above module information should always be checked on Portico. **It is important to remember that if you choose modules
outside the Faculty of Life Sciences you may be at a disadvantage as you will be less familiar with the teaching and examining methods than those students who study fulltime in that Faculty.**.
The information here takes no account of individual circumstances and you should always discuss your options with your year tutor. A compulsory one-to-one meeting will be time-tabled with your year tutor on the first day of Term 1 who will approve your choices (induction week).

MSci NEUROSCIENCE: CHOOSING MODULES IN YEAR 4

As a final year MSci Neuroscience student, you must choose M versions of courses related to neuroscience.   If you are doing a 2.0CU (M901) lab project, you need to choose taught courses up to a value of 2.0CU.   if you are doing a 3.0CU (M030) lab project, you need to choose taught courses up to a value of 1.0CU.   Do not ask or attempt to register for modules below M level.

New M Level Modules:

There are several interesting new M courses this year.   Please contact the course organizers directly if you are interested in taking one or more of them and would like more details

NEURM012: Foundations of Neuroinformatics (0.5 CU)– Professor Ken Harris. Term 2
NEURM004/5/6: Neurobiology of Brain Injury and Disease (0.5/1.0CU)– Professor Paola Pedarzani. (Term 1 & 2)
NEURM011: The neuroscience of danger detection and body protection (0.5CU) – Professor Giandomenico Iannetti. Term 2
EARIMA14: SenSYT Introduction to Sensory Systems, Technologies & Therapies (0.5CU) – Professor Joerg Albert. (Term 1)

Other Acceptable Modules

In addition, M versions of the following courses are all acceptable:

NEUR3003 Metabolic Neuroscience	0.5 CU
NEUR3004 Neurobiology of Brain Injury and Disease Extended	1.0 CU
NEUR3005 Neurobiology of Brain Injury and Disease I	0.5 CU
NEUR3006 Neurobiology of Brain Injury and Disease II	0.5 CU
NEUR3008 Topics in the Neurobiology of Brain Injury and Disease	0.5 CU
NEUR3018 Neural Basis of Motivation and Learning	0.5 CU
NEUR3025 Integrative Systems Neuroscience	0.5 CU
NEUR3031 Control of Movement	0.5 CU
NEUR3041 Neural Computation	0.5 CU
NEUR3045 Visual Neuroscience	0.5 CU
PHAR3002 Neuropharmacology	0.5 CU
PHOL3006 Cellular Basis of Brain Function	1.0 CU
ANAT3040 Molecular Basis of Neuropsychiatric Disorders	0.5 CU
ANAT3042 Pain	0.5 CU
BIOL3012 Sex, Genes and Evolution	0.5 CU
BIOL3017 Biology of Ageing	0.5 CU
BIOS3016 Genes to Disease	0.5 CU
CELL3001 Stem Cells and Regenerative Medicine	0.5 CU
CELL3002 Functional Genetics of Model Systems	0.5 CU
CELL3005A Mechanisms of Development	0.5 CU
CELL3005 Mechanisms of Development	1.0 CU
CELL3006 Dynamics of Biological Systems	0.5 CU
CELL3030 Cellular and Developmental Neurobiology	0.5 CU
CELL3105 Clocks, Sleep and Biological Rhythms	0.5 CU
PHAR3001 Neuropharmacology	1.0 CU
PHAR3003 Molecular Pharmacology	0.5 CU
PHAR3004 Receptor Mechanisms	0.5 CU
PHAR3008 Psychopharmacology	0.5 CU
PHAR3011 Synaptic Pharmacology	0.5 CU
PHOL3004 Cell Signalling in Health and Disease	1.0 CU
PHOL3011 Autonomic & Central Control of Cardioresp. Function	0.5 CU

Note: ANAT3028 Neurobiology of Neurodegenerative Diseases cannot be taken with NEUR3004/5 Neurobiology of Brain Injury and Disease. Students taking PHAR3002 cannot take PHAR3001 and vice versa.

Other ANAT, CELL, BIOC, BIOL, BIOS, PHAR, PHOL modules and modules offered by other Faculties (e.g. COMP, PSYC, PALS, HPSC) may also be acceptable but require your Tutor, Professor Maria Fitzgerald's approval.

Maths/Statistics/Computing/Medical Physics & Engineering Modules

Year 4 is **not** the time to **begin** to study the subjects covered in the Maths and Physical Sciences (MAPS) and Engineering (including Computer Science) Faculties. These divisions do run courses for students from outside degree courses but they still require stringent prerequisites. You must consult the relevant course organiser who will determine whether you have the necessary academic prerequisites for an M level course in these areas.

Finally: This is a guide to help you choose your M level taught modules. Since modules change from year to year, the above module information should always be checked on Portico.

The information here takes no account of individual circumstances and you should always discuss your options with your year tutor, Prof Fitzgerald. Please email Prof Fitzgerald in early September with your module choices. A one-to-one meeting will be time-tabled in the first week of Term 1 (induction week) to discuss your choices.

NEUR3904 BSc/MSci ADVANCED LIBRARY PROJECT
Guidelines for Supervisors and Students

The Third Year Advanced Library Project
The NEUR3904 (1.0 unit) project is a major component of the 3rd year assessment of your MSci Neuroscience degree.   Some BSc finalists also take this module at the discretion of the Tutor.

What to expect from a third year Advanced Library Project?
The NEUR3904 Advanced Library project is substantially more advanced than library projects in the first and second year. As it is assigned 1.0 CU (of a total of 4.0 CU in Year 3), it is expected that the student will spend an appropriate proportion of their time in Term 1 and 2 on this project before submitting their dissertation at the penultimate day of end of Term 2, date to be confirmed.

NEUR3904 requires in-depth research of a topical area of biological science through independent reading of original published research articles and books.   The written report will have a clear aim to address or answer a particular question in the field. This will be achieved by an independent literature search and a written report that summarises the relevant published experimental evidence, critically appraises that evidence and reaches an independent conclusion.

Selecting a Project
• Projects may involve research on any topic of relevance to the Neuroscience BSc, MSci or IBSc programme supervised by a member of UCL academic staff in neuroscience or related area.
• Individual project supervisors may require course prerequisites. They may also specify that a course is undertaken in the BSc/MSci year to complement the project.
• An online portal is provided by NPP for application to 5 supervisors/laboratories (see the NPP Projects Moodle site: https://moodle.ucl.ac.uk/course/view.php?id=40171&section=8). The topic of study with a supervisor is not prescriptive. Once assigned a supervisor, project titles are negotiable. If none of the supervisors/projects provided on the aforementioned portal appeals, students can consider other members of the UCL Faculty of Life Sciences, Medical Sciences and Brain Sciences, by approaching them directly to undertake a project.
• Students arranging to do a project with a supervisor not listed on the NPP online sign-up system must contact the NEUR3904 tutor, Professor Talvinder Sihra and the 3rd year Neuroscience tutor, Prof. Stephen Price (BSc/MSci programmes) (stephen.price@ucl.ac.uk), or Professor Chris Yeo (IBSc programme) (c.yeo@ucl.ac.uk), providing full details of the proposed project and must receive their approval before proceeding.

What to do once a project has been arranged?
• Fill up the NEUR3904 Project Registration Form (available on the NPP Project Moodle site) and get it signed by your new supervisor. Return it to the teaching office, from where it will be forwarded to Prof. Sihra and Prof. Price or Prof. Yeo, the project tutors. This form is an undertaking by all parties and, without it, the project will not be registered.
• The time allocated for the NEUR3904 project is in the range of 250 hours. This allocation is for the library research and the preparing and writing of the dissertation. The exact timetable is flexible and is decided between student and supervisor. It is very important to start work on the project as soon as possible in Term 1.
• Regular interaction with the supervisor is assumed with NEUR3904 library projects.   Completion of the NEUR3904 library project will require regular (at least five) "steering meetings" between student and supervisor. The onus is on the student to arrange these meetings and record these on the Progress Progression Form (available from the Teaching Office). This form must be submitted together with the final dissertation according to the set deadline before Easter.
• The project supervisor will give advice on initial background reading, formulating a specific question or area of research, further critical reading, critical analysis of publications and report writing. In many instances, some of these roles will be delegated to other members of the research group but it remains the responsibility of the supervisor to ensure that appropriate training and guidance is given.

Preparing your NEUR 3904 dissertation
Details on the preparation of the dissertation can be found on the Moodle site for NEUR3904 at:
https://moodle.ucl.ac.uk/course/view.php?id=18342&section=0

The style of your written report should be modelled upon short reviews in high quality international neuroscience journals, such as the Nature Neuroscience Reviews.

Rules of Submission
- The deadline for the submission of all projects (2 bound copies and electronic submission) is 12 noon on the penultimate day of Term 2, date to be announced.   A late penalty (see below) will be incurred if the project is submitted after the deadline.
- Two bound copies of the project must be submitted to the Teaching Office. Do not hand these in directly to your supervisor. Additional to the hard-copies, students are required to submit an electronic copy of the project via Turnitin on the NEUR3904 Moodle site. You should include the entire text of the project together with all of the figures etc. embedded in the text. This final, composed version should be identical to the bound, hardcopy versions and may be submitted as a "Word" or as an "Acrobat" (.pdf) document. The Teaching Office will send one bound copy to your supervisor and one bound copy to your internal examiner. Full submission instructions will appear on the Moodle site before the submission process opens.
- Both bound copies will be retained permanently by the Faculty. Supervisors normally like to have their own copy to keep – so you may wish to make an extra copy for this purpose.

Project Assessment

The written dissertation will be marked by your supervisor and an internal examiner who mark independently.

You will also be required to present a poster presentation of your research to one or more internal examiners.   As in scientific meetings, the poster guidelines are strictly controlled (details will be provided) . Questions from the examiner(s) about your poster will test your understanding of your project, as well as establishing that the work presented is your own.

Marking of the project will follow the Faculty guidelines:
- Dissertation – supervisor's assessment: 35% of total
- Dissertation – internal examiner's assessment: 35% of total
- Poster Presentation – supervisor's assessment: 15% of total
- Poster Presentation – internal examiner's assessment: 15% of total

Penalties
You must contact the course Tutor, Professor Talvinder Sihra or Professor Christopher Yeo, immediately if you are unable to submit the project on time or unable to present the poster.

- Failure to attend the research presentation will result in a 30% mark deduction from the total project mark.

- Late submission will accrue penalties according to UCL regulation. The full allocated mark will be reduced by 10 percentage points for the first two working day after the deadline for the submission of coursework. If the project is submitted with five working days after the deadline, the maximum award will be a pass (40%). Projects received more than five working days after the deadline will be recorded as zero, but the assessment will be considered to be complete if it is of an acceptable (pass) standard. If the project is not submitted at all, the student will be "incomplete". These are the Faculty regulations for all coursework and dissertations. However, students are reminded that the project must be passed in order to get a classified (honours) degree and, if it is not passed, the student would only be eligible for consideration of an Ordinary degree (bearing in mind that it would be a failure of 1.0 course units). For intercalated students, no award would be possible.

Extenuating circumstances: If there are extenuating circumstances that have been recognized by the Board of Examiners or its representative, none of these penalties will apply until an agreed extension period has been exceeded.

For permission to derogate from these penalties, an application should be made Neuroscience Board of Examiners through the Project Tutor and the Teaching Office.

Over length penalties: The dissertation shall be within the word limits of 7500 words. If submitted coursework exceeds the word limit but by less than 10%, the mark will be reduced by 10 percentage marks; but the penalised mark will not be reduced below the pass mark, assuming the work merited a pass. For work that exceeds the word limit by 10% or more, a mark of zero will be recorded.

Guidelines for Supervisors and Students

The Third Year Experimental Research Project
The NEUR3903 (1.5 unit) project is the major component of the final assessment for BSc and IBSc students.

Project Selection and Conduct:

- Projects may involve research on any topic of relevance to the Neuroscience degree programme
- Individual project supervisors may require that a particular course has been studied previously and passed at a satisfactory level. They may also specify that a current course is undertaken to complement or support the project.
- Admission to laboratory projects will remain at the discretion of the prospective supervisor and project tutor (for BSc students, Prof Stephen Price; for IBSc students, Prof Christopher Yeo). It should be noted that some project supervisors may require a specific taught course to be undertaken.
- A list of supervisors/laboratories within the NPP Department is provided to aid placement of students. However, such lists are not prescriptive. Project titles are negotiable with supervisors and indeed, if none of the suggested supervisors/projects appeals, students can consider other members of the Faculty of Life Sciences (Biology & Medicine) or beyond with whom to arrange supervision and conduct a project. However, students choosing the option to do a project with an external supervisor will be required to give full details of the proposed work to the relevant project tutor who will make a final decision as to the suitability of the proposal.
- Once arranged, projects must be registered with the project tutor – use the Project Registration Form that is signed by the supervisor. Return it to the teaching office form where it will be forwarded to the project tutor. This form is an undertaking by all parties and without it, the project will not be registered.
- The time allocated for the NEUR3903 project is in the range of 350-400 hours. This allocation is for the laboratory work and the preparing and writing of the dissertation. The exact timetabling of either project type is flexible and decided between student and supervisor. Regular interaction with the supervisor is assumed with these laboratory projects. We recommend that about 2 days per week throughout Terms 1 and 2 are spent on the project. This may vary on a week-by-week basis to accommodate particular patterns of experimental work and to fit with the timetabling of lecture and tutorial commitments in other modules.
- **It is very important to start work on the project early in Term 1. Experience shows us that there can be unforeseen problems and these need to be overcome at an early stage.**
- The 350-400 hours nominally allocated to the project includes time for reading around the subject before beginning experiments and for writing-up. Allowing laboratory work or writing-up to impinge on the time allocated for other course units is usually extra effort for diminishing returns and, accordingly, is to be discouraged.
- It is expected that the project supervisor will give advice on background reading, experimental design, training in necessary techniques, data analysis and report writing. In many instances, some of these roles will be delegated to other members of the research group but it remains the responsibility of the supervisor to ensure that appropriate training and guidance is given.
- The research project dissertation will be marked by the supervisor and an internal examiner. All students will discuss their project work in a short research presentation at the end of the course. Internal examiners will be present to ask questions about the work. Training workshops to help with preparing a research presentation may be timetabled during the year

but it is recommended that the supervisor also arranges a practice presentation to familiarize the student with the process.

• In those cases where Home Office personal licenses (for experimental work on animals) or ethical permissions are needed, it is essential that these are planned early and obtained as soon as possible within Term 1. Students will be at a severe disadvantage if these arrangements are not in place within 6 weeks of the beginning of the session.

• Paired and group projects. On occasion it is useful for two or three students to work on related projects, usually with the same supervisor. This can be especially effective when the projects are linked to the supervisor's ongoing research. Such projects must remain sufficiently distinct and independent of one another that the students' work can be properly evaluated.

Writing up the Project:

Take great care in the writing of the report of your project. It is from this that others will be able to judge the way you have carried out your work, the background reading you have undertaken and your understanding and appraisal of your results. The style of your presentation should aim to use the conventions with which you are familiar from reading papers in high-quality international science journals. Some projects will have generated a greater number of results than others. It is inevitable that some will have given negative results, or even failed, but this should not prevent you from completing a good report. All research workers find that at times their work does not go well, or that the results are not as abundant as they would have hoped at the planning stage of the experiment. You will not be penalized if experiments have not worked for reasons beyond your control.

The report should normally have the following structure:
• Title
• Abstract
• Declaration of Contribution
• Contents Table
• Introduction
• Material and Methods
• Results
• Discussion
• Acknowledgements
• References
• Appendices (if appropriate)

The maximum permissible length of the report is 40 typed A4 pages and 7500 words including all of the Title, Abstract, Declaration, all other text, figures, photographs, graphs, diagrams, charts and tables but *excluding* the Reference list. Neither page nor word length maxima may be exceeded. It should be double-spaced, on one side only and page-numbered throughout. Use Arial (or Helvetica) 11 point or Times New Roman 12 point font.

The number of figures should be sufficient to illustrate your work adequately, but remember, particularly with micrographs, that it is necessary to be concise and that selection of representative material is an important part of the exercise (in scientific papers it is often as unhelpful to have too many figures as it is to have too few). It is unlikely that more than 30 figures could ever be required. Students are responsible for printing the micrographs and photographs that they use. Figures and short tables should be included within the main body of the text. Complex tables of results and additional figures can be included as Appendices. Appendices do not form part of the 40 page or 7500 word limits – but they will not be analyzed in detail by the examiners.

You should discuss your results and how to present them in general with your supervisor before compiling your report. Supervisors will be happy to comment on an early draft outline of your report, but the final version is your responsibility. In particular the Discussion section should represent your own interpretation of the Results.

Checklist for writing your report:

Abstract: 200-300 words describing the aims and nature of the work and the results obtained.

Declaration of Contribution: On the same page as the abstract, write a brief explanation of your contribution to the project. Describe which of the experiments you did and whether you had assistance with them. In the case of multi-technique experiments, describe which techniques you used and which were performed for you. In the case of joint experiments, declare which data are directly from your own experiments and which are from your collaborator. Finally, where appropriate, describe which data analyses are yours and which were done for you.

Introduction: Should place the project work in its biological context with a thorough, but concise, review of the relevant literature. The aims should be clear. In other words the Introduction should define what the problem is and how you are going to investigate it.

Materials and Methods: All the experimental procedures, protocols and possible sources of error should be fully described. Could someone else repeat your work from the methods reported here?

Results: Should adequately describe both the control and experimental results and be structured in such a way as to provide a basis for subsequent discussion. All tables and figures to be numbered and appropriate for the type of data you are presenting. They should be well-labelled and easy to follow from the legend that accompanies them; any photographs should have their scales indicated. Statistics to be included where appropriate (ask your supervisor for guidance if necessary). The text should draw attention to the main findings presented in tables and figures, rather than acting merely to repeat the data included in these.

Discussion: The results should be discussed in relation to the previously published literature. Is the significance of the findings fully explained and the limitations of the project discussed? Is there any consideration of further developments arising from the findings of the current project?

References: Should be cited in the text as author and date, e.g. Smith and Jones, 1992; Smith et al., 1992. This is a Harvard style reference system. Do not use a Vancouver style, with numbered references in the text. The reference list at the end of the dissertation should be in a format similar to the following and listed in alphabetical and chronological order, e.g.

Rochlin MW, Itoh K, Adelstein RS and Bridgman PC (1995) Localization of myosin IIA and B isoforms in cultured neurons. J Cell Sci 108:3661-3670.

Matlin KS and Caplan MJ (1992) Epithelial cell structure and polarity. In The Kidney: Physiology and Pathophysiology (ed Seldin DW and Giebisch G), New York: Raven Press pp.447-473

Rules of Submission

• The deadline (towards the end of term 2) for the submission of all projects (2 bound copies and electronic submission) will be **published on the Moodle page.** A late penalty (see below) will be incurred if the project is submitted after the deadline.

• Two bound copies of the project must be submitted to the Teaching Office. Even in cases where projects are conducted with supervisors outside the Bloomsbury site, you should not hand-in either of these copies directly to your supervisor. Additional to the hard-copies, students are required to submit an electronic copy of the project via Turnitin on the NEUR3903 Moodle site. You should include the entire text of the project together with all of the figures etc. embedded in the text. This final, composed version should be identical to the bound, hardcopy versions and may be submitted as a "Word" or as an "Acrobat" (.pdf) document. The Teaching Office will send one bound copy to your supervisor and one bound copy to your internal examiner. Full submission instructions will appear on the Moodle site before the submission process opens.

• Both bound copies will be retained permanently by the Faculty. Supervisors normally like to have their own copy to keep – so you may wish to make an extra copy for this purpose. Projects should be written according to the regulations and guidelines in this document. with absolute maxima of 7500 words and 40 typed A4 pages, including figures, photographs, graphs, diagrams, charts and tables but excluding the Reference list and Appendices. It should be double-spaced, on one side only and page-numbered throughout. Neither word nor page length maxima can be exceeded. An over length penalty (see below) will be incurred if either criterion is exceeded.

• The dissertation should entirely be the work of the student. Plagiarism will be checked using the electronic copy and will carry a severe penalty if committed. Students unsure of what constitutes plagiarism should consult the section below.

Plagiarism

Plagiarism concerns the use of material published by others and of the student's own material previously submitted as course work.

•UCL Policy on Plagiarism in the on-line Guidelines for current students:

http://www.ucl.ac.uk/current-students/guidelines/plagiarism

Penalties

To ensure fairness in the examination process and to give sufficient time for the examiners to read the projects, penalties for late submission and for exceeding the word limits will be applied. These penalties have been prescribed at the Faculty level and the key points relating to dissertations and project reports are given below:

Late submission penalties

The full allocated mark will be reduced by 5 percentage points for the first working day after the deadline for the submission of coursework.

The mark will be reduced by a further 10 percentage points (i.e a total of 15%) if coursework is submitted during the following six days.

In the case of project reports submitted more than seven days late, the mark will be recorded as zero but the assessment will be considered to be complete if it is of an acceptable (pass) standard. If the project is not submitted at all, the student will be "incomplete". These are the Faculty regulations for all coursework and dissertations. However, students are reminded that the project must be passed in order to get a classified (honours) degree and if it is not passed the student would only be eligible for consideration of an Ordinary degree (bearing in mind that it would be a failure of 1.5 course units). For iBSc students, no award would be possible.

Where there are extenuating circumstances (EC) that have been recognized by the Faculty EC Panel, none of these penalties will apply until the agreed extension period has been exceeded.

For permission to derogate from these penalties, an application should be made to the Chair of the UCL Board of Examiners through the relevant Faculty Tutor.

Worked Example: A project is submitted late, but assessed as deserving a mark of 65%. If it was submitted within one working day after the deadline, the mark becomes 60%. If, however, it was submitted two to seven days late, the mark becomes 50%.

Over length penalties

The dissertation shall be within both the word and page limits of 7500 words and 40 pages, respectively.

Penalties will apply for over length submissions. Details of these and all other UCL regulations applicable to course work and examinations can be found at:

http://www.ucl.ac.uk/ras/acd_regs/2013-2014/UG_Section_3_2013-2014.pdf

Research Presentation – penalty for non-attendance

Failure to attend the research presentation (see below) without mitigating circumstances will incur a penalty of 15 marks.

Examination Process

One copy of the project is sent to your supervisor and the other copy is sent to an internal examiner. Both will read the project and decide upon their marks independently. You will then present a short, research talk on your project work. This presentation will be to a small group consisting of some of your co-presenters, your internal examiner, one or more other internal examiners and the course tutor, who will act as moderator for all of the research presentations. As in scientific meetings, times will be strictly controlled and extra time will not be allowed. Questions from the examiner(s) will test your understanding of your project, as well as establishing that the work presented is your own.

Failure to attend the research presentation, without mitigating circumstances, will result in a 15 mark deduction.

Project Assessment

Marking of the project will follow the Faculty guidelines:

- Performance in the Laboratory – supervisor's assessment: 15% of total
- Dissertation – supervisor's assessment: 35% of total
- Dissertation – internal examiner's assessment: 35% of total
- Research Presentation – panel assessment: 15% of total

Printing and Binding

The project should be printed on plain white A4 paper, leaving at least a 30 mm margin down the left-hand side for binding and 20 mm margins for the rest. Number the pages and use either Arial 11 point or Times New Roman 12 point font. There are numerous places in London where you can get your project printed and bound, but probably the easiest and cheapest is ULU in Malet Street.

Final Year Research Project Dissertation: Two bound copies and MUST be submitted to the Teaching Office by **the stated deadline**. Electronic submission via Turnitin on the NEUR3903 Moodle web pages, also by **the same deadline**.

Suggested Timetable for NEUR3093 Final Year Experimental Research Project

Projects differ in the amount of time needed to learn techniques and to get useful results, so the following are guidelines. If you find yourself falling behind them, you should seek advice.

Stage 1: Preliminary (Start of Term 1 – or earlier)
• agree title of project
• agree a schedule of hours/week for the lab work
• do preliminary reading and perhaps write short essay (750 words) outlining background to project and major question (s) to be addressed
• do preliminary literature search
• list and learn major techniques needed for the project

Stage 2: Experiments/data collecting and results (Term 1)

• In this stage you should be concentrating on setting up and running experiments, or collecting data. By the end of term 1 you should have some preliminary results and should be fully competent in the skills needed for the work.

• At the end of Term 1 – optional short meeting with third year tutor to discuss progress

•Over the Christmas vacation you should write a first draft of the introduction to your project. Give this to your supervisor at the beginning of January and ask for feedback. This should help identify any obvious weaknesses in style presentation or understanding before you begin the main part of the project report in Term 2.

Stage 3: Finish experiments/data collection and begin drafts of report (Early Term 2)

• In the first part of Term 2 you should be completing your experiments/data collection, beginning any necessary statistical analyses, and learning the techniques needed to display your results (photography, electron microscopy, drawings etc).

• you should begin to make a list of all the references you have used and store this on computer

• you should write a draft of your methods section and have it checked by your supervisor

• you should begin to draft your results and discussion sections

Stage 4: Completion and write-up (Mid-late Term 2)

• unless there has been a problem of some kind, you should have finished collecting data

• complete your methods section

• update your introduction and finalise it

• prepare your results section including any images/graphs etc you need for your report

• prepare your discussion

• think about sources of error and think about additional work that might be done in the future to improve the work

• it is usual to add an acknowledgement section to thank everyone that has helped you with the project.

• aim to have a complete draft of your report finished well before the end of term 2. Most supervisors like to look at a preliminary draft to check for obvious problems but do give your supervisor enough time!

SUPERVISORS MUST HAVE APPROVED YOUR FINAL DRAFT BEFORE SUBMISSION

NEURM901 MSci ADVANCED EXPERIMENTAL RESEARCH PROJECT

Guidelines for Supervisors and Students

The Fourth Year Masters Level Experimental Research Project
The NEURM901 (2.0 unit) project is the major component of the 4th year assessment of your MSci Neuroscience degree.

What to expect from a Masters Level Experimental Research Project?
The NEURM901 MSci Advanced Experimental Research project is substantially more advanced than the BSc level experimental project (e.g. NEUR 3093). As it is assigned 2.0 CU (of a total of 4.0 CU in Year 4), it is expected that the student will spend half of their time in Term 1 and 2 on this project before submitting their dissertation at the penultimate day of end of Term 2, Thursday 26th March.

NEURM901 should teach you to form a clear hypothesis and design a set of experiments to test that hypothesis. You should also collect your own experimental data, or play a clear role in that collection, and perform appropriate quantitative and statistical analysis. Finally you should write up your results in the form of a paper published in a scientific journal such as Journal of Neuroscience.

* Note to Supervisors: Please note that MSci students, in contrast to MSc students, do not spend the summer in the lab and must complete all experimental work well before the end of Term 2. Financial support is available from the Division of Biosciences to cover the cost of the research project. Application forms for these costs will be sent to you. In addition, a percentage of the FTE for the project will be awarded to your department.

Selecting a Project
·   Projects may involve research on any topic of relevance to the Neuroscience MSci programme supervised in a UCL laboratory.

·   Individual project supervisors may require course prerequisites. They may also specify that a course is undertaken in the MSci year to complement the project.

·   An online sign-up list of supervisors/laboratories is provided by the NPP department to aid placement of students. However, such lists are not prescriptive. Project titles are negotiable with supervisors and indeed, if none of the suggested supervisors/projects appeals, students can consider other members of the UCL Faculty of Life Sciences, Medical Sciences and Brain Sciences.

·   Students arranging to do a project with a supervisor not listed on the NPP online sign-up system must contact Professor Maria Fitzgerald (m.fitzgerald@ucl.ac.uk) providing full details of the proposed work and must receive her approval before proceeding.

What to do once a project has been arranged?

·   Fill up the NEURM901 Project Registration Form and get it signed by your new supervisor. Return it to the teaching office, from where it will be forwarded to Professor Fitzgerald, the project tutor. This form is an undertaking by all parties and, without it, the project will not be registered.

·   The time allocated for the NEURM901 project is in the range of 400-500 hours. This allocation is for the laboratory work and the preparing and writing of the dissertation. The exact timetable is flexible and is decided between student and supervisor. It is very important to start work on the project as soon as possible in Term 1.

·   Regular interaction with the supervisor is assumed with NEURM901 laboratory projects. It is expected that the project supervisor will give advice on background reading, experimental design, training in necessary techniques, data and statistical analysis and report writing. In many instances, some of these roles will be delegated to other members of the research group but it remains the responsibility of the supervisor to ensure that appropriate training and guidance is given.

·   If a Home Office personal licence (for experimental work on animals) or Ethical Approvals (for experimental work on human subjects) are needed, it is essential that these are planned early and obtained as soon as possible within Term 1. Students will be at a severe disadvantage if these arrangements are not in place within 6 weeks of the beginning of the session.

Preparing your NEUR M901 dissertation
The style of your written report should be modelled upon papers in high quality international neuroscience journals such as the Journal of Neuroscience.

The maximum permissible length of the report is 40 typed A4 pages. It should be double-spaced, on one side only and page-numbered throughout. Each page should be formatted with a 30 mm left

margin for binding and 20 mm margins for the rest. Use Arial (or Helvetica) 11 point or Times New Roman 12 point font.

The maximum number of words is 7500 words. The word count includes the Title, Abstract, Declaration, Acknowledgement and all other text, including figure legends.

The word count does not include figures, tables, displayed equations or references.

If the dissertation exceeds the word or page maximum, penalties will be incurred according to UCL regulations (see below). If you have produced material that cannot be compressed into the word limit, we suggest that the best of the material is put into the report, and any additional material can be placed into an appendix. Please note that marks will not take the appendix into account, but this gives you the opportunity to archive any additional work you have done

The dissertation should have the following headings

· Title Page
· Abstract (300 words max)
· Introduction (750 words maximum, including in-text citations)
· Materials & Methods
· Results
· Discussion (2000 words maximum, including in-text citations)
· Acknowledgements
· References

Figures and short tables should be included within the main body of the text. The number of figures should be sufficient to illustrate your work adequately, but remember that figures, if they are clear and well labeled, take up a lot of space and you only have 40 pages overall.

You should discuss your results and how to present them in general with your supervisor before compiling your report. Supervisors should comment on an early draft outline of your report, but the final version is your responsibility.

Checklist for writing your report:

· Title Page: This should contain a brief, informative title for the project and your name.
It should also state the total word count (not to exceed 7500 words) and page count (not to exceed 40 pages).

· Abstract: 200-300 words on a separate page, briefly summarising the aims and nature of the work, the results obtained and conclusions reached.

· Declaration of Contribution: On the same page as the abstract, write a brief explanation of your contribution to the project. Describe which of the experiments you did and whether you had assistance with them, what techniques and analysis you used and whether they were all performed by you.

· Introduction: (500 -750 words) The Introduction should indicate the objectives of the study and provide enough background biological information to clarify why the study was undertaken and what hypotheses were tested.

· Materials and Methods: All the experimental procedures, protocols and possible sources of error should be fully described. They should be sufficient to allow other investigators to repeat the research. Reference should be made to published procedures. The sex of subjects should be stated. All companies from which materials were obtained should be listed. If materials were obtained from an individual, this should be stated.

· Results: Should adequately describe both the control and experimental results and be structured in such a way as to provide a basis for subsequent discussion. All tables and figures to be numbered and appropriate for the type of data you are presenting. They should be well labeled and easy to follow from the legend that accompanies them; any photographs should have their scales indicated. Statistics should be included (ask your supervisor for guidance if necessary). The text should draw attention to the main findings presented in tables and figures, rather than repeating the data included in these.

· Discussion: (1500-2000 words) The results should be discussed in relation to the previously published literature. Is the significance of the findings fully explained and the limitations of the project discussed? Were you able to test your hypothesis? What conclusions can be drawn? Are there any further developments arising from your findings?

· References: As in Journal of Neuroscience, these should be cited in the text as author and date, e.g. Smith and Jones, 1992; Smith et al., 1992. The reference list at the end of the dissertation should be listed in alphabetical and chronological order, e.g. Rochlin MW, Itoh K, Adelstein RS and Bridgman PC (1995) Localization of myosin IIA and B isoforms in cultured neurons. J Cell Sci

108:3661-3670. Matlin KS and Caplan MJ (1992) Epithelial cell structure and polarity. In The Kidney: Physiology and Pathophysiology (ed Seldin DW and Giebisch G), New York: Raven Press pp.447-473.

Plagiarism

The dissertation should entirely be your work. Plagiarism will be checked using the electronic copy and will carry a severe penalty if committed. Plagiarism concerns the use of material published by others and of the student's own material previously submitted as course work. UCL Policy on Plagiarism can be found on: http://www.ucl.ac.uk/current-students/guidelines/plagiarism

Printing and Binding

The project should be printed on plain white A4 paper, leaving at least a 30 mm margin down the left hand side for binding and 20 mm margins for the rest.

Rules of Submission

· The deadline for the submission of all projects (2 bound copies and electronic submission) is 12 noon on the penultimate day of Term 2, Thursday 26th March. A late penalty (see below) will be incurred if the project is submitted after the deadline.

· Two bound copies of the project must be submitted to the Teaching Office. Do not hand these in directly to your supervisor. Additional to the hard-copies, students are required to submit an electronic copy of the project via Turnitin on the NEURM901 Moodle site. You should include the entire text of the project together with all of the figures etc. embedded in the text. This final, composed version should be identical to the bound, hardcopy versions and may be submitted as a "Word" or as an "Acrobat" (.pdf) document. The Teaching Office will send one bound copy to your supervisor and one bound copy to your internal examiner. Full submission instructions will appear on the Moodle site before the submission process opens.

· Both bound copies will be retained permanently by the Faculty. Supervisors normally like to have their own copy to keep – so you may wish to make an extra copy for this purpose.

Project Assessment

The pass mark for NEURM091is 50%. Marking of the project will follow the Faculty guidelines:

· Performance in the Laboratory – supervisor's assessment: 15% of total
· Dissertation – supervisor's assessment: 35% of total
· Dissertation – internal examiner's assessment: 35% of total
· Research Presentation – panel assessment: 15% of total

The written dissertation will be marked by your supervisor and an internal examiner who mark independently.

You will also be required to give a short oral research presentation to a panel consisting of your internal examiner, one or more other internal examiners and the course tutor, who will act as moderator for all of the research presentations. Some of your co-presenters will also be present. As in scientific meetings, times will be strictly controlled and extra time will not be allowed. Questions from the examiner(s) will test your understanding of your project, as well as establishing that the work presented is your own.

Penalties

You must contact the course Tutor, Professor Maria Fitzgerald, immediately if you are unable to submit the project on time or unable to attend the research presentation.

• **Failure to attend the research presentation**

This will result in a 15 mark deduction from the total project mark.

• **Late submission**

The full allocated mark will be reduced by 5 percentage points for the first working day after the deadline for the submission of coursework. The mark will be reduced by a further 10 percentage points (i.e a total of 15%) if coursework is submitted during the following six days.

In the case of project reports submitted more than seven days late, the mark will be recorded as zero but the assessment will be considered to be complete if it is of an acceptable (pass) standard. If the project is not submitted at all, the student will be "incomplete". These are the Faculty regulations for all coursework and dissertations. However, students are reminded that the project must be passed in order to get a classified (honours) degree and if it is not passed the student

would only be eligible for consideration of an Ordinary degree (bearing in mind that it would be a failure of 1.5 course units). For intercalated students, no award would be possible.

Worked Example: A project is submitted late, but assessed as deserving a mark of 65%. If it was submitted within one working day after the deadline, the mark becomes 60%. If, however, it was submitted two to seven days late, the mark becomes 50%.

• **Extenuating circumstances**

If there are extenuating circumstances that have been recognized by the Board of Examiners or its representative, none of these penalties will apply until an agreed extension period has been exceeded.

For permission to derogate from these penalties, an application should be made to the Chair of the MSci Neuroscience Board of Examiners through the Project Tutor and the Teaching Office.

• **Over length penalties**

The dissertation shall be within both the word and page limits of 7500 words and 40 pages, respectively. If submitted coursework exceeds the word limit but by less than 10%, the mark will be reduced by 10 percentage marks; but the penalised mark will not be reduced below the pass mark, assuming the work merited a pass. For work that exceeds the word limit by 10% or more, a mark of zero will be recorded.

NEURM030 MSci EXTENDED 3.0 CU EXPERIMENTAL RESEARCH PROJECT

The extended 3.0CU MSci extended laboratory project is assessed differently from 2.0 and 1.5CU projects.

- An interim report, including planned methodology and statistics, is submitted at the end of Term 1.
- An abstract of the research is submitted in Term 2
- The supervisor's lab notebook assessment takes place in Term 2
- A final written report (in the form of a research manuscript submitted to a top, international neuroscience research journal) is submitted in Term 3.
- An oral presentation of laboratory results followed by a question and answer session takes place at the end of Term 3.

For detailed guidelines and mark scheme, please go to the NEURM030 Moodle page.

Life Sciences Faculty (Harmonised) Marking Scheme (November 2015)

Descriptor	Percentages	Notes to Guide Examiners (marks for individual questions)
exceptional performance	91 - 100	*91-100* An outstanding answer, work submitted publishable in current form.
High 1st	81 - 90	*81-90* An excellent answer, original and showing a deep and critical understanding of the question. Work potentially publishable.
Mid-range 1st	76 - 80	*76-80* Clear first class answer; almost everything included that you can think of (containing critical discussion of facts or evidence). Well argued, to the point. No significant errors.
Low 1st	70 - 75	*70-75* A very good, correct answer, showing insight and well written.
High 2i	66-69	A well organised and well expressed answer which shows clear understanding; a good number of correct facts, with no significant errors, but lacking the critical insight of a 1st class answer.
mid-range 2i	65	
low 2i	60-64	
High 2ii	56-59	Undoubtedly sufficient to pass but not enough detail, and/or not sufficiently well constructed or well argued to be considered for a 2:1. May have had potential for a higher grade but contains one or two significant errors. MSci Pass
mid-range 2ii	55	
low 2ii MSci Pass	50-54	
High 3rd MSci Fail	46-49	MSci Fail
mid-range 3rd	45	Adequate number of relevant points to pass (BSc) but muddled presentation. Several significant errors or very poor expression of material. Poor judgment about what is important.
low-mid 3rd	40-44	
Fails/referrals Referrals are NOT available to 1st year or final year students or for students on M- or G-level modules	35-39	Addresses question set but supplies inadequate information, Relevant points counterbalanced by multiple significant errors. No judgement about balance of what is important or what is trivial. With a little extra work, candidate could pass (BSc).
fail	25-34	*25-34* Tries to answer question set but shows weak knowledge of subject/core concept throug Numerous and significant errors, poor presentation
clear fail	15-24	*15-24* Doesn't answer question set; little understanding of topic/core concepts but makes a few (2-3) relevant points.
weak fail	1-14	*1-14* Doesn't answer question set or is unacceptably brief, little/no understanding of the topic/core concepts but makes a single relevant point.
zero	0	*0* irrelevant/unintelligible and/or doesn't answer questio of fails to provide an answer.

Pass mark for BSc modules = 40% and no referrals for 1st year or final year students.
Pass mark for M-level and G-level modules = 50% and no referrals.