PHYSIOLOGY & PHARMACOLOGY

INFORMATION FOR BSc and IBSc STUDENTS
(Programme codes: UBSPHSING05 & UBIMEDWPHL01)

2017/18

Image: CA1 pyramidal neurone in a rat organotypic slice at 11 days in vitro. (France Edwards, 2013)
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INTRODUCTION

Welcome to the Physiology and Pharmacology degree programme in the Faculty of Life Sciences and the Division of Biosciences.

"In the first half of the 20th century [...] pharmacology really established its identity and its status among the biomedical sciences. In parallel with the exuberant proliferation of therapeutic molecules-driven mainly by chemistry-which gave pharmacologists so much to think about, physiology was also making rapid progress, particularly in relation to chemical mediators [...]. Many hormones, neurotransmitters and inflammatory mediators were discovered in this period, and the realisation that chemical communication plays a central role in almost every regulatory mechanism that our bodies possess immediately established a large area of common ground between physiology and pharmacology, for interactions between chemical substances and living systems were exactly what pharmacologists had been preoccupied with from the outset." (Rang et al., “Pharmacology”, 2007, 6th Ed)

Physiology and Pharmacology study how living organisms work, and how chemical compounds, endogenous or exogenous, interact with them to affect their function. The joint honours programme ensures a deep knowledge of two tightly related and complementary disciplines, for which understanding of one is required for, and enhances, understanding of the other. They are the basic sciences underlying modern medicine and research aimed at understanding human health and disease.

The Division of Biosciences was formed in 2008 when the Faculty of Life Sciences was re-organised. The Division has a number of undergraduate and IBSc programmes covering the Biosciences area – such as Pharmacology, Neuroscience, Physiology, Biochemistry, Biological Sciences and Anatomy.

UCL Biosciences is one of the largest multi-disciplinary research environments in the UK with over 120 research active laboratories. State-of-the-art research facilities enhance the research environment and provide students with the possibility of acquiring research skills.

The research interests of the Department (NPP Research) are mainly centered on the nervous system, but not limited to it. Research activity spans areas ranging from the molecular study of drug receptors, ion channels, transporters (expressed in the brain and in various epithelia), intra- and inter-cellular signalling, including the study of neurotransmitter action in the peripheral and central nervous system, to information processing in the nervous system, especially the auditory and visual systems. Reflecting the excellence of research carried out in the Department, the final year modules make extensive use of material drawn from contemporary scientific literature and aim at familiarizing students with critical thinking and the scientific method.

Together with the Biosciences Divisional Handbook, these notes are intended to inform BSc and IBSc students about the organisation of the Physiology and Pharmacology BSc/IBSc programmes, and to help students have an enjoyable and productive College life. The aim is also to try to answer some of the questions students commonly ask (or sometimes feel unsure about, but are too shy to ask!). The best way to contact members of staff is by email. Email addresses can be
found on the internet: http://www.ucl.ac.uk/directory/
The following pages should be read in conjunction with the information about your modules
provided at the start of each module and by referring to the College and Examination
Regulations in the UCL Academic Manual, which can be found at:
http://www.ucl.ac.uk/srs/academic-manual/overview

Physiology and Pharmacology students are encouraged to join the student-run Bernard Katz
(http://www.facebook.com/group.php?gid=2210873847) and Gaddum Societies which organise
social events.

CONTACTS AND COMMUNICATION MECHANISMS

Important Staff Contacts

Physiology and Pharmacology Degree Tutor: Dr Paola Vergani
p.vergani@ucl.ac.uk Telephone: 020 7679 7908, Room 240/245 Medical Sciences Building

Physiology and Pharmacology Programme Administrator: Mr Nick Clarke n.m.clarke@ucl.ac.uk
Telephone: 020 7679 3751, Biosciences Teaching Office, G10 Medawar Building

Head of Teaching NPP: Prof Talvinder Sihra
t.sihra@ucl.ac.uk Telephone: 020 7679 3296, Medawar Building Room 334

The Biosciences Teaching Office

Your first point of contact for general enquiries and submission/collection of coursework is the
Teaching Office located in Room G10, Medawar Building, open 09.30 am - 4.00 pm Monday to
Friday. Out of term opening hours are Monday to Thursday 10am-12noon & 2-4pm, Friday
10am-12noon.

Staff Communication: Email and Moodle Forums

Please use your UCL email address for all communication with staff. It is important to save staff
contact details in your email address book, to ensure important messages do not go into your
junk or clutter folders. You will also receive important emails from staff via your module Moodle
Forums. We strongly discourage the use of the Moodle message email digest facility, in case you
miss important communication. To check, go to the ‘Settings’ tab on your home page of Moodle,
to ‘my profile setting – edit profile’ and under ‘Preferences’ and make sure you are set up as
‘No digest (single email per forum post)’.

Personal Tutor

As students, you are provided with a Personal Tutor from within the Division of Biosciences who
is responsible for monitoring your academic progress and providing pastoral support. You are
expected to meet your tutor at least once a term to discuss your progress and plans for the
future.
Further Sources of Support

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.

**Staff-Student Consultative Committee (SSCC)**

The joint NPP SSCC meets two times per year to provide a forum for discussions between staff and students. All students are invited to contribute to SSCC meetings by providing items for the agenda to either Dr Ian Edwards (i.edwards@ucl.ac.uk) or Dr Martina Wicklein (m.wicklein@ucl.ac.uk) who co-chair the SCC meetings, or via the student representative from the programme on the SCC.

If you would like to become a student representative for Physiology and Pharmacology, please give your name to Mr Nick Clarke or contact Dr Ian Edwards directly.

Nominations for SSCC representatives can be made early in the autumn term. The NPP SSCC is, however, open to any student wishing to attend to voice their views on a module or programme.

The dates of the Staff Student Consultative Committee (SSCC) meetings and minutes will be
posted on a Moodle site for the SSCC (http://moodle.ucl.ac.uk/course/view.php?id=9563).

The Head of Teaching normally attends the SSCC meetings as well as other members of staff according to the needs of the agenda. All the main groups of undergraduate students present in NPP are represented on the SSCC.

The Physiology and Pharmacology student representative/s from the SSCC are also invited to attend meetings of the Programme Teaching/Steering Committee and the NPP Teaching Committee for agenda items relevant to matters raised at the SSCC.
PROGRAMME OF STUDY

The programme of study is designed to give you a good background in all areas of Physiology and Pharmacology and to provide some advanced training in specialized areas. The degree also teaches you a variety of transferable skills including presentation and communication skills.

Aims and Objectives

In both our programmes we aim to:

- Recruit high calibre students.
- Stimulate the student's interest in the subject.
- Inform students of the basic facts on which their knowledge can be built.
- Promote the capacity for self-education.
- Develop the ability to evaluate critically both theories and evidence.
- Provide teaching that is informed by research.
- Produce graduates well equipped for advanced study, research, and for a wide variety of careers in the private or public sector.

Common objectives are that students should be able, as appropriate, to:

- Have followed a coherent programme of study which includes a broad grounding in life sciences.
- Have detailed knowledge of a chosen area.
- Be familiar with selected current research issues.
- Be aware of relevant state-of-the-art research techniques.
- Compile and critically evaluate information (study skills).
- Use a range of common laboratory techniques competently and safely, as part of a team or individually.
- Plan, carry out and compile a detailed report on a piece of original research that they have personally conducted (specific subject knowledge, research skills, report writing).
- Demonstrate the development of skills necessary to work both as individuals and as part
of a team, e.g. time management, decision making, sharing of resources, co-operation with others, autonomous learning.

Additional specific aims and objectives for each degree programme are:

**BSc Physiology & Pharmacology**

**Aims to:**

- Meet the national need for graduates who have a detailed knowledge of specialist subjects and can apply this knowledge in a research environment.

**Integrated BSc Physiology & Pharmacology**

**Aims to:**

- Provide the opportunity for in-depth study of a defined area of medical science.
- Develop the skills needed for research into a selected topic.
CURRICULUM

Term Dates

Term 1: Monday 25 September 2017 - Friday 15 December 2017
Term 2: Monday 08 January 2018 - Friday 23 March 2018
Term 3: Monday 23 April 2018 - Friday 08 June 2018

Induction Week: Monday 25 September - Friday 29 September 2017

Reading Weeks: Monday 06 November – Friday 10 November 2017
       Monday 12 February – Friday 16 February 2018

Additional teaching sessions such as practicals and tutorials may be scheduled during the term 1 and term 2 Reading Weeks and you must be available to attend these. Reading Weeks should not be viewed as a holiday.

Main Exam Period: The UCL exam period runs from late April to late May - you could have exams scheduled at any time during this period so you must be available on all these dates. The exam timetable is published by Central Exams, and should be made available directly to students by the end of term 2.

Common Timetable Teaching Blocks

Modules run within the Common Timetable structure. Most modules include small-group tutorial sessions as well as lectures, and most have in-course assessments (practical reports, essays, oral presentations etc.), usually amounting to 20 - 30% of the total.

<table>
<thead>
<tr>
<th>Time</th>
<th>Monday</th>
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<tr>
<td>9am – 11am</td>
<td>Block A</td>
<td>Block B</td>
<td>Block C</td>
<td>Block D</td>
<td>Block E</td>
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<tr>
<td>11am – 1pm</td>
<td>Block C</td>
<td>Block D</td>
<td>Block E</td>
<td>Block A</td>
<td>Block B</td>
</tr>
<tr>
<td>1pm – 2pm</td>
<td>Lunch break *</td>
<td>Lunch break *</td>
<td>Lunch break *</td>
<td>Lunch break *</td>
<td>Lunch break *</td>
</tr>
<tr>
<td>2pm – 6pm</td>
<td>Block F</td>
<td>Block G</td>
<td>Block H</td>
<td>Block I</td>
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</tr>
</tbody>
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* The lunch break may be used by some modules for teaching which cannot timetabled otherwise.
## Life Sciences Marking Scheme

<table>
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<tr>
<th>Descriptor</th>
<th>Percentages</th>
<th>Notes to Guide Examiners (marks for individual questions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>exceptional performance</td>
<td>91 - 100</td>
<td>91-100 An outstanding answer, work submitted publishable in current form.</td>
</tr>
<tr>
<td>High 1st</td>
<td>81 - 90</td>
<td>81-90 An excellent answer, original and showing a deep and critical understanding of the question. Work potentially publishable.</td>
</tr>
<tr>
<td>Mid-range 1st</td>
<td>76 - 80</td>
<td>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.</td>
</tr>
<tr>
<td>Low 1st</td>
<td>70 - 75</td>
<td>70-75 A very good, correct answer, showing insight and well written.</td>
</tr>
<tr>
<td>High 2i</td>
<td>66-69</td>
<td>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.</td>
</tr>
<tr>
<td>mid-range 2i</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>low 2i</td>
<td>60-64</td>
<td></td>
</tr>
<tr>
<td>High 2ii</td>
<td>56-59</td>
<td>Undoubtedly sufficient to pass but not enough detail, and/or not sufficiently well constructed or well argued to be considered for a 2:i. May have had potential for a higher grade but contains one or two significant errors.</td>
</tr>
<tr>
<td>mid-range 2ii</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>low 2ii MSci Pass</td>
<td>50-54</td>
<td>MSci Pass</td>
</tr>
<tr>
<td>High 3rd</td>
<td>46-49</td>
<td>MSci Fail</td>
</tr>
<tr>
<td>MSci Fail</td>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>mid-range 3rd</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>low-mid 3rd</td>
<td>40-44</td>
<td></td>
</tr>
<tr>
<td>referrals</td>
<td>35-39</td>
<td>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).</td>
</tr>
<tr>
<td>fail</td>
<td>25-34</td>
<td>25-34 Tries to answer question set but shows weak knowledge of subject/core concept throughout. Numerous and significant errors, poor presentation. 15-24 Doesn’t answer question set; little understanding of topic/core concepts but makes a few (2-3) relevant points.</td>
</tr>
<tr>
<td>clear fail</td>
<td>15-24</td>
<td>15-24 Doesn’t answer question set; little understanding of topic/core concepts but makes a single relevant point. 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.</td>
</tr>
<tr>
<td>weak fail</td>
<td>1-14</td>
<td>0 irrelevant/unintelligible and/or doesn’t answer question set or fails provide an answer.</td>
</tr>
<tr>
<td>zero</td>
<td>0</td>
<td></td>
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Pass mark for BSc modules: 40%
Course Unit Assessment

Your performance is assessed by coursework (e.g. essays and practical write-ups) which are usually marked by tutors, and by final examinations at the end of each year.

BSc Physiology & Pharmacology

For Science students the final B.Sc. degree classification is based on a weighted overall mark calculated using results from all three years. The weighting is 1:3:5 for the 1st, 2nd and 3rd year respectively, with other specific requirements stipulated below. In final evaluation of the overall degree, marks from the best 10.5 course unit (1st year, 3 course units; 2nd year, 3.5 course units; 3rd year, 4 course units) will be considered, but note below the total number of course credits required for progression and completion.

In order to progress from Year 2, students must be complete in the 4.0 course units from Year 1, and have passed at least 7.0 course units, and be registered to complete in their final year any course unit not yet complete. However, students may not progress from Year 2 or register for incomplete course units or re-sit attempts if they have exhausted the permitted number of opportunities.

For the consideration of an award of an honours degree, a minimum of 11 course units should be passed on a three-year programme with three course units passed at advanced level.

Twelve course units overall must be completed on a three-year programme.

Further information can be found via chapter 4 of the ‘UCL Academic Manual’ documentation.

IBSc Physiology & Pharmacology

For Integrated B.Sc students the weighting for the final degree classification is 1:1:6 for 1st, 2nd and 3rd (integrated) year respectively.

Information about in-course assessment within a course unit is given by individual module organisers in the module documentation. Criteria for the assessment of course units are as follows:-

- Your depth of knowledge and understanding of the module contents.
- Knowledge of set texts and original articles relevant to the module.
- Accuracy and clarity of the work produced by the student.
- Skill in essay writing and presentation, including the correct use of English.
- Relevance to the set question and appropriate use of references.
- Credit is given for original ideas, as long as they are relevant.

Strength in these areas will normally result in high marks. Coursework submissions are now usually expected to be made as duplicate paper copies AND on-line, through the use of Turnitin®.
Year 2 Modules

Students must take a total of 4 cu. 3 modules are compulsory:

PHAR2002: General and Systematic Pharmacology
PHOL2005: Structure and Function of the Nervous system, and
STAT6101: Introduction to Statistical Methods and Computing.

In addition, a Biochemistry module is required. There is some flexibility:

Either


Or

BIOC2002: Essential Protein Structure and Function and BIOC2003: Essential Molecular Biology

Finally, students can choose between two alternative modules aimed at developing practical and experimental skills (PHAR2003: Experimental Pharmacology or PHAR2006: Practical Pharmacology).

If the 0.5 cu PHAR2006 is chosen, students need to take an additional 0.5 cu module, chosen from: PHOL2001: Animal and Human Physiology, PHOL2003: Systems Neuroscience or BIOS2001: Writing and Presenting Bioscience.

Language courses are also an option.
## Year 2 Term Timetables

### Year 2 Term 1

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<td>10 AM</td>
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<tr>
<td></td>
<td></td>
<td>PHAR2003/6 Experimental Pharmacology</td>
<td>STAT6101 Intro to statistical methods &amp; computing (group A)</td>
<td>STAT6101 Intro to statistical methods &amp; computing (group A)</td>
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<td>11 AM</td>
<td>Block C</td>
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<tr>
<td></td>
<td>PHOL2005 Structure and Function of the Nervous System</td>
<td>PHAR2002 Gen &amp; systematic Pharmacology</td>
<td>STAT6101 Intro to statistical methods &amp; computing (group A)</td>
<td>BIOC2003 Essential Molecular Biology</td>
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<td>PHOL2005 Structure and Function of the Nervous System</td>
<td>BIOC2003 Essential Molecular Biology</td>
<td>PHOL2001 Integrative Physiology</td>
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<td>PHAR2003/6 Experimental Pharmacology</td>
<td>STAT6101 Intro to statistical methods &amp; computing (group B)</td>
<td>PHOL2001 Integrative Physiology</td>
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<td>PHAR2003/6 Experimental Pharmacology</td>
<td>STAT6101 Intro to statistical methods &amp; computing (group B)</td>
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<td>PHAR2003/6 Experimental Pharmacology</td>
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<td>PHOL2001 Integrative Physiology</td>
<td>STAT6101 Intro to statistical methods &amp; computing (group B)</td>
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**Reading week term 1:** Some PHOL2005 Structure and Function of the Nervous System practical groups will run in reading week.
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<td>BIOC2002 Essential Protein Structure and Function</td>
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<td>PHOL2003 Systems Neuroscience</td>
<td>PHAR2002 Gen &amp; systematic Pharmacology</td>
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<td>10 AM</td>
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<td>PHOL2003 Systems Neuroscience</td>
<td>PHAR2003 Experimental Pharmacology</td>
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<td>STAT6101 Intro to statistical methods &amp; computing (Group C)</td>
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Year 3 Modules

Third year students (both BSc and IBSc) select modules to complete 4 units in total, including at least 1 taught unit (which can comprise two 0.5 units) from modules offered by the NPP Physiology (PHOL) group and 1 taught unit from the NPP Pharmacology (PHAR) group. These include one compulsory module which can be taken in either Pharmacology (Molecular Pharmacology, PHAR3003) or Physiology (Cell Signalling, PHOL3004).

In addition to taught modules, students will carry out either a laboratory- (1.5 units) or a library-based project (1 unit) on a topic of their choice. A member of NPP academic staff, working in the field, normally provides supervision for the project. With permission, students can do projects supervised by staff from other UCL Departments.

Listed below are final year Biosciences modules, all suitable for BSc and Integrated students. Further details on the available modules can be accessed from the Faculty of Life Sciences module database http://www.ucl.ac.uk/lifesciences-faculty-php/courses/search.php. You are encouraged to view the appropriate web pages for up-to-date information on individual modules. Students may take undergraduate module(s) elsewhere within the Faculty of Life Sciences, so long as there are no timetable clashes and the degree programme tutor agrees.
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<td>Term 1 &amp; 2</td>
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<td>PHAR3011 Synaptic Pharmacology</td>
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<tr>
<td>PHAR3010 Pharmacology Laboratory Project</td>
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Year 3 Projects

Project Selection Procedures and Criteria
Projects may research any topic of relevance to Physiology & Pharmacology. Students will already have been contacted by e-mail to start the project selection procedure detailed at: https://www.ucl.ac.uk/biosciences/departments/npp/study/npp-projects. After browsing the list of supervisors/laboratories offering projects, students decide their fields of interest, and formally apply to five supervisors/laboratories in order of preference as indicated on the aforementioned web-site.

PHOL3902 and PHAR3009 literature projects for 3rd year BSc and IBSc students will be assigned based on student preference and then, for over-subscribed projects, on merit (i.e. based on 2nd and 1st year marks).

For PHOL3904 and PHAR3010 laboratory projects, once a supervisor has accepted a student for supervision and agreed on an appropriate project title, projects have to be registered with the Project Tutor by completion of a Registration Form available from the relevant Moodle page, or online from the NPP Projects website.

All students must normally have achieved an overall mark of at least 60% in the 2nd year to do a laboratory project. Admission to laboratory projects will remain at the discretion of the prospective supervisor and Projects Tutor.

The exact time-tabling of the project is decided between the student and the supervisor. While frequent interaction with the supervisor is essential with PHOL3904 and PHAR3010 laboratory projects, students are reminded that PHOL3902 and PHAR3009 literature projects should also involve at least five "steering meetings" with the supervisor, which are arranged by the student.

While technically nine weeks are allocated for the PHOL3904 and PHAR3010 1.5-unit modules, students are reminded that this allocation includes the time 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 modules is usually extra effort for diminishing returns and is accordingly to be discouraged.

Project Assessment
For both PHOL3902 and PHAR3009 (literature project, 1.0 unit) and PHOL3904 and PHAR3010 (laboratory project, 1.5 unit) the project report comprises the major component of the final assessment. For laboratory projects, students’ laboratory performance will also be taken into account in the final assessment.

Literature Projects will be assessed by a poster presentation and a written dissertation. Students taking a literature project will be required to have had at least five supervisory meetings during the project with their supervisor. The dates of these are flexible, but the onus is on the student to ensure that these meeting are arranged and documented on the Progress
Form (found on the aforementioned web-site and the relevant Moodle page), which will need to be returned together with the completed project dissertation at the end of the year. Laboratory Projects will be assessed by a supervisor’s report on the student’s laboratory performance, a poster presentation, and by a written dissertation.

Poster presentations for PHOL3902, PHAR3009, PHOL3904 & PHAR3010 will be held in the penultimate week of term 2, prior to project submission.

Project dissertations should be typewritten. Dissertations are expected to be a maximum of 7500 words. If the dissertation is in excess of this maximum word limit, over-length penalties will be applied. All sources of information in the project must be properly referenced, both in the text and in the bibliography. Students must check Project Moodle pages for word limit regulations.

Extensive unacknowledged use of published text is considered as plagiarism. The penalty for plagiarism is severe with a Department Panel (DP) being automatically convened to consider every reported instance. Recommendations of DPs have in the past ranged from a deduction of marks, according to the extent of plagiarism, to a complete nullification of the module mark.

Two copies of the written project reports together with an electronic copy of the project text submitted to Turnitin© must be submitted no later than the stated deadline (at the end of Term 2 before the Easter break) unless prior arrangements for late submission have been agreed with the supervisor and the Project Tutor.

The submission of the electronic copy of the project text is compulsory and will be scanned for journal/text-book or web-based plagiarism, using Turnitin software designed for the task.

All projects will be double marked by the supervisor and one other field expert. The mark for laboratory projects will include an assessment of practical skills and diligence in the lab as well as academic skills. The Department is obliged to keep both marked copies for the Physiology Examination Board meeting in June. These copies are not returnable, therefore students should retain an electronic and/or hard copy for their own records.

For more details on project preparation and assessment, please refer to the relevant project guidelines from: https://www.ucl.ac.uk/biosciences/degree-programmes/current_students/npp-projects as well as relevant Moodle pages.

**Project Tutor Contact Details:**

**PHAR3009 & PHAR3010**
Prof Talvinder Sihra  
t.sihra@ucl.ac.uk  
020 7679 3296

**PHOL3902 & PHOL3904**
Dr Jonathan Fry  
j.fry@ucl.ac.uk  
020 7679 6214
## Year 3 Term Timetables

### Year 3 Term 1

<table>
<thead>
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<td>BIOS3016 - Genes to Disease</td>
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<td>NEUR3018 Neural basis of motivation &amp; learn</td>
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<td>PHAR3004 Receptor Mechanisms</td>
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<td>VRL3001 Molecular virology</td>
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### Notes
- **Block A** includes PHAR3001/2 Neuropharmacology and PHOL3002 Heart & Circulation.
- **Block B** includes BIOS3016 - Genes to Disease and PHAR3004 Receptor Mechanisms.
- **Block C** includes PHAR3003 Molecular Pharmacology and PHOL3004 Cell signalling.
- **Block D** includes NEUR3018 Neural basis of motivation & learn and BIOL3017 Biology of Ageing.
- **Block E** includes NEUR3041 Neurocomputation and ANAT3050 Advanced molecular cell biology.
- **Block F** includes ANAT3050 Advanced molecular cell biology and PHAR3003 Molecular Pharmacology.
- **Block G** includes BIOC3005 Molecular Basis of Cellular Regulation and PHOL3004 Cell signalling.
- **Block H** includes PHAR3001 Neuropharmacology and PHOL3002 Heart & Circulation.
- **Block I** includes PHAR3004 Receptor Mechanisms and PHAR3006 Drug Design and development.
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**Reading week term 2:** PHAR3005 Immunopharmacology (practicals)
DETAILED 2ND YEAR MODULE INFORMATION

**PHAR2002: General and Systematic Pharmacology**  
1.0 units  
Course organiser: Prof Talvinder Sihra  
Term 1 & 2 Blocks D, F  
A comprehensive lecture course designed for students of Pharmacology, Physiology/Pharmacology (joint) 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. See [http://www.ucl.ac.uk/lifesciences-faculty/degree-programmes/pharmacology/PHAR2002_2005/PHAR2002](http://www.ucl.ac.uk/lifesciences-faculty/degree-programmes/pharmacology/PHAR2002_2005/PHAR2002) for further information.  
**Module assessment:** In-course assessment 10%; Unseen three-hour written examination 75%; Pharmacokinetics test 10%; Essay (1,500 words) 5%

**PHOL2005: Structure and Function of the Nervous System**  
0.5 units  
Course organiser: Dr Frances Edwards and Prof Kristjan Jessen  
Term 1 Blocks C, I  
This course is an introduction to neurobiology. It covers neural structure and function, organisation of the vertebrate nervous system, sensory pathways and perception, neurochemistry and pharmacology and the neural basis of behaviour. The course is available in the first or second year. It assumes a basic knowledge of biological principles (eg A-level). This module aims to give an overview of how the nervous system functions and how it is structured. It is broad and introductory in nature rather than selective and detailed. Using lectures, practicals and revision tutorials the module covers molecular, cellular, systematic and behavioural aspects.  
**Module assessment:** In-course assessment 25%; Unseen three-hour written examination 75%.

**STAT6101: Introduction to Statistical Methods and Computing**  
0.5 units  
Course organiser: Dr Matina Stamatiki Rassias  
Term 1 / 2 (depending on your timetable, groups assigned after Portico registration)  
This course provides an introduction to statistical methods and interpretation of data, along with associated computing. It provides some expertise in applying quantitative methods in the Life and Physical Sciences. The statistical methods covered are useful in the routine analysis of scientific methods, as might be encountered in other course units. Weekly practical exercises are set and are carried out in supervised workshops. There are no formal lectures for this course; all classes are workshops at which attendance is compulsory. The syllabus includes: descriptive statistics and graphical methods; introduction to probability theory; use of normal, binomial and Poisson distributions; confidence intervals and significance tests applied to one and two sample problems by parametric and non-parametric methods; goodness-of-fit and contingency tables; correlation and regression; use of the Minitab statistical computing package.  
**Module assessment:** Details available from Department of Statistical Science
**BIOC2002:** Essential Protein Structure and Function

0.5 units
Course organiser: Prof Stephen Perkins
Term 2 Blocks A
This half course unit is designed for students whose principal discipline is not Biochemistry, but whose interests lie in the broad area of biological sciences. It is primarily a lecture course with tutorials and a dry lab practical on protein structures. The course covers key topics in protein structure and function. The depth of understanding of these topics that the students will attain will equip the student for final year studies in non-molecular based fields of biological science such as Anthropology, Psychology, and Physiology, or in some cases Human Sciences.

**Module assessment:** Unseen two hour written examination 80%; Test 20%.

**BIOC2003:** Essential Molecular Biology

0.5 units
Course organiser: Prof Stephen Perkins
Term 1 Blocks A
The 1/2 unit course, intended for students not specialising in Biochemistry, is a lecture course with tutorials. It covers topics in molecular biology.

**Module Assessment:** Unseen two hour written examination 80%; Test 20%.

**PHAR2003:** Experimental Pharmacology

1.0 units
Course organiser: Prof Mark Farrant
Term 1 & 2 Blocks B, G
This is a largely practical course, which is only available to students taking Pharmacology PHAR2002 which aims to develop experimental skills. In addition to a wide range of in-vitro experiments and studies of drug action in humans, the course includes student presentations, sessions to develop computer skills and also visits to research laboratories.

**Module assessment:** In course test 5%; 14 practical reports 90%; Presentation and write-up 5%.

**PHAR2006:** Practical Pharmacology

0.5 units
Course organiser: Prof Mark Farrant
Term 1 Blocks G & B
A selection of practicals and follow-up sessions designed for students taking Pharmacology PHAR2002 It provides reinforcement of the material in those courses and also aims to develop practical skills.

**Module assessment:** In course test 10%; 7 practical reports 90%.

**PHOL2001:** Animal and Human Physiology

0.5 units
Course organiser: Dr Brian King
Term 1 Blocks B, G & H
This module is designed for students with a background knowledge of Mammalian Physiology, but who are not enrolled in the Physiology BSc degree programme, yet wish to
increase their knowledge of the major physiological systems. This course excludes the central nervous system which is covered in PHOL2003 (Systems Neuroscience) and PHOL2005 (Structure & Function of the Nervous System). In addition to lectures and tutorials, the course includes practical work in cardiovascular & respiratory physiology and in endocrinology.

**Module assessment:** Unseen three-hour written examination 60%; Online MCQ test 10%; Two written accounts of lab/field work 30%.

**PHOL2003: Systems Neuroscience**  
0.5 units  
Course organiser: Dr Margaret Mayston  
Term 2  Blocks B & H  
This neurophysiology course aims to advance and consolidate knowledge gained during the first year course PHOL1001. It will allow students to develop specialist interests in motor and sensory physiology. The course also provides a forum to develop transferable skills.  
**Module assessment:** Unseen three-hour examination 65%; Group presentation 10%; Two online MCQ tests 25%.

**BIOS2001: Writing and Presenting Bioscience**  
0.5 units  
Course organiser: Dr Brian King  
Term 1 & 2  
This is a half-unit course, offering a library project to 2nd year students to conduct research in the Biosciences field, on an essay topic supervised by a member of staff from the Division of Biosciences and its associated departments. The module aims to improve transferable skills in formal writing and oral presentation, with the view to preparing students for their higher-tariff project in the 3rd year and, afterwards, for today’s labour market which prizes good communication skills.  
**Module assessment:** Dissertation (5,000 words) 80%; Oral presentation (15 minutes) 20%.
DETAILED 3\textsuperscript{RD} YEAR MODULE INFORMATION

3\textsuperscript{rd} Year Pharmacology Modules

**PHAR3001 / PHAR3002: Neuropharmacology**
1 / 0.5 unit
Module organiser: Prof Anthony Dickenson
Term 1 Blocks A, D & H / Term 1 Blocks A & D

In recent years many developments, such as the use of levodopa in Parkinsonism, the manipulation of excitation in epilepsy and the discovery of endogenous opioids, have brought basic neuropharmacology and the successful treatment of disorders of the C.N.S. much closer together. It is likely that future prospects for drug therapy in neurology and psychiatry will depend very much on a better understanding of neurotransmitter function and manipulation. This neuropharmacology module tries to provide a basis for such an understanding. Students taking the whole unit (PHAR3001) will perform individual or group projects on the release and electrophysiological and behavioural effects of neurotransmitters and their modification by drugs.

**Module assessment (PHAR3001):** Unseen three-hour written examination 50%; 1 essay 10%; 4 practicals 40%.

**PHAR3002:**
Term 1 Blocks C & F

**Module assessment (PHAR3002):** Unseen three-hour written examination 80%; Essay 20%. (PHAR3002 does not include the practical work)

**PHAR3003: Molecular Pharmacology**
0.5 unit
Module organiser: Prof Alasdair Gibb
Term 1 Blocks C & F

The module deals with the quantitative principles that underlie the study of the action of drugs at receptors beginning with the physical chemical principles which underlie drug-receptor interactions. The molecular nature of receptors is considered in detail and a critical and quantitative approach to the analysis and interpretation of pharmacological data is developed. Intercalating students will do the practical on agonists and antagonists and the radioligand binding data analysis exercise.

**Module assessment:** Unseen three-hour written examination 75%; 2 practicals 25 %.

**PHAR3004: Receptor Mechanisms**
0.5 unit
Module organiser: Prof Alasdair Gibb
Term 1 Blocks B & I (second half of Term 1, following PHAR3003, which is a prerequisite)

This module is about the mechanisms involved in the generation of a response following receptor activation, either by a natural hormone or neurotransmitter or by drug action, and how drugs may interfere with receptor-mediated responses. Mechanisms involving ligand-gated ion channels, voltage-dependent calcium channels and potassium channels, G-proteins, second messengers (e.g. inositol phosphates, diacylglycerol) and cellular kinases and phosphatases are then considered in detail, together with the role of calcium. A final section draws these themes together by examining integrated cell responses such as the control of the release of insulin from the pancreas.
Module assessment: Essay 15%; Unseen three hour written examination 85%.
Note: Students are not permitted to take both PHAR3004 and PHOL3004

PHAR3005 OR PHAR3031: Pharmacology of Inflammation
1 or 0.5 unit
Module organiser: Dr Dean Willis
Term 2 Blocks B & I (PHAR3031 without the practical work)
As our knowledge of human disease increases it is becoming evident that inflammation plays a significant part in many pathologies. The diseases in which inflammation has a major role, not only includes the classical inflammatory diseases, such as asthma, arthritis, allergies and the auto-immune pathologies, but also atherosclerosis, ischemic-reperfusion injury, sepsis/multiply organ failure and COPD. Inflammation is also an important component of metabolic diseases, with evidence suggesting a link between diabetes obesity and inflammation, is an important of tumor genesis and is the underlying mechanism by which transplants are rejected. This module provides in-depth coverage of the core mechanism by which inflammation is initiated and maintained and discusses the state of the current and future research trends in its treatment.

Module assessment (PHAR3005): Unseen three-hour written examination 65%; Group project 25%; Data analysis (1000 words) 10%.
Module assessment (PHAR3031): Unseen two-hour written examination 75%; 1 essay of 3000 words 25%.

PHAR3006: Drug Design and Development
0.5 unit
Module organiser: Dr Dean Willis
Term 1 Blocks B & I
This module is about the discovery of new drugs. Students will consider the ways of identifying novel compounds for development and the processes which take place before such compounds are released onto the market following its introduction into clinical practice. The module includes an opportunity for project work on the development of a specific drug, a practical class on the effects of drugs on gastric secretion in human volunteers, seminars on ethics committee operation and on drug licensing and a one-day visit to the drug industry.
Module assessment: Unseen three-hour written examination 75%; 1 practical/poster presentation 25%.

PHAR3009: Pharmacology Library Project
1 unit
Module organiser: Prof Talvinder Sihra
Term 1 or 2 Blocks – Any
To conduct a project, utilizing library resources, on a subject/topic offered by a member of staff in the Department of Neuroscience, Physiology and Pharmacology or associated departments. See https://www.ucl.ac.uk/biosciences/departments/npp/study/npp-projects for list of titles and further information.
Module assessment: Dissertation 70%; poster 30%
PHAR3010: Pharmacology Laboratory Project
1.5 units
Module organiser: Prof Talvinder Sihra
Term 1 or 2 Blocks - Any
To conduct an original project, involving experimental work, in one of the laboratories of the Department of Neuroscience, Physiology and Pharmacology or associated departments. See https://www.ucl.ac.uk/biosciences/departments/npp/study/npp-projects for list of titles and further information.
Module assessment: Dissertation 70%; laboratory performance 15%; poster 15.00%

PHAR3011: Synaptic Pharmacology
0.5 unit
Module organisers: Prof Talvinder Sihra and Prof Stuart Cull-Candy
Term 2 Blocks A & H
The way in which synapses, and the receptors and ion channels present therein, function is central to our understanding of a major component of modern Pharmacology and is an extremely active area of basic and applied research.
Module assessment: Unseen three-hour written examination 90%; 2 essays 10%.

3rd Year Physiology Modules

PHOL3001: Respiration in Health and Disease
0.5 unit
Module organiser: Prof Alex Gourine
Term 2 Blocks A & G
This module examines the control of breathing particularly in humans, in a wide range of physiological and pathophysiological conditions including exercise, altitude, sleep and asthma. The relationship between respiratory function, structural anatomy and pathological states are explored.
Module assessment: Oral Presentation (10 minutes) 20%; Summary of Oral Presentation (One page) 5%; Unseen two-hour written examination 75%.

PHOL3002: The Heart and Circulation
1 unit
Module organiser: Prof Lucie Clapp
Term 1 Blocks A & H
The module builds upon your primary knowledge of the heart and circulation. Essential aspects of cardiac and vascular physiology will be considered. This will enable you to grasp a number of areas of experimental, applied and pathophysiology.
Module assessment: Organ Bath Pharmacology Prac 5%, Poster presentation (15 minutes) 15%, Unseen three-hour written examination 60%, Essay (3,000 words) 20%.

PHOL3004: Cell Signalling in Health and Disease
1 unit
Module organiser: Dr Julie Pitcher
Term 1 Blocks C & G and Term 2 Blocks D & I
All cell processes are regulated by signalling pathways. The correct regulation of cell processes
is critical for the development and homeostasis of animals whereas dysregulation of these processes results in diseases as diverse as diabetes, schizophrenia and cancer. Taking advantage of the outstanding research environment at UCL, this module will consist of a series of lectures and associated journal clubs presented by research scientists of international renown. The lecturers will discuss the signalling pathways that regulate distinct cell processes such as proliferation, cell:cell communication, motility, differentiation, fertilisation and cell death. Each researcher will focus on their own research strengths to present an overview of the field, followed by a presentation of work from their own laboratory. The associated journal club will discuss a recent innovative piece of work related to the research area.

**Module assessment:** Essay 10%; One orally assessed coursework 10%; One written coursework/problem paper 10%; Unseen three-hour written examination 70%.

**Note:** Students are not permitted to take both PHAR3004 and PHOL3004

**PHOL3006: Cellular Basis of Brain Function**
1 unit

**Module organisers:** Prof Angus Silver, Prof Jonathan Ashmore & Dr Beverley Clark

**Term 1 Blocks A & H**

The course covers the description of brain function from Molecule, to Cell and to System levels. The detailed topics include: 1) Methods, ion channels, channelopathies, transporters and ischaemia; 2) Synaptic transmission, plasticity, integration and dendrites; 3) Metabolism, microcircuits, coding, sensory processing, neural networks and the control of behaviour. This structure is designed to provide a thorough grounding in the cellular mechanisms of brain function in health and disease.

**Module assessment:** Two essays 25%; Unseen three-hour written examination 60%; Two practical write ups 15%.

**PHOL3011: Autonomic and Central Control of Cardiorespiratory Function**
0.5 units

**Module organiser:** Dr Ian Edwards

**Term 2 Block B & H**

This module will look at the autonomic control of the cardiovascular and respiratory systems. The module will cover the anatomy of the autonomic nervous system (introducing the relevant peripheral and central areas that are involved in homeostatic control), the sympathetic nervous system and the parasympathetic nervous system (specifically how they interact to control the activity of the cardiovascular system), the central respiratory network and how it establishes normal breathing patterns, and finally how the activity in these pathways changes in response to exercise and disease. This will be accompanied by a mini-project comparing the sympathetic/parasympathetic balance in different exercise paradigms.

**Module assessment:** Project report (2,000 words) 20%, Laboratory worksheets 10%, Unseen three-hour written examination 70%.

**PHOL3016: Cell Polarity and Disease**
1 unit

**Module organisers:** Prof Shamshad Cockcroft and Dr Anselm Zdebik

**Term 1 Block E & I**

Epithelial cells form sheets that cover the surface of the body and line the internal organs and perform vectorial functions. The module aims to provide an understanding of epithelia tissues by describing: how the polarization of epithelia is maintained; the mechanisms underlying the
regulated directional transport of ions, nutrients and water across epithelia; normal physiological function of the renal, gastro-intestinal and respiratory systems.

**Module assessment:** Unseen three-hour written examination 60%; Seminar presentation 10%; two In-class written essays 20 %; Invigilated Paper Review 10%.

**PHOL3902:** Literature Project in Physiology
1 unit
**Module organiser:** Dr Jonathan Fry
**Term 1 or 2 Blocks - Any**
A literature-based project allowing final year students to conduct physiological research, utilizing library resources, on a subject/topic offered by a member of staff in the Division of Biosciences or associated departments. See https://www.ucl.ac.uk/biosciences/departments/npp/study/npp-projects for further information.

**Module assessment:** Poster presentation 30%; report 70%.

**PHOL3904:** Laboratory Project in Physiology
1.5 units
**Module organiser:** Dr Jonathan Fry
**Term 1 or 2 Blocks - Any**
A research based project which allows final year students to conduct some original research in the laboratory of a member of academic staff or in one of the laboratories of one of our associated Institutes or, with the approval of the Project Tutor, in the laboratory of a non-associated Institution. See https://www.ucl.ac.uk/biosciences/departments/npp/study/npp-projects for further information.

**Module assessment:** poster presentation 15%; Report 70%; Laboratory performance 15%

**3rd Year Neuroscience Modules**

**NEUR3003:** Metabolic Neuroscience
0.5 unit
**Module organiser:** Dr Stefan Trapp
**Term 2 Block E**
The lectures in this module cover metabolic neuroscience research at an advanced level. They provide a thorough understanding of the physiology of metabolic regulation based on current ongoing research in this area. The lectures cover metabolic disease and discuss current and novel treatment strategies. Finally, emphasis is placed on the key technical approaches applied in metabolic neuroscience and their critical evaluation, as addressed in the journal club.

**Module assessment:** Oral presentation 15%, Unseen three-hour written examination 70%, Review article (2,000 words) 15%.

**Note:** this module can count as a PHOL module

**NEUR3018:** Neural Basis of Motivation and Learning
0.5 unit
**Module organiser:** Dr Francesca Cacucci
**Term 1 Block D**
The module is centered around the group of neural structures traditionally described as the limbic system which are involved in learning, memory, emotion, motivation and navigation.
They include the amygdala, septum, hippocampus, and prefrontal cortex. The module consists of a set of lectures on the anatomy, physiology and role in behaviour of these structures, as well as the molecular, cellular and genetic basis for their involvement in these behaviours. In addition, tutorials will be given on specific topics raised in the lectures.

**Module assessment:** Unseen three-hour written examination 100%

**NEUR3031: Control of Movement**  
0.5 unit  
**Module organiser:** Prof Christopher Yeo  
**Term 2 Block A**  
The module begins by considering the anatomy and physiology of essential components of the motor system; muscles and the motor unit; proprioception; spinal integration; ascending and descending pathways in the spinal cord; motor cortex; basal ganglia and cerebellum. The integrated action of these systems in locomotion, voluntary movements and eye movements is considered. The module includes tutorials with target papers through the course and concludes with analyses of motor learning and modelling of motor control.

**Module assessment:** Unseen three-hour written examination 100%

**NEUR3041: Neural Computation**  
0.5 unit  
**Module organiser:** Prof Neil Burgess  
**Term 1 Block E**  
This module examines how behaviour results from the properties of neurons and synapses in the brain. Some simple computational models of how networks of neurons can be used to perform useful functions are introduced and applied to help understand several examples of the neural bases of behaviour in humans and animals. Topics covered will include the role of synaptic plasticity in learning and memory, the coding of information by the firing rate and time of firing of neurons, the neural bases of memory, coordination of action, audition, olfaction, and conscious awareness. Neural systems studies will include the motor, parietal and frontal cortices, the hippocampus, cerebellum and the spine.

**Module assessment:** Unseen three-hour written examination 90%; One Essay (2,000 words) 10%.

**NEUR3045: Visual Neuroscience**  
0.5 unit  
**Module organiser:** Prof Andrew Stockman  
**Term 2 (Block G)**  
This module will teach visual neuroscience from a broad, interdisciplinary point of view. Our modern understanding of vision and visual processing depends not only on the more traditional fields of anatomy, physiology and psychophysics, which remain centrally important, but also on the fields of genetics, molecular and cellular biology, ophthalmology, neurology, cognitive neuroscience and brain imaging. In this module, we will present visual neuroscience as a multidisciplinary, yet integrated field of study. This half unit also makes up part of the full unit module NEUR3001 “Advanced Visual Neuroscience”.

**Module assessment:** Unseen two-hour written examination 80%; Oral presentation 20%.
3rd Year Modules in Other Departments

See individual webpages for details and timetable information. Modules not listed here may also be included, following discussion and approval by degree tutor and module organiser.

**ANAT3042: Pain**

0.5 unit

**Module organiser:** Prof Steve Hunt

**Term 2 (Block D)**

This module aims to present an integrated approach to pain. Through a series of 18 lectures, students will be presented with information about the basic mechanisms of pain and its clinical manifestations. Students will also be introduced to current ideas about therapy and management and to the problems inherent in measurements of pain. A series of seminars based on reading topics will be held at the end of the module.

**Module assessment:** Unseen three-hour written examination 80%; 1 Essay 20%.

*Note: this module can count either as a PHOL or as a PHAR module*

**ANAT3029 / ANAT3028: The Neurobiology of Neurodegenerative Disease**

1 / 0.5 unit

**Module organiser:** Prof Stephen Davies

**Term 1 Block E**

The last few years have seen a remarkable increase in our understanding of the basic biological mechanisms underlying human neurodegenerative diseases. Identification of the mutations in tau, underlying many familial forms of dementia and of the mutations in α-synuclein and parkin, found in familial cases of Parkinson’s disease, has provided a molecular basis for these two classes of disease. Similarly the discovery of neuronal intranuclear inclusions containing proteins with expanded poly-glutamine sequences again provides a unifying pathogenic mechanism for 10 triplet-repeat expansion diseases (best illustrated by Huntington’s disease). It therefore seems that a common feature of all these diseases is the intracellular accumulation of fibrous protein aggregates within neurons (and/or glial cells?) which leads to neurodegeneration. This module will discuss this novel hypothesis in the light of contemporary research and provide a foundation for our current understanding of neurodegenerative diseases.

**Module assessment (ANAT3029):** Unseen three-hour written examination 50%; One essay (6,000 words) 50%.

**Module assessment (ANAT3028):** Unseen three-hour written examination 100%.

**CELL3050: Advanced Molecular Cell Biology**

0.5 unit

**Module organisers:** Dr Jonathan Chubb & Prof Geraint Thomas

**Term 1 Blocks E and F**

Introduction to concepts and problems in selected topics of current cell biology Understanding the methods by which data are obtained and their limitations To study original scientific literature relevant to cell function To develop skills to judge the quality and validity of literature.

**Module assessment:** Unseen three-hour written examination 60%; Essay (1,500 words) 20%; Practical 20%.
CELL3105: Clocks, Sleep and Biological Time
0.5 unit
Module organiser: Prof David Whitmore
Term 2 Block C
The objectives, to be achieved through lectures and reading of research papers, is to examine the mechanisms of biological clocks through a detailed study of the experimental evidence. Topics include: Introduction to circadian timing, The mammalian clock mechanism, The Drosophila clock mechanism, Peripheral tissue clocks, Clocks in unusual species, Hibernation and navigation, Circadian light detection, Photoperiodism, Clocks and the cell cycle, Human Clocks.
Module assessment: Unseen three-hour written examination 100%.

CELL3002: Functional Genetics of Model Systems
0.5 unit
Module organiser: Dr Jason Rihel
Term 2 Block G
The aim of this module is to provide in depth coverage of new concepts in the molecular genetics of animal model systems, including nematode worms, fruit flies, zebrafish and mouse. Following a refresher on model organism biology and basic genetics, the topics covered will include genetic screening, modern gene mapping techniques, advanced recombinant technology and genome editing, as well as emerging concepts such as chemical genetics and optogenetics. Drawing mainly on recent examples from the primary literature, emphasis will be placed on the use of molecular genetics to tackle wide-ranging questions, from basic biological principles in development and neuroscience to the dissection of disease.
Module assessment: One essay (2,000 words) 30%.
Unseen two-hour written examination 70%

CELL3006: Dynamic Biological Systems
0.5 unit
Module organiser: Dr Philip Lewis
Term 2 Block FH
All biological interactions, whether they take place on a molecular, organism or ecosystem scale, are part of complex dynamical systems. Understanding the behaviour of these systems lies at the heart of many key challenges in biological research. In this module you will learn techniques from mathematics, engineering and computer science, that enable you to construct, implement and analyse interaction networks using the Python programming language.
Prerequisites: A-level Maths or equivalent is desirable.
Module assessment: Scientific report one (2,500 words) 20%.
Scientific report two (2,500 words) 20%.
Departmental test two (2 hours) 20%.
Departmental test one (2 hours) 20%.
Departmental test three (1.5 hours) 20%.
**BIOC3013: Cancer Biology**  
0.5 unit  
Module organiser: Dr M Katan-Muller  
Term 2 Blocks A and H  
This course focuses on the mechanism of cancer generation and progression and on the most advanced treatments. Starting with a background integrating genetic, cellular and molecular aspects, it covers recent cancer research leading to a general conceptual framework for the development of this disease. The course also provides insights and illustrations from specific cancer types and concludes with a variety of established and emerging treatments. The overall aim of this course is to provide a strong background for careers related to basic cancer research, experimental medicine and drug discovery.  
**Module Assessment:** Coursework 30%. Unseen two-hour written examination 70%.

**BIOS3016: Genes to Disease (formerly BIOC3016)**  
0.5 unit  
Module organiser: Prof K. Srai  
Term 1 Block B  
Neurodegenerative diseases are a very important cause of morbidity and mortality and with an ageing population they are becoming more prevalent. This course aims to equip the students with an in depth understanding of the molecular basis of a variety of important neurodegenerative diseases and how this has contributed to our current understanding of their disease mechanisms. It begins with coverage of basic and more advanced aspects of molecular genetics; an understanding of the various model systems used to investigate these diseases; a description of common pathways involved from a biochemical and cell biology perspective including the importance of protein aggregation, free radical mechanisms, iron regulation and mitochondrial function and the use of stem cells to study and treat the diseases. Finally more detailed clinical, pathological, genetic and mechanistic issues are covered for a number of diseases including: Parkinson’s disease, Alzheimer’s disease, prion diseases, hereditary spastic paraplegia, motor neuron disease, mitochondrial diseases and Huntington’s disease.  
**Module Assessment:** Unseen two-hour written examination 70%; ICA reference evaluation (1,800 words) 15%; ICA Journal Club presentation (8 minutes) 15%.

**BIOC3017: Cellular and Molecular Aspects of Cardiovascular Disease**  
0.5 unit  
Module organiser: Prof K Srai  
Term 2 Block C&F  
**Module Assessment:** Unseen two-hour written examination 70%; Coursework 30%.

**BIOL3017:** Biology of Aging  
0.5 unit  
Module organiser: Dr D Gems  
Term 1 Block A  
Course surveys the biology of ageing (biogerontology). It covers evolutionary and mechanistic theories of ageing; comparative biology of ageing; the new model organism genetics of lifespan (e.g., C. elegans, Drosophila); methods in ageing research (e.g., microarray analysis); the biology of caloric restriction; cellular senescence, telomeres and cancer; ageing-related disease; the biology of insulin signalling, energy handling and associated diseases (e.g., diabetes and obesity); stem cells and tissue engineering; prospects for treatments for ageing; and social and ethical issues relating to research on ageing.  
**Module Assessment:** 3 tutorials, including 2 essays of 1500-2000 words each 20%.  
Unseen two-hour written examination 80%.

**PSYC3209:** Cognitive Neuroscience  
0.5 unit  
Module organiser: Dr L. Otten

**PSYC3207:** Human Learning and Memory  
0.5 unit  
Module organiser: Prof D. Shanks