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THE INTEGRATED BSc DEGREE

This booklet is an introduction to the Integrated BSc (IBSc) degree at UCL. Its purpose is to provide students with:

- The information required to select a programme(s)
- The contact details of those they may wish to consult about individual programmes
- Details of how to apply and the selection criteria
- Possible sources of funding to support their studies

The first section of the booklet provides general information about the IBSc degree. This is followed by a description of the individual degree programmes with details of course units that may be selected. Students either join the final year of a three year BSc degree programme or pursue a programme which is provided exclusively for them. Each IBSc degree has a maximum number of students that can be accommodated on the programme. In many cases this is limited by the availability of suitable projects and/or supervisors. The number of applications may therefore well exceed the number of students that can be accommodated on a programme. In view of this you must select a first and a second choice of degree programme.

Historically when the BSc was unfunded 70% of medical students who did not already hold a bachelors degree opted to follow an IBSc degree. A few graduate entrants into Medicine took a second bachelors degree (in a different subject) on the IBSc programme and a few an MSc if they had an appropriate first degree. The IBSc is now an integral part of the MBBS programme for all medical students who do not already hold a UK degree. Completion is now a requirement for progression.

During the BSc year, students have the opportunity to study topics in greater depth than during their medical studies. It also affords them the opportunity to become familiar with research literature, scientific methods and techniques and the current state of thinking in their selected area. An experimental project may form a significant part of a programme, in some cases extending for one or more days a week throughout the year, in other cases concentrated over a period of six or more weeks. This is a very valuable experience and will help you to determine your aptitude and enthusiasm for future research in your clinical career. Whether the BSc incorporates an experimental project or not, we believe students obtain considerable benefit from the intellectual experience of pursuing knowledge for its own sake, learning very valuable transferable skills not least in critical thinking and evaluation of evidence. From the point of view of clinical training and career options, it is relatively unimportant which particular programme you choose. The training given in approaching problems scientifically is a common feature of all of them. Do not be mislead into believing that one BSc programme has a *higher profile* or is *more prestigious* than another!

THE STRUCTURE OF THE IBSc DEGREE

The degree programme is made up of course units. Units usually have a value of (0.5, 1.0 or 1.5) course unit. A 1.0 course unit normally has about 40 hours of lectures and a total work load (including private reading, preparation of course work and revision) of 200 to 300 hours. Each 0.5, 1.0 and 1.5 course units has its own assessment components which usually include an examination and course work. ALL IBSc degree programmes consist of 4 course units (You may not take more than 4). A degree programme is defined by its CORE COURSE UNITS: those you must take. In many cases there is the possibility of selecting some optional course units. Your course tutor will provide details of optional course units. In all cases your course tutor must approve your choice of optional course units. In addition the department/division teaching the course must approve your taking it as there may be constraints imposed by prerequisites, the timetable or numbers. The regulations covering an IBSc degree (which will formally have “Medical Sciences with’’ as part of the field of study) are similar in many respects to other course unit degrees. The most important difference is that a minimum of 3 COURSE UNITS MUST BE PASSED, INCLUDING THE RESEARCH PROJECT TO BE AWARDED A BSc AND ALL FOUR CONTRIBUTE TO THE CLASSIFICATION AND MUST BE COMPLETED

It is usual for about 90% of IBSc students at UCL to obtain a first or upper second class honours degree.

MARKING SCHEME AND CLASSIFICATION OF DEGREES AT UCL

Marks for Course Unit degrees are on a standard scale: Marks of 70% and above are first class honours degree standard; marks in the range 60 to 69% are upper second class honours standard; marks in the range 50 to 59% are lower second class honours standard; 40 to 49% is third class honours standard. Below 40% is a fail. Normally an unauthorised absence from an examination, a mark of incomplete or a withdrawal from an examination will be counted as zero in computation of average marks unless the Board of Examiners agree that there are grounds for discounting it.

From the 2013/2014 session onwards ratification of marks and degree classifications will be determined by the MBBS Year 3 Sub Board of Examiners. Degree classifications will be determined by the Board using the approved Scheme for the Award of Honours.

Students are advised to follow the correct procedures regarding withdrawal or an interruption of studies from an IBSc programme should this situation arise. Circumstances surrounding the need for withdrawal/Interruption should be discussed with programme tutors and Dr Cross. Retrospective withdrawals/interruptions are ***not*** permitted and can result in a fail mark. Students who entered the medical degree programme at UCL from September 2005 onwards should be aware that marks obtained in Phase 1 (years 1 and 2) contribute towards the classification of their degree, From the 2010/2011 academic year a ratio of 1:1:6 (Yr1: Yr2: IBSc Yr) will be used to determine classification for all students completing the IBSc at UCL.

ALLOCATION OF AN IBSc DEGREE PROGRAMME AT UCL

It is expected that students will be allocated to their first choice 1) if the number of applications to that programme is within the total number that can be accommodated on the programme and 2) provided they meet any entry criteria for the programme. Where the number of applicants exceeds the number that can be accommodated entry will be competitive and based on merit.

Students who cannot be allocated to their first choice will be advised that they have been unsuccessful. The application will be passed to the programme of second choice.
In the event that the programme of second choice is also oversubscribed students will be asked to select a preference from alternative programmes where places remain available.

Any indication given by tutors may only be viewed as provisional and not binding. Offers of places on an IBSc programme are formally made only by letter from the Faculty Tutor and are issued subject to quota.

HOW TO APPLY

All students are required to complete an application form which is available from the UCL IBSc webpage: http://www.ucl.ac.uk/medicalschool/bsc-ibsc

The deadline for applications is **4th MARCH 2013**. Any students failing to meet the deadline will be allocated an IBSc course at the discretion of the Faculty Tutor. It is hoped that decisions will be made by the end of April for all 1st choices. All applicants are required to submit a personal statement for both their first and second choice.

Students **must** select 2 choices. Applications will then be considered sequentially according to your preference. Applications will only be passed to the Tutor of their second choice if they are unsuccessful in their first choice.

SOURCES OF FUNDING UK

IBSc degree students are eligible for Student Loans towards fees and maintenance. EU students can apply for Student Loans towards fees. It should be noted that all medical and dental students domiciled in England who started their degree programmes from September 1998 onwards will qualify for NHS Bursaries for the fifth and subsequent year of study (this includes the IBSc year). This means that students intercalating a BSc will be eligible for an extra year of bursaries. In the 2012/2013 session the fee for UK/EU was £3,465 while for overseas students the fee was typically £ 18,500. The tuition fees

for both categories of continuing students are expected to increase by approximately 5% for the 2013/2014 session. The sum of money you will need for personal maintenance (accommodation, food, books etc) is estimated to be in the region of £245 per week.

It is very important that ALL students who are having problems with their tuition fee payment should discuss these matters with Student Funding (Registrar's Division, room G19 in the South Wing of the main building). If the problem is ignored it will not go away and you may find yourself deregistered if you miss the payment deadline and have not been in touch. Tuition fee refunds are not normally given but applications for partial refund of fees will be considered on an individual basis. It is your responsibility to request a refund from Student Funding. Please be aware it is your responsibility to arrange funding for your IBSc year and to inform your LEA/SLC of any change in details during the year.

ACCESS TO LEARNING FUND

The Government provides universities with Access Funds which are used to assist students who are suffering financial hardship. The fund is available to UK students only (both full time and part time).

You should receive a notice about the Access to Learning Fund at the start of the session. Application forms are available to download from the UCL website and from the Rights and Advice Centre in the UCL Students' Union (Bloomsbury Building). Applications may be submitted at any point during the year. It is not essential to have Faculty or Departmental endorsement to apply. However, the Faculty Tutor is willing to discuss your application with you. It is very important that you complete the application form carefully and provide all of the relevant information requested. You must have applied for and taken out your full entitlement to a student loan to be eligible for the Access to Learning Fund assistance. Special arrangements will be made to assist those whose loan is delayed at the start of term. If this happens to you please speak to your course tutor. For other sources of financial support please consult the UCL website.

It has been the practice that scholarships awarded by, or through, the UCL Medical School should usually go to internal students who commit themselves to undertaking their IBSc at UCL. Students at the UCL medical school have in the recent past been recipients of awards generously provided to the Medical School by organisations and benefactors such as the Jean Shanks Foundation, the Wolfson Foundation, the Arthritis Research Council, the Association of Physicians of Great Britain and Ireland, the Health Foundation, the British Pathological Society, the Physiological Society, the Goldberg Schachmann and Freda Becker Memorial Fund, the Clothworkers' Foundation and the Michael Sims Memorial Fund. These organisations and benefactors generally require that we approach candidates who are selected on the basis of academic merit and/or financial need. Students should not approach the organisations offering these scholarships directly. Applications for the grants and scholarships available to Medical students may be required from individual students in advance. If advance application is necessary, you will be informed accordingly. The nominations for these grants and scholarships are announced by email over the summer. About 10 to 15% of UCL medical students doing the IBSc degree have in the past received some sort of financial support which ranged from a scholarship of £9,690 down to about £500. In the coming session, the availability of scholarships is expected to decrease and it is probable that only 5% of students will benefit from this type of financial support. The maximum support available to a given student for the 2013/14 session is likely to be £6000.

Acknowledgement of sponsorship it is good practice to put an acknowledgement of any assistance or sponsorship you have received in such things as project reports and posters. Such an acknowledgement may even be a condition of holding the award. Failure to fulfil the conditions of an award may result in a student being asked to refund all or part of the award.

Other Sources of Funding

(a) Charities and organisations: Many of the national charities that used to support intercalating BSc students ceased to do so when the IBSc programme became funded by the LEA and Student Loans Company in the same way as for any other year of the medical degree programme. However, there are still a limited number of national charities or companies that still provide financial support to some UK students. It is not necessary or advisable to apply for any of these before July 2012. (b) Student Hardship Funds UK, EU and international students in financial difficulties are eligible to apply for Student Hardship Funds. Applications need to be accompanied by a departmental recommendation /

reference. For details (application forms with instructions for completion) please consult the UCL website.

CONCERNED ABOUT YOUR IBSc YEAR?

The Medical School are aware that students may have concerns about their IBSc and may not be sure what subject they wish to study if any. We can offer you advice should you find yourself in this situation.

The IBSc is a compulsory part of the MBBS programme, however exemptions can be given in exceptional circumstances these will need to be approved by Dr Cross. If you wish to discuss your options please contact Rebecca Holmes (rebecca.holmes@ucl.ac.uk) for further advice.

Please read the IBSc Policy before submitting your application http://www.ucl.ac.uk/medicalschool/bsc-ibsc/

Anatomy, Cell and Developmental Biology

The Research Department of Cell and Developmental Biology offers a wide range of course units for IBSc BSc students. The research strengths of the department are in cell and developmental and stem cell biology, neuroscience, anatomy and mineralised tissues (bones & teeth) / palaeontology; these areas are well-represented in the modules and research projects offered. Students take 2.5 course units of taught modules selected from the list below, and from other modules within the Division of Biosciences (to be agreed by the Programme Tutor). In addition, an experimental research project ANAT3903 (1.5 units) is arranged by the student with a supervisor of their choice in the Department of Cell and Developmental Biology or another UCL department or institute. The format for the project varies between departments: in CDB, the student effectively becomes a full member of the chosen laboratory for much of the year; other departments may confine the project to a shorter, intensive period. For further details of IBSc and all programme units, please contact Helen Jefferson Brown (h.jefferson-brown@ucl.ac.uk).

The ACDB programme, based in England's oldest biomedical science department, aims to give IBSc students the opportunity to study and perform original research at the highest level. The experiences gained by students during this year provide critical (and often unexpected) insights into the realities of biomedical research that should be of continuing benefit during their careers. The programme offers:

- Induction sessions on basic research skills (3-4 hours).
- Small-group tutorials to support students in their adjustment to the research environment. These sessions cover practical issues such as scientific method and philosophy; reading and understanding scientific papers; how to write and present a research report; how to give an oral presentation.
- Access to a distinguished group of research scientists and teachers, including Fellows of the Royal Society and of the Academy of Medical Sciences.

PROGRAMME UNITS AVAILABLE

ANAT3003: MECHANISMS OF DEVELOPMENT
0.5 unit
***Term 1, Block B*.**
Tutor: Professor Claudio Stern (c.stern@ucl.ac.uk).
No prerequisite modules
Assessment: Unseen 3-hour written examination (100%).

This module will consider the cellular and molecular events which underlie animal development and cell differentiation, drawing on examples of a range of vertebrate and invertebrate organisms. Topics to be covered include maternal, gap and pair-rule genes, imaginal disks and signalling pathways, gastrulation, hindbrain and PNS patterning, limb development and regeneration, neural induction and aspects of development in the human adult. The module aims to bring the students' knowledge and understanding of developmental biology to the level of current research.

ANAT3005: MECHANISMS OF DEVELOPMENT
1.0 unit (includes practicals)
Term 1, Blocks B/H.
Tutor: Professor Claudio Stern (c.stern@ucl.ac.uk)
Assessment: Unseen 3-hour written examination (60%) and 4 or 5 practical write-ups (40%).

This module will consider the cellular and molecular events which underlie animal development and cell differentiation, drawing on examples from both vertebrate and invertebrate organisms. Model organisms covered include Drosophila, sea urchin, zebrafish, *Xenopus*, chick and mouse. Topics include induction of the mesoderm and nervous system, gastrulation, neural development, mammalian fertilization and early human development, mouse genetics and early development, Drosophila genetics and gastrulation, gene regulatory networks, development and evolution, stem cells and developmental clocks. The module aims to bring knowledge and understanding of developmental biology to the level of current research. It allows students to become acquainted directly with the model systems involved, and develop practical skills useful for future careers in biomedical research. Four or five practicals will complement the lecture component, based on animal models studied (eg, Drosophila, *Xenopus*, zebrafish, chick, mammal). This module comprises the lectures of the 0.5 CU ANAT3003 module, plus practicals and extra lectures. The module aims to bring the students' knowledge and understanding of developmental biology to the level of current research.

ANAT3028: NEUROBIOLOGY OF NEURODEGENERATIVE DISEASE
0.5 unit
***Term 1, Block E*.**
Tutor: Professor Stephen W Davies (s.w.davies@ucl.ac.uk).
Prerequisite module: ANAT2010 / a basic understanding of neuroanatomy and neuroscience, as determined by Tutor
Assessment: Unseen 3-hour written examination (100%).

The last few years have seen a remarkable increase in our understanding of the basic biological mechanisms underlying human neurodegenerative diseases. Identification of mutations in a variety of genes, found to encode proteins present in neuro-pathological inclusions, has suggested that a common feature of all these diseases might be the intracellular accumulation of fibrous protein aggregates within neurons, resulting in neuronal cell death. This module will discuss this novel hypothesis in the light of contemporary research, and provide a foundation for our current understanding of neurodegenerative diseases.

ANAT3029: NEUROBIOLOGY OF NEURODEGENERATIVE DISEASE (EXTENDED)
1.0 unit
Terms 1 & 2, Block E. **Tutor: Professor Stephen W Davies** (s.w.davies@ucl.ac.uk).
Prerequisite module: ANAT2010 / a basic understanding of neuroanatomy and neuroscience, as determined by Tutor
Assessment: Unseen 3-hour written examination (50%) and a 6,000 word dissertation, together with a short oral presentation (50%).

The last few years have seen a remarkable increase in our understanding of the basic biological mechanisms underlying human neurodegenerative diseases. Identification of mutations in a variety of genes, found to encode proteins present in neuro-pathological inclusions, has suggested that a common feature of all these diseases might be the intracellular accumulation of fibrous protein aggregates within neurons, resulting in neuronal cell death. This course will discuss this novel hypothesis in the light of contemporary research, and provide a foundation for our current understanding of neurodegenerative diseases.

ANAT3030: CELLULAR AND DEVELOPMENTAL NEUROBIOLOGY
0.5 unit
Term 1, Block G.
Tutor: Professor Roberto Mayor (r.mayor@ucl.ac.uk).
Prerequisite modules: PHOL2005 / BIOL2010 / ANAT2008 / ANAT2010 or speak to module organizer
Assessment: Unseen 3-hour written examination (85%) and a short oral presentation (15%).

This module comprises a survey of selected topics of current interest and importance in developmental neurobiology and in the repair of neural structures. Particular emphasis is placed on cellular and molecular aspects of these topics. Numerous lecturers both from UCL and other Institutions contribute to

the module. Detailed composition varies from year to year but topics likely to be covered are: neural induction and patterning; neurogenesis; generation of cell diversity; cell-cell interactions; neuronal growth factors; programmed cell death; axon guidance and synaptogenesis; neuronal migration; development of excitability; neuron-glia interactions; myelination; stem cells and injury and repair in central and peripheral nervous systems.

ANAT3038: ADVANCED ANATOMY
0.5 unit
Term 2, Block I.
Tutor: Professor Susan Evans (s.e.evans@ucl.ac.uk).
Prerequisite modules: ANAT2050 / MBBS years 1 & 2
Assessment: Dissection viva (70%) and essay / project report (30%).

This module offers students the opportunity to continue their studies of human anatomy through dissection and reading related literature. Each student will focus on a specialised dissection project, chosen in consultation with the module organiser. This is complemented by a literature review of the anatomy of the region linked to an aspect of clinical, comparative, developmental or evolutionary significance. The module is open to students whether or not they have prior experience of dissection, provided they have taken a course of general human anatomy beyond introductory level (or equivalent – e.g, primate or veterinary anatomy). . Students who have not previously dissected will be given additional guidance in doing so and this will be taken into consideration when choosing and assessing the dissection project. At the end of the second term students submit a 2,500-word essay on an anatomical subject related to their dissection topic.

ANAT3042: PAIN
0.5 unit
Term 2, Block D.
Tutor: Professor Stephen Hunt (hunt@ucl.ac.uk)
No prerequisite modules
Assessment: Unseen 3-hour written examination (80%) and an essay (20%).

This module aims to present an integrated approach to pain - which, until the 1960s was considered an inevitable sensory response to tissue damage. 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.

ANAT3050: ADVANCED MOLECULAR CELL BIOLOGY
0.5 unit
***Term 1, Blocks E/F*.**
Tutor: Professor David Becker (d.becker@ucl.ac.uk).
No prerequisite modules
Assessment: Unseen 3-hour written examination (55%), a practical (15%), a 1,500-word essay (15%) and a short oral presentation (15%).

This module focusses on molecular cell biology and its relationship to disease, in areas of active research in and around UCL. Small group practicals on live cell imaging are included. All of the lecturers on this module are actively researching in these fields and so are in a position to provide the student not just with background information but also with cutting edge research and primary knowledge of the field.

ANAT3105: CLOCKS, SLEEP AND BIOLOGICAL TIME
0.5 unit
Term 2, Block C.
Tutor: Professor David Whitmore (d.whitmore@ucl.ac.uk).
No prerequisite modules
Assessment: Unseen 3-hour written examination (75%) and a 3,000-word essay (25%).

The aim of this module is to examine the importance of time, and oscillations, in a range of biological situations. The central theme will be the circadian or daily clock. What is currently known about the clock mechanisms (what makes the clock 'tick') will be considered in a range of animal systems, from *Drosophila* to the mouse. This will include the genetic-molecular aspects of the clock, as well as some biochemistry and neurobiology, as well as how the clock regulates physiological events, such as seasonal reproduction, and human sleep-activity rhythms. The importance of light and the retina in setting the clock will be discussed, as will the timing of hibernation, cell division and animal migration.

ANAT(tbc): STEM CELLS AND REGENERATIVE MEDICINE
0.5 unit
Term 2 (tbc),
Tutors: Professor Tim Arnett (t.arnett@ucl.ac.uk) **and Dr Leslie Dale** (l.dale@ucl.ac.uk).
No prerequisite modules
Assessment: Unseen 3-hour written examination (80%) and a 2,500-word essay (20%).

This new module is planned to commence in autumn 2013. It aims to provide an up-to-date survey of stem cell biology, with a critical review of its applications, potential (and pitfalls) in medicine. Lectures and interactive sessions will be given by leading UCL researchers.

ANAT3903: EXTENDED EXPERIMENTAL RESEARCH PROJECT –
1.5 unit
Terms 1 & 2.
Tutor: Professor Tim Arnett (t.arnett@ucl.ac.uk).
No prerequisite modules

The Research Department of Cell and Developmental Biology offers a diverse, ever-changing range of cutting-edge research projects to UCL medical students. Students can expect to join an internationally-ranked research lab for up to 6 months (October – March). Dissertations (up to 9,000 words) are submitted at the end of Term 2. It is not uncommon for ACDB projects to result in research journal publications for students; some examples are listed below.

Projects are assessed according to Faculty guidelines: supervisor's assessment of lab performance (15%), supervisor's assessment of dissertation (35%), internal examiner's assessment of dissertation (35%), panel assessment of oral presentation of research (15%). Note that most original research projects, by their nature, cannot have a guaranteed outcome; assessment is therefore based on the quality of the work and its presentation, rather than on the 'success' of the results.

Examples of past project titles from the ACDB IBSc programme

- Skeletal development in the Asiatic flying dragon
- The evolution and development of osteological adaptations for caudal autotomy in Lepidosauria
- An examination of the trigeminal nerve foramina of vertebrates
- Skull shape in the origin of snakes
- Bisphosphonates inhibit the formation and activity of mouse osteoclasts
- Comparison of in vitro function of osteoblasts from long bones and skull bones
- Molecular mechanism of neural crest migration
- Wnt signalling in neural crest induction
- Direct actions of strontium on bone cell function

Examples of publications resulting from the ACDB IBSc programme

(Student author underlined)

Hoebertz A, Mahendran S, Burnstock G, Arnett TR (2002) ATP and UTP at low concentrations strongly inhibit bone formation by osteoblasts: a novel role for the $P2Y_2$ receptor in bone remodeling. *Journal of Cellular Biochemistry* **86:** 413-419.

Coutinho P, Qiu C, Frank S, Tamber K, Becker DL (2003) Key events in the wound healing process correlate with changes in connexin expression. *Cell Biol Int* **27:** 525-541.

Marziano N, Casalotti SO, Portelli AE, Becker DL, Forge A (2003) Deafness-related mutations in gap junction protein connexin 26 have a dominant negative effect on connexin 30. *Human Mol Genetics* **203:** 805-812.

Arnett TR, Gibbons DC, Utting JC, Orriss IR, Hoebertz A, Rosendaal M, Meghji S (2003) Hypoxia is a major stimulator of osteoclast formation and bone resorption. *J Cell Physiol* **196:** 2-8.

Robinson M, Parsons Perez MC, Tébar L, Palmer J, Patel A, Marks D, Sheasby A, De Felipe C, Coffin R, Livesey FJ, Hunt SP (2004) FLRT3 is expressed in sensory neurons after peripheral nerve injury and regulates neurite outgrowth. *Mol Cell Neurosci* **27:** 202-214.

Roberts R, Stark J, Iatropoulou A, Becker DL, Franks S, Hardy K (2004) Energy substrate metabolism of mouse cumulus-oocyte-complexes: response to FSH is mediated by the phosphatididylinositol 3-kinase pathway and associated with oocyte maturation. *Biol Reprod* **71:** 199-209.

De Calisto J, Araya C, Marchant L, Riaz CF, Mayor R (2005) Essential role of non-canonical Wnt signalling in neural crest migration. *Development* **132:** 2587-2597.

Utting JC, Robins SP, Brandao-Burch A, Orriss IR, Behar J, Arnett TR (2006) Hypoxia inhibits the growth, differentiation and bone forming capacity of rat osteoblasts. *Exp Cell Res* **312:** 1693-1702.

Theodossiou TA, Thrasivoulou C, Ekwobi C, Becker DL (2006) Second harmonic generation confocal microscopy of collagen type I from rat tendon cryosections. *Biophys J* **91:** 4665-4677.

Becker DL, Webb K, Thrasivoulou C, Lin C-C, Nadershahi R, Tsakiri N, Cook JE (2007) Multiphoton imaging of chick retinal development in relation to gap junctional communication. *J Physiol* **585**: 711-719.

Valasek P, Macharia R, Neuhuber WL, Wilting J, Becker DL, Patel K (2007) Lymph heart in chick somitic origin, development and embryonic oedema. *Development* **134:** 4427-4436.

McCutcheon JE, Fisher AS, Guzdar E, Wood SA, Lightman SL, Hunt SP (2008) Genetic background influences the behavioural and molecular consequences of neurokinin-1 receptor knockout. *Eur J Neurosci* **27:** 683-690.

Hawkins TA, Haramis A-P, Etard C, Prodromou C, Vaughan CK, Ashworth R, Ray S, Behra M, Holder N, Talbot WS, Pearl LH, Strähle U, Wilson SW (2008) The ATPase-dependent chaperoning activity of Hsp90a regulates thick filament formation and integration during skeletal muscle myofibrillogenesis. *Development* **135:** 1147-1156.

Géranton SM, Tochiki KK, Chiu WW, Stuart SA, Hunt SP (2010) Injury induced activation of extracellular signal-regulated kinase (ERK) in the rat rostral ventromedial medulla (RVM) is age dependant and requires the lamina I projection pathway. *Mol Pain* **6:** 54.

Gibson A, Robinson N, Streit A, Sheng G, Stern CD (2011) Regulation of programmed cell death during neural induction in the chick embryo. *Int J Dev Biol* **55:** 33-43.

Thrasivoulou C, Virich G, Krenacs T, Korom I, Becker DL (2011) Non-Invasive second harmonic diagnostic imaging of human skin cancers. *Biomed Optics* **2:** 1282-1295.

Patel JJ, Utting JC, Key ML, Orriss IR, Taylor SEB, Whatling P, Arnett TR (2012) Hypothermia inhibits osteoblast differentiation and bone formation but stimulates osteoclastogenesis. *Exp Cell Res* **318:** 2237-2244.

Tochiki KK, Cunningham J, Hunt SP, Géranton SM (2012) The expression of spinal methyl-CpG-binding protein 2, DNA methyltransferases and histone deacetylases is modulated in persistent pain states. *Mol Pain* **8:** 14.

Takesono A, Moger J, Farog S, Cartwright E, Dawid IB, Wilson SW, Kudoh T (2012) Slc3a2 controls yolk syncytial layer (YSL) formation by regulating microtubule networks in the zebrafish embryo. *Proc Natl Acad Sci USA* **109:** 3371-3376.

Wornham DP, Hajjawi MO, Arnett TR (2013) Strontium salts directly inhibit mineral deposition in bone-forming primary osteoblast cultures. *Manuscript in preparation.* Also given as oral presentation at the Osteoporosis & Bone Conference 2012, Manchester, 1-4 July 2012.

Voiculescu O, Bodenstein L, Lau I-J, Stern CD (2012) The primitive streak is not a blastopore but the sum of EMT events by individual cells amplified by a community effect (*manuscript submitted*).

Papanayotou C, De Almeida I, Liao P, Oliveira NMM, Lu SQ, Kougioumtzidou E, Zhu E, Shaw A, Sheng G, Streit A, Yu D, Soong TW, Stern CD (2013) Calfacilitin: a novel calcium channel modulator essential for initiation of neural plate development *Nature Comms* (in final revision).

PROGRAMME TUTOR: Prof Tim Arnett - t.arnett@ucl.ac.uk / 020 7679 3309 / X33309

COURSE ADMINISTRATOR: Ms Helen Jefferson-Brown **-** h.jefferson-brown@ucl.ac.uk / 020 7679 2200 / X32200

Clinical Sciences

The Division of Medicine is made up of a series of specialised academic centres, each working under a Director whose aim is to bring research and clinical scholars into productive collaborations. Each of the Academic Centres runs a research programme that encompasses the basic sciences underpinning the specified clinical discipline as well as patient-based clinical studies. The broad philosophy is to apply rigorous scientific methodologies to questions that are relevant to a wide range of human diseases. The Division currently holds some 200 research grants from outside bodies, many of them major grants from the MRC and medical research charities such as the Wellcome Trust, the British Heart Foundation and the Arthritis Research Campaign. The academic centres which make up the Division are located on the Bloomsbury, Royal Free and Whittington Campuses. The clinical centres of the Division are based in the University College London Hospitals Trust, the Royal Free Hampstead NHS Trust, the Whittington Hospital Trust and the Islington Community Trust. This BSc will be run primarily from the Royal Free Campus.

AIMS & OBJECTIVES

Objectives

The programme is designed to develop the student's interest in and knowledge of clinical science as applied to medicine. It will provide an understanding of: the interface between basic and clinical sciences; the evolution of current regulatory practice, and in particular research governance; the ethical and moral issues which direct the conduct of clinical research; and the ways in which basic scientific research has contributed to the understanding of disease pathogenesis and influenced clinical practice. It will allow in depth study of one or more aspects of clinical science and an opportunity to undertake a clinically orientated project from inception through ethical submission to completion and publication. The programme can be tailored to suit the interests of individual students by inclusion of one whole or two half unit modules from other, already established BSc programmes, and by selection of an appropriate or matching clinical project. Thus, while the majority of the projects will be undertaken in the Department of Medicine, opportunities to undertake projects in the other sites such as The Institute of Child Heath/ Great Ormond Street and the Department of Genetics, Evolution and Environment at UCL will also be available. Advances in clinical practice are based on the results of medical research. This programme aims to foster the development of intellectually trained individuals equipped with the interest and understanding necessary to pursue, if desired, a career in academic medicine.

Aims

To allow students to gain a knowledge and understanding of**:**

- The key concepts of clinical science as applied to medicine
- The interface of basic and clinical science
- Clinical research methodology
- The generation of testable hypotheses
- Principles of hypothesis testing
- Study design, analysis and reporting

PROGRAMME STRUCTURE

The programme will be made up of four course units. There are three compulsory courses which together make up 3.0 units and a choice of either two 0.5 unit courses or a 1.0 course unit selected from other established IBSc programmes.

The ***compulsory courses*** for this BSc degree are:

- **Clinical Transition:** CLCS3003 - 0.5 Unit
- **The Basics of Clinical Science:** CLCS3001 - 1.0 Unit
- **Clinical Research Project**: CLCS3901 - 1.5 Units

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The ***optional courses*** for this BSc degree are:

- A choice of either two 0.5 unit modules or a single 1.0 unit module from other established in IBSc programmes

COURSE DETAILS

CLINICAL TRANSITION
CLCS 3003
0.5 unit
TERM 1
Dr M Y Morgan
Assessment: a reflective diary, a poster presentation, an ethical debate and an unseen 2-hour written examination

This module will provide students with the essential skills to undertake data retrieval from a variety of sources, to design clinical investigations and undertake statistical analyses. It will also provide opportunities for students with little or no clinical experience to familiarize themselves with the clinical environment as time will be spent in the clinical skills centre acquiring a variety of skills including phlebotomy and cannulation and several evenings will be spent working alongside clinical staff on a several inpatients ward in the Royal Free Hospital. There will be opportunities to gain an understanding of disease processes and presentation though small group teaching on the wards. The ethical and moral dilemmas facing clinicians and scientists alike in an increasingly litigious world will be explored in depth; topical ethical dilemmas will be debated.

THE BASICS OF CLINICAL SCIENCE
CLCS3001
1.0 unit
TERM 1
Dr M Y Morgan
Assessment: two pieces of course work and an unseen written 3-hour examination

This course introduces the student to aspects of clinical scientific practice. The evolution of current regulatory practice will be traced from eugenics to the modern era of often unnecessarily restrictive, political correctness. The origins and outcomes of errors in medicine will be themed and the effects of enquiries such as Alder Hey, Bristol and Shipman on modern clinical practice will be reviewed. The role of both complementary medicine and the pharmaceutical industry in medical practice will be critically examined. The clinical/research interface will be explored through practical classes on clinical data retrieval systems, structured writing and medical statistics. The ways in which basic scientific research has contributed to the understanding of disease pathogenesis and influenced clinical practice will be detailed and explored through visits to research, investigational and treatment facilities. There will be opportunities to spend time in small group discussions with individuals working at the cutting edge of technological advances.

CLINICAL RESEARCH PROJECT
CLCS3901
1.5 units
TERMS 1, 2 & 3
Assessment: supervisor's report, written report and viva presentation

The majority of projects will be undertaken in the Department of Medicine but opportunities are made available to undertake projects in other Departments such as Surgery, Obstetrics and Gynaecology and the Institute of Child Health. The detailed arrangements for the selection of projects and supervisors will be co-ordinated by the course director. Every effort will be made to accommodate students who express a wish to work in a particular field of study or in a particular department. Likewise every effort

will be made to secure places for students on the optional half-unit courses which will best complement their project. The timing of the dedicated period for execution of the research project will depend on optional courses selected but will total 12 weeks. However it is envisaged that students will be able to continue with their research work throughout the integrated year while attending taught courses associated with their optional modules. Students will become integral and valued members of the groups to which they are attached and will receive all the necessary training they need to undertake the tasks their projects demand. It is expected that in addition to the specific skills acquired in relation to their own project, students will learn about the planning, execution and presentation of original research, and in particular:

- The generation of testable hypotheses
- The principles of hypothesis testing
- Study design and organisation
- Research governance and ethics
- Clinical research methodology
- Retrieval and selection of information
- Data collection and documentation
- Key methods and concepts of statistical analysis
- Critical thinking and reasoning

Students will also learn to present their findings accurately, in an adroit and cogent fashion, both in written and oral form. The project will be written up in the form of a scientific paper and should be of sufficient quality to be presented at national and international scientific meetings and to form the basis for a publication.

Projects selected between 2006/07 and 2012/13 have included:

- Alcohol pharmacokinetics in non-Muslim Asians of Indian origin
- Deaths in scleroderma: do new treatments unmask hidden complications?
- Critical Flicker Frequency for the diagnosis of hepatic encephalopathy
- Regulation of adipose interleukin-6 in obesity
- The outcome of traumatic brain injury
- Activation of the P2X system in association with uroepithelial inflammation
- Early diagnosis of pulmonary hypertension in sickle cell disease
- Single fibre EMG for the assessment of myasthenia gravis
- Complex attention task defects in patients with cirrhosis
- Parents' attitudes to food as a factor in childhood obesity
- Plasma biomarkers to determine the cause of exacerbations in patients with COPD
- The risk of cardiovascular disease in patients with psoriatic arthritis
- Body shape: a new categorical variable in childhood obesity
- Intracellular bacterial colonisation of urothelial cells in renal transplant recipients
- Design of a rationally attenuated vaccine and anti-viral drugs for Dengue Fever
- Catch-up growth in early life and resting metabolic rate in young adulthood
- Are all seizures seizures? How ambulatory or telemetry EEG affects clinical diagnosis
- Role of endosomal toll-like receptors in keratinocyte activation by systemic sclerosis autoantibodies
- Investigating the aetiology of systemic autoimmune ANCA associated vasculitis
- The effects of violent video games on blood pressure and appetite in overweight young men
- Missed urinary tract infection in the aetiology of miscarriage and premature birth
- Biomarker for disease progression in autosomal dominant polycystic kidney disease
- Novel early diagnostic pathways in pancreatic cancer
- Using herbal remedies to generate lead compounds for structure-based drug design
- Heart rate variability-a measure of haemodynamic/inflammatory status in advanced cirrhosis

OPTIONAL COURSE UNITS

TERM 2
Assessment: arrangements will vary according to teaching department

The optional course units will be selected from other established Integrated BSc programmes. The choice of the optional units can be tailored to best suit individuals and their proposed field of research. Due to the timetabling of the core module, students will only be able to choose optional modules which take place in Term 2. Places on some of these modules are limited, and there may be pre-requisites.

Selections made by students between 2006/07 and 2012/13 have included:

1.0 Unit selections

- Space medicine & extreme environment (PHOL3009: Physiology)
- Cell signalling in health & disease (PHOL3004: Physiology)
- Foetal and neonatal physiology (PHOL3003: Physiology)
- Neurodegenerative diseases (ANAT3029: Neuroscience)
- Advanced visual neuroscience (NEUR3001: Neuroscience)

0.5 Unit selections

- Clinical microbiology (INFN3002: Infection)
- Pathology of chronic disease (IMMN5005: Infection & Immunity)
- Allergy, immunodeficiency and transplantation (IMMN3006: Infection & Immunity)
- Molecular CVS (BIOC3017: Molecular Medicine)
- Sex, genes and evolution (BIOL3012): Human Genetics)
- Physiological monitoring (MPHY3012: Medical Physics)
- Medical imaging with non-ionising radiation (MPHY3891: Medical Physics)
- Respiration in health & disease (PHOL3001: Physiology)
- Neuropharmacology (PHAR3001: Pharmacology)
- Neurodegenerative diseases (ANAT3028: Neuroscience)
- Transplantation: science and practice (SURG3010: Surgical Sciences)
- Topics in clinical psychology (PSYC3107: Psychology)
- Disease in history (HMED3010: History of Medicine)
- Madness and society (HMED3004: History of Medicine)
- Medicine in modern society (HMED3006: History of Medicine)
- History of Asian medicine (HMED3014: History of Medicine)
- Advanced topics in philosophy of medicine (HPSC3028: Philosophy, Medicine & Society)
- Science and ethics (HPSC2006: Philosophy, Medicine & Society)
- Science communication in digital environments (HPSC3033: Philosophy, Medicine & Society)
- Evolution in science and culture (HPSC3027: Philosophy, Medicine & Society)
- Clocks, sleep & biological time (ANAT3105: Anatomy & Developmental Biology)
- Pain (ANAT3042: Anatomy & Developmental Biology)
- Control of Movement (NEUR3031: Neuroscience)

PUBLICATIONS

Scientific Abstracts *(IBSc Students in Italics)*

BASL Annual Meeting 2007

IM Head, CD Jackson, *CW Jenkins*, M Y Morgan. Smooth pursuit and saccadic eye movements in patients with cirrhosis in relation to their neuropsychiatric status

E Harazi, T Darch, J Wells, MY Morgan. Alcoholic liver disease – The Indian dimension.

DK Dhar, *JH Brindley*, MH Chapman, JS Dooley, S.P. Pereira. Role of tumour M2-PK in biliary tract cancer: diagnostic and prognostic evaluation.

American Association for the Study of the Liver Annual Meeting, Boston, USA, 2007 (Published in Hepatology)

E Harazi, T Darch, J Wells, MY Morgan. Alcoholic liver disease – The Indian dimension.

JH Brindley, DK Dhar, MH Chapman, JS Dooley, SP Pereira. Tumour M2-Pyruvate Kinase has a diagnostic and prognostic role in biliary tract cancer.

International Meeting on Hepatic Encephalopathy, Valencia, Spain 2007

IM Head, CD Jackson, *CW Jenkins*, MY Morgan. Smooth pursuit and saccadic eye movements in patients with cirrhosis in relation to their neuropsychiatric status

CW Jenkins, CD Jackson, S Montagnese, P Amodio, MY Morgan. Spatio-temporal decomposition of the EEG in patients with cirrhosis: further validation

M Marks, *CW Jenkins*, CD Jackson, S Montagnese, P Amodio, MY Morgan. Psychometric hepatic encephalopathy scores (PHES) are significantly influenced by the normative population used for reference**.**

M Marks, *CW Jenkins*, RW Morris, S Montagnese, M Y Morgan. The scoring of the line tracing test (LTT) has a significant effect on the overall psychometric hepatic encephalopathy score (PHES).

M Rayan, *CW Jenkins, IM Head*, S. Montagnese, MY Morgan. Evoked potentials in patients with cirrhosis

British Society of Gastroenterology Annual Meeting, Birmingham, UK, 2008 (Published in Gut)

KJ Rhee, *KA Chandarana*, R Ruparelia, E Woolman, S Kanagalingam, M Thomas, MY Morgan. Blood glucose and glycosylated haemoglobin are insensitive diagnostic indicators of glucose intolerance in patients with cirrhosis

K A Chandarana, S J Eaton, M Y Morgan. Slow-release carbohydrates: a rational, patient-acceptable approach for the nutritional management of patients with cirrhosis?

European Society for the Study of the Liver Annual Meeting, Milan, Italy 2008 (Published in Journal of Hepatology)

KJ Rhee, *KA Chandarana*, R Ruparelia, E Woolman, S Kanagalingam, M Thomas, MY Morgan. Blood glucose and glycosylated haemoglobin are insensitive diagnostic indicators of glucose intolerance in patients with cirrhosis

KA Chandarana, S J Eaton, MY Morgan. Slow-release carbohydrates: a rational, patient-acceptable approach for the nutritional management of patients with cirrhosis?

International Society for Hepatic Encephalopathy and Nitrogen Metabolism, Padua, Italy, 2008 (Published in Liver International)

M Marks, S Montagnese, CD Jackson, C*W Jenkins, IM Head, H Wilson,* RW Morris, MY Morgan. Derivation of a normative UK database for the psychometric hepatic encephalopathy score (PHES): confounding effect of ethnicity and test scoring

British Pain Society, 2008

L Morgan-Rowe, B Rai, MY Morgan, A Ordman. A survey of steroid use in interventional pain management procedures among British Pain Society members

L Morgan-Rowe, B Rai, MY Morgan, A Ordman. Triamcinolone in interventional procedures leaches into the Systemic Circulation

BASL Annual Meeting 2008

H Wilson, CD Jackson, MY Morgan. Critical Flicker Fusion Frequency (CFF) for the diagnosis of hepatic encephalopathy.

British Society of Gastroenterology Annual Meeting, Glasgow, UK, 2009 (Published in Gut)

H Wilson, C Jackson, RW Morris, BD Youl, MY Morgan. Critical Flicker Fusion Frequency (CFF) for the diagnosis of hepatic encephalopathy.

C Chong, E Harazi, T Tian, T Darch, J Wells, MY Morgan. Alcoholic Liver Disease – The South Indian Dimension

5th International Hannover Conference on hepatic Encephalopathy, Mainz, Germany, 2009

H Wilson, CD Jackson, RW Morris, BD Youl, MY Morgan. Critical Flicker Fusion Frequency (CFF) for the diagnosis of hepatic encephalopathy.

European Society for Biomedical Research on Alcohol, Helsinki, 2009 (Published in Alcohol & Alcoholism)

C Chong, E Harazi, T Tian, T Darch, J Wells, MY Morgan. Ethnic difference in alcohol pharmacokinetics: the relationship to body composition variables

T Tian, MD Alexander, BD Youl, MY Morgan. The role of ion channel dysfunction in the pathogenesis of alcohol-related peripheral neuropathy

International Meeting on Hepatic Encephalopathy, Valencia, Spain 2009

YY Goh, *M Hussein*, S Montagnese, BD Youl, CD Jackson, MY Morgan. Visuospatial attention defects and the ocular system in patients with hepatic encephalopathy

British Society of Gastroenterology Annual Meeting, Liverpool, UK, 2010 (Published in Gut)

M Hussein, YY Goh, CD Jackson, MY Morgan. The diagnosis of hepatic encephalopathy: test performance of novel paradigms.

British Society of Gastroenterology Annual Meeting, London, UK, 2011 (Published in Gut)

EM Williams, M Heeren, CD Jackson, H Pflugrad, J Krause, LM Weber, K Weissenborn, MY Morgan. Abnormal EEG activity in patients with chronic hepatitis c (HCV) infection and minimal liver disease

American Association for the Study of the Liver, Boston, USA, 2011 (Published in Hepatology)

EJ Halliday, S Stevens, MA Stubbs, RJ Morris, MY Morgan. The performance validity of breath sample analysis in the diagnosis of hepatic encephalopathy in patients with cirrhosis.

World Congress of Neurology, Marrakesh, Morocco, 2011

V Narwani, T Tidswell, M Pitt. A novel analytical method for the diagnosis of paediatric myasthenia using stimulated single fibre electromyography

World Congress of Neurology, Marrakesh, Morocco, 2011

F Javaid, T Tidswell, H Angus-Lappan. Maximising the efficacy of the EEG for diagnosis and management of epilepsy.

Peer-Review papers

Mani AR, Montagnese S, Jackson CD, *Jenkins CW, Head IM,* Stephens RC, Moore KP, Morgan MY. Decreased heart rate variability in patients with cirrhosis relates to the presence and severity of hepatic encephalopathy. American Journal of Physiology - Gastrointestinal and Liver Physiology 2009;

296:G330-338.

Morgan MY, *Chandarana K,* Morris RW, Madden AM. Hand-grip strength is a measure of nutritional status in men with cirrhosis. Gastroenterology: submitted

Wilson HR, Jackson CD, Morris RW, Youl BD, Morgan MY. Critical flicker fusion for the diagnosis of hepatic encephalopathy: diagnostic considerations and confounders. Hepatology, submitted

NATIONAL / INTERNATIONAL AWARDS

- *Core Pharma* Prizes have been awarded to fourteen students for their project proposals: these prizes, each worth £1,000, and were competed for nationally
- Two students have been awarded *Core Pharma* Prizes, worth £1,000 for the most outstanding research in the field of gastroenterology undertaken by a BSc, MD or PhD student nationally.
- Two students have been awarded £5000 bursaries for their research proposals from *The British Society of Clinical Neurophysiologists*
- Two students have been awarded research prizes of £500 each by the *Medical Council on Alcohol.*
- *BASL* prizes have been awarded to one student for the best clinical research poster presentation and to another for best clinical research oral presentation.
- *EASL* prize has been awarded for the best poster presentation at a monothematic meeting
- A number of travel scholarships were awarded to facilitate participation in national and international conferences to present research findings *AASLD (1); BASL (2); BSG (1); EASL; International Neuroscience Society (4).*

FURTHER INFORMATION

For further details or to discuss the programme, please contact:
Dr Marsha Morgan 020 7433 2873 e-mail: marsha.morgan@ucl.ac.uk
Miss Carolyn Cohen 020 7472 6105 e-mail: carolyn.cohen@ucl.ac.uk
Website: www.ucl.ac.uk/medicine/teaching/undergraduate

Global Health

AIMS & OBJECTIVES
The programme is designed to give students an introduction to global health. It aims to enable students to:

- gain an understanding of health and the provision of healthcare in different countries and cultures worldwide
- understand the local factors that affect a population's health and the global factors that shape health across the world
- understand the political and economic environment in which global health policy is formed and delivered.

PROGRAMME STRUCTURE
The programme consists of 3.5 compulsory course units, 1.5 units of which is a project of the student's choice. There is a further 0.5 unit of optional courses.

COMPULSORY MODULES

- Global Health Policy (1 unit)
- Health, Poverty and Development (0.5 unit)
- Conflict, Humanitarianism and Health (0.5 unit)
- Global Health Project (1.5 unit).

OPTIONAL MODULES
Students must take either:
Global Maternal and Child Health (0.5 unit) **(OR)** Global communicable and Non-Communicable Diseases (0.5 unit) **(OR)** Anthropological Perspectives on Global Health (0.5 unit).

CIHD3001: GLOBAL HEALTH POLICY
1.0 unit
TERM 1 & 2
Jolene Skordis-Worrall and Chris Willott
Assessment: written essay 25%, group poster presentation 25%, oral exam 50%

This module examines health and health care in its global context. It involves analysis of the key stakeholders in policy formulation and their involvement in changing patterns of health care provision. The activities of governments, NGOs, supranational institutions and corporations in providing health care are examined in the context of complex global social, political and economic trends.

CIHD3002: HEALTH, POVERTY AND DEVELOPMENT
0.5 unit
TERM 1
Mike Rowson and Chris Willott
Assessment: written essay 50%, unseen written exam 50%

This module introduces students to some of the key debates in international development, including those surrounding poverty, aid, trade and globalization. The module shows how these debates also underpin our understanding of why improvements or declines in health occur in different countries. Students will learn some basic economic theory and a range of political and sociological ideas that assist in understanding the state of the world today.

CIHD3003: CONFLICT, HUMANITARIANISM AND HEALTH
0.5 unit
TERM 2
Maria Kett and Mike Rowson
Assessment: written essay 50%, unseen written exam 50%

The conflict, humanitarianism and health module examines the causes of violent conflict and its effects on health. It discusses key policy issues in contemporary humanitarianism and assesses the effectiveness of humanitarian interventions and organisations. Students will also engage with particular topics related to these areas, including the policy responses to migration in conflict situations and the effectiveness of psychosocial interventions and reconciliation initiatives in divided societies.

CIHD3004: GLOBAL COMMUNICABLE AND NON-COMMUNICABLE DISEASES
0.5 unit
TERM 2
William Newsholme and Ben Killingley
Assessment: written essay 50%, unseen written exam 50%

In this module students are introduced to key principles of public health through the study of specific diseases. Students learn about the management of these diseases both at the individual and population levels and the challenges faced in dealing with them in the context of poverty and poor-quality services. Public policy and global campaigns are examined in relation to these issues.

CIHD3005: GLOBAL MATERNAL AND CHILD HEALTH
0.5 unit
TERM 1
Jenny Hall and Fred Martineau
Assessment: written essay 50%, oral exam 50%

The module provides an introduction to the health problems facing mothers and children across the world. The seminars address the main causes of child and maternal mortality and the socio-cultural factors affecting them. Malnutrition, pregnancy, childbirth, breastfeeding and the perinatal period are examined in detail as well as important infectious diseases such as vaccine preventable diseases, HIV, malaria and diarrhoeal disease. The impact of public health programmes addressing these diseases is explored.

CIHD3006: ANTHROPOLOGICAL PERSPECTIVES ON GLOBAL HEALTH
0.5 unit
TERM 2
Audrey Prost and Rodney Reynolds
Assessment: written essay 50%, oral exam 50%

This course introduces students to the anthropology of global health. The general aims of the module are to link illness experience with socio-political factors; understand cultural influences on health and sickness in a variety of contexts; appreciate the celebration of and resistance to biomedicine in local contexts; and develop cultural and personal empathy through an appreciation of radically different conceptualisations of sickness.

CIHD3901: GLOBAL HEALTH PROJECT
1.5 units
Chris Willott and Mike Rowson
Assessment: project presentation 10%, project 90%

The project component of the course provides students with the experience of creating an original piece of work on a global health issue. The project module takes place throughout the year and is self-directed with support from a supervisor. At the end the student is required to produce a 10,000 word dissertation.

PROJECT TOPICS 2011-12
Patents and prices in South Africa
Rape in Democratic Republic of Congo
Epilepsy and traditional medicine in Sub-Saharan Africa
Post-Traumatic Stress Disorder in humanitarian relief
Circumcision and HIV
Hepatitis C in Egypt
Organ transplants in China
Family planning in Ghana
Health insurance in Ghana
Philanthrocapitalism
Measles control
Aboriginal health in Australia

Trypanosomiasis
Post-apartheid health changes in South Africa
Alcohol policy in the UK
Safe abortion in India and Nepal
Alcohol advertising in the UK
Malnutrition and democracy
Emerging infectious diseases
Peace through health in eastern Congo
Poverty and Neglected Tropical Diseases in India
Organised crime and HIV
Health systems and post-conflict reconstruction
Obesity in the south Pacific
Guinea worm.

PUBLICATIONS BY STUDENTS RESULTING FROM BSc

Agwu K, Llewelyn M et al. (2009). Compensation for the brain drain from developing countries. *Lancet* 2009; 373: 1665-1666.

Anwar E, Hesketh T (2008). Child Labour. *Student BMJ* 16: 248-250

Baker P (2009). On the relationship between economic growth and health improvement: Some lessons for health-conscious developing countries. *Radical Statistics* 98.

Boutros, S, Skordis, J (2010). HIV/AIDS surveillance in Egypt: Current status and future challenges. *Eastern Mediterranean Health Journal*. Volume 16 (3): 251-258.

Costello A, **Abbas M**, Allen A, Ball S, Bell S, Bellamy R, Friel S, Groce N, Johnson A, Kett M, Lee M, Levy C, Maslin M, McCoy D, McGuire B, Montgomery H, Napier D, Pagel C, **Patel J**, de Oliveira JA, Redclift N, Rees H, Rogger D, Scott J, Stephenson J, Twigg J, Wolff J, Patterson C (2009). Managing the health effects of climate change: Lancet and University College London Institute for Global Health Commission. *Lancet* 373(9676):1693-733.

Ellis, J, Morarji, N, North, S, Walpole, S et al (2007). Global health and foreign policy *Lancet* 369 (9574):1689-90.

Khan S, Hesketh T (2010). Deteriorating situation for street children in Pakistan: a consequence of war. *Arch Dis Child*. 2010 Aug;95(8):655-7.

McCoy D, Kembhavi G, **Patel J, Luintel A** (2009). The Bill & Melinda Gates Foundation's grant-making programme for global health. *Lancet* 373(9675):1645-53.

Willott C, Blum N, **Burch W, Page B** and Rowson M (2012). *The Global Doctor*. London: UCL Institute for Global Health and Institute of Education.

USEFUL INFORMATION

The course is mainly lecture and library-based. The teaching time is fairly small but there is a large amount of material to read for each module. Each module consists of a lecture and a tutorial each week. The lecture provides students with an overview of a particular issue, which is then built on through readings. Tutorials are either a discussion of these readings or a debate or role play. The emphasis will be on students developing their own ideas and arguments around the lectures and reading material.

THE CENTRE

The Integrated BSc is run by the UCL Institute for Global Health undergraduate teaching office. The aim of the undergraduate department is to develop and promote teaching on global health in the medical curriculum. The Centre is based at 30 Guilford Street, near Russell Square.

For more information regarding the course, admission and entry requirements please contact Chris Willott, Course Director (c.willott@ucl.ac.uk, 020 7905 2626) or Caroline Smith, Course Administrator (ich.cihdu@ucl.ac.uk Tel: 020 7905 2126).

Further information is available on the department's website: http://www.ucl.ac.uk/igh/undergraduate.

History of Medicine

History of Medicine offers medical students the opportunity to study health and sickness in communities worldwide through all periods of history from ancient times to today. Whether or not you have a background in history, you will develop critical reading, writing and thinking skills to interpret original manuscripts and published texts as well as historical images and objects.
Students reading for the IBSc in History of Medicine must complete a total of four course units, which includes two core courses and a compulsory dissertation. The dissertation will be an original research project and offers the opportunity to use historical method to explore a topic in depth. Dissertations are deposited in the Wellcome Library (http://library.wellcome.ac.uk/) where it is likely that you will spend much of your study time. The Wellcome Library is the largest history of medicine resource in Europe.

Programme tutor: Dr Carole Reeves (c.reeves@ucl.ac.uk)

HMED3002: RESEARCH PROJECT
1.5 units (compulsory)

Research projects will be original research, 10,000 – 15,000 words in length, developed from a topic of personal interest or a special area of expertise, and supervised by your personal tutor and programme tutor. You can see past IBSc History of Medicine research projects in the Wellcome Library.

HMED3004: MADNESS AND SOCIETY
0.5 unit (option)
Dr Carole Reeves
TERM 1, Monday 13.00 – 14.00 and Wednesday 09.00 – 10.00
Assessment: two essays (50%) and 3-hour examination (50%)

This course examines the ways in which deviant behaviour has been identified and controlled from the ancient world to the present. Topics include the witch hunts in Western Europe, the history of suicide, the rise of the asylum, mad monarchs, spies and visionaries, gendered madness, criminal insanity and degeneration, damaging the body, the growth of the psychiatric profession, Freud, Jung and anti-psychiatry, and the tensions between organic, analytical and sociological explanations of insanity.

HMED3006: MEDICINE AND MODERN SOCIETY
0.5 unit (core course)
Professor Roger Cooter (r.cooter@ucl.ac.uk)
TERM 1, **Thursday 15.00 – 17.00**
Assessment: two essays (50%) and 3-hour examination (50%)

This course will explore the emergence of modern medicine from the 18th century to the present day in European society. It will assess how historians have interpreted the radical changes in the last 250 years of European medicine and the intellectual contexts in which they have done so. We will discover how the response of medical practitioners, institutions, legislators and the general public to health problems always reflected and at the same time contributed to changing social and cultural ideas and attitudes within contemporary European society. We will also see how historians are never the authors of their own thoughts.

HMED3017: MEDICINE IN LITERATURE
0.5 unit (option)
Dr Stephanie Eichberg (s.eichberg@ucl.ac.uk)
TERM 1, Tuesday 11.00 – 12.00 and Thursday 09.00 – 10.00
Assessment: two essays (50%) and 3-hour examination (50%)

This course explores the relationship between literature, medicine and history: we will investigate how medicine has shaped literary responses to death and disease and evaluate critically what literature can accordingly teach us about the history of medicine. Can fictional (and non-fictional) narratives of the past reflect changing views of the body in health and illness? Can the creative arts truly represent the subjective experience of illness and suffering? Can the historical context reveal different layers of a story?

HPSC3029: MEDICINE, DISEASE AND HISTORY
0.5 unit (option)
Dr Bill Maclehose (w.maclehose@ucl.ac.uk)
TERM 1, Monday 10.00 – 11.00 and Thursday 12.00 – 13.00
Assessment: one essay (40%) and 3-hour examination (60%)

This course addresses the changes and developments in Western medicine from the Ancient Greek world to 1700. The course will discuss the varieties of theory and practice of medicine, the understandings of the body and illness, and the historical contexts in which medicine can be understood in the pre-modern world, including classical Greek and Roman society, medieval Islamic and Western cultures, and Renaissance and early modern periods.

HMED3010: DISEASE IN HISTORY
0.5 unit (core course)
Dr Carole Reeves
TERM 2, Tuesday 12.00 – 13.00 and Thursday 09.00 – 10.00
Assessment: one essay (50%) and 3-hour examination (50%)

What is disease? How has our understanding of disease, and people's experiences of disease, changed over time? This course will give you some new and challenging ways to think about these questions. We will take specific diseases such as cholera, tuberculosis, smallpox, plague, malaria and AIDS, and examine their social and medical impact during the past couple of centuries. In doing so, we will trace the interplay of scientific, clinical, social and moral judgments invested in 'framing' a disease.

HMED3015: BRAIN, NERVES AND HUMAN NATURE IN THE MODERN ERA
0.5 unit (option)
Dr Stephen Jacyna (s.jacyna@ucl.ac.uk) / Dr Stephanie Eichberg (s.eichberg@ucl.ac.uk)
TERM 2, days and times TBC
Assessment: one essay (50%) and 3-hour examination (50%)

The aim of the course is to survey topics in the history of psychology and neuroscience from the end of the seventeenth century to the twentieth century. It also touches on some aspects of the applications of neuroscience in contemporary culture. Topics to be covered will include: the rise of the cerebral body; eighteenth-century sensationalism; the phrenological legacy; romantic psychology; cerebral localization; evolutionary neurology; experimental psychology in the twentieth century; behaviourism; "neuro-culture".

HIST7014: HISTORY OF ASIAN MEDICINE
0.5 unit (option)
Dr Vivienne Lo (v.lo@ucl.ac.uk)
TERM 2, Monday 14.00 – 16.00
Assessment: two essays (50%) and 3-hour examination (50%)

Asian Medical History aims to provide knowledge of the background and development of key concepts and practices in the history of Chinese medicine, with a secondary focus on the history of Tibetan and/or Indian medicine. It will describe the transmission of these Asian medical systems and traditions to Europe and the reception of traditional medicines in the modern world. The course will give a broad historical perspective, while at the same time focusing on the social, cultural and political contexts of key times of medical innovation.

Please note that this module may not be offered in 2013-2014

HPSC3027: EVOLUTION IN SCIENCE AND CULTURE
0.5 unit (option)
Professor Joe Cain (j.cain@ucl.ac.uk)
TERM 2, Tuesday 11.00 – 12.00 and Thursday 10.00 – 11.00
Assessment: one essay (40%) and 3-hour examination (60%)

A historical survey of evolutionary thinking from the Enlightenment to the present. Content includes the history of scientific ideas and the context for those ideas. It also considers the influence of evolutionary ideas on society, and the reverse.

PROJECTS UNDERTAKEN IN 2011-2012

Life before insulin: the development of diabetic therapy from John Rollo (1797) to Elliot Joslin (1921).

The gatekeepers of gender: A history of transsexuality in the National Health Service (Including a case study of the Gender Identity Clinic at Charing Cross Hospital).

Save the mother, lose the child: moral and medical attitudes to obstructed labour in the 19th century.

A forgotten medicine: an examination of medical practice by Jewish physicians in the Warsaw ghetto, 1940-1942.

Medicine and military imperatives in the Napoleonic Wars, 1805-1813: shaping the British Army Medical Department.

Plague and public health in Bombay, 1896-1901: the voice of the people and the will of the Government.

One Flew Over the Cuckoo's Nest and anti-psychiatry in the United States during 1960s and 1970s.

'A slave to her own body': views of menstruation and menopause in Victorian England, 1820-1899.

'Poles of psychiatric modernism': Lewis Yealland and William Rivers' treatment of shell-shock during the First World War.

MDMA: from a therapy to a schedule I drug.

'A Woman Hater' and other stories: female doctors in 19th century literature as a reflection of British society's ideas about women in medicine.

Puerperal insanity, 1895-1905, with reference to Colney Hatch Asylum.

'The power and beauty of superb womanhood': the preoccupation with women's health, fitness and beauty in early 20th century Britain, and major themes in its discourse.

Psychiatry's wonder drug: a social history of chlorpromazine in the United States from 1954-1963.

Mesmerism and the fall of Dr John Elliotson.

'A document in madness': Shakespeare's Ophelia as a representation of female madness through the centuries.

PUBLICATION / COMPETITION

Kirpal Sadheura (2011-2012) has entered an article entitled 'Framing Lewis Yealland and his Historians' for the 2013 Norah Schuster Essay Prize in History of Medicine, Royal Society of Medicine.

Human Genetics/Genetics

Genetics is becoming more and more important in many areas of clinical medicine. Within the next few years all health professionals will be expected to have a rigorous understanding of the contribution of genetic variation to health and disease. The Integrated degree in 'Medical Sciences with Human Genetics' at UCL is the first of its kind in the United Kingdom and has been universally popular since its introduction. The importance of genetic knowledge in Primary Care has been accepted by the Department of Health. General Practitioners with a special interest in genetics have been recruited, and it is now accepted that all primary care health professionals have a working knowledge of genetics. The rapidly developing field of pharmacogenetics will have a significant impact on prescribing and patient care, across the whole of medicine. It is also possible to choose to study the broader application of genetic principles leading to an integrated degree in 'Medical Sciences with Genetics'. Students take a total of 4 course units and the exact courses to be taken should be discussed with the programme tutor, Dr. James Mackay.

HUMAN GENETICS - COURSE STRUCTURE

Core Courses

Code	Title	Value	Term
BIOL3005 BIOL3004	Introduction to Research OR Literature Review	1.5cu 1.0cu	1 & 2
BIOL3011	Advanced Human Genetics (2)	0.5cu	2
BIOL3013	Advanced Human Genetics (1)	0.5cu	1
BIOL2006	Introduction to Human Genetics	0.5cu	1

Optional Courses – choose 1 course unit worth

ANAT3028	The Neurobiology of Neurodegenerative Diseases	0.5cu	2
ANAT3042	Pain	0.5cu	2
BIOC3010	Computational and Systems Biology : In Silico Analysis of Genes and Proteins and Their Biological Roles	0.5cu	2
BIOC3013	Cancer Biology	0.5cu	2
CELL2006	Cell Biology	0.5cu	1
BIOL3010	Molecular Evolution	0.5cu	2
BIOL3012	Sex, Genes and Evolution	0.5cu	2
PHAR2001	Drugs and the Mind	0.5cu	1 & 2
PHOL3003	Fetal and Neonatal Physiology	1.0cu	2

You must complete 3 course units worth of core modules including BIOL3005, and you must select 1 course unit worth of optional modules. Please note you must select at least 0.5cu at advanced level (i.e. 7 or 3 codes).

BIOL3005: INTRODUCTION TO RESEARCH
1.5 unit
Professor Jurg Bahler
Assessment: Coursework 100%

The course provides the opportunity to undertake an individual research project of 9 weeks duration (including writing the assessed report) under supervision. Projects can be based on experimental research, field work, theoretical or data analysis. You will develop skills in designing experiments, framing questions, and, where relevant, planning the details and implementing the practical work. You will also receive guidance on assessing results and on presenting the project in both written and verbal form. You will also be expected to read relevant literature.
Further information:
http://www.ucl.ac.uk/lifesciences-faculty-php/courses/viewcourse.php?coursecode=BIOL3005

BIOL3004: LITERATURE REVIEW
1.0 unit
Professor Jurg Bahler
Assessment: Coursework 100%.

The course provides the opportunity to undertake an individual review of published literature on a specified topic under supervision. You will develop skills in searching literature databases, reading and critically evaluating published work and presenting it in a scientific report.
Further information:
http://www.ucl.ac.uk/lifesciences-faculty- php/courses/viewcourse.php?coursecode=BIOL3004

BIOL3011: ADVANCED HUMAN GENETICS (2)
0.5 unit
Prof Andres Ruiz Linares
Assessment: Unseen two-hour written examination 75%. 20% coursework and 5% problem solving (25%)

The course focuses on the analysis of common "complex" diseases which, though they are partly genetic, are not inherited in a 'simple' Mendelian fashion. A general introduction to some of the main statistical methods and genetic concepts used in the analysis of these diseases is provided. A substantial part of the course is devoted to a detailed discussion of selected case-studies. The phenotypes chosen vary from year to year, but can include examples such as eye and neurological disorders, pharmacogenetics, cardiovascular disease, psychiatric genetics, mitochondrial disorders, and the molecular genetics of pain perception.
Further information:
http://www.ucl.ac.uk/lifesciences-faculty-php/courses/viewcourse.php?coursecode=BIOL3011
Module timetable:
https://cmis.adcom.ucl.ac.uk:4443/timetabling/moduleTimet.do?firstReq=Y&moduleId=BIOL3011

BIOL3013: ADVANCED HUMAN GENETICS (1)
0.5 unit
Prof Andres Ruiz Linares
Assessment: Unseen two-hour written examination 75%. Three genetics problems and one essay (1,500-2,000) 25%

This course covers the methodology used for the cloning of genes responsible for Mendelian diseases, how genetic analysis has provided insights into the biology of human disease, together with prospects for the management of Mendelian disorders in human populations. Lectures in the course are organized around three broad topics: Methods: Linkage analysis, genetic and physical maps, population studies, finding candidate genes experimentally and by database searching, identifying pathogenic mutations Relating genotype to phenotype: Selected human diseases are exemplified as well as animal models Impact on medicine: genetic counselling; DNA diagnosis and screening, and gene therapy. Tutorial/practical sessions provide hands on exposure to the methodology used in finding genes for Mendelian diseases, including an integrative practical making extensive use of web resources for genetic mapping.
Further information:
http://www.ucl.ac.uk/lifesciences-faculty-php/courses/viewcourse.php?coursecode=BIOL3013

Module timetable:
https://cmis.adcom.ucl.ac.uk:4443/timetabling/moduleTimet.do?firstReq=Y&moduleId=BIOL3013

BIOL2006: INTRODUCTION TO HUMAN GENETICS
0.5 unit
Dr Nikolas Maniatis
Assessment: Essay and workshop/ practicals 30%. Unseen two-hour written examination 70%

This course introduces the subject of human genetics, to enable students to appreciate the implications of genetic research for society and also to provide a basis for more advanced studies. The unifying topic of this course is how genes and their interactions, either with other genes or with the environment,

make us what we are. When these interactions break down genetic disease may result, and it is often through these genetic mistakes that we are able to work out what happens in the normal situation. First comes a reminder that Mendelian rules of inheritance can be applied to human families but that this is not always straightforward to interpret. Not all traits are inherited in a simple Mendelian fashion and the methods by which quantitative and multifactorial traits are studied are introduced. These methods are followed by a section on molecular genetics which continues into genetic mapping techniques which culminated in the multi billion dollar human genome project. Within this section we examine some of the better known human genetic diseases which are interesting both for their own sake but also as examples of the results obtained using the molecular methods discussed earlier. One week is spent considering chromosomes. The human genome project has now moved on from the study of the human DNA sequence to the study of variation between individuals and populations. The existence of genetic variation, polymorphism, has been known for many years and we look at this both from a historical perspective as well as considering how this is of interest to medicine and to the pharmaceutical industry. The fourth week of the course considers the nature and origin of genetic variation and gives a historical outline of the human genome project. In the fifth week we consider cancer, the biggest problem of genetic disease and finally we look at the study of human populations.
Further information:
http://www.ucl.ac.uk/lifesciences-faculty-php/courses/viewcourse.php?coursecode=BIOL2006
Module timetable:
https://cmis.adcom.ucl.ac.uk:4443/timetabling/moduleTimet.do?firstReq=Y&moduleId=BIOL2006

ANAT3028: THE NEUROBIOLOGY OF NEURODEGENERATIVE DISEASE
0.5 unit
Professor Steve Davies
Assessment: Unseen three-hour written examination 100%.

This course will focus on the genetics, and cellular and molecular biology of Alzheimer\'s, Huntington\'s, Parkinson\'s and Motor Neurone disease, with the main emphasis on the mechanisms leading to cell death. A combination of lectures and video presentations will cover topics including: molecular genetics of HD, AD, PD and ALS, transgenic mouse models of human NDD, mechanisms of protein aggregation and degradation, cell biology of the neuronal response to injury, molecular pathways for cell death. This course is also available as a full unit, which comprises a 6000 word library dissertation and the end of course exam (50/50 weighting for each component). The course code for the full unit is C29A. All students wishing to undertake the full course unit will be required to attend a meeting early in the first term to discuss the selection of a topic for the dissertation and the timetable for completion of this component.
Further information:
http://www.ucl.ac.uk/lifesciences-faculty-php/courses/viewcourse.php?coursecode=ANAT3028
Module timetable:
https://cmis.adcom.ucl.ac.uk:4443/timetabling/moduleTimet.do?firstReq=Y&moduleId=ANAT3028

ANAT3042: PAIN
0.5 unit
Professor Steve Hunt
Assessment: Unseen three-hour written examination 80%. 1 Essay 20%

This course aims to present an integrated approach to pain. Through a series of 18 lectures and a clinical demonstration students will be presented with information about the basic mechanisms of pain and chronic pain states and their clinical manifestations. Students will also be introduced to current ideas about therapy and management and to the problems inherent in measurements of pain. Students are also asked to write a 'News and Views' type essay on a selected paper sent to them at the early in the course.
Further information:
http://www.ucl.ac.uk/lifesciences-faculty-php/courses/viewcourse.php?coursecode=ANAT3042
Module timetable:
https://cmis.adcom.ucl.ac.uk:4443/timetabling/moduleTimet.do?firstReq=Y&moduleId=ANAT3042

BIOC3010: COMPUTATIONAL AND SYSTEMS BIOLOGY: In Silico Analysis of Genes and Proteins and Their Biological Roles
0.5 unit
Professor C Orengo
Assessment: Practical's/essay (36 hours) 20%. Unseen two hour written examination 80%

The course has three themes: (1) Genomics (including mapping, sequencing & assembly, coding region identification, genome projects & model genomes, disease genes, applications in therapy etc.), (2) Analysis of protein sequences (including an introduction to databases, information networks, the World Wide Web, sequence alignment, structural and/or functional motif recognition, estimation of significance, etc.),(3) Analysis of protein structure (including structure comparison, fold classification, structure prediction, protein evolution etc.).
Further information:
http://www.ucl.ac.uk/lifesciences-faculty-php/courses/search.php?action=single&coursecode=BIOC3010
Module timetable:
https://cmis.adcom.ucl.ac.uk:4443/timetabling/moduleTimet.do?firstReq=Y&moduleId=BIOC3010

BIOC3013: CANCER BIOLOGY
0.5 unit
Dr. Matilda Katan-Muller
Assessment: Unseen two-hour written examination 80%. Data analysis exercise 20%

This course focuses the on mechanism of cancer and the cutting edge in its treatment. It focuses on the regulation of cell proliferation, DNA damage and repair, Aberrant growth regulatory mechanisms in malignant cells, Oncogenes related to guanine nucleotide-binding proteins, Inherited cancers; the genetics of tumour suppressor genes, The biochemistry of tumour suppressor gene-encoded proteins, Chromosomal translocations in cancer, Metastasis and adhesion molecules; angiogenesis, colorectal cancer as a model of tumour progression, The regulation of normal haemopoiesis and haematological malignancies. The origins of epithelial tumours, tumour measurement and location; markers and imaging, An overview of systemic cancer therapy, Cytotoxic drug therapy and drug resistance, Targeted and cytokine therapy in solid tumours, Hormone-dependent tumours and hormonal therapy, Mechanisms of cure in leukaemia, Cancer prevention.
Further information:
http://www.ucl.ac.uk/lifesciences-faculty-php/courses/search.php?action=single&coursecode=BIOC3013
Module timetable:
https://cmis.adcom.ucl.ac.uk:4443/timetabling/moduleTimet.do?firstReq=Y&moduleId=BIOC3013

CELL2006: CELL BIOLOGY
0.5 unit
Dr Geraint Thomas
Assessment: Coursework 30%. Unseen two-hour written examination 70%

This is a new broad-based cell biology course that aims to introduce the student to a wide range of topics related to the biological functioning of eukaryotic cells. The lectures cover how different parts of the cell are formed and function, and how one cell differs from another. The coursework forms an important part of the course and is designed to illustrate specific cellular processes and techniques in greater detail.
Further information:
http://www.ucl.ac.uk/lifesciences-faculty-php/courses/viewcourse.php?coursecode=CELL2006
Module timetable:
https://cmis.adcom.ucl.ac.uk:4443/timetabling/moduleTimet.do?firstReq=Y&moduleId=CELL2006

BIOL3010: MOLECULAR EVOLUTION
0.5 unit
Prof Ziheng Yang FRS
Assessment: Practical 30%. Unseen two-hour written examination 60%. Online test 10%

In the last few decades, molecular genetics has grown explosively, and generated an enormous amount of DNA and protein sequence data. The trend is continuing as many whole genomes are now being sequenced in various genome projects. There is now an acute need for making sense of this flood of data, and for training in bioinformatics to take advantage of the available methods. Evolutionary analysis has been ever more important in this effort. By comparing genes and genomes across species, one can interpret Natures grand experiment over millions of years of evolution and detect evidence of natural selection on genes and gene regions, thus gaining insights into their functional significance. In this course, students will learn about exciting new developments in comparative genomics and the tools and techniques of modern molecular evolution, bioinformatics, and phylogenetics.
Further information:
https://www.ucl.ac.uk/lifesciences-faculty-php/courses/search.php?action=single&coursecode=BIOL3010
Module timetable: https://cmis.adcom.ucl.ac.uk:4443/timetabling/moduleTimet.do?firstReq=Y&moduleId=BIOL3010

BIOL3012: SEX, GENES AND EVOLUTION
0.5 unit
Prof A Pomiankowski
Assessment: Unseen two-hour written examination 60%. Coursework 40%

A lecture and seminar course on modern aspects of evolutionary genetics and sociobiology. The course will concentrate on (a) the evolution of sex and its consequences and (b) evolutionary conflicts between individuals and genes within individuals. A wide range of topics will be covered including: the evolutionary origins of sexual reproduction; the maintenance and consequences of selfish genetic elements (meiotic drive genes, cytoplasmic genes, transposable elements, B chromosomes); the evolution of sex chromosomes; the evolution of distinct sexes; the origin and evolution of social insects; sexual selection; sperm competition; genomic imprinting; the inheritance of acquired characters; the biology of ageing. The course is designed to attract students from a diverse range of backgrounds. In previous years, students have attended from Biology, Ecology, Genetics, Human Genetics, Human Sciences, Integrated Medical Students, Zoology and the Human Evolution MSc.
Further information:
http://www.ucl.ac.uk/lifesciences-faculty-php/courses/viewcourse.php?coursecode=BIOL3012
Module timetable:
https://cmis.adcom.ucl.ac.uk:4443/timetabling/moduleTimet.do?firstReq=Y&moduleId=BIOL3012

PHAR2001: DRUGS AND THE MIND
0.5 unit
Prof A H Dickenson
Assessment: Unseen three-hour written examination 70%. Practical 15% Essay 15%

Drugs which affect the central nervous system can be used for therapeutic benefit, eg antidepressants, analgesics, tranquillisers, or to modify normal behaviour eg. amphetamine, cannabis, alcohol etc. In this course you will be told not only about what drugs do but how they are thought to do it.
Further information
http://www.ucl.ac.uk/lifesciences-faculty-php/courses/search.php?actio+single&coursecode=PHAR2001
Module timetable:
https://cmis.adcom.ucl.ac.uk:4443/timetabling/moduleTimet.do?firstReq=Y&moduleId=PHAR2001

PHOL3003: FETAL AND NEONATAL PHYSIOLOGY
1.0 unit
Dr Greg Fitzharris
Assessment: Portfolio of in-course work 30%. Unseen three-hour written examination 70%

This is an increasingly important area of physiology, both in terms of basic science and because of its clinical applications. This course addresses fundamental questions in this area with particular emphasis

on an integrative or systems approach. A range of scientists and clinicians teach on it, and there are discussion sessions where ethical and practical considerations are debated.
With guided reading, students are encouraged to develop a special interest in one or two specific aspects of this area.
Further information:
http://www.ucl.ac.uk/lifesciences-faculty-php/courses/viewcourse.php?coursecode=PHOL3003
Module timetable:
https://cmis.adcom.ucl.ac.uk:4443/timetabling/moduleTimet.do?firstReq=Y&moduleId=PHOL3003

GENETICS - COURSE STRUCTURE

Core Courses

Code	Title	Value	Term
BIOL3005 BIOL3004	Introduction to Research OR Literature Review	1.5cu 1.0cu	1 & 2
BIOL2006	Introduction to Human Genetics	0.5cu	1
BIOL2007	Evolutionary Genetics	0.5cu	2
BIOL3012	Sex, Genes and Evolution	0.5cu	2

For unit descriptions BIOL3005, BIOL2006, BIOL3012 Please see above. (BIOL2007 overleaf)

ANAT3028	The Neurobiology of Neurodegenerative Diseases	0.5cu	2
ANAT3042	Pain	0.5cu	2
BIOC3010	Computational and Systems Biology : In Silico Analysis of Genes and Proteins and Their Biological Roles	0.5cu	2
BIOC3013	Cancer Biology	0.5cu	2
BIOL3010	Molecular Evolution	0.5cu	2
BIOL3011	Advanced Human Genetics (2)	0.5cu	2
BIOL3013	Advanced Human Genetics (1)	0.5cu	1
PHOL3003	Fetal and Neonatal Physiology	1.0cu	2

All optional unit descriptions listed above.

You must complete 3 course units worth of core modules including BIOL3005, and you must select 1 course unit worth of optional modules. Please note you must select at least 0.5cu at advanced level (i.e. 7 or 3 codes).

BIOL2007: EVOLUTIONARY GENETICS
0.5 unit
Kevin Fowler
Assessment: Three tutorial exercises 25%. Unseen two-hour written examination 75%

This course covers the ecological and genetic core of evolutionary biology using prokaryote, plant, animal and human examples. It discusses the maintenance of genetic variability, the rôle of chance in evolution, the origins of species and theories of evolution beyond the species level. The usefulness of evolutionary biology in disease and pest control, and in conservation also plays a part. Lecture topics include the effects of mutation, drift and selection (including directional, stabilizing and disruptive selection), sexual selection, molecular evolution, mimicry, chromosomal evolution, spatial evolution, evolution of species, and evolution beyond the species level.
See also the Reading List.
Further information:
http://www.ucl.ac.uk/lifesciences-faculty-php/courses/viewcourse.php?coursecode=BIOL2007

We aim to help you keep abreast of the course by asking you to do three written assignments, then discuss the assignment topics in a small group of other students and tutor.

TITLES OF PAST RESEARCH PROJECTS

- Investigation of mutations in the Glycine Cleavage System protein H (GCSH) gene and if they play any part in the development of neural tube defects

- Preimplantation genetic diagnosis protocol development for the BRCA1 gene
- Studying the interaction between Nrp1 and Wnt signalling in retinal vascularisation
- Molecular genetics of inherited blinding disease
- Retinal astrocyte vessel interactions – is Efnal involved?
- The clinical utilisation of CYP2D6 testing in tamoxifen prescription for breast cancer
- MLPA analysis of MFN2 and MPZ in patients with Charcot-Marie Tooth disease
- Did the Anglo-Saxons migrate en masse?
- Investigation of gene expression during craniofacial development
- Looking at axon duplication/deletion in DOPA responsive dystonia

For further details please contact: Fiona Paul
Email: f.paul@ucl.ac.uk / 020 7679 5105
Available Monday and Thursday all day and Tuesday morning

Immunology, Infection & Cell Pathology

AIMS & OBJECTIVES

This IBSc programme focuses on in-depth understanding of the role of the **immune system, infectious agents and cellular processes in the pathogenesis of diseases** and of how this can be modified by treatment.
We seek excellent students who wish to study the mechanisms of infectious and immunological diseases and engage with current issues faced in this area at the leading edge of medicine. We will encourage you to exploit and develop your analytical and critical abilities, to increase your scientific maturity and self-confidence, and help you build an intellectual framework for rapidly assimilating new subject areas and evaluating the claims made in contemporary medical research.

The curriculum provides a broad and comprehensive foundation in **three compulsory modules** on "Immunology in Health and Disease", "Infectious Agents" and "Cellular Pathology" in term one. These are followed by a choice of **two from five optional modules** that allow students to extend their study of immunology, infectious diseases and/or neoplastic diseases in term two. The teaching is based on contemporary research-led knowledge at the interface of basic and clinical science and is delivered by research-active experts in each field. Open discussion between lecturers and students is encouraged as a way of addressing important or unresolved scientific questions. Specific modules incorporate laboratory practicals to introduce key research methods in the field and small group tutorials will run through terms one and two to discuss seminal discoveries and provide experience in critical appraisal of research literature.

The taught components of this programme are complemented by a **substantial laboratory research project based on the student's interests,** which spans four months of the course. This highly popular component has long been the lynchpin of this IBSc. It offers students an invaluable opportunity to experience original scientific research by becoming an integral part of leading UCL biomedical research groups. Frequently, this leads to original research publications, and provides an excellent platform for those with aspirations for careers in clinical academic research.

PROGRAMME STRUCTURE

Each taught module represents 0.5 course units and the laboratory project represents 1.5 course units. **Therefore, students will complete 4 course units, comprising the laboratory project and five taught modules,** summarised in the following matrix:

Term 1	Term 2
Compulsory modules	Optional modules (any two)
INIM3002 Immunology in Health & Disease INIM3003 Infectious Agents INIM3004 Cellular Pathology	INIM3005 Immunodeficiency & therapeutics INIM3006 Allergy, Autoimmunity & Transplantation INIM3007 Viruses and Disease INIM3008 Microbial Pathogenesis INIM3009 Neoplasia & it's treatment
INIM3001 Laboratory Based Research Project (Term 1&2)	

COMPULSORY MODULES

INIM3001: LABORATORY BASED RESEARCH PROJECT
1.5 unit
Term 1 & 2 (November – April)
Dr Mahdad Noursadeghi
Assessment: written abstract, oral presentation and end of course oral examination (20%), project write-up (80%)

This module aims to give you first-hand experience of original laboratory research under direct supervision of principal investigators at UCL. We assess the aspirations of each student individually to

identify their preferences for potential types of project that are relevant to the broad scope of the ibis. Together with their supervisor, students will then formulate a specific project, design and undertake experiments, and interpret /communicate their work in oral presentations and a written report. This module provides invaluable teaching in scientific methodology, laboratory techniques, critical appraisal of original experimental data, and unique insight into the potential of new discoveries. The skills acquired here provide a competitive platform for students who may wish to pursue a future clinical academic career.

INIM3002: IMMUNOLOGY IN HEALTH & DISEASE
0.5 unit
Term 1, Block C and F
Dr Antony Antoniou
Assessment: practical write-up (20%), unseen written exam (80%)

This module will extend your understanding of immunology from **(1)** cellular and molecular anatomy of the immune system and **(2)** the principles of immune responses, through to **(3)** advanced contemporary understanding of role of immunology in health and the mechanisms of immunopathogenesis in disease. This module will incorporate 6 practical sessions encompassing important laboratory and bioinformatic methods.

INIM3003: INFECTIOUS AGENTS
0.5 unit
Term 1, Block A
Dr Richard Milne
Assessment: journal presentation and reflective commentary (20%), unseen written exam (80%)

This module will provide a balanced overview of the infections of man, to include bacteria, viruses, fungi, and parasites. The content will encompass **(1)** the basic biology of the infectious agents; **(2)** the factors that they must overcome to establish and persist in a host; **(3)** approaches to treatment, prevention and control.

INIM3004: CELLULAR PATHOLOGY
0.5 unit
Term 1, Block D
Professor Benny Chain
Assessment: written essay (20%), unseen written exam (80%)

Cellular pathology encompasses the mechanisms by which dysfunction of cellular processes contributes to the pathogenesis of disease. In this module, we aim **(1)** to give you an in-depth understanding of key cellular processes, **(2)** to highlight the mechanisms by which their dysfunction can cause disease, and **(3)** to introduce the contemporary experimental approaches that are used to study these.

OPTIONAL MODULES (A CHOICE OF TWO FROM FIVE MODULES)

INIM3005: IMMUNODEFICIENCY & THERAPEUTICS
0.5 unit
Term 2, Block B
Dr Mahdad Noursadeghi
Assessment: written essay (20%), unseen written exam (80%)

Both genetic (primary immunodeficiency) and environmental (secondary immunodeficiency) causes of impaired immunity will be discussed, together with the consequences for the patient of such deficiencies. The insights provided into the functioning of the normal immune system will be explored, as will the reasons why certain pathogens reveal themselves in the form of opportunistic infection. The treatment options that are available for these will be discussed, including research which aims to transform gene therapy into a ‘routine’ procedure.

INIM3006: ALLERGY, AUTOIMMUNITY & TRANSPLANTATION
0.5 unit
Term 2, Block E
Organiser: Professor Peter Delves
Assessment: written essay (20%), unseen written exam (80%)

This module focuses on the mechanisms by which the immune system can cause diseases by inappropriate immune responses against self or transplanted tissues. We aim **(1)** to describe the contemporary understanding of allergic and hypersensitivity disorders; **(2)** to describe the spectrum of pathogenetic mechanisms involved in antibody and cell mediated autoimmunity; **(3)** to give a broad understanding of the principles of transplantation, transplant rejection and graft versus host disease.

INIM3007: VIRUSES & DISEASE
0.5 unit
Term 2, Block C
Organiser: Dr Richard Milne
Assessment: journal presentation (20%), unseen written exam (80%)

This module is based on a major strength in experimental and clinical virology at UCL, with the aim to provide advanced understanding of **(1)** the principles of virus replication **(2)** the remarkable interaction between a virus and its host and **(3)** broad knowledge of individual virus infections, their treatment and prevention.

INIM3008: MICROBIAL PATHOGENESIS
0.5 unit
Term 2, Block A
Organiser: Dr Bambos Charalambous
Assessment: library project (20%), unseen written exam (80%)

This module builds on the foundations of the compulsory module on “Infectious Agents”, with a particular focus on bacterial, fungal and parasitic pathogens that cause human disease. The course will cover the role of microbial virulence factors and the host-pathogen interactions that mediate disease, and hence inform our clinical management strategies.

INIM3009: NEOPLASIA & ITS TREATMENT
0.5 unit
Term 2, Block D
Organiser: Dr Emma Morris
Assessment: written essay (20%), unseen written exam (80%)

This module explores the processes and molecular mechanisms that underpin neoplastic transformation, tumour invasion and metastasis, with reference to specific haematological and solid tumours. The module complements the other themes in the programme from the role of viruses in oncogenesis, to the mechanisms of immunological tolerance to tumours and research-led approaches to immunotherapy of cancer.

TITLES OF PAST LABORATORY BASED RESEARCH PROJECTS

‘Characterisation of the ccr5 receptor using monoclonal antibodies’ (Prof B Chain, 2011)

‘Interaction between VZV replication and the suprabasal differentiation markers KRT1/10’ (Prof J Breuer, 2011)

‘Investigating reversal to germ-line mutations in an HIV neutralising llama antibody fragment (VHH)’ (Prof R Weiss, Dr L McCoy, 2011)

‘TEMRA cells, exhausted or senescent?’ (Prof A Akbar, Dr S Henson, 2011)

‘Investigating the Protective Effect of FLIP Isoforms Against TNF-mediated Cell Death’ (Prof M Collins, 2011)

‘Unravelling potential functional differences in regulatory B cells between responding and non-responding SLE post rituximab’ (Prof C Mauri, 2011)

‘In vitro analysis of helper T cells engineered to express additional CD3 molecules: potential to enhance efficiency of immunotherapy’ (Dr E Morris, 2011)

‘The role of cytokines in the induction of human T follicular helper cells’ (Prof M Ehrenstein, 2011)

‘Investigating the cross-presentation of lentivector-derived antigens by DC’ (Dr C Bennett, 2011)

‘Non-coding enhancer RNAs in T helper cell differentiation’ (Dr R Jenner 2011)

‘Transcriptomic analysis of B1-cells in inflammation’ (Prof D Gilroy, 2011)

‘The effect of inflammatory cytokines on the senescence of T cells’ (Prof A Akbar, Dr N Riddell, 2011)

‘How does the differential localization of CD1d into lipid rafts affect iNKT cell activation in healthy and patients with SLE’ (Dr L Jury, Prof C Mauri, 2011)

‘Knocking out ERAP- 1 and analysing its effects on HLA-B27 and Inflammation’ (Dr A Antoniou, 2011)

‘The impact of anti-inflammatory lipids on macrophage phenotype’ (Prof D Gilroy, 2011)

‘Evaluating the efficacy of a new sequetyping method for serotyping Streptococcus pneumoniae’ (Dr B Charalambous, 2011)

‘The use of an In-cell PCR, using mRNA substrate from within single cells, to amplify and eventually link the alpha and beta chain components of the T-cell receptor’ (Prof B Chain, 2011)

‘The effect of PD-L1 suppression in Dendritic Cells on the receptor profile and anti-tumour potency of tumour specific effector T-cells’ (Prof M Collins, 2010)

‘Investigating the role of Munc13-4 and Rab27a in Human Immunodeficiency Virus Infection’ (Dr C Jolly, 2010)

‘Examination of receptor-ligand binding differences between ECM-inducing and non-ECM parasitized red blood cells and activated brain microvascular endothelial cells in vitro’ (Dr B de Souza, 2010)

‘Lytic induction therapy of EBV associated Burkitt's lymphoma’ (Prof H Stauss, Dr S Xue, 2010)

‘The interaction of MEK inhibition with therapies targeting EGFR in cancer cells’ (Prof D Hochhauser, 2010)

‘Investigating the upregulation of tissue factor induced by IgG from patients with the antiphospholipid syndrome’ (Prof A Rahman, Dr I Giles, 2010)

‘Molecular analysis of antibiotic resistant bacteria isolated from humans’ (Dr A Roberts, 2010)

‘Identification of different Transportin 3 isoforms and their role in HIV-1 infection’ (Dr A Fassati, 2010)

‘Expression of HIV-1 Env glycoproteins on the surface of cell membranes for use as immunogens’ (Prof R Weiss, Dr W Koh, 2010)

‘Exploiting a novel mutation in the CD8α co-receptor to enhance T cell function’ (Dr E Morris, Dr I Chua, 2010)

‘The effects of treatment on regulatory T cells (Treg) in Juvenle dermatomyositis’ (Prof L Wedderburn, 2010)

’Development of a regulated gene therapy vector for HLH’ (Prof B Gaspar, 2010)

‘Differentiation macrophage populations & their phenotype during resolving inflammation’ (Prof D Gilroy 2010)

‘Pathogenic interactions between innate cells and adaptive cells in chronic Hepatitis B infection’ (Prof M Maini, Dr D Peppa, 2010)

‘A novel assay for systemic lupus erythematosus based on the detection of circulating nitrated nucleosomes’ (Prof A Rahman, Dr J Ioannou, 2010)

A SELECTION OF PUBLICATIONS THAT HAVE BEEN ACHIEVED AS A RESULT OF THE IBSC PROGRAMME

(IBSC STUDENTS IN BOLD)

PD-L1 co-stimulation contributes to ligand-induced T cell receptor down-modulation on CD8(+) T cells
Karwacz K, **Bricogne C**, Macdonald D, Arce F, Bennett CL, Collins MK, Escors D. (2011)
EMBO Molecular Medicine (2011)

Nitrated nucleosome levels in patients with systemic lupus erythematosus – associations with ethnicity and autoantibody status.
Croca S, Pericleous C, **Alber K, Yong H**, Giles I, Rahman A and Ioannou Y
American College of Rheumatology meeting (November 2011)

Gyrase B Inhibitor Impairs HIV-1 Replication by Targeting Hsp90 and the Capsid Protein
Luciano Vozzolo, Belinda Loh, Paul J. Gane, **Maryame Tribak**, Lihong Zhou, Ian Anderson, Elisabeth Nyakatura, Richard G. Jenner, David Selwood, and Ariberto Fassati
The Journal of Biological Chemistry (2010)

Disease activity and levels of anti-apoA1, anti-HDL and anti-oxLDL in patients with SLE
Goulden BS, Turner-Stokes TJ, Pericleous C, Lambrianides A, Bell K, Ioannou Y, Latchman D, Isenberg D, Giles I, Rahman A.
British Society of Rheumatology meeting (April 2010)

Parasite-Derived Plasma Microparticles Contribute Significantly to Malaria Infection-Induced Inflammation through Potent Macrophage Stimulation
Kevin N. Couper, **Tom Barnes**, Julius C. R. Hafalla, Valery Combes, Bernhard Ryffel, Thomas Secher, Georges E. Grau, Eleanor M. Riley, J. Brian de Souza
PLoS Pathogens (2010)

High expression of the ectonucleotidase CD39 on T cells from the inflamed site identifies two distinct populations, one regulatory and one memory T cell population
Moncrieffe, H. Nistala, K., **Kamhieh, Y**., Eddaoudi, A. and Wedderburn L. R.
Journal of Immunology (2010)

Abnormal CTLA-4 function in T cells from patients with systemic lupus erythematosus
Elizabeth C. Jury, Fabian Flores-Borja, **Hardeep S. Kalsi**, Mark Lazarus, David A. Isenberg, Claudia Mauri and Michael R. Ehrenstein
European Journal of Immunology (2010)

Blockade of Immunosuppressive Cytokines Restores NK Cell Antiviral Function in Chronic Hepatitis B Virus Infection
Dimitra Peppa, Lorenzo Micco, Alia Javaid, Patrick T. F. Kennedy, Anna Schurich, Claire Dunn, Celeste Pallant, **Gidon Ellis**, Pooja Khanna, Geoffrey Dusheiko, Richard J. Gilson, Mala K. Maini
PLoS Pathogens (2010)

Thrombin Binding Predicts the Effects of Sequence Changes in a Human Monoclonal Antiphospholipid Antibody on Its In Vivo Biologic Actions
Ian Giles, Charis Pericleous, Xiaowei Liu, **Jasmine Ehsanullah**, Lindsey Clarke, Paul Brogan, Marvin Newton-West, Robert Swerlick, Anastasia Lambrianides, Pojen Chen, David Latchman, David Isenberg, Silvia Pierangeli and Anisur Rahman
The Journal of Immunology (2009)

Expression of vFLIP in a Lentiviral Vaccine Vector Activates NF- B, Matures Dendritic Cells, and Increases CD8_ T-Cell Responses
Helen M. Rowe, Luciene Lopes, Najmeeyah Brown, Sofia Efklidou, Timothy Smallie, **Sarah Karrar**, Paul M. Kaye, and Mary K. Collins
Journal of Virology (2009)

Relationship between anti-dsDNA, anti-nucleosome and anti-alpha-actinin antibodies and markers of renal disease in patients with lupus nephritis: a prospective longitudinal study
Jessica J Manson, **Alexander Ma**, Pauline Rogers, Lesley J Mason, Jo H Berden, Johan van der Vlag, David P D'Cruz, David A Isenberg and Anisur Rahman

Arthritis Research & Therapy (2009)

Insertional Gene Activation by Lentiviral and Gammaretroviral Vectors
Marieke Bokhoven, Sam L. Stephen, **Sean Knight**, Evelien F. Gevers, Iain C. Robinson, Yasuhiro Takeuchi, and Mary K. Collins
Journal of Virology (2009)

*Temporal analysis of early immune responses in patients with acute hepatitis B virus infection*Dunn C, Peppa D, Khanna P, Nebbia G, Jones M, **Brendish N**, Lascar RM, Brown D, Gilson RJ, Tedder RJ, Dusheiko GM, Jacobs M, Klenerman P, Maini MK.
Gastroenterology (2009)

Functional skewing of the global CD8 T cell population in chronic hepatitis B virus infection
Abhishek Das, Matthew Hoare, Nathan Davies, A. Ross Lopes, Claire Dunn, Patrick T.F. Kennedy Graeme Alexander, Helene Finney, Alistair Lawson, Fiona J. Plunkett, Antonio Bertoletti, Arne N. Akbar and Mala K. Maini
The Journal of Experimental Medicine (2008)

Cytokines induced during chronic hepatitis B virus infection promote a pathway for NK cell–mediated liver damage
Claire Dunn, Maurizia Brunetto, Gary Reynolds, **Theodoros Christophides**, Patrick T. Kennedy, Pietro Lampertico, Abhishek Das, A. Ross Lopes, Persephone Borrow, Kevin Williams, Elizabeth Humphreys, Simon Aff ord, David H. Adams, Antonio Bertoletti, and Mala K. Maini
The Journal of Experimental Medicine (2007)

Arginine Residues Are Important in Determining the Binding of Human Monoclonal Antiphospholipid Antibodies to Clinically Relevant Antigens
Ian Giles, Nancy Lambrianides, **Nisha Pattni**, David Faulkes, David Latchman, Pojen Chen, Silvia Pierangeli, David Isenberg, and Anisur Rahman
The Journal of Immunology (2006)

Retroviral Restriction Factors Fv1 and TRIM5_ Act Independently and Can Compete for Incoming Virus before Reverse Transcription
Luca D. Passerini, Zuzana Keckesova, and Greg J. Towers
Journal of Virology (2006)

Compromised Function of Regulatory T Cells in Rheumatoid Arthritis and Reversal by Anti-TNF Therapy
Michael R. Ehrenstein, Jamie G. Evans, **Animesh Singh**, **Samantha Moore**, Gary Warnes, David A. Isenberg and Claudia Mauri
The Journal of Experimental Medicine (2004)

Increased Ubiquitination and Reduced Expression of LCK inT Lymphocytes From Patients With Systemic Lupus Erythematosus
Elizabeth C. Jury, Panagiotis S. Kabouridis, **Amina Abba**, Rizgar A. Mageed, and David A. Isenberg
Arthritis & Rheumatism (2003)

KSHV vFLIP binds to IKK-g to activate IKK
Nigel Field, Walter Low, Mark Daniels, Steven Howell, Laurent Daviet, Chris Boshoff and Mary Collins
Journal of Cell Science (2003)

FURTHER INFORMATION

The Integrated BSc in Immunology, Infection and Cell Pathology is run by the Division of Infection and Immunity based at the UCL Cruciform Building, Gower Street.

For more information regarding this programme please contact:

Ms Biljana Nikolic (Divisional Teaching Administrator)
Email: b.nikolic@ucl.ac.uk Tel: 020 3108 2122 (internal: 52122)

Dr Mahdad Noursadeghi (Programme Tutor)
Email: m.noursadeghi@ucl.ac.uk Tel: 020 3108 2128 (internal: 52128)
Further information is available on the division's website: http://www.ucl.ac.uk/infection-immunity/

Medical Anthropology

AIMS & OBJECTIVES

- To examine the social and cultural context of health, well being and a variety of diverse medical practices from a cross cultural perspective.
- To investigate the political, social, economic and practical dimensions of health care in clinical and non-clinical settings
- To explore health care delivery in international environments through critical examination of NGO work and health policy
- To consider the barriers and obstacles to health in a comparative way in to understand illness and disease experiences in the context of healing and curing especially in circumstances of cultural diversity
- To introduce students to relevant theories and methods within anthropology, including gender, class, kinship, the body, agency, risk, subjectivity and personhood
- To support student development of skills in critical evaluation of evidence and to encourage oral and written expressions of informed opinions about health as understood from both biomedical and non-biomedical perspectives.

PREREQUISITES

None, other than successful completion of years 1 and 2 of the MBBS programme. No previous academic knowledge of anthropology is required, though an interest in experiencing ways of thinking beyond scientific biomedicine may be an advantage. We will support students in presenting their written work in a social science format throughout the degree providing detailed feedback on assignments. The departmental writing tutor can provide additional support to students.

COURSE OPTIONS

Medical students receive an introduction to social anthropology as linked to varied medical practices and health. Students learn key social anthropology concepts related to kinship, witchcraft, religion, immigration and development and also read selected contemporary medical anthropology texts. If required these can be complemented by available courses in evolutionary anthropology and human ecology, which examine human-environment relationships and an evolutionary life-course perspective to help understand dimensions of human biology and behaviour, such as ageing, reproduction, health behaviour and world health variation.

PROGRAMME STRUCTURE

2.0 units of compulsory subjects (ANTH1005A, ANTH3007, ANTH3036), and a further 2.0 units of the student's choice. The course ANTH3036 "Anthropology for Medical Students" is exclusive to the integrated students taking IBSc Medical Anthropology. It is designed as a 'link course' to the other Anthropology options and focuses on those issues of particular interest to medical students. It is assessed through a dissertation on a subject of the students' choice. Most other courses are assessed by examination and/or essays**.**

COMPULSORY COURSES:

ANTH3007: MEDICAL ANTHROPOLOGY
0.5 unit
Joe Calabrese, Sahra Gibbon and Joanna Cook
Assessment: 2,500 word essay 40% + 2 hr examination 60%

Using data from societies throughout the world, the course covers biomedical and behavioural definitions of disease and illness: systems of classification, the distinction between disease and illness; the roles of healer and the sick; rituals of healing; politics of diagnosis; competition between, and change within, medical systems. This includes exploring from an anthropological perspective how notions of self, personhood and the body are constituted and transformed in medical practice,

medicalization, the ‘healing’ technologies of modern medicine including genetic testing and organ transplant, Drugs, Personhood and the Pharmaceuticalization of Health, Health inequalities and the Anthropology of Depression

ANTH3036: ANTHROPOLOGY FOR MEDICAL STUDENTS
IBSC BSc Medical Anthropology students only
1.0 unit
Joe Calabrese, Sahra Gibbon and Joanna Cook
Assessment: Dissertation 100% Taught over two terms.

For students taking the integrated BSc in Medical Anthropology. The course provides an introduction to some of the key concepts and texts in medical anthropology. It considers how anthropology can be applied to clinical issues and in turn how clinical practice raises questions for anthropology. It will also look at a few anthropological ethnographies in some detail. It provides a range of methodological tools to give an insight into anthropological research methods to equip students to undertake a small piece of independent research for the dissertation.

In Term 2, the seminar will focus on Clinical Ethnography, covering methodological approaches to provide hands on approach to the practice of doing clinically-relevant ethnography. This will include discussions of the ethical dimensions of work with clinical populations, designing and setting up a project, using clinically-informed ethnographic techniques, and critical analysis of the inequalities and cultural ideologies shaping intervention and health outcome. Examples will illustrate the range of clinically-relevant ethnographic approaches, exploring such topics as understanding patients' experiences of cancer or mental illness, clinical trials, bioethics, cultural competency, reflexivity, interviewing, narrative analysis, and constructing an anthropological understanding of local therapeutic approaches in sociopolitical context.

ANTH1005A: INTRODUCTION TO SOCIAL ANTHROPOLOGY
0.5 unit
Jerome Lewis
Assessment: Unassessed Essays + 2.5 hour examination 100%

The first part of the course deals with the pre-history and history of social anthropology, with principles and types of social organisation in both small and large-scale societies, and with aspects of economy, politics, social control, kinship and cosmology. It also considers the local and global integration of these societies. Readings (2-3 per week) are a mixture of book chapters and journal articles

OPTIONAL COURSES

ANTH3017: ANTHROPOLOGY AND PSYCHIATRY
0.5 unit
Roland Littlewood
Assessment: 2000 word essay 25% + 2.5 hr examination 75%

The course examines: a) popular understandings of psychology, self-hood and abnormal experience in different societies, and how they may be organised into a body of knowledge; b) the relationship between popular and professional notions of ‘mental illness’ and their roots in the wider social, economic and ideological aspects of different societies, with particular respect to women and minority groups; c) the contribution of academic psychology, psychiatry and psychoanalysis to social anthropology; d) running through the course is the question of whether we can reconcile naturalistic and personalistic modes of thought and, if so, how.

ANTH7020: ANTHROPOLOGIES OF SCIENCE, SOCIETY AND BIOMEDICINE
0.5 unit Course
Sahra Gibbon
Assessment: 2000 word essay 40% and 2 hr unseen examination 60%

This course will critically engage with recent anthropological research and theory addressing the social and cultural context of novel developments in the field of genetics, biotechnology and the life/medical

sciences. The course incorporates emerging research in different national contexts that include the 'global south' drawing on ethnographic work in Asia and South America to provide a critical comparative perspective on these transnational developments

ANTH3005: HUNTER-GATHERERS PAST, PRESENT AND FUTURE
0.5 unit
Andrea Migliano
Assessment: 2000 word essay (50%) + 2.5hr exam (50%)

Hunter-gatherers past present and future will cover the relevant literature on the study of contemporary hunter-gatherers aiming at understanding their evolutionary history and pre-history, their demography and demographic challenges to their existence that began with the invention of agriculture. The course will cover hunter-gatherer's genetic, linguistic and behavioural affinities, population decrease, extinction and resilience. The course will also focus on hunter-gatherers adaptations in the past and present, exploring their behavioural, genetic, life history and cultural adaptations to the environment and to the current demographic pressures imposed by the growing neighbour populations. Furthermore, the course will discuss the usefulness of current hunter-gatherer models to explore past human evolution and will also focus on the political and conservation conflicts related to the current and future maintenance of hunter-gatherers' lands and the process of cultural and biological loss happening to most hunter- gatherer populations due to external pressures.

ANTH3049: REPRODUCTION, FERTILITY AND SEX
0.5 unit
Sara Randall with a social anthropologist
Prerequisites: ANTH7005 Population Studies –
(exceptions made for IBSc and by discussion with the tutor)
Assessment: essay 2200 words 40% + 2hr hour examination 60%

This course takes an interdisciplinary perspective on a range of topics in the domain of reproduction, fertility and sex. Each week a different topic is considered using perspectives from biology, medicine, evolutionary anthropology, demography, social anthropology and other disciplines. Students play an active role in seminars contributing to developing their own reading list through identifying important articles, posting summaries on a data base which is accessible to the class and presenting material to the class Topics covered vary from year to year but are likely to include Love, hormones and bonding, breastfeeding, infertility, abortion and miscarriage, contraception, adolescent sex, male and female reproductive strategies. Essays and exam answers must demonstrate an integration of different disciplinary perspectives.

ANTH3030: NATIONALISM, ETHNICITY & RACE
0.5 unit
Ruth Mandel
Prerequisites: ANTH1005: Introduction to Social Anthropology
Assessment: 2 x 2200 word essays (50% each)

This course focuses on theories and practices of ethnicity, race and nationalism. The reading material is divided between theoretical work on these issues and ethnographic examples. The readings primarily are from what sometimes are called the '1st and 2nd worlds'. Though most of the readings are contemporary, historical sources will be used as well.

ANTH3028: GENDER, LANGUAGE and CULTURE
0.5 unit
Alex Argenti-Pillen
Prerequisites: 3rd year students only, iBSc students require permission from the tutor.
Assessment: 2000 word book review (25%) + 2 hour examination 75%

The course will explore the cultural concepts and models through which sexual difference is produced and to consider a number of different theoretical approaches to the relationship between the biological/physical body and its social and political meaning and interpretation.

ANTH7005: POPULATION STUDIES
0.5 unit
Sara Randall
Assessment: Practical book 5% + Essay 2000 words 30% + Group presentation and powerpoint 10% + 2 hour examination 55%

An introduction to the study of human populations focusing on patterns and determinants of fertility, mortality. The course examines the interplay between biological and social determinants of change in the basic population parameters, using examples drawn largely from contemporary developing countries, although issues in historical demography and contemporary developed-country demography are touched upon; theories of population change, population and resources, population

ANTH7019 COMMUNICATION AND CULTURE
0.5 unit
Luke Freeman
Assessment: 2000 word essay (40%) and 2 hour unseen written exam (60%)

The Communication & Culture course has two main aims. The first aim is to introduce students to the complexity of human communication. This will be achieved ethnographically via the study of a series of communicative modes such as deception, irony, rhetoric and joking. This ethnographic exploration will be complemented by an introduction to some apparently universal underpinnings of communication such as inference, innovation, and influence. The second aim of the course is to test the hypothesis that these characteristics of communication are in fact the key characteristics of culture itself. Rather than communication and culture, can we talk about communication as culture?

ANTH7008: MAN AND ANIMALS
0.5 unit
Katherine Homewood
Assessment: 2.5 hour examination 100% (plus unassessed essay)

This course looks at the interrelations of humans with animal populations, focusing on human populations as a selective force shaping environments, wildlife conservation and utilisation; domestication; and diseases shared by human and animal populations.

ANTH7009: PRIMATE BEHAVIOUR AND ECOLOGY
0.5 unit
Volker Sommer
Assessment: 1,500 word essay 25% + 2.5 hour examination

Current Darwinian theory is applied to explore the evolution of primate social systems. A particular focus lies on the interplay between environmental conditions and reproductive strategies as well as cognitive abilities.

ANTH7015: FISHERS AND FISHERIES; ANTHROPOLOGY, AQUATIC RESOURCES AND DEVELOPMENT
0.5 unit
Caroline Garaway
Assessment: 1 x 1500 essay 20%; 1 x write up of role play assignment 10% and 2 hour examination 70%

With global demand for fish expected to double in the next 25 years, 75% of the world's fish stocks already fully exploited or overfished, and much of the fish traded being produced by developing countries, there is a very real possibility of environmental catastrophes affecting millions of people whose livelihoods depend on these stocks. The course begins with an overview of the economic, cultural and nutritional significance of fish from pre-history to the modern day. This is followed by a critical assessment of current thinking and practices in managing and interacting with one of mans most important natural resources argued to be the most globalized product in the world. Western scientific management, with its emphasis on prediction and control is contrasted with alternatives that stress instead adaptation and resilience when dealing with what are often complex, dynamic and, frequently, poorly understood social and ecological systems. The course focuses on human interaction with fish and other aquatic resources, but would be relevant to anyone interested in natural resources and the environmental challenges to be faced over the next 50 years.

ANTH7018: HUMAN BEHAVIOURAL ECOLOGY
0.5 unit
Ruth Mace and Andrea Migliano
Assessment: 2.5 hour examination 100% (plus unassessed essay)

This is a new evolutionary anthropology course, open to all second and third years. It is about how human behaviour evolves as a response to different ecological circumstances. Topics will include basic behavioural ecology (as applied to both animal and human behaviour) and also some evolutionary psychology and cultural evolution. Topics will include mate choice, life history evolution, kinship and marriage systems in human

Other options may be on offer each year according to staff availability: not all the options listed above are guaranteed to be offered every year

Titles of selected past projects undertaken by IBSc Medical Anthropology students

- Understanding Mental Illness in London's South Asian Muslim Community
- Blood: Soup or Soul? A Study into the Meaning and Representations of Blood as Encountered in the Clinical Setting
- "It Does No Harm Anyone, but It Is Harming Us". Crematoria, Cremation and a Culture Clash
- Fetal Personhood and Mothers in Limbo: an Anthropological perspective on narratives of Miscarriage
- Lectures, Labs and Anatomy: a Medical Student's Notion of the Body
- Organ Transplants and the Contemporary Body-Self in a Euro-American Context: Online Communities and the Social Lives of Organs
- The Singleton Experience in reference to China's One Child policy
- No visible whip marks please, I have a meeting on Monday. An ethnography of a London Fetish Club
- Women and High Heels: The Search for Power
- Cosmetic Surgery as a Cultural Phenomenon: Race and Gender Ideologies and the Medicalisation of the South Korean Female Body
- Papering over the cracks: A Critique of the Admissions Process at the Royal Free and University College Medical School
- Ori: The Yoruba Conceptualisation of Destiny, Society and Religion
- How has the medicalisation of childbirth altered Women's subjective experience of childbirth
- Risk and Public Health Policy
- Bangladeshi Shamanism
- Cultural perspectives of Epilepsy
- The Emergence of an Autistic Culture

Student Testimonials (2011-2012)

"*Already in term one the IBSc in Medical Anthropology has given me a different perspective on western biomedicine and social life itself. Studying anthropology is completely different from studying preclinical medicine as you are actively encouraged to formulate your own opinions and you are taught to take a critical approach to everything you read. This new way of learning and thinking about different, previously untouched concepts has been quite a challenge but has made me use my brain in a whole new way, and this new way of anthropological thinking is something I hope to carry with me through the rest of my medical career.* "

"*In order to treat a person you need to understand their culture, beliefs and background. It is essential as a good doctor to gain trust from your patients so that they are more likely to comply and to feel involved in their treatment. Studying Medical Anthropology as an IBSc has allowed me to immerse myself into different cultures and relate to aspects of health in a holistic manner. It has helped me to consider the political, social, economic climates of health care in different environments and practical dimensions"*

"Living in one of the most diverse cities in the world I think that it is important as a doctor to be able to interact with patients and be able to interpret health with "an open mind." The course is flexible in terms of which aspects of anthropology you study. There are a wide variety of modules to choose from, some medically related, and others less so. I am studying Primate Behavioural Ecology which I am really enjoying! I come back each day with something new to tell my housemates whether it's about an initiation ritual, life as a hunter gatherer in the Mbenjele tribe or spirit possession in Native America"

"I was apprehensive about starting a course that wasn't purely scientific after the last two years of Medicine but I am glad that I took the leap of faith as I am loving the diversity, enthusiasm of the lecturers and the development of my way of thinking; critically and creatively."

"*Studying medical anthropology has truly changed the way I view not just medicine, but the whole world, for example, the economic system. Though it might seem daunting that the things you take for granted everyday are challenged, it is immensely rewarding to be able to see how you can then make real, sustainable changes for the better. In our preclinical years, we spend so much time studying the minutiae of the human body that we forget the people don't just exist in vacuums. People are influenced in every way by their social, economic, political and historical contexts and unless some of these change, for example social inequalities, people won't really get better. Therefore anthropology will allow you to orientate yourself back to the real world that people live in, especially before you start meeting patients in the clinical years. Learning about all the different people of the world also allows you to become much more understanding and tolerant of people, which I think is especially important if you have to deal with difficult patients. As medical students, I assume that we already have some interest in people, albeit helping them when they're suffering. Therefore medical anthropology could be considered an extension of that interest, by studying all the hugely intriguing ways people go about their everyday lives. Thus, I highly recommend that you be brave and take this rare opportunity to study something so different and so rewarding."*

COURSE TUTORS:

Joseph Calabrese (Lecturer, Medical Anthropology)
Room 242, Taviton Street, j.calabrese@ucl.ac.uk.

Fieldwork with Native North Americans, in Haiti and, most recently, Bhutan. Trained in Anthropology and Clinical Psychology. Interested in culture and mental health, with several years spent working with persons having mental illness (both as a clinician and as a researcher). Was a Medical Anthropology fellow and a Clinical Fellow in Psychology at Harvard. Other interests include anthropology of religion and ritual, healing, postcolonial revitalization, symbolism, and comparative human development.

Joanna Cook (Lecturer, Medical Anthropology)
Room TBC, TBC
Fieldwork in Thailand and the United Kingdom on Buddhist meditation practices and their incorporation into mental healthcare programmes. Interests include medical anthropology, the anthropology of religion, the anthropology of Southeast Asia, anthropology of ethics, asceticism, gender, the body, the gift, hagiography, theory and methodology.

Sahra Gibbon (Lecturer, Medical Anthropology)
Room 240, Taviton Street, s.gibbon@ucl.ac.uk

Fieldwork in Cuba, Brazil and UK on genetics, breast cancer, disparities and activism. Interested in genomic knowledges/technologies and public health in comparative cultural arenas (especially Latin America); gender, kinship, breast cancer and 'BRCA' genetics; biosocialities and communities of health activism; and inter and cross-disciplinary research practices.

Website http://www.ucl.ac.uk/anthro/medical-anthropology/ibsc/

Medical Physics & Bioengineering

Technology plays an increasingly dominant role in medicine, and doctors are finding that an ability to understand and utilise new instrumentation and techniques encountered in hospitals is becoming essential. The integrated B.Sc. in Medical Physics provides a comprehensive overview of the technology involved in modern healthcare, and introduces medical students to the fundamental physical principles on which it is based. The course will be particularly valuable to medical students considering careers in Diagnostic Radiology, and also in Surgery. The degree programme is based at the Department of Medical Physics & Bioengineering, located in the new Malet Place Engineering Building

AIMS & OBJECTIVES

The aim of the integrated degree offered by the Department of Medical Physics & Bioengineering is to fill a void in the majority of MBBS degrees which typically contain little or no medical physics material. The course is suitable for students at any stage of the MBBS programme. Although most courses are the same as those offered to Physics B.Sc. students, no significant background knowledge beyond A-Level Physics and Mathematics (or equivalent standard) is essential. Students without A-Level Mathematics (or equivalent) are still permitted to take the course, although some additional background reading will be required. Our integrated students are also provided with informal tutorials every week which enable them to discuss matters arising from the course material, and to supplement their background knowledge of physics and mathematics. Having completed integrated degrees, several of our past students have elected to pursue PhD degrees within our department before returning to medical school.

COURSE STRUCTURE

Students are not overburdened with lectures (an average of 9 hours per week), giving adequate time to understand the technical issues and fundamental principles through background reading, problem sheets, and a research project. The IBSc students share most of their courses with a small number of Physics and Electronic Engineering students, which provides a stimulating environment with a mix of relevant backgrounds akin to that encountered in hospital care and medical research. The total number of students in each class is generally quite small (typically less than 30), which provides an informal, friendly atmosphere, with more opportunities for personal contact with teaching staff than many medical students have previously experienced. Students will be required to take six lecture courses, plus a project selected from those offered each year by the many research groups working in the Medical Physics & Bioengineering Department and UCL Hospitals. The courses will be chosen from the list given below, including the two medical imaging courses and an introductory mathematics course which are compulsory. There are no pre-requisites for individual courses.

COURSE UNIT INFORMATION

There are no pre-requisites for any of the individual courses. The exact choice of optional courses may be subject to timetabling constraints.

MPHY3000: PHYSICS PROJECT
1.0 unit
Terms 1 & 2 (Compulsory course) Project Co-ordinator: Professor Jem Hebden
Assessment: Final report (85%) + oral presentation (15%)

This represents an opportunity to work within one of the department's research groups on a self-contained project related to their on-going research activities. The project often involves working closely with a small team of full-time researchers, and is usually a major highlight of the student's IBSc year. A project is selected by the student at the start of the academic year from a list placed on a website during the summer. Assessment is based on an extensive final report and a short (15 minute) oral presentation at the end of the second term.

MPHY3893: MATHEMATICAL METHODS IN MEDICAL PHYSICS
0.5 unit
Term 1 (Compulsory course) Course Co-ordinator: Professor Jem Hebden
Assessment: Exam (80%) + coursework (20%)

This introductory course is designed specifically for IBSc students in order that they gain a basic familiarity with various mathematical techniques and notation which form part of their other lecture courses. The lectures emphasise the need for an intuitive understanding of specific methods and their application rather than a rigorous training in mathematics.

MPHY3890: MEDICAL IMAGING WITH IONISING RADIATION
0.5 unit
Term 2 (Compulsory course) Course Co-ordinator: Dr. Alessandro Olivo
Assessment: Exam (80%) + coursework (20%)

The most frequently undertaken clinical investigation apart from the analysis of a blood sample is the use of ionising radiation to image or investigate the function of an organ. This course covers the theoretical background to the formation and analysis of such images and uses clinical examples to illustrate the application of the imaging systems. It covers both planar and cross sectional imaging using x-ray and gamma ray sources.

MPHY3891: MEDICAL IMAGING WITH NON-IONISING RADIATION
0.5 unit
Term 2 (Compulsory course) Course Co-ordinator: Dr. Ben Cox
Assessment: Exam (80%) + coursework (20%)

This course covers the technology and basic principles of diagnostic ultrasound and magnetic resonance imaging (MRI). The ultrasound topics include image formation, system design, image artefacts, and Doppler flow measurement. The other half of the course is devoted to the basic theory of nuclear magnetic resonance, signal acquisition techniques, MRI image formation, image processing techniques, and MRI instrumentation.

MPHY3892: TREATMENT USING IONISING RADIATION
0.5 unit
Term 1 (Optional course) Course Co-ordinator: Dr. Adam Gibson
Assessment: Exam (80%) + coursework (20%)

The aim of this course is to present the basic physics involved in radiotherapy. This includes a knowledge of how quantities of radiation and radiation doses are measured, including the theory of radiation detectors and dosimeters; a knowledge of how cells are affected by exposure to ionising radiation and the mechanisms involved; knowledge of how the treatment plan for a patient is developed and carried out; and a knowledge of the risks involved and the concepts of radiation protection.

MPHY3886: OPTICS IN MEDICINE
0.5 unit
Term 1 (Optional course) Course Co-ordinator: Professor Clare Elwell
Assessment: Exam (80%) + coursework (20%)

Techniques based on the use of optical radiation are playing an increasingly important role in diagnosis, therapy, and surgery. This course describes the fundamental interactions of visible, near-infrared, and ultraviolet light with biological tissues, and presents the instrumentation involved. The applications which are discussed include spectroscopy (as a physiological sensor), endoscopy, laser surgery, optometry, and therapy.

MPHY3012: PHYSIOLOGICAL MEASUREMENT
0.5 unit
Term 1 (Optional course) Course Co-ordinator: Dr. Martin Fry
Assessment: Exam (85%) + coursework (15%)

The course provides an in-depth understanding of the theory and practice of transducers and monitoring techniques in physiology and medicine, and covers most of the commonly used methods in medical practice with the exception of those derived from imaging and radionuclide methods. Topics include blood

pressure sensing, gait analysis, temperature measurement, respiratory monitoring, optical sensing methods in oximetry and blood flow, and blood analysis.

MPHYMB22: APPLICATIONS OF BIOENGINEERING
0.5 unit
Term 1 (Optional course) Course Co-ordinator: Dr. Terence Leung
Assessment: Exam (100%)
This module illustrates how the foundation knowledge of bioengineering is used in the provision of clinical services. Topics include EEG/ECG/EMG, respiratory measurements, rehabilitation engineering and aspects relating to medical devices.

MPHY3013: MEDICAL ELECTRONICS AND NEURAL ENGINEERING
0.5 unit
Term 2 (Optional course) Course Co-ordinator: Professor Nick Donaldson
Assessment: Exam (80%) + coursework (15%) + lab report (5%)

For students interested in the fundamental processes involved in the development of new medical instruments, this course provides a valuable introduction to electronics applied to medicine. Topics include: the origin and measurement of electrophysiological signals; electrodes; muscle stimulation; and electric shock hazards and safety devices. Material taught in the classroom will be supplemented with laboratory practicals and visits to local hospitals.

MPHY2002: INTRODUCTION TO BIOPHYSICS
0.5 unit
Term 2 (Optional course) Course Co-ordinator: Dr. Adrien Desjardins
Assessment: Exam (80%) + coursework (20%)

The course will provide an introductory overview of the biophysics pertinent to the human body. Topics covered will include: foundational physics; biological polymers; biological energy; transport processes; membranes; nerve signals; and imaging/analytical techniques. Students will learn about these topics as they relate to the practice of Medical Physics.

Project information and examples of previous projects can be found at: http://www.ucl.ac.uk/medphys/undergrad/mphy3000

Numerous projects have led to publications in peer reviewed journals including:

R. J. Cooper, **D. Bhatt**, N. L. Everdell, and J. C. Hebden, A tissue-like optically turbid and electrically conducting phantom for simultaneous EEG and near-infrared imaging, Physics in Medicine and Biology 54, N403-N408, 2009.
T. Correia, **A. Banga**, N. L. Everdell, A. P. Gibson, and J. C. Hebden, A quantitative assessment of the depth sensitivity of an optical imaging systems using a solid dynamic tissue-equivalent phantom, Physics in Medicine and Biology 54, 6277-6286, 2009.
R. J. Cooper, **R. Eames**, J. Brunker, L. C. Enfield, A. P. Gibson, and J. C. Hebden, A tissue equivalent phantom for simultaneous near-infrared optical tomography and EEG, Biomedical Optics Express 1, 425-430, 2010.
I. Tachtsidis, **Gao L.,** T. Leung, M. Kohl-Bareis, C. Cooper, C. E. Elwell A hybrid multi-distance phase and broadband spatially resolved spectrometer and algorithm for resolving absolute concentrations of chromophores in the near-infrared light spectrum. Advances in Experimental Medicine and Biology 662: 169-75 (2011)

COURSE TUTOR CONTACT DETAILS & WEBSITE DETAILS

Prospective students requiring more information are invited to contact the Admissions Tutor, and/or visit the department's extensive website at the following address:
Department home webpage: http://www.ucl.ac.uk/medphys **IBSc degree webpage:** http://www.ucl.ac.uk/medphys/undergrad/intercal

The Admissions Tutor will also be happy to arrange for an informal visit to discuss the course, and for prospective students to talk to IBSc students currently studying on this course.

Contact: Professor Clare Elwell, Email: c.elwell@ucl.ac.uk, Phone: 020 7679-0270 or 0200

Neuroscience

Neuroscience is one of UCL's greatest research strengths. We are ranked first in Europe and second in the world for neuroscience and behaviour by a leading science indicator. Our success depends not just upon world-class infrastructure but fundamentally upon the people who make up UCL Neuroscience. They build upon a distinguished history of neuroscience research and teaching across many UCL departments. Within the Faculty of Life Sciences, many of the neuroscience and behaviour research groups are within the Department of Neuroscience, Physiology and Pharmacology and others are within the Department of Cell and Developmental Biology and within the Division of Psychology and Language Studies. There is a range of neuroscience research institutes within the Faculty of Biomedical Sciences

PROGRAMME STRUCTURE

Extended Research Project

The Neuroscience IBSc draws upon UCL's leading strengths in neuroscience research and teaching. A major component of the degree is the extended research project (course code **NEUR3903**) that spans the whole of the teaching year and provides the opportunity to work within one of UCL's neuroscience research groups. To work closely with a group of dedicated research scientists is a key experience for IBSc Neuroscience students. For many, the knowledge and experience gained extends far beyond the research project itself. The opportunity to join in seminars, journal clubs and informal discussions with members of the research group usually opens up important new horizons and primes an interest in research that can be developed later. The research project is arranged by the student with a supervisor of their choice.

Students are encouraged to consult the UCL Neuroscience web pages: (http://www.ucl.ac.uk/neuroscience/Page.php) for a list of active neuroscience researchers.

All projects should then be discussed and agreed with the programme tutor. The IBSc programme tutor and course tutor for the research project is Prof. Christopher Yeo, Dept. Neuroscience, Physiology and Pharmacology (c.yeo@ucl.ac.uk)

Taught Courses

The extended research project **(NEUR3903)** has a course unit value of 1.5 units. In addition to the project, taught courses to the value of 2.5 units must be selected. These may be chosen from the wide range offered by the Faculty of Life Sciences. All course choices will be discussed and agreed by the course tutor before the beginning of term or during induction week. Listed below is a summary of key popular taught courses for the Neuroscience IBSc programme. This list is not prescriptive and others may be considered in consultation with the programme tutor. This course list is correct at the time of going to press. Details may change and these will appear on the Faculty web pages.

NEUR3018: NEURAL BASIS OF LEARNING AND MOTIVATION
0.5 unit
Dr Francesca Cacucci
Term 1, Block D
Assessment: In-course essay (25%), 3-hour exam (75%)

The course is centred 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 course 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.

NEUR3025: ADVANCED FUNCTIONAL NEUROANATOMY
0.5 unit
Professor Maria Fitzgerald
Term 1, Block B
Assessment: 3-hour exam (100%)

This module explores the structural organisation and connectivity of the mammalian central nervous system at levels ranging from global behavioural systems to local circuits and synaptic complexes, with an emphasis on experimental evidence, structure/function relationships and clinical significance.

Lectures are integrated with discussion workshops for which prior reading will be expected, a mid-course formative assessment will focus on skills of critical analysis, and all students will be required to prepare a short oral presentation of their own, with support from teaching staff.

This module addresses fundamental issues of nervous organization – structural, functional and clinical – that are of importance to all students of the nervous system, whether specializing in neuroscience, taking a neuroscience stream in a more general three-year BSc, or intercalating from the medical programme.

Functional neuroanatomy forms a bridge between our understanding of brain function at the cellular and molecular levels (addressed by modules such as PHAR3001/2 Neuropharmacology; PHOL3006 The Cellular Basis of Brain Function) and our understanding of animal and human behaviour at the cognitive level (addressed by modules such as PSYC3207 Human Learning and Memory; PSYC3209 Cognitive Neuroscience; PSYC3211 Attention and Awareness).

This module may also be of interest to students taking NEUR3041 (Neural Computation: Models of Brain Function) which links together the cellular, behavioural and cognitive aspects of brain function in a different and complementary way by looking at neurons and synapses in terms of their computational properties and information-processing abilities.

ANAT3028/29: THE NEUROBIOLOGY OF NEURODEGENERATIVE DISEASE
0.5/1.0 unit
Professor Stephen W Davies
Term 1, Block TBA
Assessment: ANAT3028 – 3-hour exam (100%)
ANAT3029 – 3-hour Exam (50%) and 6,000 word dissertation (50%)

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 asynuclein 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 course will discuss this novel hypothesis in the light of contemporary research and provide a foundation for our current understanding of neurodegenerative diseases.

ANAT3030: CELLULAR AND DEVELOPMENTAL NEUROBIOLOGY
0.5 unit
Dr Roberto Mayor
Terms 1, Block G
Assessment: 2000-2500 word in-course essay (25%), 3-hour written exam (75%)

This course comprises a survey of selected topics of current interest and importance in developmental neurobiology and in the repair of neural structures. Particular emphasis is placed on cellular and molecular aspects of these topics. Numerous lecturers both from UCL and other Institutions contribute to the course. Detailed composition varies from year to year but topics likely to be covered are: neural induction and patterning; neurogenesis; generation of cell diversity; cell-cell interactions; neuronal growth factors; programmed cell death; axon guidance and synaptogenesis; neuronal migration;

development of excitability; neuron-glia interactions; myelination; stem cells, and injury and repair in central and peripheral nervous systems.

NEUR3031: CONTROL OF MOVEMENT
Value: 0.5 unit
Professor Christopher Yeo
Term 2, Block A
Assessment: 3-hour exam (100%)

The course 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 course includes tutorials with target papers through the course and concludes with analyses of motor learning and the cognitive aspects of movement control.

NEUR3041: NEURAL COMPUTATION: MODELS OF BRAIN FUNCTION
0.5 unit
Professor Neil Burgess
Term 1, Block E
Assessment: 2,000 word course essay (10%), 3-hour exam (90%)

This course 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 spinal cord.

ANAT3042: PAIN
0.5 unit
Professor Steve Hunt
Term 2, Block D
Assessment: In-course Essay (20%), 3-hour exam (80%)

This course 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 course.

ANAT3050: ADVANCED MOLECULAR CELL BIOLOGY
0.5 unit
Professor David Becker
Term 1, Blocks E & F
Assessment: In-course essay (12.5%), Paper
Presentation (12.5%), 3-hour exam (75%)

The course introduces concepts and problems in selected topics of current cell biology with an emphasis on looking at the dynamics of living cells. There is a focus on understanding the methods by which data are obtained and their limitations. Emphasis is placed on studying the original scientific literature relevant to cell function and in developing the skills to judge the quality and validity of literature

ANAT3105: CLOCKS, SLEEP AND BIOLOGICAL TIME
0.5 unit
Professor David Whitmore
Number Limit: 30
Term 2, Block C
Assessment: In-course essay of 3,000 words (25%), 3-hour exam (75%).

The aim of this course to examine the importance of time, and oscillations, in a range of biological problems. The central theme will be the circadian or daily clock. We will look at what is currently known about the clock mechanisms (what makes the clock 'tick') in a range of animal systems, from Drosophila to the mouse. This will include the genetic-molecular aspects of the clock, as well as some biochemistry and neurobiology. We will also examine how the clock regulates physiological events, such as seasonal reproduction, and human sleep-activity rhythms. The importance of light and the retina in setting the clock will be discussed. The course will then go on to examine a range of other biological timing events, such as the somite clock in embryology, rapid biochemical oscillations, oscillations in the brain and some basic mathematical aspects of oscillations. The relevance of time, from seconds to years, and how these oscillations influence cells and animals will be discussed.

NEUR3045: VISUAL NEUROSCIENCE
0.5 unit
Professor Andrew Stockman
Term 2, Blocks G
Assessment: In-course essay (10%), Presentation (10%), 3-hour exam (80%)

And

NEUR3001: ADVANCED VISUAL NEUROSCIENCE
1.0 unit
Professor Andrew Stockman
Term 2, Blocks G and D
Assessment: 3-hour written exam (60%); in-course 2,000-2,500 word essay (20%); seminar presentation (10%); log book (10%)

The NEUR3045 course 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 course, we will present visual neuroscience as a multidisciplinary, yet integrated field of study. This half unit also makes up part of the full unit course NEUR3001 “Advanced Visual Neuroscience”.

Aims: The aim is to provide students with an understanding of the functional anatomy and neurophysiology of the visual system, and an understanding of how neural activity results in visual perception and in behaviours that depend on vision. Students will be introduced to a variety of methods for investigating visual neuroscience including molecular biology, psychophysics, single cell recording, electrophysiology, brain imaging, and the experimental study of patients with brain damage or genetic defects.

Summary of Course Content: The course presents a multidisciplinary approach to vision. It will cover anatomical, physiological, genetic, molecular and psychological approaches. The first part of the course, which can be taken as a separate half unit, covers the fundamentals of visual neuroscience from the visual input at the retina to visual perception. The topics range from retinal imaging, visual transduction, the functional anatomy of the retina and LGN, cortical processing to higher level visual functions, such as colour, depth, space, and motion perception. The second part of the course, which completes the full unit, will cover advanced topics including the neural development of the retina, visual development in babies and infants, more in depth coverage of retinal and cortical processing, fMRI, object and face recognition, visual memory, vision and action colour, space, depth, motion and form perception, high level cortical processing, neurology and ophthalmology.

Students who take the half-unit (**ANAT3045**) will be provided with a strong foundation in visual neuroscience. Those who take the full-unit (**BIOS3001** Advanced Visual Neuroscience) will be provided

with an extensive and unique coverage of the topic that reflects the remarkable diversity of local expertise in vision and visual neuroscience at UCL.

PHOL3006: THE CELLULAR BASIS OF BRAIN FUNCTION
1.0 unit
Professor Jonathan Ashmore
Term 1, Blocks A & H
Assessment: One practical write up 9.00% Two essays 16.00%. Unseen three-hour written examination 75.00%.

The course covers the description of brain function from Molecule, to Cell and to System levels.
This structure is designed to provide a thorough grounding in the cellular mechanisms of brain function in health and disease.

The Module aims to provide up to date knowledge of nervous system function; provide background on methodological tools used in modern neuroscience research; allow the student to develop and deepen their interest in specific areas of neuroscience; develop communication skills.

Module objectives include: developing an understanding of experimental methods in cellular neuroscience; gaining a knowledge of the evidence underlying our current views on brain function; developing critical thinking about the link between experimental data and hypotheses; developing more general scientific communication skills.

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.

OTHER TAUGHT COURSES

In addition to the courses listed above, Neuroscience IBSc students can choose from a wide range of other ANAT, PHOL, PHARM and PSYC courses, some of which are listed below:

PHAR3001 Neuropharmacology 1.0 unit
PHAR3002 Neuropharmacology 0.5 unit
PHAR3003 Molecular Pharmacology 0.5 unit
PHAR3004 Receptor Mechanisms 0.5 unit
PHAR3008 Psychopharmacology 0.5 unit
PHAR3011 Synaptic Pharmacology 0.5 unit
PSYC3209 Cognitive Neuroscience 0.5 unit
PSYC3210 The Brain in Action 0.5 unit
PSYC3211 Attention and Awareness 0.5 unit
PSYC3203 Language and Cognition 0.5 unit
PSYC3207 Human Learning and Memory 0.5 unit

For further information please contact the Course Tutor:

Professor Christopher Yeo
Department: Neuroscience, Physiology and Pharmacology
email: c.yeo@ucl.ac.uk

Orthopaedic Science

AIMS AND OBJECTIVES

This programme provides an opportunity to study the scientific basis of one of the most rapidly changing and exciting fields of surgery. The subject of orthopaedics now encompasses many different scientific disciplines, including materials science, biomechanics, medical physics, nanotechnology, molecular biology of skeletal tissues, tissue engineering, cell therapies and genetics. Orthopaedic surgery itself is advancing rapidly with the benefit of these new areas in science. These advances in clinical practice depend on the findings of current medical research. More than ever, specialists in the field will need to be trained and involved in the research process to understand the scientific basis for these new developments. The programme aims to present a broad-based understanding of how skeletal tissues function, how they degrade and repair and how the design, manufacture and fixation of implants can be improved. A large proportion of the programme is dedicated to a laboratory based research project with training and hands-on experience in research methodology and skills needed to carry out medical research successfully in orthopaedics and other related disciplines.

PROGRAMME STRUCTURE

The programme now consists of 5 taught modules and one laboratory based research project. **All modules are compulsory.** Each taught module consists of around 26 lectures / tutorials with linked practical demonstrations, library based assignments and problem solving sessions. There will also be visits and demonstrations arranged on and off site. The taught modules in 'Clinical Aspects of Orthopaedics', 'Biomaterials and Biomechanics' and 'Skeletal Tissue Biology' are of three weeks duration each and run consecutively through the Autumn term. The order of these modules may vary from above. These modules are assessed by an essay (20%) which is submitted towards the end of each module and a written examination in early January (80%). A taught module in 'Rehabilitation Science' is being introduced from 2012-13, to run in Term 2. The fifth module in 'Research Methodologies and Transferable skills' runs concurrently with the other modules throughout the Autumn term, on Tuesday afternoons. This module is assessed by a written MCQ examination in December.

ORTH3001: CLINICAL ASPECTS OF ORTHOPAEDICS
0.5 unit
Tutor: Mr A Goldberg FRCS
TERM 1
Assessment: 80% exam, 20% coursework.
Venue: IOMS Stanmore

This module introduces students to the clinical aspects of orthopaedics. The global significance of Musculoskeletal disease will be given, with emphasis on osteoarthritis, osteoporosis, high energy trauma, sports medicine, and spinal disease. Different methods of medical and surgical treatment which are currently available to manage bone and soft tissue disease and injury will be covered as well as the importance of a multi-disciplinary approach. The module will include management of patients with varied bone and joint diseases, the biomechanical and anatomical aspects of fracture management and joint replacement from a surgical perspective. Some specialist topics will be included to expose the student to the wide range of clinical expertise found at the Royal National Orthopaedic Hospital. Throughout the module, students will have the opportunity to attend operations, clinical conferences and out-patient clinics.

ORTH3002: BIOMATERIALS AND BIOMECHANICS
0.5 unit
Tutor: Dr J Hua PhD
TERM 1
Assessment: 80% exam, 20% coursework.
Venue: IOMS Stanmore

This module is designed to allow students to develop further their understanding of the mechanical aspects of skeletal tissue disease, injury and repair and the biomaterials used in orthopaedic surgery

which will have been introduced in the two previous modules. Students will learn about stress, strain, elasticity and visco-elasticity and will investigate how these material properties are determined. The mechanical function of natural and artificial joints, tendons, ligaments and bone will be related to their material properties, organisation and geometry. Other topics will cover kinematics and kinetics of joints, analysis of gait, and the measurement of bone/joint forces *in vivo*. A visit to an orthopaedic manufacturing company and a gait analysis laboratory will also take place. Students will learn in greater depth about the biomaterials used in clinical applications. Biomaterials are either natural or synthetic materials, which find applications in a wide spectrum of medical implants and prostheses. This course covers the majority of biomaterials in current use, and includes composition, interaction and integration with adjacent tissues. In addition, novel bone analogue materials under development and the incorporation of biologically active agents and the role of biomaterials as drug delivery systems are covered.

ORTH3003: SKELETAL TISSUE BIOLOGY
0.5 unit
Tutor: Dr H Birch PhD
TERM 1
Assessment: 80% exam, 20% coursework.
Venue: IOMS Stanmore

This module will deal with the composition of skeletal tissues from the macroscopic to the molecular level and provide information to explain the mechanical behaviour of the tissues discussed in the next module. The major molecular components of connective tissues will be described including collagens, elastic fibres and proteoglycans. Connective tissue cell types, their functions and role in maintaining the skeletal tissues will also be discussed and the response of cells to their physiological and mechanical environment will be included. For specific tissues (bone, tendon/ligament, cartilage, fibrocartilage) the relationship between structure and functional requirements will be covered. Age related, exercise related and degenerative changes to these skeletal tissues will be included and possible mechanisms involved in skeletal tissue disease, injury and repair discussed.

ORTH3004: RESEARCH METHODOLOGIES AND TRANSFERABLE SKILLS
0.5 unit
Tutors: Professor A McGregor / Dr C Pendegrass
TERM 1
Assessment: 100% exam.
Venue: UCL Bloomsbury

This module introduces the skills required to conduct research and to understand and critically evaluate research output produced by others. It includes basic approaches to scientific writing and critical analysis of published work, together with bibliographic information management and presentation skills. A substantial proportion of the module is concerned with understanding data and how it can be analysed: variables, statistical methods and how to interpret results. The design of research (including clinical) studies, the principles of epidemiology and the ethical considerations in both laboratory and clinical research are also covered. The contents of the module will be useful in preparing for students' own projects.

ORTH3005: GOOD RESEARCH PRACTICE
0.5 unit
Tutor: Dr M Coathup PhD
TERM 2
Assessment: 100% Coursework.
Venue: IOMS Stanmore

This new module will teach the techniques and practices of basic and clinical research. This will complement the research project, and will run concurrently with it (0.5 day per week). Basic and clinical research staff from different disciplines will show how they run their research, and give examples of actual projects. This will include the elements of Good Research Practice and Good Clinical Practice. Students will further develop their understanding of statistics from ORTH3004 by using specific statistical analyses with their project data. Assessment will be by Coursework.

ORTH3901: LABORATORY RESEARCH PROJECT
1.5 units
Tutor: Dr M Coathup PhD
TERMs 2&3
Assessment: 80% project dissertation and 20% viva.
Venue: IOMS Stanmore

Commencing at the end of the Autumn term and continuing through the Spring term students will undertake a laboratory-based research project. The research projects are supervised by post-doctoral research staff at the Institute. These topics will be in areas linked to the researcher's current work and the student will form part of the research group for the duration of the project. Project work is written up in the form of a thesis and students are encouraged to submit their work for presentation at relevant conferences and for publication in peer-reviewed journals. The research project is assessed by a written report (80%) and a viva examination (20%) in May.

THE INSTITUTE

The staff of the Institute of Orthopaedics and Musculoskeletal Science, many of whom are internationally recognised leaders in their field, are actively engaged in clinical work, research and teaching at both postgraduate and undergraduate levels. The Institute is closely associated with and is on the site of the Royal National Orthopaedic Hospital Trust. The Institute is a multi-disciplinary department dedicated to education and training in orthopaedic surgery and research in to the aetiology, diagnosis and management of diseases and injuries of the musculoskeletal system. Postgraduate teaching and training are provided through educational courses in orthopaedics and related subjects as part of the combined training scheme organised jointly by the Institute and the Royal National Orthopaedic Hospital Trust. In addition to orthopaedic surgery, basic sciences, radiology, biomedical engineering, pathology, rehabilitation and physiotherapy are taught either as part of the programme for surgeons in training or to those specialising in the different fields. The Institute and the Royal National Orthopaedic Hospital Trust have developed a number of special clinical units whilst retaining general orthopaedic activities for teaching.

THE ROYAL NATIONAL ORTHOPAEDIC HOSPITAL

The Royal National Orthopaedic Hospital (RNOH) was founded in 1905 with the amalgamation of London's three specialist orthopaedic hospitals into a single centre of excellence and can thus trace its history back to 1838 when the Royal Orthopaedic Hospital was founded. Since its inception, the hospital has become an acknowledged world leader in its field, offering a breadth of specialist services unrivalled in the United Kingdom, and matched only by a couple of centres world-wide. The RNOH working in partnership with University College London's Institute of Orthopaedics and Musculoskeletal Science forms the hub of the country's most comprehensive training course for orthopaedic surgeons. Within an environment of teaching and research, the aim is to maintain the highest standards of care and to provide top quality teaching for patients with disorders and injuries of the musculoskeletal system.

RECREATIONAL FACILITIES

In addition to a limited amount of accommodation, the campus of the Royal National Orthopaedic Hospital Trust offers sports facilities which include a fully equipped sports hall, weight training room and swimming pool.

CONTACT DETAILS

A limited number of places are available. For further details or to discuss the programme contact Dr Stephen Taylor (Course Tutor, Tel: 020 8954 0268, stephen.taylor@ucl.ac.uk) or Mrs Ruth Williams (Courses Co-ordinator, Institute of Orthopaedics and Musculoskeletal Science, RNOH Trust, Brockley Hill, Stanmore, Middlesex HA7 4LP, Tel: 020 8909 5494
ruth.williams@ucl.ac.uk).

EXAMPLES OF RECENT RESEARCH PROJECTS

- An Engineering Solution to Foot Drop.
- Balance Measurements in Joint Hypermobility

- Does Porosity explain Discrepancy between Quantitative Radiography and Raman Spectroscopy Measurements of Bone?
- The Protective Nature of HA Collars on Massive Prostheses
- The Use of Porous, Strontium containing Bioglass as a Bone Graft Substitute Material
- Development if a protocol for the Isolation and Culture of MSC's from Synovial Tissue
- Biomechanical properties of a biomimetic IVD Replacement
- Assessment of accelerometer array for predicting fracture healing

PREVIOUS RESEARCH PROJECTS EXAMPLE PUBLICATIONS

Journal papers (5 in 2011-12)

Malikian R, Maruthainar K, Stammers J, Cannon SR, Carrington R, Skinner JA, Maruthainar N, Dowd G, Briggs TW, Blunn GW. In vivo roughening of retrieved total knee arthroplasty femoral components. Knee. 2012 Nov 8. doi:pii: S0968-0160(12)00160-3.

Mordecai SC, Lambert SM, Meswania JM, Blunn GW, Bayley IL, Taylor SJ. An experimental glenoid rim strain analysis for an improved reverse anatomy shoulder implant fixation. J Orthop Res. 2012 Jun;30(6):998-1003.

Vijayan S, Bartlett W, Bentley G, Carrington RW, Skinner JA, Pollock RC, Alorjani M, Briggs TW. Autologous chondrocyte implantation for osteochondral lesions in the **knee** using a bilayer collagen membrane and bone graft: a two- to eight-year follow-up study. J Bone **Joint** Surg Br. 2012 Apr;94(4):488-92.2)

Oral Presentations (19 in 2011-12)

When can patients return to driving after a lower limb injury? An evaluation of the force applied to the brake pedal as a potential clinical assessment. **MacLeod K**, McCarthy ID, Smitham P, Grange S. Orthopaedic Research Society, Long Beach, California, January 2011.

Malikian R, Maruthainar K, Skinner J, Maruthainar N, Carrington R, Cannon S, Briggs T, Dowd G, Blunn GW. Wear and Roughening of Knee Replacement Components. Accepted for poster presentation (1145) at the Orthopaedic Research Society, Long Beach, 2011.

Kerns, J.G., Gikas, P.D., Perera, J.R., Buckley, K., **Shepperd, A**., Birch, H.L., McCarthy, I.D., Miles, J., Briggs, T.W.R., Parker, A.W., Matousek, P., Goodship, A.E. Spatially offset Raman spectroscopy: A novel method for the detection of molecular changes in osteoarthritis. Orthopaedic Research Society, February 2012, San Francisco, USA (poster presentation).

Pendegrass, C J; **Fontaine, C**; Blunn, G W. Intraosseous Transcutaneous Amputation Prostheses vs Dental Implants: A comparison between keratinocyte and gingival epithelial cell adhesion *in vitro*. Accepted for podium presentation at the British Orthopaedic Research Society, Cambridge, 2011.

Prizes

Measurement of regenerate stiffness in distraction osteogenesis using RSA. **Jackson D**, McCarthy ID. Prize for best oral presentation at the annual meeting of the British Limb Reconstruction Society, Gateshead, 2009.

Jackson Lewis Prize 2012. **Barian Mohidin**. (Runner-up prize to Faculty Medal

Paediatrics and Child Health

AIMS AND OBJECTIVES

The IBSc in Paediatrics and Child Health offers:

- a unique academic insight into Paediatrics and Child Health throughout the NHS,
- clinical exposure distinct from but enriching the undergraduate curriculum,
- options for in-depth study of core topics and research areas
- learning through reflection
- an innovative individual mentoring programme using Registrar-level participants from our well-established postgraduate programme in Paediatrics and Child Health,
- access to world-class teaching and research resources through the Institute of Child Health, the Whittington Hospital and other UCL Partners.

The BSc complements the Paediatrics module offered later in the MBBS programme. It is not designed to teach you about exotic conditions and how to look after and manage sick children, but to understand health services more broadly with a focus on families' pathways through health care both in health and disease. We explore issues around service provision and our roles as health professionals, as well as developing research skills.

We strongly recommend this course to those considering a career in Paediatrics, but also feel that many of the skills developed during this year would be applicable to any specialty.

PROGRAMME STRUCTURE

The course combines in-depth analysis of the "patient journey", giving unique insights into the causes and effects of childhood illness, with the opportunity to undertake diverse Paediatric research projects. The latter is supported by sessions on health research methods, evidence based medicine and study skills such as searching the literature, referencing, and essay writing but the student has the freedom to design and complete their own chosen project

Each taught module is managed by a Module Co-coordinator, who is responsible for the academic content of the module, its delivery and the setting and marking of written assignments and exams. In some modules there are a number of guest lecturers. They bring expertise and experience from a variety of disciplines and backgrounds.

Discussion and debate are encouraged by flexible interactions between teachers and students in the tutorials and seminars. Both the taught modules and the project give students a degree of freedom to explore areas that particularly interest them. We place a good deal of emphasis on the ability of students to organise their own schedule and to study independently and effectively.

Taught courses in term 1 are timetabled in 'long-thin' format: in the same time slot each week. Students take four taught courses in term 1 and one in Term 2. The remaining time is divided between self-directed study, visits to the assigned baby and family, independent research, and carrying out assignments for assessment.

Students must complete 4 units during the whole BSc. 3.5 units are compulsory then you must select one of the 0.5 unit optional modules. A list of these is given below, as taught in the 2011-12 programme. Further modules may be offered next year.

COMPULSORY UNITS OVER LEAF

COMPULSORY UNITS

TERM 1

CHLD3001: HEALTH SERVICES FOR CHILDREN [HSC]
0.5 unit
Term 1
Dr Caroline Fertleman, Dr Chloe Macaulay, based at the Whittington Hospital
Assessment: 2000 word reflective essay on patient journey 40%; Exam 40%, Developing a new description of a specific patient journey 20%

The course will consider the child in his/her entirety and his/her contact with diverse aspects of health and social services. The taught course explores the following themes: Structure of the NHS; Acute services (primary, secondary and tertiary care); the role of public health; other agencies such as social care, safeguarding, police); Education and schools.

You will receive formal teaching sessions from diverse professionals in their own location to cover these themes.

Self-directed study is based on individual scenarios (provided by the tutors) reflecting the 'patient journey' of real children. Regular facilitated discussions will be held, and part of the assessment is a reflective essay on one of these 'patient journeys'. Students also collect a new patient journey from an allocated family.

One of the key differences between this and your previous learning is the strong emphasis on 'reflection', which involves appraisal of the issues, context and literature. We consider this to be one of the most useful and unique parts of the BSc since reflection, rather than textbook learning, is a core component of later medical training. There will be several sessions to discuss and help you with each reflective assessment.

CHLD3002: THE CHILD AND COMMUNITY [TCC]
0.5 unit
Term 1
Dr Caroline Fertleman and Dr Nicole Horwitz, based at the Whittington Hospital/ Northern Health Centre
Assessment: Leaflet 25%, Oral presentation 15%, Exam 60%

This module has 2 components:
i) Baby follow up (0-6 months)
Each student studies the development of a baby born in Term 1, and the impact on the family through regular home visits. The student will enter information into their own 'Red Book', (which is the parent-held child record) and will be expected to read about conditions and situations as they arise. Formal teaching will be provided at the Whittington Hospital.

ii) Young child or adolescent option
Students choose whether to study development, disability and behaviour in younger children (0-5 years) or adolescents (13-19 years)

Those choosing the young child option will explore what services are available for all under-5's such as Children's Centres, health visitors (universal services) and will learn about more targeted services such as Speech and Language therapy and Child Development teams.

Those choosing the adolescent option will explore issues such as what it means to be an adolescent, adolescent mental health, sexual health and the additional burden of chronic disease in adolescents.

CHLD3003: HEALTH RESEARCH METHODS [HRM]
0.5 unit
Term 1
Dr Angie Wade and Dr Eirini Koutoumanou , based at the Institute of Child Health
Assessment: Exam 100%

This module is delivered as a series of lectures with a strong interactive element, covering research design, methodology, and statistical analysis. Topics include: designing research studies: research

question; qualitative/quantitative approaches; allocation, randomisation, blinding; Interpreting information provided by published research; using research guidelines and checklists; writing research proposals and protocols; ethical issues in medical research; summarising data: means, medians, measures of spread; displaying data – why and how; sse of age-related standards; normal distribution and normal tables; making inferences: significance testing and confidence intervals; parametric and non-parametric analyses; paired and unpaired t-tests; analysing 2x2 tables; likelihood ratios, sensitivity and specificity; serial measurements, one-way ANOVA; introduction to regression analysis; assessing reliability and validity; sample size estimation.

OPTIONAL UNITS

CHLD3005 LABORATORY METHODS IN BIOMEDICAL SCIENCES [LBS]
0.5 unit
Term 1
Dr Mona Bajaj-Elliot and Dr Ryan O'Shaughnessy, based at the Institute of Child Health
Assessment: Essay 50%, Exam 50%

This course is strongly advised for students intending to undertake a laboratory-based project. Students acquire the basic knowledge to enable them to understand the principles, scope and limitations of laboratory methods in current use, and their relevance to biomedical science.
The course is delivered through lectures, interactive seminars and visits to active laboratories where research and hospital diagnostic procedures are carried out.

CIHD3005 MATERNAL AND CHILD HEALTH IN DEVELOPING COUNTRIES [MCH]
0.5 unit
Term 1
Dr Bhanu Williams, based at the Institute of Child Health
Assessment: 2500 word essay 50%, Exam 50%

This option is offered through the IBSc in International Health. The course provides an introduction to the problems facing mothers and children in developing countries. Each week there is a lecture and discussion. These seminars address the main causes of child and maternal mortality and the socio-cultural and economic factors affecting them. Malnutrition, pregnancy, childbirth, breastfeeding and the perinatal period are examined in detail as well as important infectious diseases such as vaccine-preventable diseases, HIV, malaria and diarrhoeal disease. The impact of public health programmes addressing these diseases is explored.

General Tutorials
Term 1
Sessions taught on different sites as appropriate

General Tutorials introduce and explore generic skills not included in the core curriculum. These may take the form of study skills sessions, project development work, or talks/discussions on Paediatric-related topics. These sessions are compulsory; they are not assessed directly but concepts discussed within these tutorials help students in several later assessments.

The sessions are mainly held during the first term, with ad-hoc sessions in the second term as required or requested by students or tutors.

TERM 2

COMPULSORY

CHLD3004 TERTIARY CARE AND COMPLEX CHILDHOOD DISORDERS [CCD]
0.5 unit
Term 2
Dr Paul Winyard and Dr Chloe Macaulay
(Taught in the mornings of 2 Core lecture weeks and by attachment to various wards for up to 1 day per week) based at Great Ormond Street Hospital
Assessment: Reflective diary 30%, Presentation 30%, Exam 40%

This module introduces tertiary pediatrics' and children with complex conditions.
Students will study four "core conditions" and use these to understand the science and medicine of complex conditions, the organisation of care, and the psychosocial implications for families with these

conditions.
Students will also have two clinical attachments on the wards or with different specialties at Great Ormond Street Hospital. Examples include Cardiology, Endocrinology, Infectious Diseases, Neurology, Neuro-disability, Oncology, Renal, Respiratory and Rheumatology. Students compile a reflective diary highlighting cases and issues from their time on the wards.

CHLD3901: INDEPENDENT RESEARCH PROJECT IN CHILD HEALTH [IRP]
1.5 units
mainly in Term 2
Dr Paul Winyard and Dr Chloe Macaulay
Research based on different sites as appropriate
Assessment: Interim proposal 5%, 8000 word dissertation 85%, *Viva* 10%

Students can either choose a topic from a list offered by supervisors in almost every sub-specialty, or develop their own project in an area of their own interest. Projects can be laboratory-based or clinical, or even a combination of both. Examples of previous studies include an A&E survey of the emergency management of drunk teenagers; a new scoring system for childhood arthritis; a genetic study on cardiac disease; developing methods to culture new human kidneys in the laboratory; a comparison of different social work approaches in different hospitals; and a review of new drug treatments in neuro-disability. Hence there is scope for projects in almost any area, and many of the earlier studies have been presented at meetings and are being prepared for publication.

The interim proposal is developed during term 1, which may include R&D registration and gaining ethical approval (the supervisor will help with this), but the bulk of the project work is done during term 2.

Course Directors:	Dr Paul Winyard p.winyard@ucl.ac.uk
	Dr Caroline Fertleman c.fertleman@ucl.ac.uk
Teaching Fellow	Dr Chloe Macaulay c.macaulay@ucl.ac.uk
Course administrators:	Ms Caroline Smith caroline_smith@ucl.ac.uk
	Ms Alison Gilry a.gilry@ucl.ac.uk

Pharmacology

The Department of Pharmacology, now merged into the Research Department of Neuroscience, Physiology and Pharmacology (NPP) at UCL, was the first pharmacology department to be established in England. Almost from its inception it has been at the forefront of research in pharmacology. We have consistently been ranked in the top category in the HEFCE Research Selectivity Exercise and it is our intention to continue to combine excellence in research with high quality teaching.

AIMS

- To provide an in depth knowledge of pharmacology of the highest quality so as to produce medical graduates with increased depth of understanding and appreciation of pharmacology so they can successfully deal with and/or develop novel therapeutic approaches for the treatment of disease.
- To offer a variety of learning experiences under the supervision of scientists actively engaged in research in pharmacology and related subjects in order to stimulate and encourage an attitude of enquiry and interest centered on the acquisition of knowledge and a desire for understanding.
- To continue to develop student knowledge, interest and appreciation of the scientific method.
- To stimulate and sustain enthusiasm for pharmacology and to enable students to engage in the subsequent phases of their careers with initiative and confidence in their abilities.
- To encourage the development of the personal transferable skills that will be essential for students' subsequent careers.
- To encourage an appreciation of social and commercial aspects of the application and exploitation of pharmacological knowledge and techniques.

OBJECTIVES

Graduates of Pharmacology will have acquired:

- An up to date knowledge of pharmacology and its continuity with chemistry, biochemistry and molecular biology, and with pathology and physiology; an awareness of some of the present day boundaries of knowledge in pharmacology; and detailed knowledge of chosen areas of pharmacology research.
- An appreciation of the importance of experimental work in pharmacology and of the use of experimental approaches drawn from other disciplines; experience in conducting laboratory experiments and projects in pharmacology as individual and as group exercises.
- The technical and organisational skills needed to acquire sound pharmacological data; experience in the critical evaluation of pharmacological data, the methods by which the data were obtained, the statistical analyses used and the inferences and conclusions drawn.
- The skills of locating and retrieving information, from a variety of sources, and compiling it to a deadline, into clear, original and critical reports; other computer-based transferable skills such as the use of word processing, spreadsheet, graphics and statistical packages as well as familiarity with computer-based simulations, tutorials and assessments.
- The ability to communicate, both verbally and in written work, and to participate constructively in group activities and discussion through the production and presentation of essays, reports, dissertations, seminars, talks and posters, and the participation in group projects and discussions.

PROGRAMME STRUCTURE

The research interests of the Pharmacology Group within NPP are in three general areas: the study of drug receptors, ion channels and synaptic transmission, the study of neurotransmitter action in the peripheral and central nervous system (particularly in relation to pain pathways and affective disorders) and the pharmacology of the immune response (particularly in relation to chronic conditions such as

asthma, rheumatoid arthritis and transplant rejection). History suggests that the advances in medical research of today will underpin future advances in clinical practice. Pharmacology is no exception to this and our final year courses are geared towards teaching students both fundamentals of pharmacology and about the latest research advances. Students taking an IBSc degree in Pharmacology take the same advanced courses (amounting to 4.0 units in total) as BSc science students. It is expected that students entering the NPP Pharmacology degree Programme will select a minimum of 2.5 units from courses and projects offered by NPP (Pharmacology Group) and that these will include the core course in Molecular Pharmacology (PHAR3003). All 3rd year courses run by the Department are suitable for IBSc students. Further details of the courses are on the NPP web pages http://www.ucl.ac.uk/lifesciences-faculty/degree-programmes/pharmacology/PHAR3009_3010/prospective-students

All courses have in-course assessment (practical reports, essays etc), usually amounting to 20 - 30% of the total. All Pharmacology exams fall in the main examining period (May).

In addition to taught courses run in Pharmacology, students are required to carry out either a laboratory (1.5 unit, PHAR3010) or library based project (1.0 unit, PHAR3009) on a topic of their choice. Details are available at:
http://www.ucl.ac.uk/lifesciences-faculty/degree-programmes/pharmacology/PHAR3009_3010/projects

PHARMACOLOGY Module TIMETABLE

	Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
9 - 11	Block A	Block B	Block C	Block D	Block E
11 - 1	Block C	Block D	Block E	Block A	Block B
1 PM	*Lunch break - no teaching*	*Lunch break - no teaching*	*No teaching Wednesday afternoon*	*Lunch break - no teaching*	*Lunch break - no teaching*
2 - 6	Block F	Block G	*No teaching Wednesday afternoon*	Block H	Block I

Each block is four hours in a week. A module assigned to a block will not necessarily use all the available time, but will stay within the limits of the block.

COURSES AVAILABLE IN PHARMACOLOGY

PHAR3001: NEUROPHARMACOLOGY
1 unit
Term 1 Blocks A, D & H
Course organizer: Prof Anthony Dickenson

The neuropharmacology course aims to provide a basis for understanding drug therapy in neurology and psychiatry. Evidence concerning different neurotransmitters (from morphological, electrophysiological, pharmacological and biochemical studies) is evaluated so as to build up a picture of their pre- and post-synaptic actions and their interactions in specific pathways and brain areas. Special emphasis is given to neurotransmitter function and malfunction in epilepsy, Parkinsonism, schizophrenia, depression, pain and anxiety states and to the mode of action of drugs in these conditions. Students taking the whole unit (3001) will perform individual or group projects on the release and electrophysiological and behavioural effects of neurotransmitters and their modification by drugs. The 1/2 unit course (3002) consists of just the lectures.

PHAR3003: MOLECULAR PHARMACOLOGY
0.5 unit
Term 1 Blocks C & F
Course organizer: Dr. Alasdair Gibb

The course aims to give students an understanding of the quantitative principles which underlie the study of the action of drugs at receptors beginning with the physical chemical principles which underlie the drug receptor interaction. The course studies the molecular nature of receptors and encourages a critical and quantitative approach to the analysis and interpretation of pharmacological data. This

course provides core information for BSc Pharmacology and BSc Medicinal Chemistry students and supplements existing course unit options for final year students in related degree courses in the Faculty of Life Sciences.

PHAR3004: RECEPTOR MECHANISMS
0.5 unit
Term 1 Blocks B & I
Course organiser: Dr. Alasdair Gibb

This course 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. The course material is supplemented by group presentation and discussion of selected research papers related to the core lectures and by the preparation of an essay by each student.

PHAR3005: IMMUNOPHARMACOLOGY
1 unit
Term 2 Blocks B & I
Course organisers: Dr Dean Willis

A knowledge of inflammatory, hypersensitivity and immune responses is of immense importance in medical sciences. Immunopharmacology is a specialised branch of pharmacology which is a fundamental part of pharmacology as a whole. This course provides up-to-date information and ideas about the cells and mediators of acute and chronic inflammation. Basic mechanisms involved in the formation and/or release and subsequent actions of pharmacologically active agents such as histamine, prostanoids, thromboxanes, leukotrienes and kinins are studied. These ideas underpin the use and development of drugs for treating diseases which involve inflammation and how new treatments could be developed for conditions for which there is at present no adequate therapy. **The 0.5 unit course (3031**) consists of a subset of the lectures and one course essay.

PHAR3006: DRUG DESIGN AND DEVELOPMENT
0.5 unit
Term 1 Blocks B & I
Course organisers: Dr Alastair O'Brien

This course is taught jointly by the Departments of Medicine and Pharmacology and 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 their introduction into clinical practice. The course 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.

PHAR3011: SYNAPTIC PHARMACOLOGY:
THE SYNAPSE, A MAJOR SITE OF DISEASE AND DRUG ACTION
0.5 unit
Term 2 Blocks A & H
Course organiser: Dr Talvinder Sihra

This course aims to consider signalling within nerve cells, and communication between cells (synaptic transmission) by considering the workings of individual cells at the level of single receptor channels and ion channels. Synapses form the functional connections between nerve cells. How synapses, receptors and ion channels work are central to our understanding of much of modern Pharmacology. It represents one of the major research areas of interest in Neuroscience today. The course will describe the exciting new concepts that derive from molecular and cellular approaches to the pharmacology of synapses and ion channels. Techniques, including patch-clamp recording, expression of receptors and ion channels in

cells injected or transfected with mRNA, the molecular analysis and structure of single channels, and molecular biology have all added greatly to our understanding of cell signalling, synaptic plasticity, anaesthetic action, and neurological diseases affecting ion channels ('channelopathies').

PHAR3008: PSYCHOPHARMACOLOGY
0.5 unit
Term 2 Blocks C & G
Course organiser: Dr. Clare Stanford

This course is designed to give an up-to-date understanding of the actions of drugs which affect mood and behaviour. It has two major themes: the neurobiological abnormalities which are thought to underlie psychiatric disorders; and the most likely neurochemical targets for drugs used to treat them. Lectures will concentrate on the effects of specific groups of drugs on behaviour as well as interesting new developments in psychotropic drugs derived from plants. All these topics will build on and complement the knowledge acquired in the Neuropharmacology course units. In addition to the lectures, which will discuss key topics (such as schizophrenia, anxiety and depression); there will be small-group tutorials and a demonstration of how drugs can affect behaviour. All these sessions will aim to develop students' ability to appraise scientific literature and to provide the background material for a written assessment.

These details may be subject to change please contact the department should you wish to confirm any details.

OTHER OPTIONAL MODULES offered under other programme boards:

- ANAT3042 Pain (0.5 CU)
- IMMN3001 Immunobiology (0.5 CU)
- BIOC3011 Biochemistry of Health and Disease (0.5 CU)
- PHOL3003 Fetal And Neonatal Physiology (1.0 CU)
- PHOL3009 Space Medicine And Extreme Environment Physiology (1.0 CU)
- ANAT3028 The Neurobiology Of Neurodegenerative Disease (0.5 CU)
- BIOC3012 Sex, Genes And Evolution (0.5 CU)
- HMED3004 Madness And Society (0.5 CU)
- HMED3001 Man's Place In Nature: The Debate In Britain (0.5 CU)
- HMED3014 Medicine In Asia (0.5 CU)
- HMED3009 Colonial And Empire Medicine (0.5 CU)

Titles of past projects conducted during the IBSc

It should be noted that this list does vary from year to year as research advances and supervisor change.
For a list of possible supervisors' interests:-
http://www.ucl.ac.uk/lifesciences-faculty/degree-programmes/pharmacology/PHAR3009_3010/projects/#supervisors

LABORATORY PROJECTS

Dickenson	Neural coding and spatial summation in lamina I of the rat dorsal horn – an electrophysiological characterisation
Dickenson	Effect of tapentadol in the neuronal activity of central amygdala neurones in rats with neuropathy
Donoghue	Detection and characterisation of mycobacterium tuberculosis complex DNA from the pre antibiotic era.
Gale	Investigation into the effect of a mitochondrial-targeted cyclosporin A on neomycin-induced ototoxicity
Gale	Investigating RACK1 function in an inner ear cell line and cochlear cultures
Sihra	Dissecting the molecular targets of glucagon-like peptide-1 activation in central nerve terminals, using the GLP-1 receptor agonist Exendin-4.
Stanford	Pharmacological Manipulation of the Behaviour of NK1 Receptor Knockout Mouse Models of ADHD: Study 2
Vergani	Steps towards the development of a halide-sensitive Yellow Fluorescent Protein-based assay for discovery of Cystic Fibrosis Transmembrane Conductance Regulator potentiators.
Calder	Characteristics of Bone marrow derived Mast Cells in Wild Type and Anax1 knockouts and the effects of anti-allergy drugs
Dickenson	Behavioural and Electrophysiological Characterisation of Sensory Processing in Calcium Channel Subunit α2δ-1 Knock-Out Mice
Dickenson	The monosodium iodoacetate model of osteoarthritis: effects of ketamine on evoked firing of

	Lamina I neurones in the rat in vivo
Dolphin	Comparing the Stability of the I-II loop of Cav2.2 and Cav3.1 Calcium Channel Alpha-Subunits in the Presence and Absence of the Beta-1b Subunit
Garthwaite	Real-time imaging of cyclic-guanosine monophosphate in N1E-115 neuroblastoma cells using a novel fluorescent biosensor
Gibb	Amantadine block of rat substantia nigra dopaminergic neurone NMDA receptor channels
MacAllister	The Effect of Block Remote Ischaemic Preconditioning in the Human Forearm
Millar	Characterisation of α7 Nicotinic Acetylcholine Receptors by Site-directed Mutagenesis
Moss	Apamin Block of rSK2 Potassium Channels
Moss	Subtype Selectivity of Novel SK Channel Blockers
Pedley	Investigating the biodistribution of humanized anti-carcinoembryonic antigen antibody in colorectal tumours.
Pitcher	Investigating a potential intracellular trafficking role for beta-arrestin 1
Pitcher	Investigating a novel nuclear function of G protein-coupled receptor kinase 5
Ramage	Vagal afferent evoked release of 5-HT in the nucleus tractus solitarius (NTS)
Ramage	Role of the Dorsal Raphe in the Control of Blood Pressure/Autonomic Control
Sihra	Bafilomycin: a Vesicular H+ ATPase Inhibitor with on and off Target Effects
Smart	Mutations of the glycine receptor B-subunit causing human startle disease
Stanford	Pharmacological manipulation of the behaviour of neurokinin-1 receptor knockout mouse models of ADHD; Study 1.
Willis	Does translocator protein 18 kDa (TSPO) regulate inflammasome activation
Willis	The Effect Of Heme Oxygenase Products On Inflammasome Activation
Willis	Does heme oxygenase regulate phagocytosis in macrophages?
	LIBRARY PROJECTS
Dickenson	Spinal Analgesia: A Comparison of Bupivacaine and Ropivacaine
Sihra	Cannabinoids in Pain and Anxiety - Novel Therapeutic Tactics
Smart	Multiple Roles of the GABA(A) Receptor in Epilepsy
Stanford	A Comparison between Mephedrone and Methamphetamine
Stanford	Bipolar Affective Disorder: Is Calcium to Blame?
Dickenson	Mechanisms of Pain in Peripheral Diabetic Neuropathy
Millar	Allosteric Modulators of Nicotinic Acetylcholine Receptors
Sihra	Molecular mechanisms underlying drug addiction
Willis	What role does the inflammasome play in inflammatory diseases?
Willis	Pharmacological treatments of HIV
Willis	Ankylosing Spondylitis

CONTACT DETAILS

IBSc Pharmacology Tutor: Professor Andrew Ramage
Room G51 Medical Science Building
Telephone 020 7679 0125; Email: a.ramage@ucl.ac.uk

Or

BSc Pharmacology Tutor: Dr Talvinder Sihra - Pharmacology Programme Tutor
Room 250/334 Medawar Building
Telephone 020 7679 3296; Email: t.sihra@ucl.ac.uk

BSc Pharm Administrator: **Miss Tracy E Boot** - Teaching Office Ground floor Medawar Building
Telephone 020 7679 3751; E-mail: t.boot@ucl.ac.uk

Philosophy Medicine and Society

This programme is an opportunity to study modern medicine through the lens of collaborating activities: (1) ethics and philosophy of science, (2) science policy and governance, and (3) science communication and engagement. It offers a package of modules rich with real-world knowledge set firmly within core academic frameworks. It also delivers key skills associated with original research, critical thinking, analysis, and reflection.

Medicine doesn't operate in a vacuum. It is surrounded, shaped, and enabled by collaborating activities. The primary aim of our programme is to prepare medical students for careers in which these subjects are encountered on a regular basis. The secondary aim is skill-development. Medicine, as a professional domain, includes many careers other than clinical practice and life at the research bench. Policy makers and regulators, journalists and funders, technology developers, ethicists and analysts all play key roles. Skill development in these areas can add complementary assets to an otherwise-standard portfolio. It also can open firm new career possibilities should clinical or research medicine lose their appeal.

By the end of the PMS programme, students should be able to:

- describe key concepts and knowledge in (1) ethics and philosophy of science, (2) science policy and governance, and (3) science communication and engagement
- relate academic research in these areas to current practice in medical research and clinical practice
- interpret current and emerging topics within analytical and reflective perspectives from science and technology studies
- demonstrate critical thinking and professional empathy
- demonstrate strong writing and engagement skills in a variety of formats
- undertake independent research in these areas and problem-solve with novel case studies
- reflect on their own strengths and weaknesses in these areas

Our primary career goal is to help medical students become better doctors: wider perspective, more analytical skill, more confident when stepping back to reflect, and more aware of why things are the way they are. Our secondary goal is to prepare you for activities supporting medical practice and related careers, such as researching, writing, and independent thinking. We want you to appreciate where this collaborating activities sit within the global community that is modern medicine, and we want you to be ready to engage with these partners when opportunities arise.

ABOUT THE DEPARTMENT OF SCIENCE AND TECHNOLOGY STUDIES

This programme is located in the Department of Science and Technology Studies (STS). We are a closely-knit research and teaching department within the Faculty of Mathematics and Physical Sciences. We have 15 core academic staff, with award-winning teaching and an award-winning programme in public engagement, with student common rooms and offices in 22 Gordon Square. We use a wide variety of teaching and assessment methods, appropriate to the task, and we promote independent, student-led research. Our intercalated degree sits within an active BSc teaching programme that includes two unique single-honours BSc degrees, two streams within UCL's Natural Sciences degrees, and major contributions to UCL Human Sciences and UCL Arts and Sciences. This combines with MSc and PhD programmes. Our student-to-staff ratio for BSc/IBSc students is 4:1 (2012-13). More: www.ucl.ac.uk/sts

The programme prescribes 2.0 units of the 4.0-unit curriculum. This includes two compulsory modules (1.0 units) from three choices (one policy, one engagement, and one philosophy), plus one independent research project (1.0 units). An additional 2.0 units are chosen from a prescribed list of optional modules. Of these, one 0.5-unit module from elsewhere may be substituted, provided it contributes to a coherent programme of study. Not more than one option module may be at the intermediate (2000) level. No pre-requisites.

Compulsory modules		units
HPSC3026	Research Project	1.0
Compulsory modules	(select two of these modules)	
HPSC2001	Policy Issues in the Life Sciences	0.5
HPSC2002	Science in the Mass Media	0.5
HPSC2020	Philosophy of Medicine	0.5
Option modules	(select four of these modules)	
HPSC2006	Science and Ethics	0.5
HPSC3002	Science, Warfare and Peace	0.5
HPSC3003	Communication of Scientific Ideas	0.5
HPSC3011	Science Writing and Reporting	0.5
HPSC3014	Magic to Science	0.5
HPSC3027	Evolution in Science and Culture	0.5
HPSC3028	Advanced Philosophy of Medicine	0.5
HPSC3029	Medicine, Disease, and History	0.5
HPSC3030	Science and Global History	0.5
HPSC3032	Investigating Contemporary Science	0.5
HPSC3033	Communicating Science in Digital Environments	0.5
HPSC3034	Science, Art, and Philosophy	0.5
HPSC3036	Governing Emerging Technologies	0.5
HPSC3037	Philosophy of Information	0.5
HPSC3038	Surveillance in Modern Society	0.5
HPSC3039	Medical Ethics	0.5
HPSC3040	Science, Politics, and the State in Russia and the Soviet Union	0.5
Elective	one 0.5-unit advanced module from elsewhere may be substituted, provided it contributes to a coherent programme of study	0.5

CORE MODULES

HPSC3026: RESEARCH PROJECT
1.0 unit
Clarke, Brendan
Assessment: Literature survey (1,200 words) (10%); presentation (work-in-progress) 20 minutes (15%); dissertation (10,000 words) (75%)

Students undertake an independent research project of their own design in the field of science and technology studies. An appropriate supervisor is selected in consultation with the module tutor. Discussion of research is undertaken during regular tutorials.
Past titles include:

- Benefits of Pluralism: A Perspectival Articulation. Focussing on the Stories of Paul Feyerabend (winner of the HAB Simons Project Prize 2010)
- Lister's Anatomy Between Artistic And Scientific Representative Practices
- Securing Secrets: British Cypher Security in the Second World War
- Prediction, Explanation, and "Self-Caused Explanations"
- Compromising on Evidence: When Patients Are Too Sick to Wait for a Clinical Trial

- Belief in the Health Care Provider and Treatment Outcome
- A Critique of the Current Criteria for Involuntary Hospitalisation of Patients with Mental Disorder
- History of Yoga as a Medical Treatment in the UK
- The Feminisation of British Health Care
- Did the Scientific Revolution have a Significant Influence on the Decline of Witch-hunting in Europe by 1700?
- Has the Development of the EBM Hierarchies of Evidence Encouraged 'Cookbook' Medicine and Has this Been Positive
- What is, and are the Causes of, Modern Day Depressive Illness?

Select two of these three modules. The remainder may be selected as an option.

HPSC2001: POLICY ISSUES IN THE LIFE SCIENCES
0.5 unit
Balmer, Brian
Assessment: Three essays (2,000 words) (33.3% each)

Provides a critical overview of policy issues arising from developments in the biological sciences. The module covers a variety of issues, including: medical research policy, biotechnology and public policy, debates about the social acceptability of recombinant DNA research, biology and its publics, controlling biological weapons research and animal experimentation.

HPSC2002: SCIENCE IN THE MASS MEDIA
0.5 unit
Assessment: Two essays (2,000 words) (25% each); one exam (3 hours) (50%)

An introduction to media studies for those interested in relations between science and the media. What science gets covered in print, on TV and online? How and why is that material selected? How can we investigate the effects of media coverage on public knowledge of or attitudes towards science? The module gives a short survey of relevant empirical and theoretical work in media studies, and public engagement with science.

HPSC2020: PHILOSOPHY OF MEDICINE
0.5 unit
Clarke, Brendan
Assessment one essay (3,000 words) (50%), exam (3 hours) (50%)

This module provides students with an overview of the exciting field of philosophy of medicine. Based on case-studies drawn from contemporary medical practice, the module will engage with six conceptual issues of major importance to medicine. In brief, these are the question of discovery (of diseases and treatments), with causation, with modelling, with complexity, with classification, and with evidence-based medicine. The teaching will be a mixture of lectures, giving topic overviews, critical reading of philosophical and medical sources, and seminar activities, intended to allow students to autonomously develop their analytical skills.

OPTIONAL MODULES

HPSC2006: SCIENCE AND ETHICS
0.5 units
Illari, Phyllis
Assessment: One essay (3,000 words) (50%), exam (3 hours) (50%)

An exploration of ethical challenges arising in recent scientific activity. Some challenges will focus on the results of research. Others will concern the process of research itself and science's efforts at self-regulation. This is a practical, issues-based course. Emphasis also will be on current events and fundamental principles.

HPSC3002: SCIENCE, WARFARE AND PEACE
0.5 unit
Balmer, Brian; Agar, Jon
Assessment: One essay (3,000 words) (50%), exam (3 hours) (50%)

Focuses on twentieth century weapons usually designated as 'unconventional' or 'weapons of mass destruction'. This module aims to place such technologies with social, political, and historical contexts. In addition to thinking about how science, technology and warfare have shaped each other, this module also considers the changing role of the scientist in relation to the state, and considers broader themes such as the arms control, ethics, popular culture and the body in relation to war.

HPSC3003: COMMUNICATION OF SCIENTIFIC IDEAS
0.5 units
Miller, Steve
Assessment: feature article (40%), report (30%), radio show (20%), news article (10%)

A practical course in communicating science based around three key tasks: (1) writing science news and feature articles suitable for New Scientist or the science pages of the 'quality' press; (2) carrying out a radio interview, such as might be broadcast on Radio 4's Science Now; (3) reporting on a piece of novel science to a committee of MPs who need to be aware both of the science content of the work and potential policy issues. Issues in the public understanding of science are discussed from this practical standpoint of communication.

HPSC3011: ADVANCED SCIENCE WRITING
0.5 units
Assessment: four pieces of coursework (10%, 20%, 20%, 50%)

A course in science feature writing, exploring in depth aspects of structure, style and explanation.

HPSC3014: MAGIC TO SCIENCE
0.5 units
Gregory, Andrew
Assessment: one essay (3,000 words) (50%); exam (3 hours) (50%)

Explores the changing relationship between astrology, alchemy, magic and science from the ancient Greeks to the present day. Topics include: magic and science in the ancient world, Christian attitudes to magic and witchcraft, the origins and development of astrology and alchemy, the anthropology of magic, magical world views.

HPSC3027: EVOLUTION IN SCIENCE AND CULTURE
0.5 unit
Cain, Joe
Assessment: one essay (3,000 words) (50%); exam (3 hours) (50%)

A historical survey of evolutionary thinking from the Enlightenment to the present. Content includes the history of scientific ideas and the context for those ideas. It also considers the influence of evolutionary ideas, especially Darwinism, on society and visa versa.

HPSC3028: ADVANCED PHILOSOPHY OF MEDICINE
0.5 unit
Clarke, Brendan
Assessment: two pieces coursework (3,000 words) (50% each)

This module will be a reading group. The first half of the term will be structured around Ludwig Fleck's seminal 1935 work Genesis and Development of a Scientific Fact, as well as critical articles examining this work. As well as presenting some fascinating insights into the development of scientific medicine, the book makes several broader claims for the role of cultural conditioning in shaping science in general. It therefore anticipated many philosophical approaches more usually associated with later

twentieth century philosophy of science. Focused, informal, teaching sessions during class time will be given in support of these core philosophical issues. The second half of the term will then look to develop the kinds of influence that this work has had in the years since its publications. These sessions will therefore each be structured around a single reading, selected by participating students, that illuminates these connections. Throughout the term, students will be expected to work collaboratively, including giving presentations on the readings at the weekly seminars.

HPSC3029: MEDICINE, DISEASE AND HISTORY
0.5 unit
MacLehose, William
Assessment: one essay (3,000 words) (50%), exam (3 hours) (50%)

This course addresses the changes and developments in Western medicine from the Ancient Greek world to 1700. The course will discuss the varieties of theory and practice of medicine, the understandings of the body and illness, and the historical contexts in which medicine can be understood in the pre-modern world, including classical Greek and Roman society, medieval Islamic and Western cultures, and Renaissance and early modern periods.

HPSC3030: SCIENCE AND GLOBAL HISTORY
0.5 unit
MacLehose, William
Assessment: one essay (3,000 words) (50%), exam (3 hours) (50%)

This course studies the history of medieval Islamic and western Christian science from a comparative perspective and focuses on the transfer of knowledge from the ancient Greek world to the Arabic and then to the Latin West from the ninth to the fifteenth centuries. Approaching the subject thematically, we will consider the following fields of scientific knowledge: geography, cosmology, astrology, technology, medicine and their connections with religion, broadly construed. In the process, we will examine the underlying political, social, cultural, institutional and intellectual structures of these societies as well as the intercultural interactions.

HPSC3032: INVESTIGATING CONTEMPORARY SCIENCE
0.5 unit
Agar, Jon
Assessment: essay 1 (4,000 words) (60%), essay 2 (2,000 words) (40%)

STS aims to provide students with the intellectual and other skills to analyse trends in science and technology. This course asks students to use – and develop further - these skills to investigate deeply, assess and present their findings on a chosen issue in the contemporary politics of science. As a third year module, this course has been designed to make most use of acquired skills and knowledge in a way that moves students towards the world of work. In particular, the kinds of capacities demonstrable in a successful completion course are similar to those needed by an investigative reporter or a researcher for a think tank.

HPSC3033: COMMUNICATING SCIENCE IN DIGITAL ENVIRONMENTS
0.5 unit
Bultitude, Karen
Assessment: coursework 1 (1,800 words) (30%), coursework 2 (2,400 words) (40%), presentation (20 minutes) (30%)

This module focuses on creative and exciting contemporary approaches to communicating scientific topics via digital means. Teaching focuses on new media and online communication mechanisms, for example podcasting, blogging, social media and/or Citizen Science approaches. Existing global patterns of Internet use will be explored, including both demographic and device-oriented trends (such as the rise of mobile Apps). Students will critique contemporary examples of projects that utilise digital environments, as well as develop their own ideas. Across the module practical opportunities to explore the various techniques will be balanced with conceptual models of effective communication.

HPSC3034: SCIENCE, ART, AND PHILOSOPHY
0.5 unit
Ambrosio, Chiara
Assessment: coursework 1 (poster) (40%), coursework 2 (3,600 words) (60%)

This module explores the interactions between science and art from the mid-nineteenth century to the present. Its philosophical focus is the notion of "representation", conceived as a crucial common link between scientific and artistic visual practices. Integrating the history and philosophy of scientific and artistic representations, the course will address a broad range of issues. These will include questions on the nature and role of visual representations in scientific and artistic practice, what counts as "objective" and "accurate" representation, when and how images count as "evidence", and whether the relations between science and modernism contribute to overturn the common sense view that "art invents, science discovers".

HPSC3036: GOVERNING EMERGING TECHNOLOGIES
0.5 unit
Stilgoe, Jack
Assessment: coursework 1 (blog posts, total 3,000 words) coursework 2 (essay 3,000 words) (50% each)

This course goes inside technology to discuss its political and ethical dimensions. Technologies shape our future in powerful and largely unaccountable ways. Are they inevitable, or can we control the technologies that we get, anticipate their implications, prevent hazards and share their benefits? Why do we have iPads and space shuttles but we don't all drive electric cars and have clean drinking water in the developing world? Were the Fukushima nuclear meltdown and the financial crisis just accidents? What could regulators have done to prevent them? As science introduces new risks and ethical dilemmas, what should governments do to control research, publication, patenting and innovation? The course will teach students to think and write clearly and critically about technology. It will be assessed through an essay and a series of short blog-posts.

HPSC3037: PHILOSOPHY OF INFORMATION
0.5 unit
Illari, Phyllis
Assessment: coursework (100%)
This is a new module for 2013-14. Description to come.

HPSC3038: SURVEILLANCE IN MODERN SOCIETY
0.5 unit
Kroener, Inga
Assessment: coursework (100%)
This is a new module for 2013-14. Description to come.

HPSC3039: MEDICAL ETHICS
0.5 unit
Assessment: coursework (100%)

Medical ethics encompasses the practical application of ethics, as a philosophical enterprise, in clinical settings and in the governance of medical practice. The module examines difference schools of moral principles as well as both classic and emerging case studies. Issues can include: values in medicine, informed consent, privacy and confidentiality, control and resolution, truth-telling, conflicts of interest, and futility.

HPSC3040: SCIENCE, POLITICS, AND THE STATE IN RUSSIA AND THE SOVIET UNION
0.5 unit
Werrett, Simon
Assessment: one essay (5,000 words) (80%), presentation (15 minutes) (20%)

How are science and politics related? What role does science play in governance, and how is science itself best governed? Is scientific knowledge apolitical, and if it is politically-informed, what

consequences does this have? This module explores the interactions of science, politics, and the state through a study of science in Imperial Russia and the Soviet Union. From the reign of Peter the Great (1696-1725) to the time of Perestroika in the 1980s, Russian science always operated close to the state. Using cases from Russian and Soviet history, we will explore a variety of approaches for understanding relations of science, politics, and the state. Some comparative studies will show that science and politics are equally integrated in western liberal democracies.

CONTACT DETAILS

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Physiology

University College London has a well-established tradition of distinguished teaching and research in Physiology that goes back to the foundation of the subject in the early 1830s. Of the nine Nobel Laureates who have worked at UCL, three have taught and had their laboratories in the Physiology Department which is now part of the 5A* ranked Neuroscience, Physiology and Pharmacology Research Department. The present balance of research in the Department favours information processing in the nervous system, including the auditory and visual systems and the use of microtechniques aimed at understanding the workings of single cells. These areas of Neurobiology and Cell Physiology are fields that are flourishing worldwide, not least because they have adopted the powerful techniques of molecular biology. A dozen or more groups are engaged in research in all these areas and there is sufficient diversity in approaches to ensure teaching that is comprehensive in scope but firmly linked to research interests of the members of the Department. One of the great attractions of Physiology is that its scope is wide. It is, as a discipline, as interested in the workings of the whole animal as it is in the workings of the individual cells that make up the animal. You will find physiologists studying the blood supply, digestion, breathing, hormones and the brain. You will also find them looking at how hair cells respond to different stimuli and how a single photoreceptor responds to a photon of light or what makes individual cells divide and grow. Broad as this scope is, there is a central theme in Physiology: that of the integration of parts into the whole. It is this holistic bias that distinguishes Physiology from other biological sciences. Physiologists often use the ideas and methods of Biochemistry, Physics, Chemistry and Molecular Biology in coming to an understanding of how animals work: what makes the physiologist's approach different is the emphasis on how the parts fit together and influence one another to make a whole.

PROGRAMME STRUCTURE

Listed below are the modules currently offered to students. A total of 4 course units (cu's) are studied made up of a combination of 1.0cu or 0.5cu modules, which must include either a laboratory (1.5cu) or library (1.0cu) research project. Also listed are modules offered by other departments that may be taken as part of the 4 cu's required for the degree programme. The "custom" timetable feature at http://www.ucl.ac.uk/timetable is a good place to start planning which modules to select. Please note that students are required to study a total of 2 units per term and that the research project (cannot be timetabled on website) is fitted in around the taught modules in consultation with the chosen project supervisor.

COURSES CURRENTLY AVAILABLE FOR IBSC STUDENTS
(For further details see: http://www.ucl.ac.uk/medicalschool/undergraduate/bsc-ibsc)

PHOL3001: RESPIRATION IN HEALTH AND DISEASE
0.5 unit
Term 2, Blocks A & G
Dr. Alex Gourine & Dr. Gareth Ackland
Assessment: Oral Presentation (10 minutes) 20.00%. Unseen two-hour written examination 75.00%. Summary of Oral Presentation (One page) 5.00%.

The module begins with a review of some basic concepts relevant to the understanding of respiratory physiology. It then builds on these basic concepts to introduce and explain how breathing is monitored and controlled in a range of physiological and pathophysiological situations. Although the emphasis is on respiration in health and disease in humans, we will draw on evidence obtained in animal experimentation to illustrate the underlying mechanisms involved in ventilatory control. Throughout, there will be emphasis on the methodology used in particular studies and their limitations.
Pre-requisites: Students must have a suitable grounding in Respiratory physiology eg. passed examinations in PHOL 1001, Undergraduate medical course or equivalent.

PHOL3002: THE HEART AND CIRCULATION
1.0 unit
Term 1, Blocks A & H
Prof. Michael Gilbey & Dr. Vidya Mohamed-Ali
Assessment: Essay (2,500 words) 12.50%. Poster preparation plus 15 minute presentation 12.50%. Unseen three hour written examination 75.00%.

The module builds on your primary knowledge of mechanisms of cardiac function. The basic cellular electrophysiology of cardiac function will be covered in sufficient depth to explore the evidence leading up to our current understanding of the workings of the heart at the cellular level. We will then build on these basic concepts to explain several important applied areas, concentrating on physiology and pathophysiology with special reference to the human heart. Several important clinical areas will be covered.
Pre-requisites: PHOL1001 and PHOL2002 or equivalent i.e. Yrs 1 and 2 MBBS

PHOL3003: FETAL AND NEONATAL PHYSIOLOGY
1.0 unit
Term 2, Blocks B & H
Dr. Greg Fitzharris
Assessment: Portfolio of in-course work 30.00% Unseen three-hour written examination 70.00%

This is an increasingly important area of physiology, both in terms of basic science and because of its clinical applications. This module addresses fundamental questions in this area with particular emphasis on an integrative or systems approach. A range of scientists and clinicians teach on it, and there are practical sessions in which current techniques for fetal and neonatal monitoring and research are demonstrated. With guided reading, students are encouraged to develop a special interest in one or two specific aspects of this area.
Pre-requisites: PHOL1001 and PHOL2002, or equivalent i.e. phase 1 MBBS

PHOL3004: CELL SIGNALING IN HEALTH AND DISEASE
1.0 unit
Terms 1, Blocks C & G
Prof. Alison Lloyd & Dr. Julie Pitcher
Assessment: Unseen three-hour written examination 70.00%.Essay 10.00%.Oral assessment 10.00%. Coursework/problem paper 10.00%

Most of our genetic material is involved not in making structural proteins or components of classical biochemical pathways but in cellular signalling and control. Research into understanding how cellular control systems operate does not fall neatly into any of the standard academic categories of genetics, biochemistry, physiology or pharmacology but uses elements of each. This is an exciting and advancing field, in part because many of the diseases important in affluent countries (cancer, atherosclerosis, diabetes, drug addiction, stroke.) are pathologies of signalling.
Pre-requisites: No formal prerequisites but a good grounding in Biochemistry and Cell Biology are recommended.

PHOL3006: CELLULAR BASIS OF BRAIN FUNCTION
1.0 unit
Term 1, Block A & H
Prof. Jonathan Ashmore & Prof. Angus Silver
Assessment: Unseen three-hour written examination 75.00% Two essays 16.00% One practical write up 9.00%

The module covers the following levels of description of brain function. These include:
1) Methods, ion channels, channelopathies, transporters and ischemia;
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 and introduces you to one of the main research strengths of UCL.
Pre-requisites: Second year neuroscience course or equivalent. Some background in the physical sciences to at least A-level would be an advantage: quantitive arguments are critical in some parts of the course.

PHOL3009: SPACE MEDICINE AND EXTREME ENVIRONMENT
1.0 unit
Term 1, Blocks C & G
Dr. Kevin Fong & Dr. Daniel Martin
Assessment: One essay (1,500 words) 10.00%. One seminar presentation 10.00%. Unseen three-hour written examination 80.00%

To provide an understanding of the physiological effects of the space environment upon the human body; the biomedical problems associated with long and short duration manned space flight; an overview of medical and health care systems required for long duration space flight and an examination of the physiological effects of short and long duration exposure to terrestrial high altitude environments.
Pre-requisites : PHOL1001 and PHOL2002 or equivalent i.e. phase 1 MBBS

PHOL3016: EPITHELIAL FUNCTION IN HEALTH AND DISEASE
1.0 unit
Terms 1 & 2, Block E (term 1) & C (term 2)
Prof. Shamshad Cockcroft
Assessment: Seminar presentation 10.00%.Two essays 20.00%.Unseen three-hour written examination 60.00%.Invigilated paper review 10.00%

The aim of this module is to provide an understanding of the different cellular and molecular mechanisms used by epithelia to solve transport problems and to explore the basics of the pathophysiological states associated with the failure of epithelial transport mechanisms. The module begins by considering the cell biology of epithelia then focuses on the molecular basis of epithelial ion secretion and absorption. The role of ion channel proteins in normal epithelial physiology, and in diseases such as Liddle's Syndrome and cystic fibrosis is examined. Particular emphasis is placed on the role these ion channels play in kidney epithelial cells, although other epithelial cells, such as the gastrointestinal system and lung are also discussed. The module familiarizes students with the major pathways regulating sodium handling in the kidney and diseases affecting these pathways, which also play an important role in blood pressure regulation. In addition, the controversial problem of water transport is examined. The emphasis throughout is to appreciate how experimental research informs our understanding of these issues, reflecting UCL's mission statement to lead teaching by current research.
Pre-requisites BIOC1001 or equivalent

PHOL3902: LIBRARY PROJECT
1.0 unit
Dr. Jonathan Fry
Assessment: One report 85.00%.1 oral presentation 15.00%

This is literature based project that allows students to conduct some physiological research, utilizing library resources, on a subject/topic offered by a member of staff in the Department of Physiology or associated departments. An oral presentation is an integral part of the marking scheme. A list of projects offered to the 2011-12 cohort of students can be found at the following website:
Website: http://www.ucl.ac.uk/lifesciences-faculty/degree-programmes/physiology/phol3902

PHOL3904: RESEARCH PROJECT
1.5 unit
Dr. Jonathan Fry
Assessment: **Laboratory performance 15.00%, Report (8,000-10,000 words) 70.00%, One poster presentation 15.00%**

This is research-based project that allows students to conduct some original physiological research in the laboratory of a member of academic staff. The aim of the module is to introduce students to contemporary research methods in a specific area of physiology, to develop the ability to evaluate critically both theories and evidence and to produce graduates well equipped for advanced study. Students have 9 weeks in which to complete their projects; this includes the period for analysing data and writing up. A list of projects offered to the 2011-12 cohort of students can be found at the following website: http://www.ucl.ac.uk/lifesciences-faculty/degree-programmes/physiology/phol3904

Pre-requisites: Students will be required to obtain an average of at least 55% in their second year exams and to have completed and passed PHOL2002 Animal And Human Physiology or a similar module containing appropriate laboratory experience.

Popular 0.5 unit modules provided by other departments and taken by intercalating physiology students:

NEUR3031: CONTROL OF MOVEMENT
0.5 unit
Term 2, Block A
Prof. Chris Yeo
Assessment: Unseen three-hour written examination 100.00%.

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 module and concludes with analyses of motor learning and modelling of motor control.

ANAT3042: PAIN
0.5 unit
Term 2, Block D
Prof. Steve Hunt
Assessment: 1 Essay 20.00%.Unseen three-hour written examination 80.00%

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.

NEUR3045: VISUAL NEUROSCIENCE
0.5 unit
Term 2, Block G
Prof. Andrew Stockman
Assessment: Oral presentation 20.00%. Unseen two-hour written examination 80.00%

(Ex Eye & Brain).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 course, we will present visual neuroscience as a multidisciplinary, yet integrated field of study.
Pre-requisites: ANAT2010 and NEUR2006 (formerly PHOL2006); or PHOL2005 or MBBS Neuroscience (none for psychologists).

NEUR3001: ADVANCED VISUAL NEUROSCIENCE
1.0 unit
Term 2, Blocks D & G
Prof. Andrew Stockman
Assessment: Unseen three-hour written examination 60.00%.Log book 10.00%.One essay (2,000-2,5000 words) 20.00%. Seminar presentation 10.00%.

The full unit includes the NEUR3045 Visual Neuroscience (ex Eye & Brain) half-unit as well as the additional lectures and requirements listed below. This course will teach advanced 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 course, we will present visual neuroscience as a multidisciplinary, yet integrated field of study.

FOR FURTHER INFORMATION PLEASE CONTACT

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Prof. Jonathan Ashmore
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Alternatively consult our website at:
http://www.ucl.ac.uk/lifesciences-faculty/degree-programmes/physiology

Physiology & Pharmacology

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

"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)

The Physiology and Pharmacology IBSc is administered and taught by the Neuroscience, Physiology and Pharmacology (NPP) Research Department. The research interests of the Department (NPP Research) are mainly centred on the nervous system, but not limited to it. Research activity spans areas ranging from the molecular study of drug receptors, ion channels, transporters and intracellular signalling, to signalling at the cellular level, 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 courses available to iBSc students make extensive use of material drawn from contemporary scientific literature and aim at familiarizing students with critical thinking and the scientific method.

Physiology and Pharmacology IBSc students can join the student-run Bernard Katz and Gaddum Societies which organise social events. The programme tutor is Paola Vergani (p.vergani@ucl.ac.uk Telephone: 020 7679 7908), the programme administrator is Anushka Magan (a.magan@ucl.ac.uk, 020 3108 1034).

PROGRAMME STRUCTURE

The Physiology and Pharmacology IBSc Programme is closely linked to the third year BSc Programme for Science students. Students select modules to complete 4 units in total, including at least 1 taught unit (which can include 0.5 units) from courses offered by the NPP Physiology (PHOL) group and 1 taught unit from the NPP Pharmacology (PHAR) group. These include one compulsory course which can be taken in either Pharmacology (Molecular Pharmacology, PHAR3003) or Physiology (Cell Signalling, PHOL3004). In addition to taught courses, students will carry out either a laboratory- (1.5 units) or a library-based (1 unit) project 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 Faculty of Life Science Departments.

Modules run within the Common Timetable structure. Most courses 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. Examinations fall in the main examining period (May).

COURSES AVAILABLE

As long as the rules above are adhered to, students can also choose courses offered by other Departments (timetable and tutors permitting). Further details on the available courses can be accessed from the Departmental web pages. For further information on specific modules, interested students can contact the course tutor.

PHARMACOLOGY COURSES

PHAR3010 PHARMACOLOGY LABORATORY PROJECT
1.5 units
Course organiser: Dr T. Sihra
Term 1 or 2 Blocks – Any
Assessment: Dissertation 70%; laboratory performance 15%; poster 15%

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 http://www.ucl.ac.uk/lifesciences-faculty/degree-programmes/pharmacology/PHAR3009_3010/projects for further information, and http://www.ucl.ac.uk/lifesciences-faculty/degree programmes/pharmacology/PHAR3009_3010/PHAR3009_3010/PreviousProjects for past project titles.

PHAR3009 PHARMACOLOGY LIBRARY PROJECT
1.0 unit
Course organiser: Dr T. Sihra
Term 1 or 2 Blocks - Any
Assessment: Dissertation 70%; poster 30%

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 web pages (shared with PHAR3010) for list of titles and further information.

PHAR 3003 MOLECULAR PHARMACOLOGY
0.5 unit
Course organiser: Dr. A. Gibb
Term 1 Blocks C & F
Assessment: Unseen three-hour written examination 75%; 2 practicals 25 %.

The course 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.
Pre-requisites: 2nd Year Pharmacology PHAR2002, Phar2005 and Phol2002 or Medicine Phase-1

PHAR3004 RECEPTOR MECHANISMS
0.5 unit
Course organiser: Dr A. Gibb
Term 1 Blocks B & I (second half of Term 1, following PHAR3003, which is a prerequisite)
Assessment: Course Essay 15%; Unseen three hour written examination 85%.

This course 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.
Note: Students are not permitted to take both PHAR3004 and PHOL3004
Pre-requisites: Pharmacology PHAR3003

PHAR3006 DRUG DESIGN AND DEVELOPMENT
0.5 unit
Course organisers: Drs Alasdair O'Brien and Dean Willis
Term 1 Blocks B & I
Assessment: Unseen three-hour written examination 75%; 1 practical/poster presentation 25%.

This course 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 course 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.
Pre-requisites: 2nd Year Pharmacology (PHAR2002 or Preclinical)

PHAR3001 OR PHAR3002 NEUROPHARMACOLOGY
1.0 or 0.5 unit
Course organiser: Prof. A. Dickenson
Term 1 Blocks A, D & H
Assessment (PHAR3001): Unseen three-hour written examination 50%; 1 essay 10%; 4 practicals 40%.
Assessment (PHAR3002): Unseen three-hour written examination 80%; Essay 20%.

In recent years many developments, such as the use of levo dopa 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 course 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.
PHAR3002 does not include the practical work.
Pre-requisites: 2nd year Pharmacology (PHAR2002, PHAR2001, or Preclinical)

PHAR3005 OR PHAR3031 IMMUNOPHARMACOLOGY
1.0 or 0.5 unit
Course organisers: Dr D. Willis
Term 2 Blocks B, D & I (PHAR3031 without the practical work)
Assessment (PHAR3005): Unseen three-hour written examination 65%; Group project 25%; Data analysis (1000 words) 10%.
Assessment (PHAR3031): Unseen two-hour written examination 75%; 1 essay of 3000 words 25%.

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 course 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. **Pre-requisites:** 2nd Year Pharmacology (PHAR2002 or Preclinical). Students who have taken other courses should consult the course organiser

PHAR3011 SYNAPTIC PHARMACOLOGY
0.5 unit
Course organisers: Dr T. Sihra and Prof. S. Cull-Candy
Term 2 Blocks A & H
Assessment: Unseen three-hour written examination 90%; 2 essays 10%.

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. **Pre-requisites:** PHAR2002 (General and Systematic Pharmacology) Or PHAR3001/2 (Neuropharmacology) Or PHAR3008 (Psychopharmacology)

PHAR3008 PSYCHOPHARMACOLOGY
0.5 unit
Course organiser: Dr Clare Stanford
Term 2 Blocks C & G
Assessment: Unseen three-hour written examination 85%; Exercise on data interpretation 15%.

This course outlines what is known about the actions of drugs that affect mood and behaviour. Key themes include the neurobiological basis of specific psychiatric disorders and their drug treatment and drugs of abuse. The lectures concentrate on the effects on behaviour of specific classes of drugs, including those derived from plants. All these topics will build on knowledge acquired in the Neuropharmacology (PHAR3001/3002) courses. There will also be small-group tutorials and a film demonstration of how drugs can affect behaviour of rodents and humans. All these sessions will aim to develop students' ability to appraise scientific literature and to provide the background material for the written assessment.
Pre-requisites: PHAR2002 General and Systematic Pharmacology; PHAR3001 / 3002; some ANAT courses (contact SC Stanford for confirmation)

PHYSIOLOGY COURSES

PHOL3902 RESEARCH PROJECT IN PHYSIOLOGY (READING)
1.0 unit
Course organiser: Dr Jonathan Fry
Term 1 or 2 Blocks - Any
Assessment: Oral presentation 15%; report 85%.

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 http://www.ucl.ac.uk/lifesciences-faculty/degree-programmes/physiology/phol3902 for list of titles and further information.

PHOL3904 RESEARCH PROJECT IN PHYSIOLOGY (LABORATORY)
1.5 units
Course organiser: Dr Jonathan Fry
Term 1 or 2 Blocks - Any
Assessment: Poster presentation 15%; Report 70%; Laboratory performance 15%.

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 Tutors, in the laboratory of a non-associated Institution. See http://www.ucl.ac.uk/lifesciences-faculty/degree-programmes/physiology/phol3904 for list of titles and further information.

PHOL3006 CELLULAR BASIS OF BRAIN FUNCTION
1.0 unit
Course organisers: Prof Jonathan Ashmore
Term 1 Blocks A & H
Assessment: Two essays 16%; Unseen three-hour written examination 75%; One practical write up 9%.

The course covers the following levels of description of brain function. These include:
1) Methods, ion channels, channelopathies, transporters and ischemia;
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.
Pre-requisites: Second year neuroscience course or equivalent. Some background in the physical sciences to at least A-level would be an advantage: quantitative arguments are critical in some parts of the course

PHOL3002 THE HEART AND CIRCULATION
1.0 unit
Course organiser: Prof V. Mohammad-Ali
Term 1 Blocks A & H
Assessment: **Essay (2,500 words) 12.5%; Unseen three hour written examination 75%; Poster (preparation plus 15 minute presentation) 12.5%**

The course 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 patho- physiology.
Pre-requisites: PHOL1001 and PHOL2002 or equivalent i.e. Yrs 1 and 2 MBBS

PHOL3004 CELL SIGNALLING IN HEALTH AND DISEASE
1.0 unit
Course organiser: Prof Alison Lloyd, Dr Julie Pitcher
Term 1 Blocks C & G and Term 2 Blocks D & I
Assessment: Two essays 15 %; One orally assessed coursework 7.5%; One written coursework/problem paper 7.5%; Unseen three-hour written examination 70%.

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 course 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 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.
Note: Students are not permitted to take both PHAR3004 and PHOL3004
Pre-requisites: No formal prerequisites but a good grounding in Biochemistry and Cell Biology are recommended.

PHOL3003 FETAL AND NEONATAL PHYSIOLOGY
1.0 unit
Course organiser: Dr Greg Fitzharris
Term 2 Blocks B & H
Assessment: Portfolio of in-course work 30%; Unseen three-hour written examination 70%

This is an increasingly important area of physiology, both in terms of basic science and because of its clinical applications. This course addresses fundamental questions in this area with particular emphasis on an integrative or systems approach. A range of scientists and clinicians teach on it, and there are practical sessions in which current techniques for fetal and neonatal monitoring and research are demonstrated. With guided reading, students are encouraged to develop a special interest in one or two specific aspects of this area.
Pre-requisites: PHOL1001 and PHOL2002, or equivalent i.e. phase 1 MBBS

PHOL3001 RESPIRATION
0.5 unit
Course organiser: Dr Alex Gourine and Dr Gareth Ackland
Term 2 Blocks A & G
Assessment: Oral Presentation (10 minutes) 20%; Summary of Oral Presentation (One page) 5%; Unseen two-hour written examination 75%.

This course 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.
Pre-requisites: Students must have a suitable grounding in Respiratory physiology eg. passed examinations in PHOL 1001, Undergraduate medical course or equivalent.

PHOL3016 EPITHELIAL FUNCTION IN HEALTH AND DISEASE
0.5 unit
Course organiser: Prof. Shamshad Cockcroft
Term 1 (Block E) and Term 2 (Block C)
Assessment: Unseen three-hour written examination 70%; Seminar presentation 10%; two In-class written essays 10 %; Invigilated Paper Review 10%.

Epithelial cells form sheets that cover the surface of the body and line the internal organs and perform vectorial functions. The module will encompass four themes:
Cell Biology of Epithelial cells,
Vectorial transport in health and disease (absorption and secretion),
Epithelial-mesenchymal transition during wound healing, development and cancer;
Specialised function of epithelia in sensing the environment.
Pre-requisites: BIOC1001 or equivalent

NEUROSCIENCE (AND ANATOMY) COURSES

ANAT3050 ADVANCED MOLECULAR CELL BIOLOGY
0.5 unit
Course organiser: Prof David Becker
Term 1 (Blocks E and F)
Assessment: Unseen three-hour written examination 75%; Essay (1,500 words) 12.5%; Paper presentation (15 minutes) 12.5%.

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

ANAT3105 CLOCKS, SLEEP AND BIOLOGICAL TIME
0.5 unit
Course organiser: Dr David Whitmore
Term 2 (Block C)
Assessment: Unseen three-hour written examination 75%; One essay (3,000 words) 25%.

The aim of this course is to examine the importance of time, and oscillations, in a range of biological problems. The central theme will be the circadian or daily clock. We will look at what is currently known about the clock mechanisms (what makes the clock 'tick') in a range of animal systems, from Drosophila to the mouse. This will include the genetic-molecular aspects of the clock, as well as some biochemistry and neurobiology. We will also examine how the clock regulates physiological events, such as seasonal reproduction, and human sleep-activity rhythms. The importance of light and the retina in setting the clock will be discussed (Prof Foster, Imperial). The course will then go on to examine a range of other biological timing events, such as the somite clock in embryology (Prof Stern), rapid biochemical oscillations (TBC), oscillations in the brain (Prof O'Keefe) and some basic mathematical aspects of oscillations (Prof Wolpert). The relevance of time, from seconds to years, and how these oscillations influence cells and animals will be discussed.

NEUR3018 NEURAL BASIS OF LEARNING AND MOTIVATION
0.5 unit
Course organiser: Dr Francesca Cacucci
Term 1 (Block D)
Assessment: **2 essays (12.5% each) 25%; Unseen three-hour written examination 75%**

The course is centred 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 course 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.
Pre-requisites: ANAT2010 or MBBS Neuroscience or permission of module organizer.

ANAT3029 or ANAT3028 THE NEUROBIOLOGY OF NEURODEGENERATIVE DISEASE
1.0 or 0.5 unit
Course organiser: Prof Steve Davies
Term 2 (Block E)
Assessment (ANAT3029): Unseen three-hour written examination 50%; One essay (6,000 words) 50%.
Assessment (ANAT3028): Unseen three-hour written examination 100%.

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 a-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 course will discuss this novel hypothesis in the light of contemporary research and provide a foundation for our current understanding of neurodegenerative diseases.
Pre-requisites: A basic understanding of neuroanatomy and neuroscience

NEUR3031 CONTROL OF MOVEMENT
0.5 unit
Course organiser: Prof Christopher Yeo
Term 2 (Block A)
Assessment: Unseen three-hour written examination 100%

The course 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 course includes tutorials with target papers through the course and concludes with analyses of motor learning and modelling of motor control.

NEUR3041 NEURAL COMPUTATION
0.5 unit
Course organiser: Prof Neil Burgess
Term 1 (Block E)
Assessment: Unseen three-hour written examination 90%; One Essay (2,000 words) 10%.

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.
Pre-requisites: ANAT2010 or MBBS Neuroscience, or permission of module organizer.

ANAT3042 PAIN
0.5 unit
Course organiser: Prof Steve Hunt
Term 2 (Block D)
Assessment: Unseen three-hour written examination 80 %; 1 Essay 20%.

This course 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 course.
Note: this module can count either as a PHOL or as a PHAR module

NEUR3045 VISUAL NEUROSCIENCE
0.5 unit
Course organiser: Prof Andrew Stockman
Term 2 (Block G)
Assessment: Unseen two-hour written examination 80%; Oral presentation 20%.

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 course, we will present visual neuroscience as a multidisciplinary, yet integrated field of study. This half unit also makes up part of the full unit course NEUR3001 “Advanced Visual Neuroscience”.
Pre-requisites: ANAT2010 and NEUR2006 (formerly PHOL2006); or PHOL2005 or MBBS Neuroscience (none for psychologists).

COURSES 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.

BIOC3011 BIOCHEMISTRY OF HEALTH AND DISEASE
1.0 unit
Course organiser: Prof. K Srai
Assessment: Moodle test 2 (1 hour) 15.00%, Moodle test 3 (1 hour) 15.00%, Online practical (3 exercises) 15.00%, Unseen three-hour written examination 40.00%, Moodle test 1 (1 hour) 15.00%.
Pre-requisites: Biochemistry BIOC1001, BIOC1008 or BIOC1009.

BIOC3013 CANCER BIOLOGY
0.5 unit
Course organiser: Prof. K Srai
Assessment: Unseen two-hour written examination 70.00%.Coursework 30.00%.

BIOC3012 NUTRITION AND METABOLISM IN HEALTH AND DISEASE
0.5 unit
Course organiser: Prof. K Srai
Assessment : Unseen two-hour written examination 70.00%. Coursework 30.00%
Pre-requisites : Minimum Biochemistry 2003

BIOC3016 GENES TO DISEASE
0.5 unit
Course organiser: Prof K. Srai
Assessment: Unseen two-hour written examination 80.00%.Coursework 10.00%. Summative Examination 10.00%.
Pre-requisites: Please contact Course Tutor Prof Kaila Srai on k.srai@ucl.ac.uk or ext.32642

BIOC3017 CELLULAR AND MOLECULAR ASPECTS OF CARDIOVASCULAR DISEASE
0.5 unit
Course organiser: Prof. K Srai
Assessment: Coursework 30.00%. Unseen two-hour written examination 70.00%.

BIOL3017 BIOLOGY OF AGEING
0.5 unit
Course organiser: Dr D Gems
Assessment : Unseen two-hour written examination 80.00%. 3 tutorials, including 2 essays of 1500-2000 words each 20.00%
Pre-requisites: No formal pre-requisites, but a good grounding in genetics and biochemistry are recommended

PSYC3209 COGNITIVE NEUROSCIENCE
0.5 unit
Course organiser: Dr L. Otten

PSYC3207 HUMAN LEARNING AND MEMORY
0.5 unit
Course organiser: Prof. D. Shanks

HISTORY OF MEDICINE MODULES: http://www.ucl.ac.uk/silva/histmed/study/ibsc
0.5 unit
Coordinator Dr C Reeves

Primary Health Care

The Department's strategic aim is to deliver high quality teaching in community-based primary care, public health and genito-urinary medicine; and to undertake a programme of internationally competitive multi-disciplinary research addressing the management and prevention of disease in individuals and populations in areas of priority to the health of the public. The Department was created in 1995 from three academic groups: the Primary Care departments at the Royal Free Hospital School of Medicine and University College London Medical School and the Public Health department at Royal Free, and predated the merger of the two medical schools in 1998. The Department of Primary Care and Population Sciences has split into two new departments as part of the reorganisation of the Faculty of Biomedical Sciences at UCL; The Research Department of Infection and Population Health and The Research Department of Primary Care and Population Health. The departments are part of the UCL Division of Population Health.

AIMS & OBJECTIVES

To provide students with the opportunity to experience primary health care in a variety of settings. To give students a sufficient understanding of the behavioural and clinical sciences to enable them to understand and critically evaluate primary care. To enable students to develop and use the skills required to carry out research in primary care.

COURSE STRUCTURE

The course will consist of five core modules plus a research project which students will be required to complete. The core modules are:

• An Overview of Primary Care and its Research Base (PRIM3001)
• The Patient, The Family and The Illness (PRIM3003)
• The Consultation in Primary Care (PRIM3002)
• The Population Perspective of Primary Care (PRIM3004)
• Critical Appraisal in Primary Care (PRIM3007) jointly taught with IBSc Critical Appraisal of Primary Care and Paediatric Practice

Each module will have a theoretical and a practical (usually clinical) component. The course has a clinical commitment in terms 1 & 2. The teaching for all modules takes place over terms 1 and 2. Terms 3 is reserved for the examinations but also the practical aspects of the research project (gathering the data, analysis, writing up and submitting). The external examiner's meeting is usually at the end of term three.

PRIM3001: AN OVERVIEW OF PRIMARY CARE AND ITS RESEARCH BASE
0.5 unit
Assessment: 1 piece of in-course assessment (30% of total) plus the exam (70% of total)

This module covers the structure of Primary Care and its historical development in the UK, the growing research base, management issues within primary care services and the importance of teamwork in the primary care setting. This module takes place in term 1.

PRIM3002: THE CONSULTATION IN PRIMARY CARE
0.5 unit
Assessment: 1 piece of in-course assessment (30% of total) plus the exam (70% of total)

This module examines the doctor-patient interaction using various theoretical models before analysing the various tasks within consultations. Factors such as consultation style, the patient perspective and the cultural backgrounds of both doctor and patient will then be explored. There will be an opportunity to examine the student's consulting style within the module.

PRIM3003: THE PATIENT, THE FAMILY AND THE ILLNESS
0.5 unit
Assessment: 1 piece of in-course assessment (30% of total) plus the exam (70% of total)

This module examines the importance of the patient's perspective on health, illness, and medical care – in the context of primary care. It includes cross-cultural perspectives on doctor-patient communication;

concepts of the body; family structure; alcohol, tobacco & drug use; birth and death practices; and non-medical health care in the UK.

PRIM3007: CRITICAL APPRAISAL OF PRIMARY CARE AND PAEDIATRIC PRACTICE
0.5 unit
Assessment: 1 piece of in-course assessment (50% of total) plus the exam (50% of total)

The course, now jointly taught with the students from iBSc paediatrics, will aim to enable the student to gain the necessary critical appraisal skills to assess the validity of clinical and laboratory data relevant to primary care. Students will develop the basic skills to access, appraise and analyse primary (original research papers) and secondary (e.g. Cochrane Database) sources of evidence. They will develop the ability to apply this to the evaluation and management of patients' problems.

PRIM3004: THE POPULATION PERSPECTIVE
0.5 unit
Assessment: 1 piece of in-course assessment (30% of total) plus the exam (70% of total)

This course enables students to understand the health needs of a population, how these may be assessed and the role of primary care services in meeting these needs. The themes include; principles of epidemiology, assessing the health needs of a population, preventing disease, promoting health, evaluating health care delivery and allocation of resources.

PRIM3005: RESEARCH PROJECT
1.5 unit
Assessment: Submission of research protocol (10% of marks) plus the 'final' dissertation (90% of marks).

Training in research methods is an essential component of this course and each student will be required to undertake a project in a primary care setting. The research module is your chance to develop and carry out a research project in Primary Care. In this module you will learn about research methods in a series of seminars and put this theoretical knowledge into practice by developing a protocol for a research project. You will then undertake the research and write it up for your dissertation. You will be supported by a supervisor during your research. Past students have undertaken a number of interesting projects and some have had their research published.

COURSE TUTOR CONTACT DETAILS & WEBSITE DETAILS
Dr Surinder Singh
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Tel: 020 7794 0500 ext. 36740
http://www.ucl.ac.uk/pcph/education/undergrad/bsc_pc/index.htm

Psychology

The IBSc Psychology programme provides an opportunity for UCL medical students to study alongside science undergraduates on one of the country's leading psychology degree programmes. The programme aims to introduce students to a wide range of psychological science and give them an understanding of what psychological science can contribute to the theory and practice of medicine. Students are required to have passed all relevant examinations and have a serious interest in studying Psychology. All students are interviewed prior to admission. Most students take the programme after Year 2. The programme is academic in nature with a strong research emphasis but many of the subject areas are relevant to clinical medicine. Up to 25 places are expected to be available.

STRUCTURE OF THE IBSC PSYCHOLOGY PROGRAMME

The programme is made up of four course units in total: six 0.5-unit modules and a 1.0 unit research project. Two of the 0.5 unit courses are compulsory, and they introduce core areas of psychology at introductory and intermediate level. The remaining four optional courses are at Third Year level. A wide range of 3rd Year courses are available each year. The research project can be carried out in one of the department's laboratories or outside - for example, in a hospital ward or clinic. Each course, apart from the research project, is taught in 15-25 lectures. One hour each week is spent in seminars with other Psychology students, the aim of which is to acquire skills in scientific analysis, oral presentation and essay writing. Much of the remaining time is spent following up reading suggested in lectures, in writing essays and in preparing, conducting and analysing the research project.

COMPULSORY COURSES

PSYC1105: CONCEPTS AND METHODS IN PSYCHOLOGY
0.5 unit
Dr John Wattam-Bell j.wattam-bell@ucl.ac.uk
Term 1 Block D
Assessed by 2-hour written exam in Term 3 consisting of MCQ section and 2 essays from a choice of 6)

Students will be introduced to key conceptual issues, methodological approaches and significant findings in scientific psychology, their historical background, and the kinds of empirical evidence on which these findings are based. Students will be encouraged to think critically and evaluate their own understanding through quizzes and class discussion. A scientific approach will be developed through an appreciation of how empirical data can be used to test competing theories. The course will have six over-arching themes which reflect the current diversity of the discipline. The themes are:

(1) science of mind and behaviour, including conscious and unconscious mental processes
(2) development, including interplay of nature and nurture
(3) cognition, including memory, perception, language
(4) the brain, including the effects of psychoactive drugs and mental illnesses
(5) individual differences, including personality, intelligence and sexuality and
(6) social and emotional behaviour, including aggression and relationships.

PSYC1203: THE PSYCHOLOGY OF INDIVIDUAL DIFFERENCES
0.5 unit
Prof Paul Burgess p.burgess@ucl.ac.uk
Term 2 Block C
Assessed by 3-hour written exam in Term 3 consisting of 3 essays from a choice of 9)

This subject introduces students to individual differences in intelligence and personality as specialised areas of study in psychology. In this subject, students will examine theories, research, measurement, and applied and research aspects of individual difference psychology. Students will be introduced to the different ways in which intelligence and personality are conceptualised and measured. In particular, students are expected to be able to critically examine the nature versus nurture controversy in the development of individual differences. Students will study, compare, and evaluate major theoretical perspectives on personality and mental ability. The work of the most influential theorists representing the major "schools of thought" (or paradigms) in personality and ability will be examined. Relevant research evidence supporting or refuting the theoretical formulations will be reviewed. Students will

learn to appreciate the contributions and limitations of each individual difference paradigm, and how it has impacted on other areas of specialisation in psychology.

PSYC3901: RESEARCH PROJECT (1 course unit).

The aim is for the students to conduct and write up an original piece of psychological research, which will enhance the skills of statistical design, data collection and analysis, and the reporting of scientific results. The third year project represents one course unit, a quarter of the final year mark, and is assessed by two pieces of work. First is a 1,000 word project proposal (10% of the final mark) presenting the background, goals and design of the proposed study. Second is the project itself, which approximates to an article in a journal.

OPTIONAL COURSES

The other 2 course units are made up of four optional third year courses. The courses you can choose from are outlined below. Detailed descriptions and timetable details can be found on:
https://www.online.psychol.ucl.ac.uk/courses/courselisting.aspx

THIRD YEAR COURSES THAT WERE AVAILABLE TO IBSc STUDENTS IN 2012/2013

all Psychology modules listed are 0.5 course units and assessed by 3-hour written exam in Term 3 consisting of 3 essays from a choice of 9, except for PSYC3207 which has a coursework essay worth 40% and a 2-hour exam worth 60%).

Course code / Course Title / Course Convenor / Term and Teaching Block
PSYC3102 Social Psychology/ Dr Richardson / 2A
PSYC3104 Psychology and Education / Dr Schlottmann / 2E
PSYC3107 Topics in Clinical Psychology / Dr Mandy / 2B
PSYC3109 Psychology of Health Risks / Dr Joffe / 1H
PSYC3110 Topics in Developmental Psychology / Dr Schlottmann / 2F
PSYC3111 Human Computer Interaction / Dr Brumby / 1E
PSYC3201 Applied Decision Making/Prof Harvey / 2A
PSYC3203 Language and Cognition/Dr Rodd / 1C
PSYC3205 Speech / Prof Howell / 1F
PSYC3207 Human Learning and Memory/ Prof Shanks / 1B
PSYC3209 Cognitive Neuroscience /Dr Otten / 2H
PSYC3210 Brain in Action /Prof Haggard / 2F
PSYC3303 Topics in Neurobiology / Prof Jeffery / 1A
PSYC3307 Genes and Behaviour / Prof Viding / 1F
NEUR3045 Visual Neuroscience / Prof Johnston / 2G (run by Anatomy)

EXAMPLES OF PROJECT TOPICS FROM 2012/13 FOR THE IBSC PSYCHOLOGY

- Perception of emotional stimuli interferes with semantic processing of emotional words - evidence for an embodied theory of cognition
- Stimulating the reading deficits found in posterior cortial atrophy in proficent readers
- Does restricting students from using Facebook have a positive or negative impact on their work-life balance?

EXAMPLES OF PUBLICATIONS THAT HAVE BEEN ACHIEVED FROM THIS PROGRAMME

Johnston, A., Bruno, A., Watanabe, J., Quansah, B., Patel, N., Dakin, S. & Nishida, S. (2008) Visually-based temporal distortion in dyslexia. *Vision Research,* 48, 1852-1858.
(Quansah and Patel, 2005/6)

McManus, I. C., Iqbal, S., Chandrarajan, A., Ferguson, E., & Leaviss, J. (2005). Unhappiness and dissatisfaction in doctors cannot be predicted by selectors from medical school application forms: A prospective, longitudinal study. *BMC Medical Education, 5:38*.
(Chandrarajan, 2004/5)

Furnham, A., Daoud, Y., & Swami, V. (2009) "How to spot a psychopath": Lay theories of psychopathy. Social Psychiatry and Psychiatric Epidemiology, 44, 464-472.
(Daoud, 2007/8)

CONTACT DETAILS FOR IBSC PSYCHOLOGY

Tutor: Dr Francesca Cacucci – f.cacucci@ucl.ac.uk extension 27580
Administrator: Miss Joanna Strange – joanna.strange@ucl.ac.uk extension 25334

Surgical Sciences

With changes in higher surgical training, there is an identified need to introduce the concept of research methodology for surgical trainees early in their career, so that they become equipped to contribute fully to advancing medical care and the application of evidence-based medicine. The course is delivered by the Division of Surgery and Interventional Sciences at UCL which comprises a number of Departments and Academic Centres focused on delivery of high-ranking clinical and research-centred practices, in which excellence is achieved via application of scientific method. The Division is multi-campus, and teaching will be provided on various sites to include the Royal Free and Bloomsbury Campuses, the Institute for Orthopaedics and Musculoskeletal Sciences at Stanmore, and affiliated centres such as Northwick Park Institute for Medical Research. The course will provide an opportunity to investigate in depth in a way which is not available in the standard undergraduate curriculum, some of the novel areas of scientific discovery which are currently impacting on surgical practices (including cancer therapy, musculoskeletal surgery and transplantation).

AIMS

The course is designed to allow students to gain experience of both theoretical and practical elements underpinning modern surgical practices, at a depth of focus different from that afforded in the MBBS programme. It combines novel approaches in the surgical skills laboratory, with 'hands-on' experience of modern techniques in cell and molecular biology which are being applied to surgical problems, so that it affords a comprehensive understanding of the scientific basis for current practices, and new areas of research may impact on service delivery in the future. The programme is aimed at those who want to find out about how surgery and science come together in current surgical practice, but also includes a batch of transferable skills to help each student develop a confident and professional approach to the application of scientific principles in medicine, whatever their future career plans may be.

PROGRAMME STRUCTURE

Module	Unit Value	Compulsory/Optional
Research Methodology, Statistics & Translatable Skills	**0.5 unit**	**Compulsory**
Surgical Skills	**0.5 unit**	**Compulsory**
Molecular Techniques in Surgical Research	**0.5 unit**	**Compulsory**
Transplantation	**0.5 unit**	**Optional**
Surgical Oncology	**0.5 unit**	**Optional**
Experimental Models of Disease in Surgical Research	**0.5 unit**	**Optional**
Applied Tissue Engineering	**0.5 unit**	**Optional**
Laboratory-based research project	**1.5 unit**	**Compulsory**

ORTH3004: RESEARCH METHODOLOGY, STATISTICS AND TRANSLATABLE SKILLS
0.5 unit
Term 1 Tuesday afternoons
Professor Alex Macgregor and Dr Catherine Pendegrass
Assessment: 2 hour online MCQ

This is a compulsory module for students taking the IBSc BSc in Surgical Sciences. The aim is to assist students in developing a sound basic understanding of statistics and to be able to eloquently present research ideas and manage data, so that they can play an active role in a multidisciplinary research team, students are encouraged to plan their own projects with the support of their peer group, and to become familiar with techniques such as literature searching and managing journal clubs. Covering: The need for research; how to read/write a scientific paper, formulate hypotheses, and design a project. How to conduct clinical research, ethics consideration, the law and trials. Underpinning relevant skills include: statistics, computer skills, presentation skills. The teaching for this takes place at the UCL Institute of Orthopaedics and Musculoskeletal Science at Stanmore.

SURG3006: MOLECULAR TECHNIQUES IN SURGICAL RESEARCH
0.5 unit
Term 1 3 weeks block
Dr Hazel Welch
Assessment: Written Lab Reports/Behaviour 50%; Written Exam 50%

This is a compulsory module for students taking the IBSc in Surgical Sciences. Molecular biology techniques are fundamental in biological research. This course offers a mixture of lectures and extensive practical sessions/workshops which introduce a number of molecular biology techniques and provide students with the opportunity to apply them in a laboratory setting. Covering: Isolation of RNA plus polymerase chain reaction, in situ hybridization; isolation of proteins plus western blotting, immunohistochemistry. (Mixture of theory and practice). The teaching takes place in the scientific laboratories, Department of Surgery, at the Royal Free and Bloomsbury campuses.

SURG3007: SURGICAL SKILLS
0.5 unit
Term 2 (3 weeks block)
Professor Paul Sibbons
Assessment: Practical 60%; Written Essay 20%; Written Exam 20%

This is a compulsory module for students taking the IBSc in Surgical Sciences. A series of introductory and some more advanced lectures covering the philosophy of surgical practice, procedural decisions, associated sequelae and currently proposed progression for future surgical advances. Many of the lectures will be supported by practical sessions to demonstrate and allow practice of specific surgical and associated procedures. Covering: manipulating sutures, microsurgical approaches, basis of laparoscopy, theories of modern surgical appliances and techniques. (Mixture of theory and practice). Most of the teaching takes place at the NPIMR Surgical Skills Laboratory at Northwick Park Hospital, Harrow, which is an affiliated member of the Division.

SURG3901: PRACTICAL RESEARCH UNIT ON THE COURSE
1.5 units
Various Supervisors (These comprise a selection of laboratory-based projects or clinical data manipulation projects – 1.5 units). This provides the opportunity to undertake extensive and focused research projects, working alongside dedicated teams with international track records in scientific publication and grant funding. Projects are selected after discussion with the various supervisors across the Division, and planning starts early in the course via prior literature review and outline plan, followed by execution in the laboratory and write up in Spring / Summer period. Students are allocated to supervisors across the Division (Bloomsbury, Royal Free, Stanmore, Whittington, NPIMR) after approval of submitted project outlines provided by the supervisors.
Note: Expected time spent in the laboratory is 6-8 weeks.

Assessment: All taught units will be assessed by written papers accounting for 70 - 80% of the marks, supplemented by in-course assessments accounting for 20-30%.

The research project course unit has no final examination. Assessment is based on laboratory performance, seminar and on the written research project report. A literature review is part of the project write-up and will be assessed solely on the written report. All students are expected to give an oral presentation of their project as part of the final assessment.

OPTIONAL UNITS ON THE COURSE

(You may choose two of the following 0.5 units): The optional units will be offered in two groups (equivalent to two teaching blocks). Students will be asked to choose one 0.5 unit from each group. The Course Tutors will decide whether the choices are viable, depending on number of interested students. Please note: The Course Tutors can deem an optional module as mandatory, for the student group, where it supports timetabling factors and/or the course structure.

SURG3008: EXPERIMENTAL MODELS OF DISEASE IN SURGICAL RESEARCH
0.5 unit
Dr Cecil Thompson
Assessment: Written Exam 100%

The use of experimental models in surgical research has provided a vehicle to examine the role of many biological systems in the pathophysiology of disease progression. The aim of the module is threefold:
1. To give an overview of surgical procedures that has been used on in vivo models to ensure that major organs such as the CNS, liver, kidney, together with the cardiovascular and musculoskeletal systems can maintain their normal function, following disease or surgical/scientific intervention.
2. To illustrate the use of in vivo models as means to test or explore specific biological hypothesis.
3. To provide an insight into the appropriate use of experimental models in surgical research to advance and support new treatment for human disease, as part of a portfolio of research strategies, while understanding the ethical and scientific need for refinement, reduction and replacement. This is taught at the Royal Campus and associated Departments at the Royal Free Hospital.

SURG3009: SURGICAL ONCOLOGY
0.5 unit
Dr Marilena Loizidou
Assessment: Group Project 15%; Individual Mark 5%; Written Exam 80%

Cancer is one of the most common diseases and the second most common cause of death in the U.K. The majority of cancers are solid tumours and of those about 90% are carcinomas, commonly affecting the breast, bowel, prostate, lung, bladder and liver. The course presents the current cellular and molecular knowledge for this disease and how this knowledge has impacted on diagnosis and treatment of specific carcinomas. The aim of the course is twofold:
1. To give an overview of cellular and molecular processes underlying the disease process (some previous knowledge of the cell cycle, oncogenes and tumour suppressor genes is desired)
2. To present common carcinomas in the context of the underlying processes and examine how our current cellular and molecular knowledge has supported new treatments.
This is taught at the Royal Free and Bloomsbury Campuses and associated Departments at the Royal Free Hospital.

SURG3011: APPLIED TISSUE ENGINEERING
0.5 unit
Dr Gavin Jell
Assessment: Coursework 30%; Written Exam 70%

The module introduces students to the use of tissue engineering as a strategy to replace or restore a level of function to diseased or damaged tissue. Students will learn about direct cell behaviour e.g. stem cell differentiation, through material design, World leading scientists and surgeons will provide lectures on engineering specific tissues and discuss future strategies in scaffold design.

TEACHING STAFF

The Division of Surgery and Interventional Sciences is comprised of a number of Academic Centres and Institutes located across several of the UCL campuses, with staff who are internationally recognised leaders in their field, are actively engaged in clinical work, research and teaching at both postgraduate and undergraduate levels. There is a strong multi-disciplinary mix of

applied surgical expertise linked with basic sciences, where modern cellular and molecular techniques are being applied to develop new strategies for clinical therapy, and feed directly into teaching strategies.

IBSc Surgical Science Research Projects

An example of projects that have been available:

- The protective effects of growth factors against oxidative injury in skeletal muscle cells. Spectroscopic studies of meta-tetra (hydroxyphenyl) chlorine photosensitisers delivered in
- Poly (D, L-lactide-co-glycolide) nanoparticles for photodynamic therapy.
- The effectiveness of the MDI MicroBlate microwave ablation device in the treatment of hepatic cancer.
- Doxycycline augments the toxicity of gemcitabine on the non-small lung cancer cell line A549 via mitochondria.
- A study of the efficacy and properties of N-acetylated ALA peptide derivatives.
- IGF-1 induced differentiation in HT-29 colorectal cancer cells and C2C12 myoblasts – Investigating the timescale and the pathways involved.
- An investigation into improving *m*THPC photodynamic therapy using long circulating liposomes.
- Assessment of surface modifications to a polyhedral oligomeric silsequioxame (POSS) (PCU) polymer to improve short and long term heamocompatibility for use in small calibre vascular grafts.
- Coating a stent with a novel nanocomposite polymer using and ultrasonic spray method.
- An experimental model to determine the safety and efficacy of double balloon catheter as a diverting ileostomy device.
- Development of a fluorescent semiconductor nanoparticle with nanomaterial coating and an investigation into its cytotoxicity.
- The role of the endothelin axis in bladder cancer cell proliferation and apoptosis.
- The role of p38 Mitogen-activated protein kinase in colorectal cancer cell attachment.
- The role of EFP in oestrogen-stimulated growth of breast cancer cells.
- The impact of surgical approach on the anatomy of ACL reconstruction.
- Advancing nasal reconstruction surgery: The application of tissue engineering technology
- Endothelin receptor antagonism in colorectal cancer.
- Development of tissue engineering skin.
- Anaemia, transfusion and intravenous iron therapy in colorectal surgery.
- A systematic review of antibiotic prophylaxis and treatment of methicillin resistant staphylococcus aureus (MRSA).
- Glaucoma drainage system using nanocomposite materials.
- Carbon nanotubes and its application in the treatment of cancer.
- Potential role of Toll-like Receptor 6 in critical limb ischaemia.
- Risk stratification in carotid artery stenting, treatment of anaemia in patients with IBD with intravenous iron.
- The role of 14-3-3s in tumourigenesis.
- Development of: trachea, heart, bypass graft, stem cell tracking with nanoparticles,
- A comparison of gene transfer to the uteroplacental circulation of guinea pigs using three different delivery techniques.
- Tissue engineering of blood vessels.
- Morphological evaluation of human donor livers after cold perfusion.
- Regnerative potential of muscle in peripheral arterial disease,
- Effects and underlying mechanisms of ETAR antagonism in multidrug-restistant bladder cancer.
- Molecular signalling in cell hypoxia and reperfusion injury.
- Mechanisms of reactive oxygen species (ROS) generation from photosensitisers for photodynamic therapy.
- Regenerative potential of muscle in peripheral arterial disease.
- A comparison of gene transfer to the uteroplacental circulation of guinea pigs using three different delivery techniques.

- Tumourigenesis of breast cancer/Tamoxifen resistance.
- The UV/p53-induced damage response pathway.
- Characterization of a panel of breast tumours.

Publications from IBSc Surgical Science projects

In general, the duration of the projects in the IBSc course is too short to provide enough data for submission as full papers. In some cases, students have been able to come back and work, for example in holiday time, to complete extra data sets, or work together on review articles, to get papers published. The following papers have contributions from IBSc students underlined:

Tan A, Yildirimer L, Rajadas J, De La Peña H, Pastorin G, Seifalian A. Quantum dots and carbon nanotubes in oncology: a review on emerging theranostic applications in nanomedicine. Nanomedicine (Lond). 2011 Aug;6(6):1101-14. PubMed PMID: 21955079.

Yang SY, Hoy M, Fuller B, Sales KM, Seifalian AM, Winslet MC. Pretreatment with insulin-like growth factor I protects skeletal muscle cells against oxidative damage via PI3K/Akt and ERK1/2 MAPK pathways. Lab Invest. 2010 Mar;90(3):391-401. Epub 2010 Jan 18. PubMed PMID: 20084055

CONTACT DETAILS

A limited number of places are available. For further details or to discuss the programme content contact the Course Tutors: Dr. Marilena Loizidou (Tel: 020 7794 0500 ext 35303 Email: m.loizidou@ucl.ac.uk) or Professor Barry Fuller (Tel: 020 7472 6111 Email: b.fuller@ucl.ac.uk) or the Teaching Administrator: Julie Cheek (Tel: 020 7794 0500 x 37665) Email: j.cheek@ucl.ac.uk)

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Please contact the programme tutors or their administrations if you have any questions about the IBSc courses.

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