
BS1030 The Molecules of Life - An Introduction to Biochemistry and Molecular Biology

Academic Year: 2018/9 Module Level: Year 1 Scheme: UG Department: Biological Sciences Credits: 30	Student Workload (hours) Lectures Seminars Practical Classes & Workshops Tutorials Fieldwork Project Supervision Guided Independent Study Demonstration Supervised time in studio/workshop Work Based Learning Placement Year Abroad Total Module Hours
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Period: Semester 1
Occurrence: E
Coordinator: Mark Leyland
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Practical report	15				
002	Report	15				
003	Online practical assessment	10				
004	Examination (Final)	60		2		

Intended Learning Outcomes

On successful completion of the module, students should be able to:

- Explain the basic chemical principles that underpin biochemistry
- Describe the structures of biological macromolecules and their components
- Explain the basic mechanisms of DNA replication, transcription and translation
- Discuss concepts of gene expression and control in prokaryotes and eukaryotes
- Discuss the relationship between protein structure and function
- Outline the key metabolic processes in cells and identify important mechanisms of metabolic regulation
- Demonstrate an ability to analyse experimental data
- Use and assess literature to produce written reports
- Reflect on and articulate motivations, strengths and experience of developing one or more transferable skills

Teaching and Learning Methods

Lectures, laboratory practical sessions, review sessions and group work, small group tutorials, revision sessions

Assessment Methods

Practical report, report, online practical assessment, examination.

Pre-Requisites
Co-Requisites
Excluded Combinations
Guided Independent Study: Indicative Activities

Preparation of laboratory reports, completion of pre-lab tests, reading practical books in preparation for laboratory classes, researching and evaluating scientific literature, preparation of formative talks/presentations for small-group tutorials, problem-solving in support of small group tutorials, guided reading to support module material.

BS1040 The Cell - An Introduction to Cell Biology and Microbiology

Academic Year: 2018/9
Module Level: Year 1
Scheme: UG
Department: Biological Sciences
Credits: 30

Student Workload (hours)

Lectures
 Seminars
 Practical Classes & Workshops
 Tutorials
 Fieldwork
 Project Supervision
 Guided Independent Study
 Demonstration
 Supervised time in studio/workshop
 Work Based Learning
 Placement
 Year Abroad
 Total Module Hours

Period: Semester 1
Occurrence: E
Coordinator: Shaun Heaphy
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Practical coursework book	25				
002	Essay	15				
003	Exam (Final)	60		2		

Intended Learning Outcomes

On successful completion of the module, students should be able to:

- Discuss and explain the basic structure and function of cells and cellular organelles, membrane transport and cellular homeostasis.
- Discuss and explain some of the diversity of life on earth including some of the similarities and differences in structures and replication between viruses and other subcellular infectious agents, archaea, bacteria, unicellular and multicellular microbial eukaryotes.
- How micro-organisms cause disease, are used in biotechnology and influence geochemical cycles.
- Discuss and explain the principles of systematics and classification, especially as they apply to micro-organisms.
- Demonstrate the use of techniques to study and handle cells and micro-organisms appropriately.
- Demonstrate competency in oral and written communications, information sourcing and handling, numeracy, basic statistical skills, IT skills, problem solving, and group working.
- Demonstrate awareness of the importance of microbiology within economic, ecosystem and health sustainability issues.

Teaching and Learning Methods

Lectures, tutorials, practical classes, workshops, problem solving classes.

Assessment Methods

Practical coursework book, essay and exam.

Pre-Requisites
Co-Requisites
Excluded Combinations
Guided Independent Study: Indicative Activities

Reading recommended literature and text books, reviewing lectures, preparing the essay and other written work, revising for the exam.

BS1050 From Individuals to Populations - An Introduction to Genetics

Academic Year:	2018/9	Student Workload (hours)
Module Level:	Year 1	Lectures
Scheme:	UG	Seminars
Department:	Biological Sciences	Practical Classes & Workshops
Credits:	15	Tutorials
		Fieldwork
		Project Supervision
		Guided Independent Study
		Demonstration
		Supervised time in studio/workshop
		Work Based Learning
		Placement
		Year Abroad
		Total Module Hours

Period:	Semester 2
Occurrence:	E
Coordinator:	Ezio Rosato
Mark Scheme:	UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Practical report	30				
002	Examination (final)	70		1.5		

Intended Learning Outcomes

On successful completion of the module, students should be able to:

- Explain how chromosomes are inherited through mitosis and meiosis and how genetic variation is generated.
- Perform elementary genetic analyses.
- Perform elementary statistical analyses.
- Recognise genetic diseases and genetically influenced disorders and appropriate methods of screening.
- Explain genetic variation and methods to measure it.
- Explain what factors influence global patterns of genetic diversity.
- Describe basic elements of molecular evolution of genes and genomes
- Define DNA sequencing technologies and their use in modern genetics
- Identify simple bioinformatics tools
- Demonstrate competent skills in data analysis and in the preparation and presentation of written work

Teaching and Learning Methods

Lectures, seminars, laboratory practical classes, tutorials and problem solving classes, supervised study, guided independent study

Assessment Methods

Practical report and examination

Pre-Requisites

Co-Requisites

Excluded Combinations

Guided Independent Study: Indicative Activities

Preparing for and revising practical classes, preparing for and revising tutorials, preparing for and producing practical report, preparing for and revision of lectures, final exam preparation.

BS1060 Multicellular Organisation - An Introduction to Physiology, Pharmacology and Neuroscience

Academic Year:	2018/9	Student Workload (hours)
Module Level:	Year 1	Lectures
Scheme:	UG	Seminars
Department:	Biological Sciences	Practical Classes & Workshops
Credits:	30	Tutorials
		Fieldwork
		Project Supervision
		Guided Independent Study
		Demonstration
		Supervised time in studio/workshop
		Work Based Learning
		Placement
		Year Abroad
		Total Module Hours

Period: Semester 2
Occurrence: E
Coordinator: Volko Straub
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Online test 1	13				
002	Online test 2	13				
003	Report	14				
004	Examination (Final)	60		1.5		

Intended Learning Outcomes

On successful completion of the module, students should be able to:

- Describe general aspects of the organisation, function and operating principles of the main physiological systems in the human body.
- Apply basic concepts of pharmacology to classes of cell surface receptors for neurotransmitter, hormones and local mediators.
- Describe the properties of cell surface receptors, their functions and relevant signalling pathways.
- Explain how individual physiological systems work together to achieve whole body homeostasis.
- Demonstrate understanding of human physiological measurements
- Handle, manipulate, display and statistically analyse physiological data.

Teaching and Learning Methods

Lectures, practical classes, group work-sessions and computer-based data handling session

Assessment Methods

Online test x2, report and examination.

Pre-Requisites

Co-Requisites

Excluded Combinations

Guided Independent Study: Indicative Activities

- Read a variety of relevant source material including textbooks and scientific articles. Specific reading tasks will be posted during the lectures and on Blackboard.
- Prepare report including data handling.
- Revise module content guided by lecture material and module workbook as well as external sources.
- Prepare and revise material covered in group work sessions (listed as tutorials).
- Prepare for practical sessions assisted by practical handbooks.
- Complete formative online tests to check understanding of material and prepare for summative online tests and exams.

BS1070 Biodiversity and Behaviour - An Introduction to Zoology

Academic Year:	2018/9	Student Workload (hours)
Module Level:	Year 1	Lectures
Scheme:	UG	Seminars
Department:	Biological Sciences	Practical Classes & Workshops
Credits:	15	Tutorials
		Fieldwork
		Project Supervision
		Guided Independent Study
		Demonstration
		Supervised time in studio/workshop
		Work Based Learning
		Placement
		Year Abroad
		Total Module Hours

Period:	Semester 2
Occurrence:	E
Coordinator:	Eamonn Mallon
Mark Scheme:	UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Practical Report	30				
002	Examination (Final)	70		1.5		

Intended Learning Outcomes

On successful completion of the module, students should be able to:

- Describe and discuss:
 - Phylogeny and the tree of life
 - Basic animal and plant development
 - Animal and plant origins and diversity
 - Biodiversity/ecology and its importance
 - Animal behavioral adaptations
 - Plant physiological features and consequences for environment and food production
- Conduct laboratory work proficiently and safely
- Work as part of a team
- Use appropriate statistical analysis software to analyse own data obtained in the practical sessions

Teaching and Learning Methods

Lectures, Laboratory practical classes, Computer practicals, Private study

Assessment Methods

Practical report and examination.

Pre-Requisites
Co-Requisites
Excluded Combinations
Guided Independent Study: Indicative Activities

Working through R statistics using swirl; Directed external reading; Write up of individual practicals.

BS2000 Research Topic

Academic Year: 2018/9
Module Level: Year 2
Scheme: UG
Department: Biological Sciences
Credits: 15

Student Workload (hours)

Lectures
 Seminars
 Practical Classes & Workshops
 Tutorials
 Fieldwork
 Project Supervision
 Guided Independent Study
 Demonstration
 Supervised time in studio/workshop
 Work Based Learning
 Placement
 Year Abroad
 Total Module Hours

Period: Semester 2
Occurrence: E
Coordinator: Alan Cann
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Team Research Proposal	70				
002	Poster (Final)	30				
003	Project Preparation Course	0	1			

Intended Learning Outcomes

On successful completion of the module, students should be able to:

- Demonstrate the ability to work effectively as part of a team.
- Plan and develop a specific research question.
- Search for information effectively using online databases.
- Demonstrate an understanding of the ethical implications and associate legal requirements of different types of biological research.
- Critically evaluate research literature.
- Interpret and present experimental data in writing and via oral and poster presentations.

Teaching and Learning Methods

Lectures, flipped classroom sessions on bioethics, small group team tutorial sessions.

Assessment Methods

Team Research Proposal and Poster. Attendance only Project Preparation Course.

Pre-Requisites
Co-Requisites
Excluded Combinations
Guided Independent Study: Indicative Activities

Individual and team research into a defined scientific topic. Preparation and writing of a team research proposal. Preparation of an individual scientific poster.

BS2009 Genomes

Academic Year: 2018/9
Module Level: Year 2
Scheme: UG
Department: Biological Sciences
Credits: 15

Student Workload (hours)

Lectures
 Seminars
 Practical Classes & Workshops
 Tutorials
 Fieldwork
 Project Supervision
 Guided Independent Study
 Demonstration
 Supervised time in studio/workshop
 Work Based Learning
 Placement
 Year Abroad
 Total Module Hours

Period: Semester 1
Occurrence: E
Coordinator: Raymond Dalglish
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Experimental Analysis	30				
002	Bioinformatics Analysis	10				
003	Exam (final)	60				

Intended Learning Outcomes

On successful completion of the module, students should be able to:

- Describe how prokaryotic and eukaryotic genomes are organised and discuss the mechanisms operating to influence this organisation.
- Describe the basic processes of DNA replication, recombination and repair.
- Analyse experimental data and experimental design.
- Perform simple bioinformatic analyses.

Teaching and Learning Methods

Lectures. Practical classes. Tutorials and discussion groups. Clinics.

Assessment Methods

Experimental analysis, Bioinformatic analysis and Exam (final).

Pre-Requisites
Co-Requisites
Excluded Combinations
Guided Independent Study: Indicative Activities

Preparation for lectures and reviewing lecture presentations. Reading based on lecture topics. Preparation for tutorials and review of tutorials. Analysing experimental data and considering experimental design. Exam preparation.

BS2013 Physiology and Pharmacology

Academic Year: 2018/9
Module Level: Year 2
Scheme: UG
Department: Biological Sciences
Credits: 15

Student Workload (hours)

Lectures
 Seminars
 Practical Classes & Workshops
 Tutorials
 Fieldwork
 Project Supervision
 Guided Independent Study
 Demonstration
 Supervised time in studio/workshop
 Work Based Learning
 Placement
 Year Abroad
 Total Module Hours

Period: Semester 1
Occurrence: E
Coordinator: Richard Evans
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
006	Essay under exam conditions	20				
007	Practical report	20				
008	Examination (Final)	60		2		

Intended Learning Outcomes

On successful completion of the module, students should be able to:

- Describe the basic structure of the various classes of cell surface receptors, explain the intracellular signalling pathways regulated by such receptors, provide examples of receptors that possess multiple subtypes for a given hormone or neurotransmitter (agonist).
- Undertake a quantitative analysis of drug-receptor interactions and interpret the information; describe how drugs can modify agonist-receptor interactions and be able to quantify these effects.
- Discuss the mechanisms by which drugs can modify the function of the cardiovascular system to treat disease states such as hypertension.
- Work effectively within a group to perform experiments and measurements that address the sites and mechanisms of drug action.
- Handle, graph, manipulate, tabulate and analyse pharmacological data derived from experiments.
- Demonstrate a range of transferable skills including written communication, information technology, numeracy, team working, problem solving, examination technique, information handling.

Teaching and Learning Methods

Lectures, tutorials and laboratory practical classes

Assessment Methods

Essay under exam conditions, practical report and examination (final).

Pre-Requisites
Co-Requisites
Excluded Combinations
Guided Independent Study: Indicative Activities

Preparation for laboratory practical class. Completion of worksheets for tutorials. Practical report preparatory work and report generation. Looking through lecture material before and after lectures, reviewing lecture recordings. Additional reading around subject areas and revision for examination.

BS2014 Exercise Physiology and Pharmacology

Academic Year: 2018/9
Module Level: Year 2
Scheme: UG
Department: Biological Sciences
Credits: 15

Student Workload (hours)

Lectures
 Seminars
 Practical Classes & Workshops
 Tutorials
 Fieldwork
 Project Supervision
 Guided Independent Study
 Demonstration
 Supervised time in studio/workshop
 Work Based Learning
 Placement
 Year Abroad
 Total Module Hours

Period: Semester 2
Occurrence: E
Coordinator: John Mitcheson
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Practical Report and supporting work	30				
002	Examination (final)	70		2		

Intended Learning Outcomes

On successful completion of the module, students should be able to:

- Explain the structure and function of the neuromuscular junction.
- Explain the different elements of the musculoskeletal system and skeletal muscle contraction.
- Integrate and explain the control mechanisms responsible for regulating the musculoskeletal, cardiovascular and respiratory systems through a consideration of the acute and chronic effects of, for example, aerobic exercise at the metabolic, cellular and systems levels.
- Describe the limitations to exercise and selected relationships between exercise, health and disease.
- Explain the use and abuse of drugs in performance sport, including cellular and systems effects.
- Demonstrate the ability to handle, manipulate, display and statistically analyse physiological data.
- Use a range of transferable skills including written communication, information technology, numeracy, team working, problem solving, examination technique, information handling.

Teaching and Learning Methods

Lectures, tutorials with problem-solving worksheets, laboratory practical class, work session, directed reading, study support session(s).

Assessment Methods

Practical report and supporting work, and examination.

Pre-Requisites
Co-Requisites
Excluded Combinations

BS2066 and BS2077

Guided Independent Study: Indicative Activities

Preparation for laboratory practical class. Completion of worksheets for tutorials. Practical report preparatory work and report generation. Looking through lecture material before and after lectures, reviewing lecture recordings. Additional reading around subject areas and revision for examination.

BS2015 Physiology of Excitable Cells

Academic Year: 2018/9
Module Level: Year 2
Scheme: UG
Department: Biological Sciences
Credits: 15

Student Workload (hours)

Lectures
 Seminars
 Practical Classes & Workshops
 Tutorials
 Fieldwork
 Project Supervision
 Guided Independent Study
 Demonstration
 Supervised time in studio/workshop
 Work Based Learning
 Placement
 Year Abroad
 Total Module Hours

Period: Semester 1
Occurrence: E
Coordinator: Martine Hamann
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Computer based exercises, data handling question during work session	40				
002	Examination (final)	60		1.5		

Intended Learning Outcomes

On successful completion of the module, students should be able to:

- Describe and explain, and analyse the many properties of ion channels and how they contribute to the resting membrane potential and the propagation of the action potential.
- Describe and analyse the basic mechanism by which neurons communicate, e.g. synaptic transmission and electrical coupling.
- Explain the basic molecular mechanisms underlying chemical transmission in the nervous system.
- Describe and analyse some key features of the mammalian nervous system, including cell types; sensory, autonomic, and motor divisions; and some of the anatomical pathways.
- Describe how synaptic information is integrated and the basis of synaptic plasticity. Provide a quantitative analysis of synaptic plasticity- Describe sensory integration during perception and analyse the properties of sensory integration.
- Use a range of transferable skills including written communication, information technology, numeracy, problem solving, examination technique, information handling.

Teaching and Learning Methods

Lectures, work-sessions with data handling questions and computerized exercises, directed reading.

Assessment Methods

Computer based exercises, data handling question during work-session.

Pre-Requisites
Co-Requisites
Excluded Combinations
Guided Independent Study: Indicative Activities

Completion of worksheets. Data handling questions, Looking through lecture material before and after lectures, reviewing lecture recordings. Additional reading around subject areas and revision for examination.

BS2026 Genes, Development and Inheritance

Academic Year:	2018/9	Student Workload (hours)
Module Level:	Year 2	Lectures
Scheme:	UG	Seminars
Department:	Biological Sciences	Practical Classes & Workshops
Credits:	15	Tutorials
		Fieldwork
		Project Supervision
		Guided Independent Study
		Demonstration
		Supervised time in studio/workshop
		Work Based Learning
		Placement
		Year Abroad
		Total Module Hours

Period: Semester 2
Occurrence: E
Coordinator: Frederick Tata
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
005	Experimental analysis	20				
006	Essay (1500 words)	20				
007	Examination (Final)	60		2		

Intended Learning Outcomes

On successful completion of the module, students should be able to:

- Explain the use of genetics to dissect gene regulation + function during development.- Describe how genetics is used to study human disease.- Analyse human pedigrees to determine inheritance patterns of genes.- Relate disruptions in the genome to expression of diseases and mutant phenotypes.
- Explain the use of population genetic analysis.
- Critically analyse experimental data.- Demonstrate competency in accessing information, organising references and writing and producing an essay.

Teaching and Learning Methods

Lectures and directed reading. Experimental practicals and analyses. Problem-solving tutorials.

Assessment Methods

Experimental analysis, essay (1500 words) and exam.

Pre-Requisites

Co-Requisites

Excluded Combinations

Guided Independent Study: Indicative Activities

Preparation for lectures and reviewing lecture presentations. Reading based on lecture topics. Preparation for problem-solving tutorials and follow-up of provided solutions. Researching and writing the essay. Exam preparation.

BS2030 Principles of Microbiology

Academic Year: 2018/9
Module Level: Year 2
Scheme: UG
Department: Biological Sciences
Credits: 15

Student Workload (hours)

Lectures
 Seminars
 Practical Classes & Workshops
 Tutorials
 Fieldwork
 Project Supervision
 Guided Independent Study
 Demonstration
 Supervised time in studio/workshop
 Work Based Learning
 Placement
 Year Abroad
 Total Module Hours

Period: Semester 1
Occurrence: E
Coordinator: Hasan Yesilkaya
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Practical Report	30				
002	Oral presentation	10				
003	Exam (final)	60		1.5		

Intended Learning Outcomes

On successful completion of the module, students should be able to:

- Explain basic techniques for isolation, handling and identification of bacteria and archaea, and demonstrate an ability to apply microbiology techniques in the laboratory.
 - Discuss the principles of taxonomy of bacteria and archaea and the diversity of the mechanisms for energy generation and cell architecture, and describe microbial communities and communication systems.
 - Evaluate ways in which genetic techniques can be applied to the study of bacteria and applications of these techniques in biotechnology.
 - Describe the salient features of selected groups of bacteria and archaea. Describe their uses in industrial processes.
- Describe basic themes in bacterial infectious diseases.
- Recognise the importance of bacterial and archaeal biology in relation to the sustainability of the health, environment and biotechnology sectors.

Teaching and Learning Methods

Lectures, seminar presentation, laboratory practicals; optional field trip (as offered to all 2nd year Microbiology BSc students).

Assessment Methods

Practical report, oral presentation and exam (final).

Pre-Requisites
Co-Requisites
Excluded Combinations
Guided Independent Study: Indicative Activities

Guided reading (text books and research journal articles), reviewing lectures, preparing written work.

BS2031 Virology

Academic Year: 2018/9
Module Level: Year 2
Scheme: UG
Department: Biological Sciences
Credits: 15

Student Workload (hours)

Lectures
 Seminars
 Practical Classes & Workshops
 Tutorials
 Fieldwork
 Project Supervision
 Guided Independent Study
 Demonstration
 Supervised time in studio/workshop
 Work Based Learning
 Placement
 Year Abroad
 Total Module Hours

Period: Semester 1
Occurrence: E
Coordinator: Alan Cann
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Single Best Answer Assessment	50		1.5		
002	Virology Techniques Report (1,500 words)	50				

Intended Learning Outcomes

On successful completion of the module, students should be able to:

- Demonstrate an awareness of the main principles of virology.
- Describe current key problems and areas of advance in virology and their contribution to health sustainability.
- Communicate in writing an awareness of concepts and debates in virology.

Teaching and Learning Methods

Lectures
 Practicals
 Tutorials

Assessment Methods

- Single Best Answer Assessment (1.5 hours): 50%
- Virology Techniques Report (1,500 words): 50%

Pre-Requisites
Co-Requisites
Excluded Combinations

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Guided Independent Study: Indicative Activities

Reading a wide range of literature relevant to the content of the module, including current news, textbooks and scientific articles. Preparing a report on techniques in virology. Reviewing lectures, revising for SBA assessment.

BS2032 Immunology and Eukaryotic Microbiology

Academic Year: 2018/9
Module Level: Year 2
Scheme: UG
Department: Biological Sciences
Credits: 15

Student Workload (hours)

Lectures
 Seminars
 Practical Classes & Workshops
 Tutorials
 Fieldwork
 Project Supervision
 Guided Independent Study
 Demonstration
 Supervised time in studio/workshop
 Work Based Learning
 Placement
 Year Abroad
 Total Module Hours

Period: Semester 2
Occurrence: E
Coordinator: Andrea Cooper
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
002	Workbook	40				
004	Examination	60		1.5		

Intended Learning Outcomes

On successful completion of the module, students should be able to:

- Describe the major features of eukaryotic microbiology and immunology.
- Perform microbiological and immunological procedures.
- Present and interpret laboratory results.
- Demonstrate competence in acquiring information from the scientific literature and use of basic bioinformatics tools.
- Be able to work effectively in small groups.
- Demonstrate effective time management.
- Demonstrate awareness of health sustainability.

Teaching and Learning Methods

Lectures
 Tutorials
 Laboratory practical classes
 Formative essay under exam conditions
 Optional field trip

Assessment Methods

- workbook: 40%
- Exam (1.5 hours): 60%

Pre-Requisites
Co-Requisites
Excluded Combinations

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Guided Independent Study: Indicative Activities

Reading a wide range of literature relevant to the content of the module, including current news, textbooks and scientific articles. Preparing a report on techniques in virology. Reviewing lectures, revising for SBA assessment.

BS2040 Bioinformatics

Academic Year: 2018/9
Module Level: Year 2
Scheme: UG
Department: Biological Sciences
Credits: 15

Student Workload (hours)

Lectures
 Seminars
 Practical Classes & Workshops
 Tutorials
 Fieldwork
 Project Supervision
 Guided Independent Study
 Demonstration
 Supervised time in studio/workshop
 Work Based Learning
 Placement
 Year Abroad
 Total Module Hours

Period: Semester 2
Occurrence: E
Coordinator: Richard Badge
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Practical report 1	20				
002	Practical report 2	20				
003	Practical report 3	60		2		

Intended Learning Outcomes

On successful completion of the module, students should be able to:

- Use computer systems to access bioinformatic databases.
- Explain the use of computers in analysing genomic data.
- Describe how protein structures are determined and modelled.
- Compare DNA and protein sequences to analyse gene structure and function.
- Demonstrate competency in accessing information, organising references and writing and producing practical reports.

Teaching and Learning Methods

Lectures and directed reading.
 Computer-based practical exercise and analyses.
 Problem-solving tutorials.

Assessment Methods

- Computer practical report: 20%
- Bioinformatic analysis: 20%
- Exam (2 hours): 60%

Pre-Requisites
Co-Requisites
Excluded Combinations

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Guided Independent Study: Indicative Activities

Preparation for lectures, including background reading.
 Reviewing and annotating lecture notes and lecture capture resources.
 Additional reading based on lecture topics.
 Preparation (directed reading on topics) for problem-solving tutorials.
 Review and follow-up of published Tutorial problem solutions.
 Preparation for computer practical, execution of practice computational analyses.
 Researching background to practical exercise, placing the results of analyses in the context of wider datasources / the literature.
 Writing up the practical reports.
 Exam preparation.

BS2066 Behavioural Neurobiology

Academic Year: 2018/9 Module Level: Year 2 Scheme: UG Department: Biological Sciences Credits: 15	Student Workload (hours) Lectures Seminars Practical Classes & Workshops Tutorials Fieldwork Project Supervision Guided Independent Study Demonstration Supervised time in studio/workshop Work Based Learning Placement Year Abroad Total Module Hours
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Period: Semester 2
Occurrence: E
Coordinator: Tom Matheson
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Practical Report 1	30				
002	Examination	70				

Intended Learning Outcomes

On successful completion of the module, students should be able to:

- Explain and critically discuss the main topics with reference to appropriate source material, including primary research papers.
- Plan and carry out experiment investigating different aspects of animal behaviour.
- Discuss the results of experiments in the context of the related research literature.
- Use a computer modelling environment to design and carry out tests of neural network function.
- Analyse the patterns of connectivity in a model neural network to explain its functional organisation.

Teaching and Learning Methods

- Traditional lectures, supported by Panopto lecture recordings and online PDF hand-outs.
- One laboratory (experimental) practical class and one computer practical class. The practical classes integrate experimental work with training in generic data analysis skills using student data as an example.
- Online learning environment (Blackboard) that supports guided independent study and practical classes.
- Online tests for student self-assessment.
- An independently researched essay written under exam conditions.
- Tutorials, including a feedback tutorial that focusses specifically on essay preparation and writing skills, and follow-up tutorials for the practical classes.
- Group learning through group work (in the practical classes), and through peer feedback (on mock-exam essay).
- Guided independent study.

Assessment Methods

- Practical Report: 30%
- Exam (2 hours): 70%

Pre-Requisites
Co-Requisites
Excluded Combinations

BS2077

Guided Independent Study: Indicative Activities

- Reading textbooks and primary research papers from the reading list and found independently to support the framework set out in the lectures.
- Preparing for practicals by reading the instructions in the Module Handbook and the relevant research papers
- Following up practicals by formulating and expressing relevant scientific hypotheses, performing independent analyses and writing them up.
- Preparing for the mock exam essay by researching for and reading relevant literature, and preparing essay outlines.
- Preparing for tutorials by reading relevant material in advance and preparing for group discussions.
- Developing knowledge and preparing for the exam by: revising lecture notes, Panopto recordings, online learning resources, feedback materials (from tutorials, the mock exam essay, and practical reports), and material from the reading list as well as independently found sources.

BS2076 Evolutionary and Developmental Biology

Academic Year: 2018/9
Module Level: Year 2
Scheme: UG
Department: Biological Sciences
Credits: 15

Student Workload (hours)

Lectures
 Seminars
 Practical Classes & Workshops
 Tutorials
 Fieldwork
 Project Supervision
 Guided Independent Study
 Demonstration
 Supervised time in studio/workshop
 Work Based Learning
 Placement
 Year Abroad
 Total Module Hours

Period: Semester 1
Occurrence: E
Coordinator: Sinead Drea
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Practical report	30				
002	Essay (1500 words)	15				
003	Examination	50		1.5		
004	Computer Practical (within class)	5				

Intended Learning Outcomes

On successful completion of the module, students should be able to:

- Recognise the evolution is more than just natural selection but also involves other mechanisms.
- Integrate classical (e.g. Darwinian) and molecular approaches to evolution, including its impact on developmental biology and health.
- Explain how evolution can help understand aspects of disease/conditions e.g. cancer.
- Recognise the importance of cell lineage, positional information and cell-cell communication during development of representative animals and plants.
- Recognise the fundamental role of differential gene expression in development and the impact of large-scale (genomic level) data.
- Explain how evolution of development can contribute to generating diversity from kingdom to species level.
- Examine development of organisms in the lab and critically assess the data collected.
- Demonstrate competency in accessing information (related to research articles and online databases), organising/formatting references and appropriate writing styles associated with scientific essays and reports.

Teaching and Learning Methods

Lectures and directed reading; bench and computer lab practicals and analyses; workshops/tutorials to provide guidance for essay and report coursework assignments and for exam preparation.

Assessment Methods

- Computer Practical: 5%
- Essay: 15%
- Practical Report: 30%
- Exam (1.5 hours): 50%

Pre-Requisites
Co-Requisites
Excluded Combinations

-

Guided Independent Study: Indicative Activities

Preparation for lectures and reviewing lecture material and concepts. Reading based on lecture topics. Preparation for researching and writing essay and report.

BS2077 Neurobiology and Animal Behaviour

Academic Year:	2018/9	Student Workload (hours)
Module Level:	Year 2	Lectures
Scheme:	UG	Seminars
Department:	Biological Sciences	Practical Classes & Workshops
Credits:	15	Tutorials
		Fieldwork
		Project Supervision
		Guided Independent Study
		Demonstration
		Supervised time in studio/workshop
		Work Based Learning
		Placement
		Year Abroad
		Total Module Hours

Period: Semester 2
Occurrence: E
Coordinator: Swidbert Ott
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Practical Report	30				
002	Examination	70		2		

Intended Learning Outcomes

- On successful completion of the module, students should be able to:
- Explain and critically discuss with reference to appropriate source material, including primary research papers.
 - Plan and carry out experiments investigating different aspects of animal behaviour.
 - Formulate hypotheses and test them using appropriately chosen and interpreted statistical techniques.

Teaching and Learning Methods

- Traditional lectures, supported by Panopto lecture recordings
- One laboratory (experimental) practical class and one computer practical class. The practical classes integrate experimental work and training in generic data analysis skills using the student practical data as an example.
- Online learning environment that supports guided independent study and front-loads practical classes.
- Online tests for student self-assessment.
- An independently researched essay written under exam conditions.
- Tutorials, including a "feedback tutorial" that focusses specifically on essay preparation and writing skills and follow-up tutorials for the practical classes.
- Group learning through group work (in the practical classes), and through peer assessment and feedback (on the mock-exam essay)
- Guided independent study

Assessment Methods

- Practical Report: 30%
- Exam (2 hours): 70%

Pre-Requisites

Co-Requisites

Excluded Combinations

BS2066

Guided Independent Study: Indicative Activities

- Reading textbooks and primary research papers from the reading list and beyond to support the framework set out in the lectures.
- Preparing for practicals and tutorials by working through the material in the Module Handbook, online learning environment and relevant research paper.
- Following up practicals by independently performing, interpreting and presenting graphical and statistical analyses of the data.
- Preparing for the exam by revising lecture notes, Panopto recordings, online learning resources and the feedback given in tutorials and practical reports.

BS2091 Biochemistry of Nucleic Acids

Academic Year: 2018/9
Module Level: Year 2
Scheme: UG
Department: Biological Sciences
Credits: 15

Student Workload (hours)

Lectures
 Seminars
 Practical Classes & Workshops
 Tutorials
 Fieldwork
 Project Supervision
 Guided Independent Study
 Demonstration
 Supervised time in studio/workshop
 Work Based Learning
 Placement
 Year Abroad
 Total Module Hours

Period: Semester 2
Occurrence: E
Coordinator: Olga Makarova
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Scientific Summary Task (1,000 words)	25				
002	Summary of Practical (data analysis)	5				
003	Examination	70		2		

Intended Learning Outcomes

On successful completion of the module, students should be able to:

- Describe how information encoded in DNA is transcribed into RNA and how primary transcripts are processed to achieve their final, functional form.
- Demonstrate the principles of the genetic code and translation of genetic information from messenger RNA into protein.
- Carry out and interpret simple experiments illustrating aspects of the above.
- Explain the principles underpinning the regulation of gene expression in prokaryotes and eukaryotes.
- Describe molecular mechanisms of DNA manipulation by specified enzyme(s).
- Develop transferable skills in writing and data analysis.

Teaching and Learning Methods

Lectures, practicals and small discussion groups (tutorials)

Assessment Methods

- Exam: 70% (2 hours)
- Summary of Practical: 5%
- Scientific Summary Task: 25%

Pre-Requisites
Co-Requisites
Excluded Combinations

-

Guided Independent Study: Indicative Activities

Guided reading, recommended audiovisual materials.
 Lectures made available for review using Reflect.
 Preparation for tutorials.
 Research for long-format writing task.

BS2092 Molecular Cell Biology

Academic Year: 2018/9
Module Level: Year 2
Scheme: UG
Department: Biological Sciences
Credits: 15

Student Workload (hours)

Lectures
 Seminars
 Practical Classes & Workshops
 Tutorials
 Fieldwork
 Project Supervision
 Guided Independent Study
 Demonstration
 Supervised time in studio/workshop
 Work Based Learning
 Placement
 Year Abroad
 Total Module Hours

Period: Semester 1
Occurrence: E
Coordinator: Sue Shackleton
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
002	Practical Report	30				
003	Examination (Final)	70		2		

Intended Learning Outcomes

On successful completion of the module, students should be able to:

- Describe the principles and outline the steps involved in common cell biology techniques.
- Explain how membrane and secreted proteins are post-translationally processed and targeted to different subcellular and extracellular locations.
- Explain how signalling pathways integrate extracellular signals to allow the regulation of complex cellular processes such as metabolism and cell proliferation.
- Explain the respective roles of microtubules, actin and intermediate filaments in the maintenance of cell architecture and function.
- Describe the processes involved in mitotic cell division and eukaryotic cell cycle control.
- Develop a strategy to address a specific scientific hypothesis and be able to critically analyse the results of such experiments.

Teaching and Learning Methods

Lectures
 Practicals
 Tutorials

Assessment Methods

- Practical Report: 30%
- Exam: 70% (2 hours)

Pre-Requisites
Co-Requisites
Excluded Combinations

-

Guided Independent Study: Indicative Activities

Reading of course material and watching videos ahead of lectures and flipped classroom sessions.
 Recapping lecture material via Reflect.
 Consolidation and extending understanding through reading of recommended cell biology text books.
 Preparation of answers to tutorial questions.
 Analysis of data and writing of practical report.
 Completion of on-line formative quizzes to test knowledge of amino acids properties and of general course material.
 Revision for end of module exam.

BS3000 Evolutionary Genetics

Academic Year:	2018/9	2018/9	Student Workload (hours)
Module Level:	Year 3		Lectures 36
Scheme:	UG		Seminars
Department:	Biological Sciences	Practical Classes & Workshops	3
Credits:	15		Tutorials
			Fieldwork
			Project Supervision
		Guided Independent Study	161
		Demonstration	
		Supervised time in studio/workshop	
		Work Based Learning	
		Placement	
		Year Abroad	
		Total Module Hours	200

Period:	Semester 1
Occurrence:	E
Coordinator:	Charalambos Kyriacou
Mark Scheme:	UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Essay (2500 words)	21				
002	Poster Presentation	9				
003	Examination	70		3		

Period:	Semester 1
Occurrence:	E1
Coordinator:	Charalambos Kyriacou
Mark Scheme:	UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Essay (2500 words)	21				
002	Poster Presentation	9				
003	Examination	70		3		

Intended Learning Outcomes

Students should understand the evolution of genes and genomes as well as appreciating the relevant roles of selection, migration and drift in shaping the genetic profiles of populations. This will be implemented through their ability to:

1. Explain the evolution of life from simple RNA molecules
2. Describe how bacterial evolution provides a model for understanding microevolution
3. Assess the use of phylogenies to answer more than just species topologies
4. Explain the evolution of gene regulation with regard to developmental and behavioural genes
5. Deduce models of human and primate evolution and genetic history
6. Provide examples of where the study of ancient DNA has illuminated macroevolutionary events
7. Assess how changes in genetic variation caused by exposure to mutagens in the environment relate to future evolutionary processes.

Teaching and Learning Methods

Lectures, directed and self-directed reading, essay, poster

Assessment Methods

Essay, poster presentation, examination.

Pre-Requisites
Co-Requisites
Excluded Combinations

-

Guided Independent Study: Indicative Activities

BS3003 Cancer Cell and Molecular Biology

Academic Year: 2018/9
Module Level: Year 3
Scheme: UG
Department: Biological Sciences
Credits: 20

Student Workload (hours)

Lectures	30
Seminars	
Practical Classes & Workshops	
Tutorials	7
Fieldwork	
Project Supervision	
Guided Independent Study	163
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	200

Period: Semester 2
Occurrence: E
Coordinator: Salvador Macip
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Essay	20				
002	Tutorial Report	10				
003	Examination (Final)	70		3		

Intended Learning Outcomes

On completion of the module students should be able to: describe the main features which distinguish malignant cells from normal cells; describe the mechanisms which regulate the proliferation of normal cells including cell signalling pathways, cell cycle control and apoptosis; explain how mutations in oncogenes and tumour suppressor genes contribute to the malignant phenotype; describe the pathological processes of cancer cell metastasis and tumour angiogenesis; integrate information from diverse sources which have contributed to the understanding of the origins of human cancer; conduct a literature research project, and write a critical appraisal of the subject.

Teaching and Learning Methods

Lectures, tutorials.

Assessment Methods

Tutorial reports, essay, essay-based examination.

Pre-Requisites

BS2092

Co-Requisites
Excluded Combinations

-

Guided Independent Study: Indicative Activities

BS3009 Genomics: a Microbial Perspective

Academic Year:	2018/9	Student Workload (hours)	
Module Level:	Year 3	Lectures	36
Scheme:	UG	Seminars	
Department:	Biological Sciences	Practical Classes & Workshops	
Credits:	20	Tutorials	7
		Fieldwork	
		Project Supervision	
		Guided Independent Study	157
		Demonstration	
		Supervised time in studio/workshop	
		Work Based Learning	
		Placement	
		Year Abroad	
		Total Module Hours	200

Period:	Semester 2
Occurrence:	E
Coordinator:	Julie Morrissey
Mark Scheme:	UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Experimental analysis 1	10				
002	Experimental analysis 2	10				
003	Experimental analysis 3	10				
004	Examination	70		3		

Intended Learning Outcomes

On completion of the module, students shall be able to:- Understand how pathogenic microbes generate genetic diversity and survive inside their hosts and other niches. Appreciate how cutting-edge genomic techniques can be used for analysis of microbial genome diversity and function, and as a tool for investigation of human disease processes. Communicate experimental strategies in written presentations. Research the literature relevant to the topics concerned. Communicate database searches and reviews of the literature in written presentations.

Teaching and Learning Methods

Lectures, tutorials, self directed learning associated with tutorial assignment.

Assessment Methods

Three hour examination with essay questions. Three assessed written assignments.

Pre-Requisites

BS2009 or BS2010

Co-Requisites
Excluded Combinations

-

Guided Independent Study: Indicative Activities

BS3010 Gene Expression: Molecular Basis and Medical Relevance

Academic Year:	2018/9	Student Workload (hours)	
Module Level:	Year 3	Lectures	30
Scheme:	UG	Seminars	1
Department:	Biological Sciences	Practical Classes & Workshops	
Credits:	20	Tutorials	6
		Fieldwork	
		Project Supervision	
		Guided Independent Study	160
		Demonstration	
		Supervised time in studio/workshop	3
		Work Based Learning	
		Placement	
		Year Abroad	
		Total Module Hours	200

Period:	Semester 2
Occurrence:	E
Coordinator:	Ian Eperon
Mark Scheme:	UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Written work in tutorials	7.5				
002	Computer Session	7.5				
003	Debates	15				
004	Examination (Final)	70		3		

Intended Learning Outcomes

By the end of this module students should be able to:

- Describe the principal components, both protein and RNA, involved in transcription, RNA processing and micro RNA action.
- Explain how these components act and interact during the various reactions involved in gene expression.
- Describe the mechanisms by which the levels or sequences of the products are regulated.
- Review the main lines of evidence supporting the mechanisms proposed.
- Discuss how these processes may cause or be altered in disease.
- Demonstrate in writing and in discussion their knowledge of current research methods and scientific reasoning.

Teaching and Learning Methods

Lectures and tutorials.

Assessment Methods

Final examination (70%), seminar debates (15%), written work associated with tutorials (7.5%) and a computer session (7.5%)

Pre-Requisites

BS2091

Co-Requisites

Excluded Combinations

-

Guided Independent Study: Indicative Activities

BS3012 Infection and Immunity

Academic Year: 2018/9
Module Level: Year 3
Scheme: UG
Department: Biological Sciences
Credits: 20

Student Workload (hours)

Lectures	28
Seminars	
Practical Classes & Workshops	
Tutorials	3
Fieldwork	
Project Supervision	
Guided Independent Study	169
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	200

Period: Semester 1
Occurrence: E
Coordinator: Christopher Bayliss
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Essay under exam conditions	15				
002	Single Best Answer And Extended Matching Question Test	15				
003	Examination, Including 15 Minutes Reading Time (Final)	70		3.25		

Period: Semester 1
Occurrence: E1
Coordinator: Christopher Bayliss
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Essay under exam conditions	15				
002	Single Best Answer And Extended Matching Question Test	15				
003	Examination, Including 15 Minutes Reading Time (Final)	70		3.25		

Intended Learning Outcomes

At the end of this module, typical students should be able to: Demonstrate a detailed knowledge of the mammalian immune system, including specific and non-specific immune responses.
 Describe the molecular and genetic basis of strategies employed by microorganisms to invade host tissue, avoid host defence mechanisms and proliferate at sites of infection.
 Explain and appreciate the molecular and cellular approaches used to investigate mechanisms of infection and immunity.
 Analyse and interpret data and information acquired from primary literature sources, then organise and communicate it in writing.
 Demonstrate in writing a capacity for critical analysis of a specialised or topical issue in microbiology or immunology.

Teaching and Learning Methods

Lectures, Formative Tutorials, Examination techniques, Directed reading, Data Analysis.

Assessment Methods

Essay under exam conditions, Essay and data analysis examination questions, Single best answer and extended matching question test.

Pre-Requisites

BS2024

Co-Requisites
Excluded Combinations

-

Guided Independent Study: Indicative Activities

BS3013 Environmental Microbiology

Academic Year:	2018/9	Student Workload (hours)	
Module Level:	Year 3	Lectures	30
Scheme:	UG	Seminars	10
Department:	Biological Sciences	Practical Classes & Workshops	
Credits:	20	Tutorials	2
		Fieldwork	
		Project Supervision	
		Guided Independent Study	158
		Demonstration	
		Supervised time in studio/workshop	
		Work Based Learning	
		Placement	
		Year Abroad	
		Total Module Hours	200

Period:	Semester 2
Occurrence:	E
Coordinator:	Martha Clokie
Mark Scheme:	UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Essay (2000 words)	15				
002	Presentation	15				
003	Examination (Final)	70		3		

Intended Learning Outcomes

On the completion of the module students should:

- Be able to critically assess current views on the origins of life and the evolution of the major microbial taxa, drawing on evidence from the fossil record, abiogenic syntheses experiments and molecular evidence in gene sequence
- Be able to identify the key roles played by microbes in the aquatic and terrestrial environment including soil structure, element cycles, metal extraction and human health.
- Be able to evaluate important plant-microbe interactions such as the rhizobium-legume symbiosis and the possibilities for manipulating such systems to agronomic advantage
- Be able to define the detrimental roles played by microbes in pollution and the beneficial roles played by microbes in waste water treatment, bioremediation and biofuel production
- Demonstrate, in the context of the above areas of environmental microbiology, experience of accessing information from the scientific literature in electronic and written form, and its organisation through oral and written presentation.

Teaching and Learning Methods

Lectures, seminars and tutorials.

The aim is to improve your communication skills, whilst at the same time improving your knowledge of material closely allied to the lecture course.

The aim is to improve your communication skills, whilst at the same time improving your knowledge of material closely allied to the lecture course.

Assessment Methods

For the seminar you will each prepare and present a 15 minute talk on an assigned topic, in front of the rest of your colleagues.

The material will then be critically assessed by your colleagues and the academic staff. The seminar presentation will be marked and account for 15% of the total marks available for BS3013. The essay on the subject matter of your seminar (2,000 words) similarly accounts for 15% of your marks.

Tutorial slots are available on demand in the summer term for discussion and clarification of course topics.

Pre-Requisites

BS2010

Co-Requisites
Excluded Combinations

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Guided Independent Study: Indicative Activities

BS3016 Neuroscience Futures

Academic Year: 2018/9
Module Level: Year 3
Scheme: UG
Department: Biological Sciences
Credits: 20

Student Workload (hours)

Lectures	3
Seminars	21
Practical Classes & Workshops	
Tutorials	8
Fieldwork	
Project Supervision	
Guided Independent Study	168
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	200

Period: Semester 2
Occurrence: E
Coordinator: Vincenzo Marra
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Journal club presentations	20				
002	Essay	10				
003	Examination	70		3.25		

Intended Learning Outcomes

- Interrogate the primary neuroscience literature in areas of current research led by relevant academic staff
- Appreciate recent advances in neuroscience with particular references to new and developing methodologies.
- Read, analyse, and interpret complex published data from the neuroscience literature
- Demonstrate the ability to communicate research findings in writing or orally.
- Integrate relevant information from related articles within neuroscience and propose future research directions.

Teaching and Learning Methods

Research seminars, journal club and student presentations

Assessment Methods

Examination - Essays - 70% 3 h plus 15 min reading time
 Coursework - Essay 10%
 Journal club presentations (20%)

Pre-Requisites

BS2015: Neuroscience
 BS2066: Behavioural Neurobiology

Co-Requisites
Excluded Combinations

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Guided Independent Study: Indicative Activities

BS3018 Genes and Development

Academic Year: 2018/9
Module Level: Year 3
Scheme: UG
Department: Biological Sciences
Credits: 20

Student Workload (hours)

Lectures	34
Seminars	0
Practical Classes & Workshops	3
Tutorials	2
Fieldwork	0
Project Supervision	0
Guided Independent Study	161
Demonstration	0
Supervised time in studio/workshop	0
Work Based Learning	0
Placement	0
Year Abroad	0
Total Module Hours	200

Period: Semester 2
Occurrence: E
Coordinator: Frederick Tata
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Essay (3000 words)	21				
002	Poster presentation	9				
003	Examination	70		3		

Intended Learning Outcomes

At the end of this module typical students should be able to:
 Describe the molecular mechanisms that link genes to development in the examples studied.
 Relate the experimental evidence to its interpretation.
 Explain the methods used to study gene function in model organisms.
 Devise experimental strategies for investigation of gene function and regulation during development.
 Interpret research publications and present interpretations in both written and oral forms.

Teaching and Learning Methods

Lectures and guided reading, independent research of a specified topic, poster presentation.

Assessment Methods

Poster presentation, essay, examination.

Pre-Requisites

BS2026

Co-Requisites
Excluded Combinations

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Guided Independent Study: Indicative Activities

BS3019 Plant Identification Skills

Academic Year: 2018/9
Module Level: Year 3
Scheme: UG
Department: Biological Sciences
Credits: 20

Student Workload (hours)

Lectures	15
Seminars	
Practical Classes & Workshops	30
Tutorials	3
Fieldwork	
Project Supervision	
Guided Independent Study	152
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	200

Period: Semester 1
Occurrence: E
Coordinator: Richard Gornall
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Essay (2000 words)	15				
002	Lab book	5				
003	Practical examination	80		3		

Period: Semester 1
Occurrence: E1
Coordinator: Richard Gornall
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Essay (2000 words)	15				
002	Lab book	5				
003	Practical examination	80		3		

Intended Learning Outcomes

On successful completion of the module, students should be able to:

- 1) demonstrate an understanding of the major plant groups and their evolutionary relationships;
- 2) Use the different types of identification key, know how to use them, and understand the relative merits of each;
- 3) Explain the morphology of various types of flower and other features relevant to family identification, and be able to describe it using appropriate botanical terminology;
- 4) identify reliably any land plant to the level of class;
- 5) identify reliably at least 36 of the commoner flowering plant families found wild in the British Isles.

Successful completion of the module provides some of the necessary training in order to sit the exam for a Field Identification Skills Qualification (FISQ), a professional qualification validated by the Botanical Society of Britain and Ireland.

Teaching and Learning Methods

Lectures, tutorials, and laboratory practical classes.

Students should take notice of the unusual timetabling: one 3-hour evening session per week, plus a total of 3 Saturdays.

Assessment Methods

Essay, Formative assessment, Practical Exam

Pre-Requisites
Co-Requisites
Excluded Combinations

-

Guided Independent Study: Indicative Activities

BS3031 Human Genetics

Academic Year:	2018/9	2018/9	Student Workload (hours)
Module Level:	Year 3		Lectures 30
Scheme:	UG		Seminars
Department:	Biological Sciences		Practical Classes & Workshops
Credits:	15		Tutorials 4
			Fieldwork
			Project Supervision
			Guided Independent Study 166
			Demonstration
			Supervised time in studio/workshop
			Work Based Learning
			Placement
			Year Abroad
			Total Module Hours 200

Period: Semester 1
Occurrence: E
Coordinator: Nicola Royle
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Essay (3000 words)	20				
002	Poster presentation	10				
003	Examination (Final)	70		3		

Period: Semester 1
Occurrence: E1
Coordinator: Nicola Royle
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Essay (3000 words)	20				
002	Poster presentation	10				
003	Examination (Final)	70		3		

Intended Learning Outcomes

By the end of the module students should be able to:
 Explain the basis of genetic variation, how it arises and how it can be used to analyse the genome.
 Describe the variety and complexity of the relationships between mutations in or near genes and the manifestation of a disease phenotype.
 Discuss the many ways that research in human genetics can be used, e.g. to study evolution, in forensics, for diagnosis, for therapy. Conduct an independent literature search on a topic of their choice and present their findings in written format; research in small groups and present their findings as a poster for discussion.

Teaching and Learning Methods

Lectures, student-lead seminars, problem-solving tutorials, directed learning, self-directed learning

Assessment Methods

Essay, poster presentation, essay, examination.

PLEASE NOTE: The examination for this module is scheduled in Midsummer (May/June).

Pre-Requisites

BS2009, BS2026

Co-Requisites
Excluded Combinations

-

Guided Independent Study: Indicative Activities

BS3033 Brain and Behaviour

Academic Year: 2018/9
Module Level: Year 3
Scheme: UG
Department: Biological Sciences
Credits: 20

Student Workload (hours)

Lectures	28
Seminars	3
Practical Classes & Workshops	10
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	159
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	200

Period: Semester 2
Occurrence: E
Coordinator: James McCutcheon
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
005	Group Presentation	10				
006	Essay (2000 words)	20				
007	Examination (Final)	70		3		

Intended Learning Outcomes

On successful completion of the module, students should be able to:

Describe LTD/LTD in context of learning and memory
 Interpret processing of visual information
 Correlate roles of structures involved in movement
 Evaluate mechanisms of feeding and reward
 Describe approaches to investigating CNS function
 Relate role of integration within the CNS
 Discuss orally or in writing critical analysis of a theory

Teaching and Learning Methods

Lectures, practical classes, directed reading, group work

Assessment Methods

Oral group presentation in the form of a critical review of a scientific programme
 Essay of 2500 words
 3 hr, essay-based examination

Pre-Requisites

BS2014 or BS2015 or BS2066

Co-Requisites
Excluded Combinations

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Guided Independent Study: Indicative Activities

Directed reading of supplied reference material, generally academic papers; research for essay and presentation topics using searchable databases and library/web resources; attendance at non-compulsory departmental research seminars.

BS3035 Virology

Academic Year: 2018/9
Module Level: Year 3
Scheme: UG
Department: Biological Sciences
Credits: 20

Student Workload (hours)

Lectures	30
Seminars	
Practical Classes & Workshops	
Tutorials	6
Fieldwork	
Project Supervision	
Guided Independent Study	164
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	200

Period: Semester 2
Occurrence: E
Coordinator: Alan Cann
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Essay Plan	5				
002	Essay (3000 words)	25				
003	Examination (Final)	70		3		

Intended Learning Outcomes

At the end of this module, typical students should be able to: Demonstrate an awareness of the main principles of Virology, having assimilated information on each of the major groups of vertebrate viruses and be able to explain the key concepts. Describe current key areas of advance in virology, including viruses and cancer, AIDS and prion diseases. Demonstrate the capacity for critical scientific analysis of issues in Virology Access appropriate scientific literature and demonstrate the capacity to analyse and criticise evidence gathered. Communicate in writing an awareness of concepts and debates in Virology Demonstrate the potential for life-long learning, use of C&IT, the capacity to access a variety of resource materials and effective time management.

Teaching and Learning Methods

Lectures, Tutorials, Directed Reading

Assessment Methods

Essay, Essay Examination

Pre-Requisites

BS2024

Co-Requisites
Excluded Combinations

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Guided Independent Study: Indicative Activities

BS3054 Molecular & Cellular Pharmacology

Academic Year:	2018/9	Student Workload (hours)	
Module Level:	Year 3	Lectures	30
Scheme:	UG	Seminars	
Department:	Biological Sciences	Practical Classes & Workshops	8
Credits:	20	Tutorials	2
		Fieldwork	
		Project Supervision	
		Guided Independent Study	160
		Demonstration	
		Supervised time in studio/workshop	
		Work Based Learning	
		Placement	
		Year Abroad	
		Total Module Hours	200

Period:	Semester 1
Occurrence:	E
Coordinator:	John Challiss
Mark Scheme:	UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Original research paper appraisal (750 words)	15				
002	Data handling and analysis	15				
003	Examination	70		3		

Intended Learning Outcomes

When a student has completed this module s/he should be able to:

- (i) Describe the structure and function of components of cell signalling cascades (e.g. G protein-coupled receptors (GPCRs)/ receptor tyrosine kinases (RTKs), G proteins (monomeric and heteromeric), enzymic and ion channel effectors), and how they interact with each other.
- (ii) Explain how receptors are regulated by pharmacological agents (e.g. agonists, antagonists, inverse agonists) that can act either orthosterically or allosterically.
- (iii) Provide a detailed contemporary account of the mechanisms of receptor desensitization / internalization / down-regulation and discuss the (patho)physiological and pharmacological significance of such regulation.
- (iv) Give examples of signalling pathways, showing how they are structured (e.g. by compartmentation, scaffolding), their (patho)physiological function(s), and how therapeutic targets might be selected and pharmacologically manipulated.
- (v) Discuss, generally and through use of specific examples, the pharmacological manipulation of GPCR and RTK activities, ion channels and intracellular enzyme activities.
- (vi) Relate acute cell signalling events to long-term changes in cell phenotype and fate: this should include an explanation of cell surface-to-nuclear signalling and how changes in stimulation patterns or components of signalling pathways may regulate longer term (patho)physiological adaptations as might be observed in certain disease conditions (e.g. hypertrophic changes in cardiomyopathies).
- (vii) The student should also be able to critically appraise original research papers, to analyse and interpret pharmacological experimental data and devise experimental strategies to address specific research questions.

Teaching and Learning Methods

Lectures, tutorials, computer-based work-session

Assessment Methods

Coursework (30%): Original research paper appraisal (750 words; preparation tutorial-supported); Data-handling and analysis including a computer-based work-session. Examination (70%): 3 essays chosen from 8-10 topics on examination paper.

PLEASE NOTE: The examination for this module is scheduled in Midsummer (May/June).

Pre-Requisites

BS2013 plus either BS2014 or BS2015 or BS2066

Co-Requisites
Excluded Combinations

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BS3054 Molecular & Cellular Pharmacology

Guided Independent Study: Indicative Activities

BS3055 Molecular & Cellular Neuroscience

Academic Year:	2018/9	2018/9	Student Workload (hours)
Module Level:	Year 3		Lectures 26
Scheme:	UG		Seminars
Department:	Biological Sciences		Practical Classes & Workshops
Credits:	15		Tutorials 8
			Fieldwork
			Project Supervision
			Guided Independent Study 166
			Demonstration
			Supervised time in studio/workshop
			Work Based Learning
			Placement
			Year Abroad
			Total Module Hours 200

Period: Semester 1
Occurrence: E
Coordinator: Nick Hartell
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Essay	15				
002	Tutorials (Data Interpretation)	15				
003	Examination (including 15mins reading time)	70		3.25		

Period: Semester 1
Occurrence: E1
Coordinator: Nick Hartell
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Essay	15				
002	Tutorials (Data Interpretation)	15				
003	Examination (including 15mins reading time)	70		3.25		

Intended Learning Outcomes

On successful completion of the module, students should be able to:

Summarise the properties of ion channels, receptors and signalling pathways involved in synaptic transmission
 Understand the spatial and temporal sequence of events and signals that underlie the development of the nervous system
 Describe dendritic propagation and the mechanisms underlying action potential generation
 Describe the molecular organization of a neurone and the role of anchoring, scaffolding, receptor and signalling proteins in pre- and post-synaptic regions
 Explain the molecular mechanisms controlling neurotransmitter release, synaptic transmission and synaptic plasticity
 Appreciate the role played by Nitric Oxide in the CNS
 Identify the specialized features employed to transmit information between neurons and to understand how neuronal excitability is regulated

Critically evaluate current literature
 Comprehend data series and learn how to interpret neuroscience experiments.

Teaching and Learning Methods

Lectures - Providing introductory material and helping to guide independent study.
 Tutorials - A combination of data interpretation/problem based learning and critical assessment of current literature.
 Essays – An opportunity for students to research, in depth, a topic that is likely to be examined.

Assessment Methods

Essay and exam
 Coursework: "News and Views" style article (formative assessment)
 Coursework: Tutorial based data handling questions (summative).

Pre-Requisites

BS2013 or BS2014 or BS2015 or BS2066

Co-Requisites
Excluded Combinations

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BS3055 Molecular & Cellular Neuroscience

Guided Independent Study: Indicative Activities

Students should use the material provided in lectures and tutorials to review and research, in more depth, each of the topics covered in the course

BS3056 Cellular Physiology of the Cardiovascular System

Academic Year:	2018/9	Student Workload (hours)	
Module Level:	Year 3	Lectures	30
Scheme:	UG	Seminars	0
Department:	Biological Sciences	Practical Classes & Workshops	2
Credits:	20	Tutorials	4
		Fieldwork	0
		Project Supervision	0
		Guided Independent Study	162
		Demonstration	2
		Supervised time in studio/workshop	0
		Work Based Learning	0
		Placement	0
		Year Abroad	0
		Total Module Hours	200

Period:	Semester 2
Occurrence:	E
Coordinator:	Noel Davies
Mark Scheme:	UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Practical and demonstration	15				
002	Critical essay (2000 words)	15				
003	Examination (including 15 minutes reading time)	70		3.25		

Intended Learning Outcomes

On successful completion of the module, students should be able to:

- Describe the cardiovascular system and appreciate the control systems involved in regulating the heart blood pressure and exchange of solutes between blood and tissue
- Explain the mechanisms of ion transport at the cell membrane and understand how ion channel structure relates to function
- Discuss the molecular processes involved in regulating ion channels and contractile proteins within the cardiovascular system
- Describe the cellular mechanisms leading to the generation and regulation of the cardiac action potential
- Explain the mechanisms that lead to contraction of both cardiac and smooth muscle and how these processes are controlled by the regulation of intracellular Ca²⁺
- Discuss disorders of cardiac rhythm and appreciate the consequences of impaired blood supply (ischaemia)
- Discuss the mechanisms that regulate vascular function in relation to the control of blood flow and blood pressure and describe some genetic and environmental aspects leading to vascular disease
- Discuss the causes and consequences of atherosclerosis
- Discuss the mechanisms and importance of receptor-operated Ca²⁺ increases in blood cells such as platelets and lymphocytes
- Apply biological knowledge in constructing hypotheses, interpreting experiments and results, data handling and evaluation of numerical and non-numerical information; drawing conclusions and making inferences; assessing the validity of experiments, results, conclusions, inferences and statements; identifying ambiguities, assumptions and mistakes
- Communicate biological information in continuous prose and by means of tables, diagrams, drawings and graphs

Teaching and Learning Methods

Lectures, practical classes, demonstration, tutorials

Assessment Methods

Exam, practical report and essay

Pre-Requisites

BS2013 plus either BS2014, BS2015 or BS2066.

Co-Requisites
Excluded Combinations

-

Guided Independent Study: Indicative Activities

- Sourcing, reading and interpreting literature relevant to the critical essay.
- Writing the essay
- Analysing, interpreting and presenting data obtained from the practical and demonstration components.
- Writing both components of a practical report.
- Preparing for the tutorials using pre-circulated tutorial questions.
- Reviewing lecture material and reading literature relevant to the lecture topics to gain further insight into the module content.

BS3064 Comparative Neurobiology

Academic Year:	2018/9	2018/9	Student Workload (hours)
Module Level:	Year 3		Lectures 24
Scheme:	UG		Seminars
Department:	Biological Sciences	Practical Classes & Workshops	13
Credits:	15	Tutorials	5

Fieldwork	
Project Supervision	
Guided Independent Study	158
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	200

Period:	Semester 1
Occurrence:	E
Coordinator:	Tom Matheson
Mark Scheme:	UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Practical report	15				
002	Tutorial essay	15				
003	Examination	70		3		

Period:	Semester 1
Occurrence:	E1
Coordinator:	Tom Matheson
Mark Scheme:	UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Practical report	15				
002	Tutorial essay	15				
003	Examination	70		3		

Intended Learning Outcomes

On successful completion of the module, students should be able to:

- Use evidence from different animal groups to demonstrate knowledge and understanding of the principles of operation of proprioception, audition, integration of sensory information to generate behaviour, olfaction, and control of limb movements.
- Synthesize raw data and published information to demonstrate understanding of energy storage mechanisms involved in insect jumping
- Synthesize a range of relevant research literature to demonstrate understanding of a current topic in neuroscience.

Teaching and Learning Methods

Lectures, tutorials and laboratory practical classes. Guided study.

Assessment Methods

Practical report, Tutorial Essay, Examination

Pre-Requisites

BS2014 OR BS2066 OR BS2077

Co-Requisites
Excluded Combinations

-

Guided Independent Study: Indicative Activities

- Preparing for practicals by reading the detailed practical instructions and related research papers.
- Carrying out in-depth analyses of two large datasets of practical results. Interpreting the data and relating them to the relevant literature.
- Reading primary research literature and textbooks to support the framework provided in lectures.
- Preparing for tutorials by searching for and reading relevant research literature, and writing essay outlines based on this.
- Following up on tutorials by revising collated material from the sessions, planning and writing a coursework essay on the allocated topic.
- Revising lecture notes together with material from the reading lists and found independently to prepare for the exam.
- Preparing for an optional revision tutorial.

BS3068 Microbial Biotechnology

Academic Year:	2018/9	2018/9	Student Workload (hours)
Module Level:	Year 3		Lectures 30
Scheme:	UG		Seminars 5
Department:	Biological Sciences		Practical Classes & Workshops
Credits:	15		Tutorials 4
			Fieldwork 5
			Project Supervision
			Guided Independent Study 156
			Demonstration
			Supervised time in studio/workshop
			Work Based Learning
			Placement
			Year Abroad
			Total Module Hours 200

Period: Semester 1
Occurrence: E
Coordinator: Primrose Freestone
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Poster Presentation	15				
002	Essay (2000 words)	15				
003	Examination	70		3		

Period: Semester 1
Occurrence: E1
Coordinator: Primrose Freestone
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Poster Presentation	15				
002	Essay (2000 words)	15				
003	Examination	70		3		

Intended Learning Outcomes

Demonstrate an awareness of the importance of understanding microbial biochemistry and genetics in microbial biotechnological processes. Describe the central theories and concepts of selected aspects of microbial biotechnology. Develop skills in researching and reviewing the scientific literature, and then be able to organise and communicate it in oral and written form. Develop a reflective appreciation of the economic, social and ethical issues surrounding uses of micro-organisms in industrial processes

Teaching and Learning Methods

These will comprise lectures, tutorials, seminars, a short field trip to a local brewery, problem surgeries, and directed reading.

Assessment Methods

Continuous assessment will constitute 30% of the course marks, comprising: poster creation and oral presentation 15% and course essay, 15%. Students will be assigned a topic upon which they are required to create and present a poster and a 2000-word essay. The End of Module written examination (3 hours) will comprise 70% of the course mark, and will consist of 2 sections: students answer 1 question out of 3 in section 1 and 2 questions out of 5 in section 2.

PLEASE NOTE: The examination for this module is scheduled in Midsummer (May/June).

Pre-Requisites

BS2010

Co-Requisites
Excluded Combinations

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Guided Independent Study: Indicative Activities

BS3070 Protein complexes: from cells to molecules

Academic Year:	2018/9	2018/9	Student Workload (hours)
Module Level:	Year 3		Lectures 32
Scheme:	UG		Seminars
Department:	Biological Sciences	Practical Classes & Workshops	15
Credits:	15	Tutorials	
		Fieldwork	
		Project Supervision	
		Guided Independent Study	153
		Demonstration	
		Supervised time in studio/workshop	
		Work Based Learning	
		Placement	
		Year Abroad	
		Total Module Hours	200

Period: Semester 1
Occurrence: E
Coordinator: Mohammed El-Mezgueldi
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Data analysis	10				
002	NMR workshop	10				
003	Literature analysis	10				
004	Examination (Final)	70		3		

Period: Semester 1
Occurrence: E1
Coordinator: Mohammed El-Mezgueldi
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Data analysis	10				
002	NMR workshop	10				
003	Literature analysis	10				
004	Examination (Final)	70		3		

Intended Learning Outcomes

At the completion of the course the students should be able to:

- Describe the evidence for the existence of protein complexes within cells.
- Explain a range of techniques used to identify interacting partners (including fluorescence spectroscopy and microscopy, yeast 2 hybrid and phage display).
- Interpret the quantitative aspects of protein complexes (equilibrium binding, kinetics and thermodynamics of interactions).
- Explain a range of techniques used to study protein structure (including NMR and crystallography).
- Describe protein databases and the concept of protein docking.
- Discuss how interactions can be understood at the molecular level.

Teaching and Learning Methods

Lectures, practicals, tutorials

Assessment Methods

70% examination, 30% coursework (comprising 3 equal elements: data analysis of protein-ligand binding data, computer practical on protein structure and an exercise on literature interpretation).

PLEASE NOTE: The examination for this module is scheduled in Midsummer (May/June).

Pre-Requisites

BS2091, BS2093

Co-Requisites
Excluded Combinations

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Guided Independent Study: Indicative Activities

BS3073 Molecular Ecology and Evolution

Academic Year:	2018/9	Student Workload (hours)	
Module Level:	Year 3	Lectures	24
Scheme:	UG	Seminars	4
Department:	Biological Sciences	Practical Classes & Workshops	14
Credits:	20	Tutorials	5

Fieldwork	
Project Supervision	
Guided Independent Study	153
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	200

Period:	Semester 2
Occurrence:	E
Coordinator:	Robert Hammond
Mark Scheme:	UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Practical reports	30				
002	Seminar	10				
003	Examination (Final)	60		3		

Intended Learning Outcomes

The aim of the course is for students to gain knowledge and understanding about up-to-date molecular methods and how they can be used to answer important questions in ecology and evolution. Emphasis will be given to next generation sequencing (NGS) methods and how these are revolutionizing both ecological and evolutionary studies of non-model organisms and also of communities.

On successful completion of the module, students should be able to:

Describe the various types of molecular marker and their properties

With a knowledge of underlying theory, describe and explain how molecular markers can be used to:

- Understand genome diversity and evolution
- Show adaptation at the molecular level
- Reveal intraspecific geographic patterns of genetic variation
- Investigate dispersal and gene flow
- Investigate mating systems, social structure and relatedness
- Quantify inbreeding
- Investigate cryptic community structure using environmental genomics.

Apply their knowledge of molecular markers to conservation and environmental issues.

Teaching and Learning Methods

Lectures, Laboratory practical classes, Tutorials (discussions of primary research papers), Student seminars (peer learning)

Assessment Methods

Exam, seminar, practical reports.

Pre-Requisites
Co-Requisites
Excluded Combinations

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Guided Independent Study: Indicative Activities

Directed reading, with particular emphasis on the primary literature

BS3077 Developmental Neurobiology

Academic Year: 2018/9
Module Level: Year 3
Scheme: UG
Department: Biological Sciences
Credits: 20

Student Workload (hours)

Lectures	30
Seminars	
Practical Classes & Workshops	
Tutorials	8
Fieldwork	
Project Supervision	
Guided Independent Study	162
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	200

Period: Semester 1
Occurrence: E
Coordinator: Jonathan McDearmid
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Essay (1000 words)	10				
002	Tutorials	20				
003	Examination	70		3		

Period: Semester 1
Occurrence: E1
Coordinator: Jonathan McDearmid
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Essay (1000 words)	10				
002	Tutorials	20				
003	Examination	70		3		

Intended Learning Outcomes

On successful completion of the module, students should be able to:

- Compare and contrast neurodevelopmental processes and neuroanatomy in vertebrate species
- Describe and discuss the gene signalling cascades that regulate specification and differentiation of nervous tissue
- Discuss the cell signalling pathways that pattern the vertebrate nervous system
- Describe the mechanisms underpinning synapse formation
- Discuss the growth and guidance of axons and dendrites
- Discuss activity-dependent regulation of CNS maturation
- Describe how perturbations of CNS development contribute to neurological disease

Teaching and Learning Methods

Lectures, tutorial sessions, essay and critical review of primary research articles

Assessment Methods

Tutorials, essay, exam.

Pre-Requisites
Co-Requisites
Excluded Combinations

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Guided Independent Study: Indicative Activities

Guided reading.

BS3901 Research Project

Academic Year: 2018/9
Module Level: Year 3
Scheme: UG
Department: Biological Sciences
Credits: 120

Student Workload (hours)

Lectures	
Seminars	
Practical Classes & Workshops	200
Tutorials	
Fieldwork	
Project Supervision	100
Guided Independent Study	600
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	900

Period: Academic Year
Occurrence: E1
Coordinator: Salvador Macip
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Laboratory Performance	25				
002	Report	75				

Period: Academic Year
Occurrence: E2
Coordinator: Salvador Macip
Mark Scheme: UG Module Grade Only

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Laboratory Performance	100				

Intended Learning Outcomes

On completion of the project, students are expected to be able to:- test a hypothesis by appropriate experimental or computer-based techniques; conduct experimental procedures and demonstrate good laboratory or bioinformatics practice; analyse and present experimental or bioinformatics data; locate appropriate literature sources and interpret their findings in relation to other work in their subject area; discuss the project report and be aware of its wider context; produce a well written and presented dissertation that complies with the guidelines for presentation of the project.

Teaching and Learning Methods

Directed reading, Project supervision, Independent research.

Assessment Methods

Assessment of performance, individual research projects, dissertation.

PLEASE NOTE: Applicants may only apply for this project if they can submit a letter of confirmation from an academic who has agreed to supervise their project.

Your home university will be asked to confirm whether you should be assessed by Assessment Group E1 or E2. E2 is based upon the assumption that the overall grading for your period of study will be determined via your report to your home university.

Pre-Requisites
Co-Requisites
Excluded Combinations

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Guided Independent Study: Indicative Activities

BS3902 Research Project

Academic Year: 2018/9
Module Level: Year 3
Scheme: UG
Department: Biological Sciences
Credits: 60

Student Workload (hours)

Lectures
 Seminars
 Practical Classes & Workshops 200
 Tutorials
 Fieldwork
 Project Supervision 40
 Guided Independent Study 210
 Demonstration
 Supervised time in studio/workshop
 Work Based Learning
 Placement
 Year Abroad
Total Module Hours 450

Period: Semester 1
Occurrence: E2
Coordinator: Salvador Macip
Mark Scheme: UG Module Grade Only

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Laboratory Performance	100				

Period: Semester 2
Occurrence: E2
Coordinator: Salvador Macip
Mark Scheme: UG Module Grade Only

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Laboratory Performance	100				

Intended Learning Outcomes

On completion of the project, students are expected to be able to:- test a hypothesis by appropriate experimental or computer-based techniques; conduct experimental procedures and demonstrate good laboratory or bioinformatics practice; analyse and present experimental or bioinformatics data; locate appropriate literature sources and interpret their findings in relation to other work in their subject area; discuss the project report and be aware of its wider context; present the key findings in the form of an oral presentation; produce a well written and presented dissertation that complies with the guidelines for presentation of the project.

Teaching and Learning Methods

Directed reading, Project supervision, Independent research

Assessment Methods

Oral presentation, assessment of performance, individual research projects, dissertation.

PLEASE NOTE: Applicants may only apply for this project if they can submit a letter of confirmation from an academic who has agreed to supervise their project.

Your home university will be asked to confirm whether you should be assessed by Assessment Group E1 or E2. E2 is based upon the assumption that the overall grading for your period of study will be determined via your report to your home university.

Pre-Requisites
Co-Requisites
Excluded Combinations

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Guided Independent Study: Indicative Activities

BS3903 Research Project

Academic Year: 2018/9
Module Level: Year 3
Scheme: UG
Department: Biological Sciences
Credits: 40

Student Workload (hours)

Lectures	
Seminars	
Practical Classes & Workshops	200
Tutorials	
Fieldwork	
Project Supervision	15
Guided Independent Study	85
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	300

Period: Autumn Term
Occurrence: E1
Coordinator: Salvador Macip
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Laboratory Performance	25				
002	Report	75				

Period: Autumn Term
Occurrence: E2
Coordinator: Salvador Macip
Mark Scheme: UG Module Grade Only

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Laboratory Performance	100				

Period: Spring Term
Occurrence: E1
Coordinator: Salvador Macip
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Laboratory Performance	25				
002	Report	75				

Period: Spring Term
Occurrence: E2
Coordinator: Salvador Macip
Mark Scheme: UG Module Grade Only

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Laboratory Performance	100				

Period: Summer Term
Occurrence: E1
Coordinator: Salvador Macip
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Laboratory Performance	25				
002	Report	75				

Period: Summer Term
Occurrence: E2
Coordinator: Salvador Macip
Mark Scheme: UG Module Grade Only

BS3903 Research Project

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Laboratory Performance	100				

Intended Learning Outcomes

On completion of the project, students are expected to be able to:- test a hypothesis by appropriate experimental or computer-based techniques; conduct experimental procedures and demonstrate good laboratory or bioinformatics practice; analyse and present experimental or bioinformatics data; locate appropriate literature sources and interpret their findings in relation to other work in their subject area; discuss the project report and be aware of its wider context; present the key findings in the form of an oral presentation; produce a well written and presented dissertation that complies with the guidelines for presentation of the project.

Teaching and Learning Methods

Directed reading, Project supervision, Independent research.

Assessment Methods

Oral presentation, assessment of performance, individual research projects, dissertation.

PLEASE NOTE: Applicants may only apply for this project if they can submit a letter of confirmation from an academic who has agreed to supervise their project.

Your home university will be asked to confirm whether you should be assessed by Assessment Group E1 or E2. E2 is based upon the assumption that the overall grading for your period of study will be determined via your report to your home university.

Pre-Requisites**Co-Requisites****Excluded Combinations**

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Guided Independent Study: Indicative Activities

MB2020 Medical Microbiology

Academic Year: 2018/9
Module Level: Year 2
Scheme: UG
Department: Biological Sciences
Credits: 15

Student Workload (hours)

Lectures
 Seminars
 Practical Classes & Workshops
 Tutorials
 Fieldwork
 Project Supervision
 Guided Independent Study
 Demonstration
 Supervised time in studio/workshop
 Work Based Learning
 Placement
 Year Abroad
 Total Module Hours

Period: Semester 1
Occurrence: E
Coordinator: Galina Mukamolova
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Essay (2000 words)	20				
002	Practical Booklet	20				
003	Examination (Final)	60		2		

Intended Learning Outcomes

On successful completion of the module, students should be able to:

- Describe major infectious diseases and name corresponding causative agents.
- Characterise major human pathogens and explain how they adapt to different environments.
- Describe the basic principles of microbial diagnostics and their application for detection of pathogens.
- Explain treatment and prevention of infectious diseases.
- Conduct experiments for identification and characterisation of microorganisms of medical importance.
- Demonstrate competency in oral and written communications, information sourcing, handling and referencing, numeracy, data analysis, basic statistical skills, problem solving, and group working.
- Demonstrate awareness of health sustainability.

Teaching and Learning Methods

Lectures, tutorials, practical classes, workshops, problem solving classes.

Assessment Methods

- Practical booklet: 20%
- Essay (2,000 words): 20%
- Exam (1.5 hours): 60%

Pre-Requisites
Co-Requisites
Excluded Combinations

-

Guided Independent Study: Indicative Activities

Reading, reviewing lectures, preparing workbook, presentation and revising for exam.

MB2050 Applications of Medical Biochemistry

Academic Year: 2018/9
Module Level: Year 2
Scheme: UG
Department: Biological Sciences
Credits: 15

Student Workload (hours)

Lectures
 Seminars
 Practical Classes & Workshops
 Tutorials
 Fieldwork
 Project Supervision
 Guided Independent Study
 Demonstration
 Supervised time in studio/workshop
 Work Based Learning
 Placement
 Year Abroad
 Total Module Hours

Period: Semester 1
Occurrence: E
Coordinator: Chris Willmott
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
005	Report to government	30				
006	Bioethics Video	30				
007	Examination	40		1.25		

Intended Learning Outcomes

On successful completion of the module, students should be able to:

- Outline selected techniques used in diagnosis and treatment of human disease.
- Give an overview of the process involved in the generation of a pharmaceutical product.
- Discuss molecular aspects of drug design and therapeutic protein production.
- Consider the potential impact of genomics on the diagnosis and treatment of disease.
- Discuss key social and ethical issues related to current development in biomedicine.
- Work as a team to design and produce a video to discuss a specific bioethical issue.
- Critically review the information available on a specific area of biology/medicine and summarise current knowledge in a written report.

Teaching and Learning Methods

Lectures, computer-based sessions, tutorials, team-based working, examples of previous student work provided.

Assessment Methods

- Report to Government: 30%
- Bioethics video: 30%
- Exam (1.25 hours): 40%

Pre-Requisites
Co-Requisites
Excluded Combinations

-

Guided Independent Study: Indicative Activities

Independent research on science and ethics (for video)
 Research on novel therapeutic agent (for written report), starting with initial provided source.
 Recommended online resources regarding video production;
 other audiovisual resources.
 Recorded lectures made available for review using Reflect lecture capture system.

MB2051 Current Issues in Medical Genetics

Academic Year: 2018/9
Module Level: Year 2
Scheme: UG
Department: Biological Sciences
Credits: 15

Student Workload (hours)

Lectures
 Seminars
 Practical Classes & Workshops
 Tutorials
 Fieldwork
 Project Supervision
 Guided Independent Study
 Demonstration
 Supervised time in studio/workshop
 Work Based Learning
 Placement
 Year Abroad
 Total Module Hours

Period: Semester 1
Occurrence: E
Coordinator: Christopher Talbot
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
005	Ethical matrix	20				
006	Website	30				
007	Dissertation (5000 words) (final)	50				

Intended Learning Outcomes

On completion of the module a typical student should be able to:

- Explain the scientific basis of current controversies in medical genetics.
- Evaluate the arguments on both sides of an ethical topic
- Outline the procedures in place for the establishment of laws and guidelines governing one of the areas listed above.
- Work as part of a team to produce a variety of presentations.

Teaching and Learning Methods

Seminars with mixture of tutor and student led discussions.
 Feedback from assessment

Assessment Methods

- Ethical Matrix: 20%
- Website: 30%
- Dissertation (5,000 words): 50%

Pre-Requisites
Co-Requisites
Excluded Combinations

-

Guided Independent Study: Indicative Activities

- Preparation for seminars
- Reading references from seminars
- Preparation for ethical matrix
- Team co-ordination and preparation of website
- Researchin and writing the dissertation

MB2080 Pathophysiology of Disease

Academic Year: 2018/9
Module Level: Year 2
Scheme: UG
Department: Biological Sciences
Credits: 15

Student Workload (hours)

Lectures
 Seminars
 Practical Classes & Workshops
 Tutorials
 Fieldwork
 Project Supervision
 Guided Independent Study
 Demonstration
 Supervised time in studio/workshop
 Work Based Learning
 Placement
 Year Abroad
 Total Module Hours

Period: Semester 1
Occurrence: E
Coordinator: Jonathon Willets
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Essay	15				
002	Computer-based multiple choice exam	15				
003	Examination	70		2		

Intended Learning Outcomes

On successful completion of the module, students should be able to:

- Discuss the underlying physiological and biochemical mechanisms and disease-induced changes associated with a range of human conditions
- Outline the symptoms, prevalence, morbidity, mortality, and risk factors associated with the range of human disease states covered.
- Make effective use of electronic sources of information, including the PUBMED and OMIM databases and disease specific web sites, to find out detailed information about the physiology, aetiology and epidemiology of a particular disease.
- Critically evaluate the use of laboratory data in the identification, aetiology and pathogenesis of selected diseases processes.

Teaching and Learning Methods

Lectures, tutorials with problem-solving worksheets, laboratory practical class, work session, directed reading, study support session(s).

Assessment Methods

Coursework essay, computer-based multiple choice test and examination (final).

Pre-Requisites
Co-Requisites
Excluded Combinations
Guided Independent Study: Indicative Activities

Preparation for problem solving tutorials. Completion of worksheets for tutorials. Looking through lecture material before and after lectures, reviewing lecture recordings. Additional reading around subject areas and revision for examination.

MB3001 Biochemical Mechanisms of Human Disease

Academic Year: 2018/9
Module Level: Year 3
Scheme: UG
Department: Biological Sciences
Credits: 20

Student Workload (hours)

Lectures	29
Seminars	0
Practical Classes & Workshops	0
Tutorials	4
Fieldwork	0
Project Supervision	0
Guided Independent Study	167
Demonstration	0
Supervised time in studio/workshop	0
Work Based Learning	0
Placement	0
Year Abroad	0
Total Module Hours	200

Period: Semester 1
Occurrence: E
Coordinator: Russell Wallis
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Tutorials	20				
002	Essay (2500 words)	10				
003	Examination	70		3		

Intended Learning Outcomes

- Describe the factors that are involved in the development of inflammation and asthma.
- Describe the molecular basis of complement activation and its role in disease.
- Summarise the biochemical evidence linking changes in signalling pathways to hypertrophic growth in the failing heart.
- Describe how mutations in sarcomeric and cytoskeletal proteins contribute to the development of cardiomyopathies
- Discuss the molecular basis of laminopathies
- Conduct a literature research project, and write a critical appraisal of the subject.
- Critically evaluate scientific papers

Teaching and Learning Methods

Lectures, tutorials, help sessions.

Assessment Methods

Written examination, essay, tutorial work.

PLEASE NOTE: The examination for this module is scheduled in Midsummer (May/June).

Pre-Requisites

MB2050

Co-Requisites
Excluded Combinations

-

Guided Independent Study: Indicative Activities

MB3020 Advanced Topics in Medical Microbiology

Academic Year:	2018/9	Student Workload (hours)	
Module Level:	Year 3	Lectures	39
Scheme:	UG	Seminars	4
Department:	Biological Sciences	Practical Classes & Workshops	
Credits:	20	Tutorials	6
		Fieldwork	
		Project Supervision	
		Guided Independent Study	151
		Demonstration	
		Supervised time in studio/workshop	
		Work Based Learning	
		Placement	
		Year Abroad	
		Total Module Hours	200

Period:	Semester 2
Occurrence:	E
Coordinator:	Edouard Galyov
Mark Scheme:	UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Essay (1500 words)	15				
002	Case presentation	15				
003	Examination	70		3		

Intended Learning Outcomes

At the completion of the course students are expected:

- To be able to critically assess current views on the molecular mechanisms underlying bacterial virulence, drawing on evidence from the studies of host-pathogen interactions, immune responses, and lessons from history.
- To be able to describe the key virulence factors and systems of major bacterial pathogens, and mechanisms of their acquisition and exchange.
- To be able to evaluate important host-microbe interactions such as bacterial invasion and intracellular life styles of different bacterial pathogens
- To be able to define host responses to bacterial infections and approaches used to create effective vaccines
- Have gained, in the context of the above areas of microbiology, experience of accessing information from the scientific literature in electronic and written form, and its organisation through oral and written presentation.

Teaching and Learning Methods

Lectures, seminars, directed reading

Assessment Methods

1 three hours exam paper, Essay, Case presentations

Pre-Requisites

MB2020

Co-Requisites
Excluded Combinations

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Guided Independent Study: Indicative Activities

MB3050 Medical Genetics

Academic Year: 2018/9
Module Level: Year 3
Scheme: UG
Department: Biological Sciences
Credits: 20

Student Workload (hours)

Lectures	26
Seminars	
Practical Classes & Workshops	4
Tutorials	6
Fieldwork	
Project Supervision	
Guided Independent Study	164
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	200

Period: Semester 2
Occurrence: E
Coordinator: Christopher Talbot
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Essay (3000-4000 words)	20				
002	Presentation	10				
003	Examination (Final)	70		3		

Intended Learning Outcomes

1. Outline the ways in which genetics is impacting on our knowledge, diagnosis and treatment of common diseases such as heart disease and Alzheimer's disease.
2. Describe how developments in gene mapping and analysis have benefited our understanding of disease
3. Outline the ways in which genetic knowledge is impacting on drug design
4. Demonstrate knowledge of the contribution of genetics to the study of behaviour and the brain.
5. Research and integrate information from a range of sources in order to give a critical appraisal of a chosen specialist area.
6. Communicate knowledge of a particular area via an oral presentation.

Teaching and Learning Methods

Lectures, tutorials and workshop.

Assessment Methods

Oral presentation, essay, examination.

Pre-Requisites

BS2009, BS2026, MB2051

Co-Requisites
Excluded Combinations

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Guided Independent Study: Indicative Activities

MB3057 Understanding Disease - An Integrated Approach

Academic Year: 2018/9
Module Level: Year 3
Scheme: UG
Department: Biological Sciences
Credits: 20

Student Workload (hours)

Lectures	25
Seminars	
Practical Classes & Workshops	
Tutorials	2
Fieldwork	
Project Supervision	
Guided Independent Study	173
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	200

Period: Semester 2
Occurrence: E
Coordinator: Ruth Luthi-Carter
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
005	Essay (1500 words)	20				
006	Critical Evaluation	10				
007	Examination	70		3		

Intended Learning Outcomes

On completion of this course students should be able to discuss the mechanisms of :

- normal wound healing and develop an appreciation of why wounds sometimes fail to heal
- haemostasis (activation of platelets and the clotting cascade) and different disease conditions arising from inadequate or excessive stimulation of haemostatic processes (bleeding/haemorrhage or thrombosis)
- insulin action and signalling, insulin resistance and decreased beta-cell function/survival, the pathogenesis of type 1 and type 2 diabetes, and the metabolic consequences of obesity
- the normally-functioning nerve-muscle unit, and of Duchenne muscular dystrophy
- the pathogenesis of the nerve-muscle interface (myasthenia gravis) and of motor neuron diseases
- The pathogenesis and rational treatments of multiple sclerosis, a neurological disease caused by immunological dysfunction
- neurodegenerative diseases (e.g. Huntington's disease, Alzheimer's disease) caused by protein misfolding/mishandling
- pathogenesis of epilepsy and how drug therapies work at the molecular level
- mood disorders, in particular, anxiety and depression; current theories, and appreciate molecular basis for how current treatments may work

Teaching and Learning Methods

Lectures, tutorials

Assessment Methods

70% examination, 30% coursework (20% 1500 word essay, 10% critical evaluation of a scientific paper)

Pre-Requisites

MB2020, MB2050, MB2051 OR MB2080

Co-Requisites
Excluded Combinations

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Guided Independent Study: Indicative Activities