Module Specification

BS2014  Exercise Physiology and Pharmacology

Academic Year: 2020/1
Module Level: Year 2
Scheme: UG
Department: Biological Sciences
Credits: 15

Student Workload (hours)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Lectures</th>
<th>Seminars</th>
<th>Practical Classes &amp; Workshops</th>
<th>Tutorials</th>
<th>Fieldwork</th>
<th>Project Supervision</th>
<th>Guided Independent Study</th>
<th>Demonstration</th>
<th>Supervised time in studio/workshop</th>
<th>Work Based Learning</th>
<th>Placement</th>
<th>Year Abroad</th>
<th>Total Module Hours</th>
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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.
Module Specification

BS2026  Genes, Development and Inheritance

Academic Year: 2020/1
Module Level: Year 2
Scheme: UG
Department: Biological Sciences
Credits: 15

Student Workload (hours)

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

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.

Last Published: 5 July 2020
BS2032 Immunology and Eukaryotic Microbiology

Academic Year: 2020/1
Module Level: Year 2
Scheme: UG
Department: Biological Sciences
Credits: 15

Period: Semester 2
Occurrence: E
Coordinator: Andrea Cooper

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
Laboratory practical classes
Optional field trip

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

Pre-Requisites

Co-Requisites

Excluded Combinations

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. Reviewing lectures, revising for assessment.
Module Specification

BS2040  Bioinformatics

Academic Year: 2020/1
Module Level: Year 2
Scheme: UG
Department: Biological Sciences
Credits: 15

Student Workload (hours)

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<th>Lectures</th>
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<th>Tutorials</th>
<th>Fieldwork</th>
<th>Project Supervision</th>
<th>Guided Independent Study</th>
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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  Computer Practical Report 20
002  Bioinformatic Analysis 20
004  Examination 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
-
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 data sources / the literature.
Writing up the practical reports.
Exam preparation.
Module Specification

BS2066 Behavioural Neurobiology

Academic Year: 2020/1
Module Level: Year 2
Scheme: UG
Department: Biological Sciences
Credits: 15

Student Workload (hours)
- Lectures: 21
- Seminars
- Practical Classes & Workshops: 10
- Tutorials: 8
- Fieldwork
- Project Supervision
- Guided Independent Study: 111
- Demonstration
- Supervised time in studio/workshop
- Work Based Learning
- Placement
- Year Abroad
Total Module Hours: 150

Period: Semester 2
Occurrence: E
Coordinator: Tom Matheson
Mark Scheme: UG Module Mark Scheme

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<th>No.</th>
<th>Assessment Description</th>
<th>Weight %</th>
<th>Qual Mark</th>
<th>Exam Hours</th>
<th>Ass't Group</th>
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</table>

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.
- 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 (formative).
- An independently researched essay written under exam conditions (formative).
- Tutorials, including a "feedback tutorial" that focuses specifically on essay preparation and writing skills, and follow-up tutorials for the practical classes.
- Group learning through group tutorial (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
BS2014
BS2066  Behavioural Neurobiology

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.
BS2077 Neurobiology and Animal Behaviour

Academic Year: 2020/1
Module Level: Year 2
Scheme: UG
Department: Biological Sciences
Credits: 15

Student Workload (hours)
- Lectures: 21
- Seminars
- Practical Classes & Workshops: 10
- Tutorials: 8
- Fieldwork
- Project Supervision
- Guided Independent Study: 111
- Demonstration
- Supervised time in studio/workshop
- Work Based Learning
- Placement
- Year Abroad
- Total Module Hours: 150

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       |           |            |             |             
003 | 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 focuses 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
BS2014
BS2077 Neurobiology and Animal Behaviour

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: 2020/1
Module Level: Year 2
Scheme: UG
Department: Biological Sciences
Credits: 15

Student Workload (hours)
- Lectures: 23
- Seminars: 1
- Practical Classes & Workshops: 16
- Tutorials: 1
- Fieldwork: 2
- Project Supervision: 110
- Guided Independent Study: 110
- Supervised time in studio/workshop: 2
- Work Based Learning: 0
- Placement: 0
- Year Abroad: 0
Total Module Hours: 150

Period: Semester 2
Occurrence: E
Coordinator: Olga Makarova

Mark Scheme: UG Module Mark Scheme

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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: 60% (2 hours)
- Computer practical: 5%
- Summary of Practical: 10%
- 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.

Last Published: 5 July 2020
BS2093  Protein Control in Cellular Regulation

Student Workload (hours)

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Period: Semester 2
Occurrence: E
Coordinator: Mark Leyland
Mark Scheme: UG Module Mark Scheme

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<td>70</td>
<td>2</td>
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</tbody>
</table>

Intended Learning Outcomes
On successful completion of the module, students should be able to:
- Discuss the properties of enzymes and describe the different ways protein activity is regulated.
- Discuss the molecular properties of proteins involved in energy transduction.
- Explain the integration and regulation of metabolism.
- Demonstrate the ability to analyse the molecular features of proteins.
- Analyse experimental data to solve problems.

Teaching and Learning Methods
Lectures, interactive tutorials, laboratory practicals, computer-based sessions, revision sessions.

Assessment Methods
- Computer modelling practical: 10%
- Presentation: 20%
- Exam: 70% - 2 hours

Pre-Requisites

Co-Requisites

Excluded Combinations

Guided Independent Study: Indicative Activities
Guided reading on key aspects of the module, preparation for laboratory practicals, analysis of data generated from laboratory practical, problem-solving in interactive tutorials, completion of online tests for formative assessment, reading of scientific literature to develop presentations, preparation of slides for presentations.
BS3003 Cancer Cell and Molecular Biology

Student Workload (hours)

<table>
<thead>
<tr>
<th>Lectures</th>
<th>Seminars</th>
<th>Practical Classes &amp; Workshops</th>
<th>Tutorials</th>
<th>Fieldwork</th>
<th>Project Supervision</th>
<th>Guided Independent Study</th>
<th>Demonstration</th>
<th>Supervised time in studio/workshop</th>
<th>Work Based Learning</th>
<th>Placement</th>
<th>Year Abroad</th>
<th>Total Module Hours</th>
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Period: Semester 2

Occurrence: E

Coordinator: Salvador Macip

Mark Scheme: UG Module Mark Scheme

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</table>

Intended Learning Outcomes

On successful completion of the module, students should be able to:
- Describe the main features which distinguish malignant cells from normal cells, the mechanisms which regulate their proliferation and survival, and how this information can be used to design new therapies
- Integrate information from diverse sources to understand the origins of cancer and the processes involved on the progression into a full malignancy.
- Conduct a literature research project and write a critical appraisal of the subject, summarising the most important facts.

Teaching and Learning Methods

Lectures, tutorials, directed reading, independent research.

Assessment Methods

Exam (final)
Essay (3000 words)

Pre-Requisites

Co-Requisites

Excluded Combinations

Guided Independent Study: Indicative Activities

Each topic has a list of essential papers which guides the students to extra reading. Preparation for tutorials is based on a list of questions that the students have to research and answer ahead of the session, thus guiding them through the acquisition of basic knowledge to reinforce what is taught in lectures. Information on how to write an essay is given to students in documents and in tutorial discussions, in order to guide them through the acquisition of the skills needed to complete the appropriate ILOs.
BS3011 Microbial Pathogenesis and Genomics

Student Workload (hours)

| Lectures | 22 |
| Seminars | 6  |
| Practicals | 6  |
| Tutorials | 6  |
| Fieldwork | |
| Project Supervision | |
| Guided Independent Study | 116 |
| Demonstration | |
| Work Based Learning | |
| Placement | |
| Year Abroad | |
| Total Module Hours | 150 |

Period: Semester 2
Occurrence: E
Coordinator: Julie Morrissey

Mark Scheme: UG Module Mark Scheme

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<th>Assessment Description</th>
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<td>Report on design of experimental strategy to analyse a virulence factor</td>
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</table>

Intended Learning Outcomes

On successful completion of the module, students should be able to:
- Present in detail and explain the genetic mechanisms underlying selected processes in bacteria.
- Demonstrate knowledge of the molecular and genetic basis of strategies employed by microorganisms to invade host tissue, avoid host defence mechanisms and proliferate at sites of infection.
- Analyse and interpret data and information from primary literature sources, and organise and communicate it in writing.
- Analyse, in writing, a capacity for critical analysis of a specialised or topical issue in microbiology.
- Design a research activity to determine the contributions of a virulence factor or other mechanism to an infectious disease. Demonstrate use of bioinformatics tools to analyse and understand microbial virulence traits.

Teaching and Learning Methods

Lectures, tutorials, problem solving classes, formative assessment, attending Departmental and College external seminars to enhance understanding of the impact of scientific research and to increase scientific knowledge related to the module.

Assessment Methods

Data analysis under exam conditions.
Written reports of experimental design and analysis.

Pre-Requisites

BS2009 OR BS2030

Co-Requisites

Excluded Combinations

Guided Independent Study: Indicative Activities

Reading research literature, reviewing lectures, reviewing and understanding lecture material, analysing data and information for tutorials and seminars, preparing coursework.
BS3013  Human and Environmental Microbiomics

Module Specification

Academic Year: 2020/1
Module Level: Year 3
Scheme: UG
Department: Biological Sciences
Credits: 15

Student Workload (hours)
- Lectures: 20
- Seminars: 2
- Practical Classes & Workshops
- Tutorials
- Fieldwork
- Project Supervision
- Guided Independent Study: 128
- Demonstration
- Supervised time in studio/workshop
- Work Based Learning
- Placement
- Year Abroad
- Total Module Hours: 150

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

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</table>

Intended Learning Outcomes

On successful completion of the module, students should be able to:
- Discuss how microbes play essential roles in planetary and human health and sustainability.
- Discuss how our understanding of microbiology has been transformed over the last decade by advances in sequencing technology, which has facilitated a deep understanding in microbial diversity and evolution and physiology both from whole genome and metagenome approaches.
- Identify the key roles played by microbes in human health and in the wider environment including aquatic and terrestrial environments.
- 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 presentation.

Teaching and Learning Methods
Lectures, seminars

Assessment Methods
Seminar
Exam (final)

Pre-Requisites

Co-Requisites

Excluded Combinations
-

Guided Independent Study: Indicative Activities
Guided reading (research journal articles), reviewing lectures, preparing written work, revising for exam.
BS3016  Neuroscience Futures

Academic Year: 2020/1
Module Level: Year 3
Scheme: UG
Department: Biological Sciences
Credits: 15

Student Workload (hours)

| Lectures | 10 |
| Seminars | 7 |
| Practical Classes & Workshops |  |
| Tutorials | 7 |
| Fieldwork |  |
| Project Supervision |  |
| Guided Independent Study | 126 |
| Demonstration |  |
| Supervised time in studio/workshop |  |
| Work Based Learning |  |
| Placement |  |
| Year Abroad |  |
| Total Module Hours | 150 |

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

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<th>Exam Hours</th>
<th>Ass't Group</th>
<th>Alt Reass't</th>
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<tr>
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<tr>
<td>003</td>
<td>Journal Club Evaluation tests</td>
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Intended Learning Outcomes
On successful completion of the module, students should be able to:
- Interrogate the primary neuroscience literature in areas of current research led by relevant academic staff and to develop critical faculties.
- Using specific examples, describe and explain recent advances in neuroscience with special reference to new and developing methodologies.
- Read, analyse, and interpret data from the neuroscience literature.
- Communicate complex ideas and research findings using a variety of appropriate media.
- Integrate relevant information and design future research in the context of an appropriate neuroscience field.

Teaching and Learning Methods
Lectures and Research Seminars with Journal Clubs in which there will be oral discussion with questions and answers (as in tutorials) alongside online evaluation; students will have directed reading and study support sessions.

Assessment Methods
Essay (1500 words)
Journal Club Presentation
Journal Club Evaluation tests
Examination (final)

Pre-Requisites
BS2015: Neuroscience
BS2066: Behavioural Neurobiology

Co-Requisites

Excluded Combinations
BS3016  Neuroscience Futures

Guided Independent Study: Indicative Activities

All students will have to read the research papers and prepare for each Journal Club and do online tests and evaluations. Research their essay which will be in the form of a Grant application, work in small group sessions with other students to prepare for presentation of a Journal Club. Look through lecture and seminar materials before and after each session. Conduct additional reading around subject areas, especially in preparation for their essay and the examination. Review lecture recordings.
BS3018  Genes and Development

Academic Year: 2020/1
Module Level: Year 3
Scheme: UG
Department: Biological Sciences
Credits: 15

Student Workload (hours)
Lectures 22
Seminars 6
Practical Classes & Workshops
Tutorials 6
Fieldwork
Project Supervision
Guided Independent Study 116
Demonstration
Supervised time in studio/workshop
Work Based Learning
Placement
Year Abroad
Total Module Hours 150

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 Presentation 12
002 Critical review (3000 words) 28
003 Exam (Final) 60 2

Intended Learning Outcomes
On successful completion of the module, 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 methods used to study gene function in model organisms.
- Critically assess research publications and present interpretations in written, visual and oral formats.

Teaching and Learning Methods
Lectures and directed reading. Independent research of a specified topic. Presentation and receiving feedback. Presentation clinic and exam clinic. Attendance at professional research seminars.

Assessment Methods
Poster presentation, Critical review, Exam (Final)

Pre-Requisites
BS2026

Co-Requisites

Excluded Combinations

Guided Independent Study: Indicative Activities
Preparation for lectures and reviewing lecture presentations. Reading based on lecture topics. Understanding the allocated research paper and designing the presentation. Formulating, researching and writing the review. Exam preparation.
Module Specification

BS3033  Physiology, Pharmacology and Behaviour

Academic Year: 2020/1
Module Level: Year 3
Scheme: UG
Department: Biological Sciences
Credits: 15

Student Workload (hours)
| Lectures | 23 |
| Fieldwork | 10 |
| Seminars | 3 |
| Tutorials | |
| Work Based Learning | |
| Total Module Hours | 150 |

Period: Semester 2
Occurrence: E
Coordinator: Frank Proudlock
Mark Scheme: UG Module Mark Scheme

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<tr>
<th>No.</th>
<th>Assessment Description</th>
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<th>Exam Hours</th>
<th>Ass't Group</th>
<th>Alt Reass't</th>
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<td>2.25</td>
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</table>

Intended Learning Outcomes

On successful completion of the module, students should be able to:
- Interpret the hierarchical and parallel processing of visual information by the brain and be able to relate this to the process of image extraction.
- Correlate the roles of the different brain structures involved in voluntary movement and be able to reconstruct, in overview, their interactions during movement generation.
- Evaluate the role of a variety of brain mechanisms in generating feeding behaviour and pursuit of other rewards.
- Describe some of the different approaches to investigating CNS function and compare their relative advantages and disadvantages.
- Relate the role of integration within the CNS with particular reference to sensori-motor integration, higher functions such as learning, memory and attention and to higher disorders of the CNS such as schizophrenia.
- Work individually and in groups, be able to discuss orally, or present in writing a critical analysis of a theory of some aspects of brain function based on the use of recent research reports.

Teaching and Learning Methods

Lectures; critical analysis with peers of mainstream science documentary; practical classes, discussion, and preparation; directed reading

Assessment Methods

Group presentation
Essay (2000 words)
Examination (final)

Pre-Requisites

Co-Requisites

Excluded Combinations

Guided Independent Study: Indicative Activities

Preparation for practical classes including worksheets and associated reading; research and preparation for group presentation including meeting with colleagues, watching documentary to be critiqued, performing background reading, practicing presentation; production of assessed essay and reading and research to support the topic; additional reading around subject areas covered by lectures and revision for examination.
### BS3056 Cellular Physiology of the Cardiovascular System

**Academic Year:** 2020/1  
**Module Level:** Year 3  
**Scheme:** UG  
**Department:** Biological Sciences  
**Credits:** 15

#### Student Workload (hours)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Lectures</th>
<th>Seminars</th>
<th>Practical Classes &amp; Workshops</th>
<th>Tutorials</th>
<th>Fieldwork</th>
<th>Project Supervision</th>
<th>Demonstration</th>
<th>Guided Independent Study</th>
<th>Work Based Learning</th>
<th>Placement</th>
<th>Year Abroad</th>
<th>Total Module Hours</th>
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**Period:** Semester 2  
**Occurrence:** E  
**Coordinator:** Noel Davies  
**Mark Scheme:** UG Module Mark Scheme

<table>
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<th>Exam Hours</th>
<th>Ass't Group</th>
<th>Alt Reass't</th>
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<tr>
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<td>70</td>
<td></td>
<td>2.5</td>
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</table>

### Intended Learning Outcomes

On successful completion of the module, students should be able to:
- Describe the cardiovascular system and the general control mechanisms involved in regulating the cardiovascular system including the 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 and importance of receptor-operated Ca²⁺ increases in blood cells such as platelets and Lymphocytes.
- Critique scientific information from a range of sources including the interpretation of data. Communicate biological information by writing and by means of tables, diagrams, drawings and graphs.

### Teaching and Learning Methods

Lectures, computer simulation work-session, tutorials with problem solving worksheets, directed reading.

### Assessment Methods

Combined essay with computer generated data (2000 words)  
Examination (final)

### Pre-Requisites

BS2013

### Co-Requisites

### Excluded Combinations

---
Guided Independent Study: Indicative Activities

Sourcing, reading and interpreting literature relevant to the combined essay.
Analysing, interpreting and presenting data obtained from running the ionic current simulation programme.
Interpreting the literature sources and simulated data to write the combined essay.
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.
Participate in a formative data-handling exercise aimed at improving understanding of key concepts.
BS3059  Current and Future Therapeutics

Academic Year: 2020/1  
Module Level: Year 3  
Scheme: UG  
Department: Biological Sciences  
Credits: 15

Student Workload (hours)

| Lectures | 20 |
| Seminars |   |
| Practical Classes & Workshops |   |
| Tutorials | 2 |
| Fieldwork |   |
| Project Supervision |   |
| Guided Independent Study | 128 |
| Demonstration |   |
| Supervised time in studio/workshop |   |
| Work Based Learning |   |
| Placement |   |
| Year Abroad |   |
| Total Module Hours | 150 |

Period: Semester 2  
Occurrence: E  
Coordinator: Gary Willars

Mark Scheme: UG Module Mark Scheme

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<th>No.</th>
<th>Assessment Description</th>
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<th>Exam Hours</th>
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</table>

Intended Learning Outcomes

On successful completion of the module, students should be able to:
- Appraise the underlying pathophysiology of a range of human diseases.
- Appraise current treatment strategies for a range of human diseases, showing a knowledge of inadequacies and unmet clinical need.
- Using specific examples, appraise current research aims, models and methods designed to facilitate the understanding, diagnosis or treatment of disease.
- Use a range of transferable skills that may include written communication, information technology, numeracy, team working, problem solving, information handling.

Teaching and Learning Methods
Lectures, tutorials, directed reading.

Assessment Methods
In-course assessments

Pre-Requisites
BS2013 or BS2014 or BS2015

Co-Requisites

Excluded Combinations

Guided Independent Study: Indicative Activities
Looking through lecture material before and after lectures, reviewing lecture recordings. Additional reading around subject areas. Revision and work for in-course assessments.
BS3073 Conservation and Ecological Genetics

Module Specification

Academic Year: 2020/1
Module Level: Year 3
Scheme: UG
Department: Biological Sciences
Credits: 15

Student Workload (hours)

<table>
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<tr>
<th>Activity</th>
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<td>Guided Independent Study</td>
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<td>Demonstration</td>
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<td>Supervised time in studio/workshop</td>
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<td>Work Based Learning</td>
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<td>Year Abroad</td>
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<td>Total Module Hours</td>
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Period: Semester 2
Occurrence: E
Coordinator: Robert Hammond

Mark Scheme: UG Module Mark Scheme

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<td>2</td>
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</table>

Intended Learning Outcomes
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 aspects of behaviour, ecology and evolution
- 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
Practical report (written as research paper)
Student presented seminar
Examination (final)

Pre-Requisites

Co-Requisites

Excluded Combinations

Guided Independent Study: Indicative Activities
Directed reading, with particular emphasis on the primary literature
BS3902  Research Project

Academic Year: 2020/1
Module Level: Year 3
Scheme: UG
Department: Biological Sciences
Credits: 60

Student Workload (hours)

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<th>Fieldwork</th>
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<th>Demonstrations</th>
<th>Supervised time in studio/workshop</th>
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Period: Semester 1
Occurrence: E2
Coordinator: Noel Davies
Mark Scheme: UG Module Grade Only

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Period: Semester 2
Occurrence: E2
Coordinator: Noel Davies
Mark Scheme: UG Module Grade Only

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</table>

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
Module Specification

BS3902  Research Project

Guided Independent Study: Indicative Activities
Module Specification

MB2080 Pathophysiology of Disease

Academic Year: 2020/1
Module Level: Year 2
Scheme: UG
Department: Biological Sciences
Credits: 15

Student Workload (hours)

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Period: Semester 2
Occurrence: E
Coordinator: Jonathon Willets

Mark Scheme: UG Module Mark Scheme

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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.
Module Specification

MB3001  Biochemical Mechanisms of Human Disease

Student Workload (hours)

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Period:  Semester 2
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  Examination [Final]                         70          2.42          

002  Coursework - literature analysis           30

Intended Learning Outcomes

On successful completion of the module, students should be able to:
- Summarise the biochemical evidence and current theories about normal and pathological ageing.
- Describe the genetic basis of laminopathies and explain how different mutations can result in different disease phenotypes by altering different properties and functions of the nuclear envelope.
- Explain the molecular basis of complement activation and its role in disease.
- Summarise the factors that are involved in the development of inflammation and asthma.
- Critically evaluate scientific papers.

Teaching and Learning Methods

Lectures, Tutorials, Guided reading, Independent research.

Assessment Methods

Examination (final)
Coursework – literature analysis

Pre-Requisites


Co-Requisites


Excluded Combinations


Guided Independent Study: Indicative Activities

Guided reading associated with lectures
Directed critical analysis of recent scientific paper(s) on topic associated with the lectures

Last Published: 5 July 2020
Module Specification

MB3020  Advanced Topics in Medical Microbiology

Student Workload (hours)

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Period: Semester 2
Occurrence: E
Coordinator: Edouard Galyov

Mark Scheme: UG Module Mark Scheme

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</table>

Intended Learning Outcomes

On successful completion of the module, students should 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.
- Describe the key virulence factors and systems of major bacterial pathogens, and mechanisms of their acquisition and exchange.
- Define host responses to bacterial infections and approaches used to diagnose bacterial infections and to create effective vaccines; to demonstrate awareness how these approaches contribute to sustainable health care.
- Have gained, in the context of the above areas of microbiology, experience of accessing information from the scientific literature in electronic and written form, to be able to perform analysis of a hypothetical clinical case and to provide an overview of microbial pathogenicity through an oral presentation.

Teaching and Learning Methods

Lectures, seminars, tutorials,directed reading

Assessment Methods

Case presentation
Examination (final)

Pre-Requisites

Co-Requisites

Excluded Combinations

Guided Independent Study: Indicative Activities

Reading recent research papers and review articles; assessing relevant on line education materials, self-testing, reviewing lectures, preparing clinical case presentation seminar, revising for examination.
Module Specification

MB3050 Medical Genetics

Academic Year: 2020/1
Module Level: Year 3
Scheme: UG
Department: Biological Sciences
Credits: 15

Student Workload (hours)

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Period: Semester 2
Occurrence: E
Coordinator: Christopher Talbot

Mark Scheme: UG Module Mark Scheme

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</table>

Intended Learning Outcomes

On successful completion of the module, students should be able to:
- Assess how genetics has impacted upon the practice of medicine
- Outline the problems and advances in using genetics to understand complex diseases
- Demonstrate a knowledge of the contribution of genetics to the study of various diseases, eg neurological, cardiovascular and cancer.
- Research and integrate information from a range of sources in order to give a critical appraisal of a chosen specialist area.
- Appraise a current research paper and give an oral presentation on it.

Teaching and Learning Methods

Lectures, Tutorials, Seminars, Tutor and peer-reviewed presentations, essay and feedback, pre-exam clinic, exam

Assessment Methods

Exam (Final)
Essay (3000 words)
Presentation

Pre-Requisites

Co-Requisites

Excluded Combinations

Guided Independent Study: Indicative Activities

Preparation for lectures
Reviewing lecture presentations
Reading references from lectures
Researching and writing the essay
Researching, preparing and practicing the presentation
Module Specification

MB3057 Understanding Disease - An Integrated Approach

Academic Year: 2020/1
Module Level: Year 3
Scheme: UG
Department: Biological Sciences
Credits: 15

Student Workload (hours)

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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
--- | ----------------------- |----------|-----------|------------|-------------|------------
001 | Essay (2000 words)     | 20       |           |            |             |            |
002 | In-course tests (4)    | 30       |           |            |             |            |
003 | Examination (Final)    | 50       | 1.5       |            |             |            |

Intended Learning Outcomes
On successful completion of the module, students should be able to:
- Appraise a range of specific human diseases, including their clinical signs and symptoms, disease aetiology, and current and future treatments.
- Appraise a range of common molecular and cellular process that lead to disease pathogenesis, such as heritability, inflammation, auto-immunity, homeostasis, protein aggregation, failure of tissue repair and abnormalities in intercellular signaling.
- Identify, integrate and convey information from a variety of sources and data types to assemble a comprehensive view of a particular disease or health condition.

Teaching and Learning Methods
Lectures, study support tutorial, directed reading, independent information gathering, essay writing, in-course tests.

Assessment Methods
Essay (2000 words)
In-course tests (4)
Examination (final)

Pre-Requisites
MB2080

Co-Requisites

Excluded Combinations

Guided Independent Study: Indicative Activities
Preparation for in-course tests and final examination. Independent research for and writing of disease essay. Completion of exercises for tutorial. Looking through lecture material before and after lectures, reviewing lecture recordings. Additional reading around subject areas, including supplemental materials provided.
Module Specification

NT2002 Evolution

Academic Year: 2020/1
Module Level: Year 2
Scheme: UG
Department: Biological Sciences
Credits: 15

Student Workload (hours)
- Lectures: 10
- Seminars: 12
- Practical Classes & Workshops: 12
- Tutorials: 6
- Fieldwork: 12
- Project Supervision: 124
- Demonstration: 12
- Guided Independent Study: 12
- Fieldwork: 12
- Work Based Learning: 12
- Placement: 12
- Year Abroad: 12
- Total Module Hours: 152

Period: Semester 2
Occurrence: E
Coordinator: Sarah Gretton
Mark Scheme: UG Module Mark Scheme

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Period: Semester 2
Occurrence: E1
Coordinator: Sarah Gretton
Mark Scheme: UG Module Mark Scheme

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</table>

Intended Learning Outcomes
On successful completion of the module, students should be able to:
- Discuss how variation arises in evolution and provide examples of its significance.
- Discuss the following concepts: Hardy-Weinberg law, genetic drift, Wright-Fisher model, gene flow, speciation, natural selection.
- Describe how molecular changes in these developmental genes underpins evo-devo (evolution of development) at the levels of macro- and microevolution.
- Apply mathematical approaches to interpret Evolution and Ecology.
- Describe and critically appraise the different theories of hominid evolution.
- Describe how DNA sequences are generated using both Sanger sequencing and next generation sequencing techniques, and how they are used to interpret evolution.

Teaching and Learning Methods
- Problem-based learning
- Lectures
- Group work
- Tutorials
- Coursework:
- Short Answer exercise sets
- Podcast (Group)
- Report (Group)

Assessment Methods
Coursework: Short Answer exercise sets, Report (Group) Podcast (Group)
NT2002  Evolution

Pre-Requisites

Co-Requisites

NT2003

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Preparation for seminars (including reading, videos, multiple choice questions)

Short Answer exercise sets
**Module Specification**

**NT2010**  
**Light and Matter, Waves and Quanta**

**Academic Year:** 2020/1  
**Module Level:** Year 2  
**Scheme:** UG  
**Department:** Biological Sciences  
**Credits:** 30

**Student Workload (hours)**

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<td>Demonstration</td>
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<td>Supervised time in studio/workshop</td>
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<td>Work Based Learning</td>
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**Period:** Semester 2  
**Occurrence:** E  
**Coordinator:** Cheryl Hurkett  
**Mark Scheme:** UG Module Mark Scheme

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<th>Exam Hours</th>
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**Period:** Semester 2  
**Occurrence:** E1  
**Coordinator:** Cheryl Hurkett  
**Mark Scheme:** UG Module Mark Scheme

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NT2010 Light and Matter, Waves and Quanta

Intended Learning Outcomes
On successful completion of the module, students should be able to:
- Know the simple properties of matter, heat and light, the laws of thermodynamics and the basic laws which describe the behaviour of light.
- Know where the basic laws come from and how they are derived.
- Know the laws in mathematical form and define all the terms used.
- Be able to derive mathematical relationships which describe the properties and behaviour of heat and light.
- Be able to solve simple problems involving thermodynamics and optics.
- Be able to state the basic language and equations used to describe oscillations and oscillators; apply this knowledge to solve basic problems in simple harmonic motion, damped simple harmonic motion, forced oscillations and resonance.
- Be able to demonstrate the need for a quantum theory of matter, as evidenced by the photo-electric effect, UV catastrophe, Compton scattering and electron diffraction.
- Be able to demonstrate knowledge of the wave and particle natures of light and matter as described by De Broglie and Heisenberg, including the description of wave functions, expectation values and probability densities.
- Be able to state and apply the basic theory of the Bohr atom and quantized electron energy levels, in order to demonstrate the origin of spectral lines.
- Have gained experience in the use and organization of private study time including background reading, and the discussion of physical ideas and problems with your peers and staff.
- Connect scientific knowledge from ‘Light and Matter’ and ‘Waves and Quanta’ to provide unique insight, or deeper analysis, of an interdisciplinary topic related to these concepts. For example construct and apply mathematical models employing thermodynamical concepts and wave-particle theory to biochemical scenarios. Carry out independent research of the literature in order to support such models/discussions.

Teaching and Learning Methods
Research-based learning
Tutorials
Lectures,
Real-time problem solving classes,
Assessed homework problems,
Discussions with peers and staff members,
Guided independent study

Assessment Methods
Coursework
Coursework (Interdisciplinary)

Pre-Requisites

Co-Requisites

Excluded Combinations

Guided Independent Study: Indicative Activities
Preparation for tutorials (including reading, videos)
Working through the example problems, and practice problems.
Discuss problems and solutions with your peers,
Review other texts on the subject to find alternative strategies to problem solving and alternative descriptions of the material.