BL1101 Biology 1

SCOTCAT Credits:	20	SCQF level 7	**Semester**	1
Academic year:	2020-2021			
Planned timetable:	10.00 am; Practical classes one per week 2.00 - 5.00 pm Mon, Tue, or Wed			
This module is an introduction to molecular and cellular biology. It covers cell diversity and the origins of life, cellular structures and fundamental processes. The central dogma of molecular biology is investigated through the examination of the structure and function of DNA, RNA and proteins, and how this knowledge led to modern developments in biotechnology. The final section of the module gives an introduction into molecular and population genetics with an emphasis on the process of evolution. Throughout the module, the lecture material is complemented by practical classes where biological laboratory techniques are taught.				
Pre-requisite(s):	The student must have Higher or A-Level (or equivalent) in Biology or Human Biology at grade B or better			
Learning and teaching methods of delivery:	**Weekly contact**: Across the semester: 40 x 1h lectures, 3 x 1h tutorials, 4 x 1h revision workshops, 5 x 3h practicals			
	Scheduled learning: 88 hours		**Guided independent study:** 112 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 0%, Practical Examinations = 0%, Coursework = 100%			
	As used by St Andrews: Coursework = 100%			
Re-assessment pattern:	Coursework = 100%			
Module coordinator:	Dr P J Coote			
Module teaching staff:	Team taught			

BL1102 Biology 2

SCOTCAT Credits:	20	SCQF level 7	**Semester**	2
Academic year:	2020-2021			
Planned timetable:	10.00 am, Practical classes one per week 2.00 - 5.00 pm Mon, Tue, or Wed			
This module provides an introduction to the diversity of life on Earth and will address key elements of organismal and ecological aspects of life. The module is divided into several sections beginning with the classification of life and an introduction to the kingdoms Monera, Fungi and Protista. Photosynthesis, respiration and the evolution and diversity of plants will be studied. Students will then look at the diversity of animals in the sea and the movement of some groups onto land. The module will also provide an introduction to animal behaviour and developmental biology, before finishing off by introducing ecology and the various factors promoting and threatening biodiversity. Throughout the module the lecture material is complemented by extensive practical classes introducing a variety of fieldwork and laboratory techniques.				
Learning and teaching methods of delivery:	**Weekly contact**: Across the semester: 40 x 1h lectures, 3 x 1h tutorials, 4 x 1h revision workshops, 5 x 3h practicals			
	Scheduled learning: 82 hours		**Guided independent study:** 119 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 0%, Practical Examinations = 0%, Coursework = 100%			
	As used by St Andrews: Coursework = 100%			
Re-assessment pattern:	Coursework = 100%			
Module coordinator:	Dr I M Matthews			
Module teaching staff:	Team taught			

BL1801 The Global Aquaculture Industry (by Distance Learning)

SCOTCAT Credits:	10	SCQF level 7	**Semester**	Both
Academic year:	2020-2021			
Availability restrictions:	Available only for students on the Undergraduate Certificate in Sustainable Aquaculture			
Planned timetable:	To be arranged.			
The module will introduce the concept and definition of aquaculture and describe the global industry in the main production regions. The module will also consider the concept of sustainability; outlining the major environmental, social and economic factors involved. Major species produced will be defined and grouped in terms of bony fishes (teleosts), shrimp, shellfish, algae and other species. The main issues and challenges relating to the development of sustainability in aquaculture will be introduced and discussed.				
Learning and teaching methods of delivery:	**Weekly contact**: 2-hour on-line lectures and 2-hour interactive on-line learning each week over 12 weeks.			
	Scheduled learning: 60 hours		**Guided independent study:** 40 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 60%, Practical Examinations = 0%, Coursework = 40%			
	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%			
Re-assessment pattern:	2-hour Written Examination = 100%			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr J A David			

BL2300 Research Methods in Biology

SCOTCAT Credits:	15	SCQF level 8	**Semester**	1
Academic year:	2020-2021			
Planned timetable:	Lectures: 12.00 noon Tue, Thu (odd weeks) 12.00 noon Wed, Fri (even weeks) Practical classes: 2.00 - 5.00 pm Wed, Thu or Fri (weeks 3, 4, 7, 8, 9, 10)			
This module will help students develop essential academic and transferable skills, with major emphasis on problem solving. It will provide an introduction to the scientific method, experimental design, understanding and presenting data. Students will learn how to draw graphs and do simple general linear modelling with the code-based statistical software R. Confidence in using R will be built through a combination of online video walk-throughs, independent data handling and online tutorials. Regular mathematics for biologists exercises will allow students to practise manipulating equations, performing laboratory calculations etc. A mini project on experimental design and data analysis, which the students conduct in small groups, will help them apply the principles learned. The module will also cover scientific essay writing, record keeping and good laboratory practice.				
Pre-requisite(s):	Before taking this module you must pass BL1101 and pass BL1102			
Learning and teaching methods of delivery:	**Weekly contact**: Across the semester: 12 x 1h lectures, 7 x 1h tutorials, 4 x 3h computer workshops (consisting of approx. 1h online video walk-throughs, 1h self-study and 1h tutorial), 1 x 3h practical			
	Scheduled learning: 38 hours		**Guided independent study:** 112 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 0%, Practical Examinations = 0%, Coursework = 100%			
	As used by St Andrews: Coursework = 100%			
Re-assessment pattern:	Alternative assessment to the same weighting as the failed item of assessment			
Module coordinator:	Dr V C J Dietrich-Bischoff			
Module teaching staff:	Team taught			

BL2301 Cell Biology

SCOTCAT Credits:	15	SCQF level 8	**Semester**	1
Academic year:	2020-2021			
Planned timetable:	Lectures: 9.00 am Mon, Tue, Wed (odd weeks) 9.00 am Mon, Tue (even weeks) Practicals: 2.00 pm - 5.00 pm Mon or Tue (weeks 1, 3, 5, 8 & 10)			
The module will introduce the concept of 'a cell', moving on to discuss different types of prokaryotic and eukaryotic cell. The structure and function of a variety of sub-cellular compartments will be examined. The diversity of different cell types within multicellular organisms will be highlighted, together with an overview of how this diversity is achieved.				
Pre-requisite(s):	Before taking this module you must pass BL1101 and pass BL1102			
Anti-requisite(s)	You cannot take this module if you take BL2101			
Learning and teaching methods of delivery:	**Weekly contact**: Across the semester: 21 x 1h lectures, 4 x 1h tutorials, 5 x 3h practicals			
	Scheduled learning: 39 hours		**Guided independent study:** 111 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 50%, Practical Examinations = 0%, Coursework = 50%			
	As used by St Andrews: 2-hour Written Examination = 50%, Coursework = 50%			
Re-assessment pattern:	2-Hour Written Examination = 50%, Existing Coursework = 50% (if Exam failed) Existing Examination = 50%, New Coursework = 50% (if Coursework failed) 2-hour Written Examination = 100% (if coursework and exam failed) 2-hour Written Examination = 100% (for Qualified Honours Entry)			
Module coordinator:	Dr J E Sleeman			
Module teaching staff:	Team taught			

BL2302 Molecular Biology

SCOTCAT Credits:	15	SCQF level 8	**Semester**	1

Academic year:	2020-2021
Planned timetable:	Lectures: 9.00 am Thu, Fri (odd weeks) 9.00 am Wed, Thu, Fri (even weeks) Practicals: 2.00 pm - 5.00 pm Mon or Tue (weeks 2, 4, 7, 9 & 11)
Molecular biology is an essential tool within modern biology, widely used in biochemistry, cell biology and ecology. This module will provide an introduction to modern molecular biology. Lectures will cover fundamental biological processes such as transcription, translation, DNA replication and repair - as well as touch on the genomics revolution and how this has influenced the field. These concepts will be reinforced through laboratory practical classes where students will develop their practical skills and be exposed to the use of basic bioinformatics resources to analyse and interpret data.	
Pre-requisite(s):	Before taking this module you must pass BL1101 and pass BL1102
Anti-requisite(s)	You cannot take this module if you take BL2104
Learning and teaching methods of delivery:	**Weekly contact**: Across the semester: 19 x 1h lectures, 4 x 1h tutorials, 5 x 3h practical
	Scheduled learning: 39 hours / **Guided independent study:** 111 hours
Assessment pattern:	**As defined by QAA:** Written Examinations = 70%, Practical Examinations = 0%, Coursework = 30%
	As used by St Andrews: 2-hour Written Examination = 50%, Coursework = 50%
Re-assessment pattern:	2-Hour Written Examination = 50%, Existing Coursework = 50% (if Exam failed) Existing Examination = 50%, New Coursework = 50% (if Coursework failed) 2-hour Written Examination = 100% (if coursework and exam failed) 2-hour Written Examination = 100% (for Qualified Honours Entry)
Module coordinator:	Dr H C Ferreira
Module teaching staff:	Team taught

BL2303 Evolutionary Biology

SCOTCAT Credits:	15	SCQF level 8	**Semester**	1
Academic year:	2020-2021			
Planned timetable:	Lectures: 11.00 am Thu, Fri (odd weeks) 11.00 am Wed, Thu, Fri (even weeks) Practicals: 2.00 - 5.00 pm Thu or Fri (weeks 1, 3, 5, 8 & 10)			
Evolution is a fundamentally important component of our understanding of all biological phenomena, from molecular to ecosystem scales. This module will give an overview of the history and major principles of modern evolutionary biology, aimed at contemporary biologists of all backgrounds.				
Pre-requisite(s):	Before taking this module you must pass BL1101 and pass BL1102			
Anti-requisite(s)	You cannot take this module if you take BL2105			
Learning and teaching methods of delivery:	**Weekly contact**: Across the semester: 23 x 1h lectures, 3 x 1h tutorials, 4 x 3h practicals			
	Scheduled learning: 39 hours		**Guided independent study:** 111 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 50%, Practical Examinations = 0%, Coursework = 50%			
	As used by St Andrews: 2-hour Written Examination = 50%, Coursework = 50%			
Re-assessment pattern:	2-Hour Written Examination = 50%, Existing Coursework = 50% (if Exam failed) Existing Examination = 50%, New Coursework = 50% (if Coursework failed) 2-hour Written Examination = 100% (if coursework and exam failed) 2-hour Written Examination = 100% (for Qualified Honours Entry)			
Module coordinator:	Professor T R Meagher			
Module teaching staff:	Team taught			

BL2304 Invertebrate Zoology

SCOTCAT Credits:	15	SCQF level 8	**Semester**	1
Academic year:	2020-2021			
Planned timetable:	Lectures: 11.00 am Mon, Tue, Wed (odd weeks) 11.00 am Mon, Tue (even weeks) Practicals: 2.00 - 5.00 pm Thu or Fri (weeks 2, 4, 7, 9 & 11)			
The vast majority of animals are invertebrates - they do not have backbones. This module surveys the major invertebrate groups, emphasizing the diversity of body plans while demonstrating how the common functional requirements such as feeding, reproduction, respiration and excretion are achieved. The module starts with the simplest animals such as sponges and jellyfish, and considers how these primitive animals may have arisen from non-animal ancestors. It continues with a description of the several groups of worms, and the molluscs and arthropods. The last major group discussed are the echinoderms, which are close invertebrate relatives to vertebrate animals such as ourselves. The economic, social, and scientific impact that invertebrates have on human society is identified. The evolutionary relations between the various groups is the common thread that binds this diversity into a coherent story. A series of practical exercises reinforces and complements the lecture component of this module.				
Pre-requisite(s):	Before taking this module you must pass BL1101 and pass BL1102			
Anti-requisite(s)	You cannot take this module if you take BL2102			
Learning and teaching methods of delivery:	**Weekly contact**: Across the semester: 23 x 1h lectures, 3 x 1h tutorials, 4 x 3h practicals			
	Scheduled learning: 39 hours		**Guided independent study:** 111 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 50%, Practical Examinations = 0%, Coursework = 50%			
	As used by St Andrews: 2-hour Written Examination = 50%, Coursework = 50%			
Re-assessment pattern:	2-Hour Written Examination = 50%, Existing Coursework = 50% (if Exam failed) Existing Examination = 50%, New Coursework = 50% (if Coursework failed) 2-hour Written Examination = 100% (if coursework and exam failed) 2-hour Written Examination = 100% (for Qualified Honours Entry)			
Module coordinator:	Dr I M L Somorjai			
Module teaching staff:	Team taught			

BL2305 Cell Systems

SCOTCAT Credits:	15	SCQF level 8	**Semester**	2
Academic year:	2020-2021			
Planned timetable:	Lectures: 9.00 am Mon, Tue, Wed (odd weeks) 9.00 am Mon, Tue (even weeks) Practicals: 2.00 pm - 5.00 pm Mon or Tue (weeks 2, 4, 6, 8 & 10)			
Cells are often considered to be the fundamental unit of life. This module will discuss how cells interact with one another to form complex tissues and organisms. You will consider, the structure-function relationship of a variety of cell types, including those involved in forming muscles, neuronal networks, blood and immunity and infectious diseases. The mechanisms by which cells communicate in order to mediate the complex physiology of an organism will be discussed and you will consider how disruption of these cell systems can lead to disease states.				
Pre-requisite(s):	Before taking this module you must pass BL1101 and pass BL1102			
Anti-requisite(s)	You cannot take this module if you take BL2101			
Learning and teaching methods of delivery:	**Weekly contact**: Across the semester: 23 x 1h lectures, 4 x 1h tutorials, 4 x 3h practicals			
	Scheduled learning: 39 hours		**Guided independent study:** 111 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 50%, Practical Examinations = 0%, Coursework = 50%			
	As used by St Andrews: 2-hour Written Examination = 50%, Coursework = 50%			
Re-assessment pattern:	2-Hour Written Examination = 50%, Existing Coursework = 50% (if Exam failed) Existing Examination = 50%, New Coursework = 50% (if Coursework failed) 2-hour Written Examination = 100% (if coursework and exam failed) 2-hour Written Examination = 100% (for Qualified Honours Entry)			
Module teaching staff:	Team taught			

BL2306 Biochemistry

SCOTCAT Credits:	15	SCQF level 8	**Semester**	2
Academic year:	2020-2021			
Planned timetable:	Lectures: 9.00 am Thu, Fri (odd weeks), 9.00 am Wed, Thu, Fri (even weeks) Practicals: 2.00 pm - 5.00 pm Mon or Tue (weeks 1, 3, 5, 7, 9 & 11)			
Due to recent technological developments, metabolism and its regulation has re-emerged as an important area of Biology. This module will examine major biological macromolecules, the common motifs which occur in metabolic reactions, explore the properties of enzymes catalysing these reactions and consider the approaches to characterise the small molecule complement (metabolites) of biological systems. A number of central metabolic pathways and their control will be studied in detail, alongside examples of their importance in disease and recent metabolomic studies.				
Pre-requisite(s):	Before taking this module you must pass BL1101 and pass BL1102			
Anti-requisite(s)	You cannot take this module if you take BL2104			
Learning and teaching methods of delivery:	**Weekly contact**: Across the semester: 23 x 1h lectures, 4 x 1h tutorials, 6 x 3h practicals			
	Scheduled learning: 42 hours		**Guided independent study:** 108 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 50%, Practical Examinations = 0%, Coursework = 50%			
	As used by St Andrews: 2-hour Written Examination = 50%, Coursework = 50%			
Re-assessment pattern:	2-Hour Written Examination = 50%, Existing Coursework = 50% (if Exam failed) Existing Examination = 50%, New Coursework = 50% (if Coursework failed) 2-hour Written Examination = 100% (if coursework and exam failed) 2-hour Written Examination = 100% (for Qualified Honours Entry)			
Module coordinator:	Dr J Nairn			
Module teaching staff:	Team taught			

BL2307 Ecology

SCOTCAT Credits:	15	SCQF level 8	**Semester**	2
Academic year:	2020-2021			
Planned timetable:	Lectures: 11.00 am Thu, Fri (odd weeks) 11.00 am Wed, Thu, Fri (even weeks) Practicals: 2.00 pm - 5.00 pm Thu or Fri (weeks 2, 4, 6, 8 & 10)			
This module introduces basic concepts in population and community ecology and how they relate to biodiversity. It provides an understanding of fundamental ecological concepts including population regulation, intra- and inter-specific competition, species niche as well as taxonomic and functional diversity. This module is suitable for all Biologists and environmental scientists. Although it is an introductory module, it will cover the latest developments in the field of ecology.				
Pre-requisite(s):	Before taking this module you must pass BL1101 and pass BL1102			
Anti-requisite(s)	You cannot take this module if you take BL2105			
Learning and teaching methods of delivery:	**Weekly contact**: Across the semester: 23 x 1h lectures, 3 x 1h tutorials, 5 x 3h practicals			
	Scheduled learning: 39 hours		**Guided independent study:** 111 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 50%, Practical Examinations = 0%, Coursework = 50%			
	As used by St Andrews: 2-hour Written Examination = 50%, Coursework = 50%			
Re-assessment pattern:	2-Hour Written Examination = 50%, Existing Coursework = 50% (if Exam failed) Existing Examination = 50%, New Coursework = 50% (if Coursework failed) 2-hour Written Examination = 100% (if coursework and exam failed) 2-hour Written Examination = 100% (for Qualified Honours Entry)			
Module coordinator:	Professor O E Gaggiotti			
Module teaching staff:	Team taught			

BL2308 Vertebrate Zoology

SCOTCAT Credits:	15	SCQF level 8	**Semester**	2
Academic year:	2020-2021			
Planned timetable:	Lectures: 11.00 am Mon, Tue, Wed (odd weeks) 11.00 am Mon, Tue (even weeks) Practicals: 2.00 pm - 5.00 pm Thu or Fri (weeks 1, 3, 5, 7, 9 & 11)			
This module will explore the diversity of vertebrate animals, beginning with the closest relatives of vertebrates and the evolutionary origins of the group. A detailed look at the defining characteristics of the body plans and lifestyles of the key vertebrate groups will illustrate how they carry out basic animal functions in similar or different ways. This will be put in an evolutionary context to reveal the patterns and trends in the vertebrates as a whole, while also highlighting current phylogenetic controversies. The module will then explore some common themes across the key groups, starting with the developmental biology of some vertebrate model systems and the lessons we can learn from these. We will also see how the highly developed brains of vertebrates have allowed the evolution of astonishing sensory capacities and of complex behaviours, and how these are different (or not) from invertebrates.				
Pre-requisite(s):	Before taking this module you must pass BL1101 and pass BL1102			
Anti-requisite(s)	You cannot take this module if you take BL2102			
Learning and teaching methods of delivery:	**Weekly contact**: Across the semester: 23 x 1h lectures, 6 x 1h tutorials, 4 x 3h practicals			
	Scheduled learning: 42 hours		**Guided independent study:** 108 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 50%, Practical Examinations = 0%, Coursework = 50%			
	As used by St Andrews: 2-hour Written Examination = 50%, Coursework = 50%			
Re-assessment pattern:	2-Hour Written Examination = 50%, Existing Coursework = 50% (if Exam failed) Existing Examination = 50%, New Coursework = 50% (if Coursework failed) 2-hour Written Examination = 100% (if coursework and exam failed) 2-hour Written Examination = 100% (for Qualified Honours Entry)			
Module coordinator:	Dr V C J Dietrich-Bischoff			
Module teaching staff:	Team taught			

BL2309 Applied Molecular Biology

SCOTCAT Credits:	15	SCQF level 8	**Semester**	2
Academic year:	2020-2021			
Planned timetable:	Lectures: 10.00 am Thu, Fri (odd weeks) 10.00 am Wed, Thu, Fri (even weeks) Practicals: 2.00 - 5.00 pm Thu or Fri (weeks 2, 4, 6, 8 & 10)			
Techniques in molecular biology represent a powerful box of tools that are used to address a wide variety of modern research questions across a broad range of biological disciplines including; ecology, biotechnology, cell biology, medicine, conservation biology, infectious disease, evolution, genetics and synthetic biology. Key molecular biology techniques will be introduced in the context of case studies that will provide examples of how molecular biology techniques are being used in cutting edge research to address real-life questions and problems that impact health, food security, the environment and the economy.				
Pre-requisite(s):	Before taking this module you must pass BL1101 and pass BL1102			
Learning and teaching methods of delivery:	**Weekly contact**: Across the semester: 23 x 1h lectures, 3 x 1h tutorials, 4 x 3h practicals			
	Scheduled learning: 39 hours		**Guided independent study:** 111 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 50%, Practical Examinations = 50%, Coursework = 0%			
	As used by St Andrews: 2-hour Written Examination = 50%, Coursework = 50%			
Re-assessment pattern:	2-Hour Written Examination = 50%, Existing Coursework = 50% (if Exam failed) Existing Examination = 50%, New Coursework = 50% (if Coursework failed) 2-hour Written Examination = 100% (if coursework and exam failed) 2-hour Written Examination = 100% (for Qualified Honours Entry)			
Module coordinator:	Dr C S Adamson			
Module teaching staff:	Team taught			

BL2310 Comparative Physiology

SCOTCAT Credits:	15	SCQF level 8	**Semester**	2
Academic year:	2020-2021			
Planned timetable:	Lectures: 12.00 noon Mon, Tue, (odd weeks) 12.00 noon Mon, Tue, Wed (even weeks) Practical classes: 2.00 - 5.00 pm Mon or Tue (weeks 3, 5, 7, 9, 11)			
A comparative physiologist studies organisms to explore the origins and nature of physiological diversity. This module covers the principles of physiological adaptation in a range of animals, including examples from all major taxa and from all habitats. The specific topics and components include: (1) the physiological consequences of body size and scaling effects; (2) respiratory and circulatory systems in vertebrates and invertebrates; (3) thermal physiology: (4) water balance in aquatic and land animals; (5) the mammalian kidney and its functioning; (6) sensory systems in different environments; (7) neural signaling and vertebrate senses; (8) control systems - hormones and pheromones; and (9) immunity and the maintenance of physiological integrity.				
Pre-requisite(s):	Before taking this module you must pass BL1101 and pass BL1102			
Anti-requisite(s)	You cannot take this module if you take BL2106			
Learning and teaching methods of delivery:	**Weekly contact**: Across the semester: 23 x 1h lectures, 3 x 1h tutorials, 4 x 3h practicals			
	Scheduled learning: 39 hours		**Guided independent study:** 111 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 50%, Practical Examinations = 50%, Coursework = 0%			
	As used by St Andrews: 2-hour Written Examination = 50%, Coursework = 50%			
Re-assessment pattern:	2-Hour Written Examination = 50%, Existing Coursework = 50% (if Exam failed) Existing Examination = 50%, New Coursework = 50% (if Coursework failed) 2-hour Written Examination = 100% (if coursework and exam failed) 2-hour Written Examination = 100% (for Qualified Honours Entry)			
Module coordinator:	Professor S D Healy			
Module teaching staff:	Team taught			

BL2311 The Oceans

SCOTCAT Credits:	15	SCQF level 8	**Semester**	1
Academic year:	2020-2021			
Availability restrictions:	This module will be available to all enrolled students who have completed the pre-requisites.			
Planned timetable:	12.00 pm - 1.00 pm, Mon, Wed, Fri - odd weeks; Tue, Thu - even weeks (lectures) 2.00 pm - 5.00 pm Mon, Tue (practical classes)			
The oceans hold approximately 97% of the earths water and are a vital component of life on this planet. This module introduces basic concepts in biological and physical oceanography. It provides an understanding of physical processes such as circulation patterns, waves and tides, and how these physical processes affect plants and animals living in the different ocean biomes. We will discuss ocean habitats ranging from the coasts to the deep sea and from polar to tropical environments.				
Pre-requisite(s):	Before taking this module you must pass BL1102			
Learning and teaching methods of delivery:	**Weekly contact**: Across the semester: 20 x 1h lectures, 6 x 1h discussion sessions, 4 x 3h practicals			
	Scheduled learning: 46 hours		**Guided independent study:** 99 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 50%, Practical Examinations = 20%, Coursework = 30%			
	As used by St Andrews: Coursework = 30%, Practical examination = 20%, Written Examination = 50%			
Re-assessment pattern:	Coursework = 50%, Written Examination = 50%			
Module coordinator:	Dr J N Oswald			
Module teaching staff:	Dr Julie Oswald, Dr Lars Boehme, Prof Patrick Miller, Prof Andrew Brierley, Dr Maria Azeredo de Dornelas, Prof David Paterson			

BL2802 Fish and Invertebrate Biology (by Distance Learning)

SCOTCAT Credits:	10	SCQF level 8	**Semester**	Both
Academic year:	2020-2021			
Availability restrictions:	Available only to students on the Undergraduate Certificate in Sustainable Aquaculture			
Planned timetable:	To be arranged.			
This module will address the essential aspects of fish and invertebrate biology including anatomy, physiology and environmental requirements. Subjects studied will include anatomy and physiology of the circulatory, respiratory, nervous, digestive sensory endocrine reproductive systems and life cycle of invertebrate and vertebrate aquaculture species. These parameters will be examined in the context of biological requirements and sustainable aquaculture; production methods and technology, effect of water quality, disease, nutrition and environmental impact.				
Learning and teaching methods of delivery:	**Weekly contact**: 2-hour on-line lectures and 2 hour interactive on-line learning each week over 12 weeks.			
	Scheduled learning: 60 hours		**Guided independent study:** 40 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 60%, Practical Examinations = 0%, Coursework = 40%			
	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%			
Re-assessment pattern:	2-hour Written Examination = 100%			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr J A David			

BL2803 Aquaculture - Products and Markets (by Distance Learning)

SCOTCAT Credits:	10	SCQF level 8	**Semester**	Both
Academic year:	2020-2021			
Availability restrictions:	Available only to students on the Undergraduate Certificate in Sustainable Aquaculture			
Planned timetable:	To be arranged.			
This module provides an understanding of the diversity of species, value of markets and global trade of aquaculture products. The module will review the range of products for finfish and invertebrates. In particular the importance of value added and niche products will be examined in a variety of aquaculture products. The module will examine critically the different markets for aquaculture products; for example a comparison of subsistence farming in Malawi for local consumption with production of high value marine species for export in Brazil. For major aquaculture species such as salmon and shrimp the effects of the main market pressures on sustainable production such as use of medicines, food safety, quality and traceability will be discussed.				
Pre-requisite(s):	Before taking this module you must pass BL1801 and pass BL2802			
Anti-requisite(s)	You cannot take this module if you take BL2804 or take BL2805			
Learning and teaching methods of delivery:	**Weekly contact**: 2-hour on-line lectures and 2-hour interactive on-line learning each week over 10 weeks.			
	Scheduled learning: 60 hours		**Guided independent study:** 40 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 0%, Practical Examinations = 0%, Coursework = 0%			
	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%			
Re-assessment pattern:	2-hour Written Examination = 100%			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr J A David			

BL2804 Aquaculture Nutrition

SCOTCAT Credits:	10	SCQF level 8	**Semester**	Both
Academic year:	2020-2021			
Planned timetable:	Not applicable			
This module provides an introduction to the anatomy, physiology and nutritional requirements of key fish and invertebrate species. It also provides an assessment of the sustainability of feed production technology and discusses the relationship between nutrition and fish health and the importance of nutrition in developing best practice in animal welfare.				
Pre-requisite(s):	Before taking this module you must pass BL1801 and pass BL2802			
Anti-requisite(s)	You cannot take this module if you take BL2803 or take BL2805			
Learning and teaching methods of delivery:	**Weekly contact**: 3 lectures(X10 weeks), 2 seminars (X10 weeks)			
	Scheduled learning: 50 hours		**Guided independent study:** 50 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 60%, Practical Examinations = 0%, Coursework = 40%			
	As used by St Andrews: Coursework = 40%, Written Examination = 60%			
Re-assessment pattern:	Written Examination = 100%			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr Neil Hazon			

BL2805 Aquaculture Health				
SCOTCAT Credits:	10	SCQF level 8	**Semester**	Both
Academic year:	2020-2021			
Planned timetable:	Not applicable			
This module provides an introduction to the disease processes in cultured fish and invertebrates including viral, bacterial, parasitic and non-infectious disease. The specific causes of disease and pathology in farmed species will be assessed. The importance of management in the development of best practice minimising impact of disease and optimising cultured species welfare and sustainability will be discussed.				
Pre-requisite(s):	Before taking this module you must pass BL1801 and pass BL2802			
Anti-requisite(s)	You cannot take this module if you take BL2803 or take BL2804			
Learning and teaching methods of delivery:	**Weekly contact**: 2 lectures(X10 weeks), 2 seminars (X10 weeks)			
	Scheduled learning: 40 hours		**Guided independent study:** 60 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 60%, Practical Examinations = 0%, Coursework = 40%			
	As used by St Andrews: Coursework = 40%, Written Examination = 60%			
Re-assessment pattern:	Written Examination = 100%			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr Neil Hazon			