

Sustainable Aquaculture - Master of Science

Programme Requirements:

Sustainable Aquaculture - MSc
BL5899 (60 credits) and BL4801 (10 credits) and (BL4802 (20 credits) or (BL4803 (10 credits) and BL4804 (10 credits))) and (BL5801 (20 credits) or (BL5806 (10 credits) and BL5807 (10 credits))) and BL5802 (10 credits) and (BL5803 (20 credits) or (BL5808 (10 credits) and BL5809 (10 credits))) and BL5804 (10 credits) and BL5805 (10 credits) and 20 credits from Module List: BL5821 - BL5825

Compulsory modules:

BL5899 Sustainable Aquaculture Research Dissertation				
SCOTCAT Credits:	60	SCQF Level 11	Semester	Full Year
Academic year:	2018/9			
Planned timetable:	To be arranged.			
The research dissertation will involve the study of a defined problem within the field of Sustainable Aquaculture. Students will be required to collate and analyse data and to discuss their results in the light of existing literature. In some cases, projects might also involve the design of experiments or the gathering of data. Each project will be written up in the form of a thesis.				
Learning and teaching methods of delivery:	Weekly contact: Individual supervision			
	Scheduled learning: 0 hours		Guided independent study: 0 hours	
Assessment pattern:	As used by St Andrews: Dissertation of up to 15,000 words = 100%			
Module coordinator:	Dr N Hazon			

BL4801 Aquaculture and Fisheries				
SCOTCAT Credits:	10	SCQF Level 10	Semester	Both
Academic year:	2018/9			
Availability restrictions:	Not available to undergraduate students			
Planned timetable:	To be arranged.			
This module provides an introduction to the global importance of aquaculture with fisheries industries worldwide. The module will compare both aquaculture and fishing industries with terrestrial, agricultural sources of food production. The global markets for aquaculture, fisheries and agricultural products will be assessed. The environmental interactions of aquaculture will be discussed with relation to the definition of, and development of, sustainable aquaculture practices. The principles of developing sustainable aquaculture in different global environments/conditions will be discussed.				
Learning and teaching methods of delivery:	Weekly contact: Distance Learning : 4 hours of lectures (x 5 weeks) and 3 hours of tutorials (x 3 weeks).			
	Scheduled learning: 0 hours		Guided independent study: 0 hours	
Assessment pattern:	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%			
Re-assessment pattern:	3-hour Written Examination = 100% TBC			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr J A David			

Biology - Sustainable Aquaculture - MSc - 2018/9 - June 2018

Either:

BL4802 Biology for Aquaculture				
SCOTCAT Credits:	20	SCQF Level 10	Semester	Both
Academic year:	2018/9			
Availability restrictions:	Not available to undergraduate students			
Planned timetable:	To be arranged.			
This module provides an understanding of the fundamental biology of aquaculture species. This includes the anatomy and physiology of both invertebrate and vertebrate aquaculture species. The interaction of aquaculture species with the aquatic environment and the requirements for developing sustainable aquaculture will be assessed.				
Anti-requisite(s)	You cannot take this module if you take BL4803 or take BL4804			
Learning and teaching methods of delivery:	Weekly contact: Distance learning: 2 x 2-hour lecture (x 10 weeks) and 1 x 3-hour tutorial (x 10 weeks)			
	Scheduled learning: 0 hours		Guided independent study: 0 hours	
Assessment pattern:	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%			
Re-assessment pattern:	3-hour Written Examination = 100% TBC			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr J A David			

Or:

BL4803 Biology for Aquaculture - Invertebrates				
SCOTCAT Credits:	10	SCQF Level 10	Semester	Both
Academic year:	2018/9			
Availability restrictions:	Not available to Undergraduate students			
Planned timetable:	To be arranged.			
This module provides an understanding of the fundamental biology of invertebrate aquaculture species. This includes the anatomy and physiology of appropriate aquaculture species. The interaction of aquaculture species with the aquatic environment and the requirements for developing sustainable aquaculture will be assessed.				
Anti-requisite(s)	You cannot take this module if you take BL4802			
Learning and teaching methods of delivery:	Weekly contact: 4 hours of lectures (x 5 weeks) and 3 hours of tutorials (x 3 weeks).			
	Scheduled learning: 0 hours		Guided independent study: 0 hours	
Assessment pattern:	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%			
Re-assessment pattern:	3-hour Written Examination = 100%			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr J A David			

And:

BL4804 Biology for Aquaculture - Vertebrates				
SCOTCAT Credits:	10	SCQF Level 10	Semester	Both
Academic year:	2018/9			
Availability restrictions:	Not available to undergraduate students			
Planned timetable:	To be arranged.			
This module provides an understanding of the fundamental biology of vertebrate aquaculture species. This includes the anatomy and physiology of appropriate aquaculture species. The interaction of aquaculture species with the aquatic environment and the requirements for developing sustainable aquaculture will be assessed.				
Anti-requisite(s)	You cannot take this module if you take BL4802			
Learning and teaching methods of delivery:	Weekly contact: 4 hours of lectures (x 5 weeks), and 3 hours of tutorials (x 3 weeks).			
	Scheduled learning: 0 hours		Guided independent study: 0 hours	
Assessment pattern:	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%			
Re-assessment pattern:	3-hour Written Examination = 100% TBC			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr J A David			

Either:

BL5801 Nutrition for Aquaculture				
SCOTCAT Credits:	20	SCQF Level 11	Semester	Both
Academic year:	2018/9			
Planned timetable:	To be arranged.			
This module provides advanced knowledge of the anatomy, physiology and nutritional requirements of key fish and invertebrate species and a critical assessment of the sustainability of feed production technology. It will also assess and discuss the relationship between clinical nutrition and fish health, the role of microbiota in fish nutrition and the importance of nutrition in developing optimal animal welfare.				
Anti-requisite(s)	You cannot take this module if you take BL5806 or take BL5807			
Learning and teaching methods of delivery:	Weekly contact: Distance learning: 2 x 2-hour lecture (x 10 weeks) and 1 x 3-hour tutorial (x 10 weeks)			
	Scheduled learning: 0 hours		Guided independent study: 0 hours	
Assessment pattern:	As used by St Andrews: 2-hour Written Examination = 40%, Coursework = 60%			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr J A David			

Biology - Sustainable Aquaculture - MSc - 2018/9 - June 2018

Or:

BL5806 Nutrition - Invertebrates			
SCOTCAT Credits:	10	SCQF Level 11	Semester 1
Academic year:	2018/9		
Planned timetable:	To be arranged.		
This module provides advanced knowledge of the anatomy, physiology and nutritional requirements of key invertebrate species and a critical assessment of the sustainability of feed production technology. It will also assess and discuss the relationship between clinical nutrition and animal health and the importance of nutrition in developing optimal animal welfare.			
Anti-requisite(s)	You cannot take this module if you take BL5801		
Learning and teaching methods of delivery:	Weekly contact: 4 hours of lectures (x 5 weeks) and 3 hours of tutorials (x 3 weeks).		
	Scheduled learning: 0 hours	Guided independent study: 0 hours	
Assessment pattern:	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%		
Module coordinator:	Dr N Hazon		
Module teaching staff:	Dr J A David		

And:

BL5807 Nutrition - Vertebrates			
SCOTCAT Credits:	10	SCQF Level 11	Semester Both
Academic year:	2018/9		
Planned timetable:	To be arranged.		
This module provides advanced knowledge of the anatomy, physiology and nutritional requirements of key vertebrate species and a critical assessment of the sustainability of feed production technology. It will also assess and discuss the relationship between clinical nutrition and animal health and the importance of nutrition in developing optimal animal welfare.			
Anti-requisite(s)	You cannot take this module if you take BL5801		
Learning and teaching methods of delivery:	Weekly contact: 4 hours of lectures (x 5 weeks) and 3 hours of tutorials (x 3 weeks).		
	Scheduled learning: 0 hours	Guided independent study: 0 hours	
Assessment pattern:	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%		
Module coordinator:	Dr N Hazon		
Module teaching staff:	Dr J A David		

BL5802 Management, Husbandry and Sustainability				
SCOTCAT Credits:	10	SCQF Level 11	Semester	1
Academic year:	2018/9			
Planned timetable:	To be arranged.			
This module provides advanced knowledge of production management and business management of modern aquaculture practices. Environmental, social and economic sustainability of aquaculture depends on an understanding of the interactions of differing but complementary management structures.				
Learning and teaching methods of delivery:	Weekly contact: 4 hours of lectures (x 5 weeks) and 3 hours of tutorials (x 3 weeks).			
	Scheduled learning: 0 hours		Guided independent study: 0 hours	
Assessment pattern:	As used by St Andrews: 2-hour Written Examination = 40%, Coursework = 60%			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr J A David			

Either:

BL5803 Health and Disease				
SCOTCAT Credits:	20	SCQF Level 11	Semester	Both
Academic year:	2018/9			
Planned timetable:	To be arranged.			
This module provides advanced knowledge of the factors that influence disease processes in cultured fish and invertebrates including viral, bacterial, parasitic and non-infectious disease. The wide range of specific causes of disease and pathology in farmed species will be discussed and the importance of operations and management on the development and impact of disease in optimising fish welfare and developing sustainable and ethical aquaculture practices will be assessed critically.				
Anti-requisite(s)	You cannot take this module if you take BL5808 or take BL5809			
Learning and teaching methods of delivery:	Weekly contact: Distance learning: 2 x 2-hour lecture (x 10 weeks) and 1 x 3-hour tutorial (x 10 weeks)			
	Scheduled learning: 0 hours		Guided independent study: 0 hours	
Assessment pattern:	As used by St Andrews: 2-hour Written Examination = 40%, Coursework = 60%			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr J A David			

Or:

BL5808 Health and Disease - Invertebrates				
SCOTCAT Credits:	10	SCQF Level 11	Semester	1
Academic year:	2018/9			
Planned timetable:	To be arranged.			
This module provides advanced knowledge of the factors that influence disease processes in cultured invertebrate species including viral, bacterial, parasitic and non-infectious disease. The wide range of specific causes of disease and pathology in farmed species will be discussed and the importance of operations and management on the development and impact of disease in optimising welfare and developing sustainable and ethical aquaculture practices will be assessed critically.				
Anti-requisite(s)	You cannot take this module if you take BL5803			
Learning and teaching methods of delivery:	Weekly contact: 4 hours of lectures (x 5 weeks) and 3 hours of tutorials (x 3 weeks).			
	Scheduled learning: 0 hours		Guided independent study: 0 hours	
Assessment pattern:	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr J A David			

Biology - Sustainable Aquaculture - MSc - 2018/9 - June 2018

And:

BL5809 Health and Disease - Vertebrates			
SCOTCAT Credits:	10	SCQF Level 11	Semester 1
Academic year:	2018/9		
Planned timetable:	To be arranged.		
This module provides advanced knowledge of the factors that influence disease processes in cultured fish species including viral, bacterial, parasitic and non-infectious disease. The wide range of specific causes of disease and pathology in farmed species will be discussed and the importance of operations and management on the development and impact of disease in optimising fish welfare and developing sustainable and ethical aquaculture practices will be assessed critically.			
Anti-requisite(s)	You cannot take this module if you take BL5803 or take BL5808		
Learning and teaching methods of delivery:	Weekly contact: 4 hours of lectures (x 5 weeks) and 3 hours of tutorials (x 3 weeks).		
	Scheduled learning: 0 hours	Guided independent study: 0 hours	
Assessment pattern:	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%		
Module coordinator:	Dr N Hazon		
Module teaching staff:	Dr J A David		

BL5804 Markets, Products, Processing and Food Safety			
SCOTCAT Credits:	10	SCQF Level 11	Semester 1
Academic year:	2018/9		
Planned timetable:	To be arranged.		
This module provides advanced knowledge of aquaculture markets, products, processing and food safety. Understanding the processes of ensuring the safety and quality of aquaculture products is central to establishing efficient and sustainable aquaculture practices.			
Learning and teaching methods of delivery:	Weekly contact: 4 hours of lectures (x 5 weeks) and 3 hours of tutorials (x 3 weeks).		
	Scheduled learning: 0 hours	Guided independent study: 0 hours	
Assessment pattern:	As used by St Andrews: 2-hour Written Examination = 40%, Coursework = 60%		
Module coordinator:	Dr N Hazon		
Module teaching staff:	Dr J A David		

BL5805 Local and Global Impacts of Aquaculture			
SCOTCAT Credits:	10	SCQF Level 11	Semester Both
Academic year:	2018/9		
Planned timetable:	To be arranged.		
This module provides advanced knowledge of the environmental impact of aquaculture practices on both local and global scales. Understanding the environmental impact of aquaculture practices is central to improving and developing sustainable aquaculture.			
Learning and teaching methods of delivery:	Weekly contact: 4 hours of lectures (x 5 weeks) and 3 hours of tutorials (x 3 weeks).		
	Scheduled learning: 0 hours	Guided independent study: 0 hours	
Assessment pattern:	As used by St Andrews: 2-hour Written Examination = 40%, Coursework = 60%		
Module coordinator:	Dr N Hazon		
Module teaching staff:	Dr J A David		

Optional modules:

BL5821 Breeding and Genetics				
SCOTCAT Credits:	10	SCQF Level 11	Semester	Both
Academic year:	2018/9			
Planned timetable:	To be arranged.			
This module provides advanced knowledge of selective breeding programmes and modern genetic techniques applied in aquaculture practices. Scientific and ethical issues raised by the application of genetic engineering will be examined with the context of developing sustainable aquaculture.				
Learning and teaching methods of delivery:	Weekly contact: 4 hours of lectures (x 5 weeks) and 3 hours of tutorials (x 3 weeks).			
	Scheduled learning: 0 hours		Guided independent study: 0 hours	
Assessment pattern:	As used by St Andrews: Coursework = 100%			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr J A David, Prof K Rana			

BL5822 Advanced Welfare and Ethics				
SCOTCAT Credits:	10	SCQF Level 11	Semester	Both
Academic year:	2018/9			
Planned timetable:	To be arranged.			
This module provides advanced knowledge of the welfare and ethical issues raised by current aquaculture practices. Animal welfare is rapidly developing as a major ethical issue within all areas of food production including aquaculture. Future development of sustainable aquaculture must incorporate ethical practices, optimising animal welfare and as a consequence improving the final product.				
Learning and teaching methods of delivery:	Weekly contact: 4 hours of lectures (x 5 weeks) and 3 hours of tutorials (x 3 weeks).			
	Scheduled learning: 0 hours		Guided independent study: 0 hours	
Assessment pattern:	As used by St Andrews: Coursework = 100%			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr J A David			

BL5823 Recirculation Aquaculture Systems				
SCOTCAT Credits:	10	SCQF Level 11	Semester	Both
Academic year:	2018/9			
Planned timetable:	To be arranged.			
This module provides advanced knowledge of the use of recirculating aquaculture systems in modern aquaculture practices. Recirculating aquaculture systems potentially provide environmentally sustainable aquaculture practices but must be assessed and viewed within the context of ethical, financial and social components of sustainability.				
Learning and teaching methods of delivery:	Weekly contact: 4 hours of lectures (x 5 weeks) and 3 hours of tutorials (x 3 weeks).			
	Scheduled learning: 0 hours		Guided independent study: 0 hours	
Assessment pattern:	As used by St Andrews: Coursework = 100%			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr J A David			

Biology - Sustainable Aquaculture - MSc - 2018/9 - June 2018

BL5824 Ornamental and Aquaria Production				
SCOTCAT Credits:	10	SCQF Level 11	Semester	Both
Academic year:	2018/9			
Planned timetable:	To be arranged.			
This module provides advanced knowledge of animals produced by the ornamental and aquaria section of the aquaculture business. This sector of the aquaculture business has specific issues with relation to establishing sustainable aquaculture practices. In particular, the sustainability and ethical issues with reference to both captive breeding systems and wild caught fish supply will be examined and assessed for different trade sectors.				
Learning and teaching methods of delivery:	Weekly contact: 4 hours of lectures (x 5 weeks) and 3 hours of tutorials (x 3 weeks).			
	Scheduled learning: 0 hours		Guided independent study: 0 hours	
Assessment pattern:	As used by St Andrews: Coursework = 100%			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr J A David, Prof K Rana			

BL5825 Larval Rearing				
SCOTCAT Credits:	10	SCQF Level 11	Semester	Both
Academic year:	2018/9			
Planned timetable:	To be arranged.			
This module provides advanced knowledge of the larval production techniques used in the aquaculture business. Larval production is often the rate limited step in development of new aquaculture species and presents particular ethical and sustainability issues with regard to current production techniques.				
Learning and teaching methods of delivery:	Weekly contact: 4 hours of lectures (x 5 weeks) and 3 hours of tutorials (x 3 weeks).			
	Scheduled learning: 0 hours		Guided independent study: 0 hours	
Assessment pattern:	As used by St Andrews: Coursework = 100%			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr J A David			