Programme Specification ARO 034a

This specification provides a concise summary of the main features of the programme and of the learning outcomes that a typical student might reasonably be expected to achieve if they take full advantage of the learning opportunities provided.

This document is published on the University website and will be a publicly available record of the named programme.

The information contained in this form should be included in the Programme Handbook, either as presented below or in a format determined by the Faculty.

Section 1 Key Facts

<table>
<thead>
<tr>
<th>Awarding Body</th>
<th>University of Stirling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partner Institution</td>
<td>NA</td>
</tr>
<tr>
<td>Programme Name</td>
<td>Sustainable Aquaculture</td>
</tr>
<tr>
<td>Award e.g. BSc (Hons), MA etc.</td>
<td>MSc</td>
</tr>
<tr>
<td>Faculty</td>
<td>Natural Science</td>
</tr>
<tr>
<td>Division (if applicable)</td>
<td>Aquaculture</td>
</tr>
<tr>
<td>UCAS Code (UG only)</td>
<td>TXX44-AQU</td>
</tr>
<tr>
<td>Programme Code</td>
<td></td>
</tr>
<tr>
<td>Mode of Study</td>
<td>Full Time ☒ Part Time ☐</td>
</tr>
<tr>
<td></td>
<td>(if both please provide two Degree Programme Tables in the Outline Programme Structure)</td>
</tr>
<tr>
<td>Location/Method of Study</td>
<td>On Campus – UK ☒</td>
</tr>
<tr>
<td></td>
<td>International ☐ Where:</td>
</tr>
<tr>
<td></td>
<td>Online ☐ Blended ☐</td>
</tr>
<tr>
<td>Admission Points</td>
<td>September ☒ January ☐ Other</td>
</tr>
<tr>
<td></td>
<td>(if more than one entry point please provide a Degree Programme Table for each in the Outline Programme Structure)</td>
</tr>
<tr>
<td>Length of Programme</td>
<td>1 year</td>
</tr>
<tr>
<td>SCQF Level</td>
<td>11</td>
</tr>
<tr>
<td>Total Credit Value</td>
<td>180</td>
</tr>
<tr>
<td>ECTS Credit Value</td>
<td>90</td>
</tr>
<tr>
<td>Relevant QAA Subject Benchmark</td>
<td></td>
</tr>
<tr>
<td>Professional Body Accreditation (all relevant accreditations to be listed)</td>
<td>Name of accrediting body: Required for programme: Yes/No (delete as appropriate) Date of Accreditation: XX / XX / 20XX Date of Renewal: XX / XX / 20XX</td>
</tr>
</tbody>
</table>
Programme Director: John Bostock
Advisor of Studies: John Bostock

Section 2 Overview

PROGRAMME SUMMARY

Our Masters in Sustainable Aquaculture explores the principles of aquaculture and the key factors influencing the viability of aquatic animal farming and food production systems. The programme covers all key technical areas of aquaculture production including aquatic animal biology, nutrition, reproduction and genetics, disease and health management, and production systems design. You will also learn about the context for aquaculture development and practice including environmental interactions, social and economic factors, markets and business strategies.

The programme is structured in three main parts: Firstly, three foundation modules introducing the key principles of aquaculture with a wide variety of examples from around the world. There is also a field trip to see aquaculture business and research in the Scottish context. The second part consists of three elective modules allowing you to focus on certain areas such as husbandry, engineering and business management, environmental management, aquatic food safety and security, health management, global aquatic resources and development. The third part is a personal research project which can involve work in the University laboratories, or with external partners (research and business) or desk-based studies such as environmental modelling and business appraisal.

The course includes a range of teaching and assessment methods which aim to help develop your generic and transferable skills and enhance employability. These include group-work, written and oral presentations, problem solving and critical analysis. Each module is individually assessed meaning the workload is evenly distributed but quite intense across the year.

Through this programme you will gain the knowledge and develop many of the skills necessary to establish, manage and appraise aquaculture activities and development projects from within the industry or public sector. An MSc in Sustainable Aquaculture provides a sound stepping stone for a career in the aquaculture industry (production and allied areas including feeds, pharmaceuticals, processing and marketing), or in environmental and health management; or consultancy and business support including risk management; or in development and sector management and regulation; or towards a career in aquaculture related research.

Key Features of the Programme (including what makes it distinctive)

The MSc Sustainable Aquaculture programme at the University of Stirling is one of the longest established and best known programmes in this area. Its global perspective make it attractive to students from around the world with interests in a great variety of culture species and systems. The teaching is delivered by staff who are actively engaged in leading edge aquaculture research and/or the provision of consultancy to governments and industry. The one-year programme provides a fast-track to an MSc qualification, or you can chose to spread the programme over a number of years if circumstances limit the time you can spend in full-time study each year. You can also opt to complete with a Postgraduate Certificate (60 credits completed), a Postgraduate Diploma (120 credits completed) or the full Masters (180 credits completed). Depending on your choice of advanced modules and research project topic you can opt to include a named pathway in on your degree certificate. Currently four named pathways are offered: Aquatic Food Security, Environmental Management, Business Management, or Governance and Development.
PROGRAMME AIMS
Our Sustainable Aquaculture programme (and named pathways) aims to produce graduates that are ready to enter directly a career in the aquaculture sector. This programme will develop your knowledge and understanding of aquaculture systems and processes, the connections between the biology, engineering, environment, ecology, sociology, markets, economics, and politics of aquaculture and the scientific and management principles underlying the development of this essential food production system in a rapidly changing world.

Through a variety of teaching methods, including field trips, industry visits, project placements, practical labs and problem-based group work you will gain experience of a wide range of challenges facing the aquaculture sector and how they are being addressed in a wide variety of contexts. The aim of the course is to help you develop into confident, knowledgeable yet questioning individuals keen to contribute to building resilience aquatic food production systems that meet the needs of different physical, economic, social and cultural contexts.

WHAT WILL I BE EXPECTED TO ACHIEVE?
On successful completion of this programme, you should be able to:

Knowledge and Understanding:
1. Critically evaluate aquaculture systems and their production objectives in relation to supporting technologies, fundamental biological principles and considerations of animal welfare and environmental contexts
2. Evaluate the business fundamentals of aquaculture enterprises with respect to markets, technology, investment and risk
3. Demonstrate understanding of aquaculture system design based on biological characteristics and environmental constraints in relation to defined production objectives
4. Demonstrate understanding of critical husbandry activities including feeding and nutrition, reproduction and breeding, welfare and health management, and control of physical and chemical environment
5. Demonstrate familiarity with aquaculture sector management in relation to statutory and voluntary governance and social and economic objectives

Intellectual, Practical and Transferable Skills and other graduate attributes:
1. Present aquaculture principles, concepts and research results clearly and precisely in a range of digital, written, graphical and verbal formats to both professional and non-professional audiences
2. Analyse, integrate and interpret aquaculture sector or experimental data using appropriate statistical methods and software, demonstrating awareness of data limitations.
3. Demonstrate a critical approach to academic literature, data and other sources of information.
4. Formulate and test hypotheses using appropriate and available lines of evidence.
5. Plan and safely and ethically conduct an independent research project involving primary data

Values and Attitudes:
1. Demonstrate your effectiveness as an independent learner who reflects upon their learning and plans their learning activities towards achieving academic and personal goals.
2. Demonstrate the strong interpersonal skills and business awareness necessary to present yourself professionally in a business environment.
3. Understanding and appreciation of the balances and conflicts inherent in aquatic food production and environmental sustainability.
HOW WILL I LEARN?

The foundation and advanced modules are relatively intensive with a high content of face-to-face teaching through lectures, practical labs and supported group work and discussions. Students are generally expected to be in attendance between 09:30 and 16:30 each weekday. In addition to class and lab teaching, there are some field visits to industry or for the purpose of environmental sampling. These can involve long days and overnight stays away from Stirling. The teaching is mostly carried out by Institute of Aquaculture academic staff who are all active researchers with their own areas of expertise. Throughout the year a number of external lecturers are also invited from other research institutes or to give industry experience and perspectives.

Significant use is made of group exercises as these help with the development of collaboration and cooperation skills as well as providing a more supportive environment for all learners. Group work is often problem-based helping you to develop analytical and problem-solving skills as well as communication skills particularly in presentation of solutions.

Very important support for learning is also provided through our virtual learning environment – Canvas – which allows presentation and supporting materials to be made available online. This includes recordings of lectures and access to other video or audio resources. It also provides a variety of collaboration and course management tools to ensure everyone can participate effectively even when far from campus.

The final third of the course is an individual research project. This can be carried out in cooperation with a wide range of external partners, or entirely within the Institute of Aquaculture. Projects can be primarily lab, field or desk based and are usually allied to the research interests of specific academic staff. You are given a wide range of project suggestions from which to choose, or you can initiate your own project if it is within the resources and expertise of the Institute of Aquaculture. During this research project you will be expected to display a high degree of personal autonomy and responsibility in managing your time and overcoming the problems that you encounter.

WHAT TYPES OF ASSESSMENT AND FEEDBACK CAN I EXPECT?

Assessment and Assessment Criteria
Each module in the programme is assessed individually with no final examination.

Students are assessed by a diversity of methods which include:
- coursework based on field, library or laboratory research, which has substantially longer deadlines than examinations for completion. Some elements of the coursework are based on individual assignments whilst others are group based with either individual or group assessments.
- written or practical examinations completed within a restricted timeframe
- a final semester research dissertation which may include collaboration and placement with another organisation and assessment through submitted manuscript and press release and oral presentation.

Throughout the programme a range of assessment methods are used including short answer or multiple choice examinations and class quizzes, online tests and exercises, extended essays, practical reports, field sketches and drawings, maps, field and laboratory notebooks, oral presentations, seminar performance, social media use reflective exercises and practical performance. All work is marked by academics but an element of peer and external feedback is included in some modules.

Feedback on Assessment
You will receive feedback on coursework within 3 weeks of completion of the assessment. Feedback is usually provided electronically on formal coursework. Feedback and Guidance sessions with teaching staff are available on all modules. These provide regular opportunities to discuss feedback further. More information about feedback on assessment can be found here; [http://www.stir.ac.uk/academicpolicy/handbook/assessment/](http://www.stir.ac.uk/academicpolicy/handbook/assessment/)
Assessment Regulations

If you would like to know more about the way in which assessment works at the University of Stirling, please see the full version of the assessment regulations at:

Undergraduate
Postgraduate – Taught
Postgraduate - Research

WHAT WILL I STUDY?

Outline Programme Structure

The list below shows compulsory and option modules for this programme. Option modules are revised over time and, in some cases, will be dependent upon pre-requisite and/or co-requisites being taken. More information about these requirements can be found in the relevant Module Descriptors. The options available each year can be subject to change due to student demand and availability of teaching staff.

- Where an “Option list” is specified, you have a choice of which module to take at this point in the degree programme and these choices are listed below
- For year 1 and 2 where “Any Module” is used it means that you can choose from all modules available to the year group and you can see the full list by following these links:

Undergraduate
Postgraduate

Year 1

Total year 1 credit value = 180
Compulsory credits = 60
Option credits = 120

Compulsory Modules

<table>
<thead>
<tr>
<th>Module Title</th>
<th>Module Code</th>
<th>Credit</th>
<th>Semester</th>
<th>SCQF Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principles of Aquaculture</td>
<td>AQUPG1X</td>
<td>20</td>
<td>Autumn</td>
<td>11</td>
</tr>
<tr>
<td>Aquaculture Husbandry</td>
<td>AQUPG2X</td>
<td>20</td>
<td>Autumn</td>
<td>11</td>
</tr>
<tr>
<td>Aquaculture in Practice</td>
<td>AQUPG3X</td>
<td>20</td>
<td>Autumn</td>
<td>11</td>
</tr>
</tbody>
</table>

Option Modules (1) – you may choose one of the following modules to take

<table>
<thead>
<tr>
<th>Module Title</th>
<th>Module Code</th>
<th>Credit</th>
<th>Semester</th>
<th>SCQF Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental systems</td>
<td>AQUPG1Y</td>
<td>20</td>
<td>Spring (1)</td>
<td>11</td>
</tr>
<tr>
<td>Aquaculture business design &amp; management</td>
<td>AQUPG4Y</td>
<td>20</td>
<td>Spring (1)</td>
<td>11</td>
</tr>
<tr>
<td>Aquatic Food Security - Safety and quality</td>
<td>AQUPG1S</td>
<td>20</td>
<td>Spring (1)</td>
<td>11</td>
</tr>
</tbody>
</table>

Option Modules (2) – you may choose one of the following modules to take

<table>
<thead>
<tr>
<th>Module Title</th>
<th>Module Code</th>
<th>Credit</th>
<th>Semester</th>
<th>SCQF Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Husbandry for aquaculture development</td>
<td>AQUPG2Y</td>
<td>20</td>
<td>Spring (2)</td>
<td>11</td>
</tr>
<tr>
<td>Global aquatic resources</td>
<td>AQUPG5Y</td>
<td>20</td>
<td>Spring (2)</td>
<td>11</td>
</tr>
<tr>
<td>Aquatic Food Security in Context</td>
<td>AQUPG2S</td>
<td>20</td>
<td>Spring (2)</td>
<td>11</td>
</tr>
</tbody>
</table>

Option Modules (3) – you may choose one of the following modules to take

<table>
<thead>
<tr>
<th>Module Title</th>
<th>Module Code</th>
<th>Credit</th>
<th>Semester</th>
<th>SCQF Level</th>
</tr>
</thead>
</table>
Aquaculture health control | AQUPG3Y | 20 | Spring (3) | 11
Aquaculture and society | AQUPG6Y | 20 | Spring (3) | 11

Research Project Modules – you may choose one of the following modules to take

<table>
<thead>
<tr>
<th>Module Title</th>
<th>Module Code</th>
<th>Credit</th>
<th>Semester</th>
<th>SCQF Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquaculture</td>
<td>AQUPGAP</td>
<td>60</td>
<td>Summer</td>
<td>11</td>
</tr>
<tr>
<td>Aquaculture Business Management</td>
<td>AQUPGBP</td>
<td>60</td>
<td>Summer</td>
<td>11</td>
</tr>
<tr>
<td>Aquaculture &amp; Development</td>
<td>AQUPGD</td>
<td>60</td>
<td>Summer</td>
<td>11</td>
</tr>
<tr>
<td>Aquaculture &amp; the Environment</td>
<td>AQUPGEP</td>
<td>60</td>
<td>Summer</td>
<td>11</td>
</tr>
<tr>
<td>Aquatic Food Security</td>
<td>AQUPGFS</td>
<td>60</td>
<td>Summer</td>
<td>11</td>
</tr>
</tbody>
</table>

Compulsory modules for specific pathways:

MSc Sustainable Aquaculture (Aquatic Food Security): AQUPG1S, AQUPG2S, AQUPGFS
MSc Sustainable Aquaculture (Environmental Management): AQUPG1Y, AQUPGEP
MSc Sustainable Aquaculture (Business Management): AQUPG4Y, AQUPGBP
MSc Sustainable Aquaculture (Governance & Development): AQUPG6Y, AQUPGDP

**READING LIST**

The following texts provide useful background for the programme but are not required reading:

- Aquaculture: farming aquatic animals and plants (2011), John S. Lucas, John Wiley & Sons 649pp

**Section 3 Student Support**

**SUPPORT FOR STUDENT LEARNING**

**Induction**

You will receive an induction during the first days of your programme. This includes a range of social events, information sessions and activities to help you orientate yourself at Stirling and access the services available to you. These are opportunities to meet staff and other students from across the university, in the Faculty and on the programme.
A timetable for the introductory week is made available prior to arrival. The first assessed module starts the week following enrolment and induction.

**Study Skills Support**
Student Learning Services (SLS) are committed to providing comprehensive guidance on all aspects of effective and efficient learning. The ultimate aim of the service is to enable you to make the most of your academic studies at the University and for you to become an independent, successful learner during your time at the University of Stirling. This is facilitated through collaborative work with experienced tutors and by offering a variety of courses, workshops and tutorials.

All students, whatever stage of their academic studies, are welcome to use Student Learning Services. However the service may be particularly beneficial:

- If you are making the transition from undergraduate to postgraduate.
- If you have been out of education for some time.

**What SLS are able to do:**

- Advise you on academic skills relevant to your studies at University.
- Help you consolidate your previous learning and develop new learning strategies.
- Advise on action-plans to potentially improve grades.
- Suggest practical solutions if you feel overwhelmed by assignment work.
- Help you gain confidence in the transition to Higher Education.

More information can be found here: [http://www.stir.ac.uk/campus-life/learning-support/student-learning-services/](http://www.stir.ac.uk/campus-life/learning-support/student-learning-services/)

**Stirling Graduate School**
For Research Postgraduate Students the Stirling Graduate School as well as your own faculty will provide support. More information can be found here: [http://www.stir.ac.uk/graduateschool/current-pg-students/skills-development/](http://www.stir.ac.uk/graduateschool/current-pg-students/skills-development/)

**Academic and Pastoral Support**

**Adviser of Studies:** Advisers have an important role to play in enhancing your academic and personal development and are essential to ensuring you make the most of your time at university. Advisers provide a personalised point of contact for you to discuss academic concerns or queries within the academic community. The general purpose of the role is to provide more in-depth advice on the academic options available to you and on the academic policies and regulations within the University. More information can be found here: [http://www.stir.ac.uk/registry/advisers/](http://www.stir.ac.uk/registry/advisers/)

**Personal Tutor:** The role of a personal tutor is to help you feel part of the University community. They are a specific and consistent source of guidance, information and support for you throughout your studies. The tutor should be your first formal point of contact for general academic guidance and pastoral support. More information can be found here: [http://www.stir.ac.uk/tse/personal-tutor/](http://www.stir.ac.uk/tse/personal-tutor/)

**Support and Wellbeing:** At university you may face non-academic issues where you need some expert help or guidance. There are lots of ways we can help you in your day-to-day life at University. Student Support Services provide a range of high-quality services to assist you during the course of your studies, help prepare you for life after graduation. We aim to enhance the student experience and help you to get the most out of your time at University. More information can be found here: [http://www.stir.ac.uk/campus-life/support-and-wellbeing/](http://www.stir.ac.uk/campus-life/support-and-wellbeing/)

**Student Union:** you can also access support through the Students’ Union, more information can be found here: [https://www.stirlingstudentsunion.com/representation/studentsupport/](https://www.stirlingstudentsunion.com/representation/studentsupport/)
Accessibility and Inclusion (A&I)
A&I are committed to offering a service which is welcoming and supportive of the needs of all students. Our service takes into account the full range of needs you may have, in a wide variety of circumstances including - physical and mobility difficulties, sensory impairments, specific learning difficulties including dyslexia and autistic spectrum disorder as well as medical conditions and mental health difficulties. A&I can also support you if you have short-term, temporary impairments or other difficulties as a result of an accident, injury, illness or surgery. More information can be found here: http://www.stir.ac.uk/student-support/accessibility-&-inclusion-service/

Learning Resources
You can find out more about the resources available to support your learning here: http://www.stir.ac.uk/campus-life/learning-support/

Section 4 Programme Evaluation and Enhancement

<table>
<thead>
<tr>
<th>METHODS FOR EVALUATING AND IMPROVING THE QUALITY AND STANDARDS OF TEACHING AND LEARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Module Evaluation</strong></td>
</tr>
<tr>
<td>Module evaluations are carried out each year and are an important way of getting student feedback on the modules we teach. We aim to evaluate every module we teach in every semester. You can find out more here: <a href="http://www.stir.ac.uk/registry/studentinformation/moduleevaluation/">http://www.stir.ac.uk/registry/studentinformation/moduleevaluation/</a></td>
</tr>
<tr>
<td><strong>Programme Review</strong></td>
</tr>
<tr>
<td>Programmes are reviewed annually and on a 5 yearly cycle. You can get involved in a variety of different ways; by completing module evaluations, becoming a course representative and attending Student Staff Consultative Committees, or participating in the review process itself. You can find out more here: <a href="http://www.stir.ac.uk/academicpolicy/handbook/review-and-monitoring/">http://www.stir.ac.uk/academicpolicy/handbook/review-and-monitoring/</a></td>
</tr>
<tr>
<td><strong>External Examiner</strong></td>
</tr>
<tr>
<td>Name of External Examiner: Professor Joao Ferreira</td>
</tr>
<tr>
<td>Institution: Universidade Nova de Lisboa</td>
</tr>
</tbody>
</table>

Section 5 My Future

<table>
<thead>
<tr>
<th>WHAT KIND OF CAREER MIGHT I GO ON TO?</th>
</tr>
</thead>
<tbody>
<tr>
<td>The programme is aimed at students who wish to pursue a career related to aquaculture and aquatic food security, whether directly in production, or the wider value chain (including feed, pharmaceuticals, equipment supply, processing, marketing, quality control) or through scientific research and technological development or sectoral management (environment, regulation, certification, training), and whether through commercial, non-profit or government organisations. With its international outlook, the programme aims to prepare you for work in any part of the world.</td>
</tr>
<tr>
<td>This programme facilitates development of the following graduate attributes</td>
</tr>
<tr>
<td><strong>Connected</strong></td>
</tr>
<tr>
<td>- The programme will connect you with aquaculture and aquatic resources system knowledge, understanding and skills as applied to complex real-world issues and processes.</td>
</tr>
<tr>
<td>- The programme will connect you with private, public and third sector representatives via external</td>
</tr>
</tbody>
</table>
teaching contributions, collaborative project opportunities and employer-engagement events.

- The programme will connect you with knowledge, experiences and people providing different perspectives on aquatic production and value chains, via diverse student and staff population, field trips, and international examples embedded in our teaching.
- The programme will allow you to work with staff, students and external organisations as part of an inclusive learning community.
- The programme will teach you to communicate effectively through a range of digital and other media.

Innovative

- The programme allows you to innovate through participation in active and ethical, world-leading research into our aquatic environment.
- The programme uses the latest global research and new technologies to develop new understandings and creative solutions to aquaculture problems and opportunities.
- The programme will train you in independent critical and reflective thinking aquaculture and food security issues.
- The programme will teach you to identify opportunities for improvement in your own learning and to take action.

Transformative

- The programme can transform your intellectual passion and excellence with regards to aquaculture systems and food security issues and solutions.
- The programme can help you share new perspectives and broaden your horizons via overseas project and collaborative research opportunities with industry as well as in-class discussions.
- The programme provides training in professionalism, allowing you to develop as an adaptable and resilient individual, equipped to succeed in the global aquaculture jobs market.
- The programme allows you to develop as an active global citizen who is socially, culturally and environmentally aware.

WHAT STUDY ABROAD OPPORTUNITIES ARE AVAILABLE?

The programme is not part of a formal study abroad scheme, but there are usually opportunities for research projects to be carried out in other countries in collaboration with external partners. In recent years this has involved student projects in Thailand, Vietnam, China, Bangladesh, Kenya, Ghana, Sierra Leone, Egypt and Portugal.

WHAT PLACEMENT OPPORTUNITIES ARE AVAILABLE?

Research projects may involve periods of time based with an external partner organisation in a laboratory, field station or production facility. These include marine hatcheries and private and government research establishments.

WHAT FURTHER STUDY OPTIONS ARE AVAILABLE TO ME?

The MSc in Sustainable Aquaculture provides an excellent platform for progression to PhD studies in any of the specialist areas introduced during the programme.
WHAT OTHER INFORMATION DO I NEED TO KNOW?

NOTE: The MSc timetable does not strictly follow the University Undergraduate teaching timetable – always refer to the module-specific information provided in the Programme Handbook and on Canvas.

Participation in lab work requires students to have a lab coat and dissection kit whilst participation in field work will require waterproof clothing and boots. These items are available to purchase through the Institute of Aquaculture stores during the induction week.

Section 6 Admissions

HOW DO I ENTER THE PROGRAMME?

Admissions Criteria
Students will require a 2.2 or better honours degree in broadly relevant subject (e.g. biological or environmental science, engineering or business related). Relevant work experience will also be taken into consideration. For non-native English speakers, IELTS of 6.0 with 5.5 minimum in each skill are required.