



ANSC*3050 Aquaculture: Advanced Issues

Fall 2021

Section(s): C01

Department of Animal Biosciences

Credit Weight: 0.50

Version 1.00 - September 07, 2021

1 Course Details

1.1 Calendar Description

This course examines the fundamental principles and advanced interdisciplinary issues involved in the farming of aquatic organisms. The course will concentrate primarily on finfish species due to their worldwide commercial importance. Lectures will cover fish physiology, behaviour, nutrition, genetics, water quality, health and disease, reproductive techniques, economic, political and legal issues and various culture technologies. Students will analyze contemporary challenges facing the aquaculture industry through exercises requiring interdisciplinary knowledge, lateral thinking, creative problem solving and bridging science and technology to issues management.

Pre-Requisites: 8.00 credits in biology, including AGR*2350 or ZOO*2090

1.2 Course Description

The goal of this course is to introduce senior undergraduate students to many of the fundamental principles as well as advanced interdisciplinary issues, involved in the farming of aquatic organisms. The course will concentrate primarily on fish species due to their worldwide commercial importance. Lectures will cover a broad range of topics including fish physiology, behaviour, nutrition, genetics, water quality, health and disease, reproductive techniques, economic, political and legal issues, and various types of culture systems technologies. Students will analyze many of the contemporary challenges facing the aquaculture industry, through task exercises requiring interdisciplinary knowledge, lateral thinking, creative problem solving and bridging science and technology to enable 'issues management'. Although the subject matter is focused on aquaculture, the pedagogical outcomes for students will include improved critical analysis and problem solving skills.

Although the course will be taught primarily by faculty from the Department of Animal

Biosciences, selected guest lecturers may also be drawn from OAC, OVC, CBS and CPES, this being a true representation of the breadth of knowledge required for such a curriculum offering and underlining the wealth of expertise to be found in our faculty at Guelph. In addition, guest speakers from industry and the applied research sector, will balance the presentations with their hands-on expertise. This diverse mix will give the student a broad perspective on the issues, principles, and technologies which are relevant to the commercial production of captive fish populations.

Finally, the course is designed to challenge students to develop independent and critical thinking skills through lateral thinking exercises, interdisciplinary problem solving and in-class discussions around case studies and issues management tasks.

1.3 Timetable

Class Schedule and Location: Monday, Wednesday and Friday at 8:30am until 9:20am in ANNU 204 in person (starting after Sept. 28th).

For the entire semester, the lectures will be Synchronous on Zoom via Courselink (under Content > Modules > Zoom). Please log on 5min before (waiting room) and attendance is encourage since we will have class and group discussions. Lectures will be recorded and uploaded ~30min after class.

Timetable is subject to change. Please see WebAdvisor for the latest information.

COVID-19 Disclaimer: please be aware that the information on course delivery, accessibility and examinations presented in this outline were developed based on current University guidelines. However, due to the continuously evolving situation and resulting changes in public health recommendations, the format and delivery of this course may be revised with limited notice.

Please note that pandemic restrictions in place at the time of each lecture must be followed by everyone according to the guidelines provided by the University and the local public health unit. The pandemic is a community problem and we all need to actively participate in a community solution. **Restrictions may include but not limited to a vaccination requirement, proper use of appropriate PPE, hand sanitation, social distancing and other measures.** Failure to comply with restrictions that are in place at the time of the lecture / lab could result in the immediate cancelation of that lecture. Students would still be responsible for learning the material that was to be covered in that lecture regardless of the cancelation.

1.4 Final Exam

There will be no formal mid-term or final examinations in this course.

2 Instructional Support

2.1 Instructional Support Team

Instructor: David Huyben
Email: huybend@uoguelph.ca
Telephone: 519-824-4120 Ext. 54293
Office: ANNU 135
Office Hours: Email: please email me any questions and I will try to respond within 24 hours, otherwise ask after class.

Video call: for complicated questions, please email me to set up a time to meet virtually (e.g. Teams or Zoom).

Homepage: if common questions arise, I will make an announcement on Courselink or email the class.

Program Advisor: Richard Moccia
Email: rmoccia@uoguelph.ca
Telephone: 519-824-4120 x56216
Office: ANNU 138

2.2 Teaching Assistants

Teaching Assistant (GTA): Rebecca Lawson MSc candidate
Email: rlawso02@uoguelph.ca

3 Learning Resources

3.1 Required Resources

Zoom online lectures (Software)

This course will use Zoom for lectures. Zoom can be found under Modules in the Content section of Courselink. Please check your system requirements beforehand to ensure you will be able to participate.

<https://opened.uoguelph.ca/student-resources/system-and-software-requirements>

Before you logon to Courselink, please download Zoom (<https://zoom.us/download>) and register with your UoG email to login easier and safer.

Required Texts (Textbook)

Because of the broad, interdisciplinary nature of this course, there is no single textbook required. However, there are several textbooks available at the Library or online via Ares (link on Courselink). In addition, a number of reading materials, such as factsheets and reports, will be posted to Courselink along with the lectures (Resources link on Courselink).

Microsoft Office and Technical Skills (Software)

As part of your learning experience, you are expected to use a variety of technologies for assignments, lectures, teamwork, and meetings. In order to be successful in this course you will need to have the following technical skills:

- Navigate through Courselink to find task assignments
- Use Microsoft Office (e.g. Word and Powerpoint)
- Access Web browsers and use search engines
- Upload files to Dropbox on Courselink

Contact your course instructor if you need support with any of the above.

CourseLink System Requirements (Equipment)

You are responsible for ensuring that your computer system meets the necessary system requirements. Use the browser check tool to ensure your browser settings are compatible and up to date. (Results will be displayed in a new browser window).

<http://spaces.uoguelph.ca/ed/system-requirements/>

<https://courselink.uoguelph.ca/d2l/systemCheck>

If you need any assistance with the software tools or the CourseLink website, contact CourseLink Support.

Email: courselink@uoguelph.ca or Tel: 519-824-4120 ext. 56939 Toll-Free (CAN/USA): 1-866-275-1478

3.2 Additional Resources**Internet Sites (Other)**

There are an abundance of internet sites available which deal directly with aquaculture and related areas. The **Aquaculture Centre** at the University of Guelph has an informative

website at the following URL: <http://animalbiosciences.uoguelph.ca/~aquacentre/>

Feel free to check it out to see the many activities that the University of Guelph is involved with concerning aquaculture. Within our website, you will also find a page of '**Useful Links**' to aquaculture groups in Guelph, Ontario, Canada and globally at the following URL: <http://animalbiosciences.uoguelph.ca/aquacentre/information/links.html>

The first lecture will be brief so that you can take class time to review the Aquaculture Centre website as well as the Useful Links (two above URLs). There will also be **Reading Materials** posted with each lecture under Content in Courselink that will give you a head-start on the course content, assist with the task assignments and help you with your final group presentation.

Email Listserv Material (Other)

Throughout the semester, various bits of information and short news-type articles will be delivered to you via the 'Aquanews' email distribution listserv, as well as other material posted only to the class list. You will be required to sign up for this during the first week of classes. This material should be considered REQUIRED READING, as it may relate to the exam or short task questions.

* To sign up for the Aquanews Listserv, send an email to: rmoccia@uoguelph.ca and put 'Add Aquanews' in the subject line of the email.

4 Learning Outcomes

4.1 Course Learning Outcomes

By the end of this course, you should be able to:

1. Critical and Creative Thinking

Create and defend a position on various aquaculture topics by integrating and applying knowledge across disciplines with a high degree of problem solving and risk taking.

2. Literacy

Extract information from various resources (e.g. lectures and reports), access the quality of the material and accurately describe trends in the aquaculture industry.

3. Global Understanding

Understand the historical development, socio-economic divides and environmental concerns relating to the aquaculture industry in different parts of the world.

4. Communicating

Communicate and synthesize arguments in both written and oral forms to the instructors as well as a variety of individuals and groups.

5. Professional and Ethical Behaviour

Demonstrate leadership, teamwork and time management skills by accomplishing individual and group tasks, while remembering ethical reasoning behind complicated matters that arise in the aquaculture industry.

4.2 How activities align with the learning outcomes:

- Attend lectures and read reference materials related to the course (outcomes 2, 3 and 5).
 - Complete task assignments on-time and use info from lectures and reference materials (outcomes 1 to 5).
 - Debate ideas and solutions to in-class case studies with class-mates (outcomes 1, 2 and 4).
 - Analyse, organize and present findings from the final team assignment (outcomes 1, 2, 4 and 5).
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5 Teaching and Learning Activities

5.1 Lecture

Topics: Lecture Content

Lectures will start on Friday, September 10th 2021 with a brief outline of the course. The following lectures will cover a broad range of topics including basic fish physiology and behaviour, nutrition, genetics and breeding, water quality, health and disease, reproductive techniques, economics and legal aspects, various types of rearing systems technology. The focus will be on finfish aquaculture as it relates to Canada's agri-food industry, but additional materials will be covered from marine and tropical aquaculture situations.

Instructors will present discipline-specific material and case studies developed from contemporary problems which face the industry. In addition, guest speakers from industry, government, academia and non-government organisations (NGOs) will balance the presentations with their hands-on expertise. This diverse mix will give the student a broad perspective on the issues, principles and technologies which are relevant to the commercial production of captive fish populations.

The following list of lecture topics will be covered throughout the semester, but to accommodate guest speakers the order may vary from the sequence provided below.

Topics covered during lectures include:

- World Aquaculture Overview
- Legislation & Regulations
- Sustainability and Decision Making
- Fish Physiology
- Microbial Interactions
- Indigenous Aquaculture
- Nutrition & Feeds for Farmed Fish
- Application of DNA barcoding
- Principals of Fish Genetics & Breeding
- Production Systems
- Aquaponics
- Fish Diseases

- Social License & Consumer Attitudes

Several **task assignments** will challenge the students to incorporate material from across selective disciplines, in order to solve problems developed from lectures and reference materials.

A series of **case studies** discussed in-class, will also challenge students to critically analyze several contemporary issues facing the development of aquaculture in an ecologically sustainable manner.

The **final team assignment** will challenge students to co-operate in large groups, organise their time and put together a joint presentation and report that evaluates an aquaculture dispute from different perspectives.

5.2 Seminar

Topics: Seminars

N/A

5.3 Lab

Topics: Labs

N/A

5.4 Field Trip

Depending on Covid-19 restrictions, the field trip for students to visit the Ontario Aquaculture Research Centre (formerly called Alma) may occur on one or two days during the semester. We will vote on a time that best suits our schedules. Transportation (e.g. carpooling) will need to be arranged as well since the station is 35min drive north of Guelph. Proper clothing for cold and slippery conditions are required. In addition, we will upload a virtual tour of the facility later on in the semester for those who cannot attend.

This facility is a large, technically sophisticated research and development centre, which permits students to view first- hand, many of the types of fish species, equipment and operational procedures discussed in the course. The Ontario Aquaculture Research Centre (OARC) is owned by the Agriculture Research Institute of Ontario (ARIO), is financially

supported by the Ontario Ministry of Agriculture, Food and Rural Affairs and is managed and operated by the University of Guelph.

More info here: <https://www.uoguelph.ca/alliance/research-facilities/research-centres/animal-research-centres/ontario-aquaculture-research-centre>

6 Assessments

6.1 Marking Schemes & Distributions

Assignment or Test	Due Date	Contribution to Final Mark (%)	Learning Outcomes Assessed
Task Assignments	Every 2 weeks (Sept 24, Oct 8, Oct 15, Oct 22, Nov 5 and Nov 12)	65% 6 online assignments - First 1 @ 5% each - Next 3 @ 10% each - Last 2 @ 15% each	Critical and Creative Thinking. Literacy. Global Understanding. Communicating. Professional and Ethical Behaviour.
In-class Case Studies	1 lecture slot at the end of semester (Nov 17)	10% 1 summary report on 3 in-class case studies	Critical and Creative Thinking. Literacy. Communicating.
Final Team Assignment	Last 3 lectures (Nov 29, Dec 1 and Dec 3)	25% - 1 team presentation @ 10%	Critical and Creative Thinking. Literacy. Communicating. Professional and Ethical Behaviour.

		- 1 team report @ 10%	
		- 1 group participation @ 5%	

Name	Scheme A (%)
Task Assignments	65
In-class Case Studies	10
Final Team Assignment	25
Final Exam	0
Total	100

6.2 Assessment Details

Task Assignments (65%)

Due: Every 1-2 weeks (Sept 24, Oct 8, Oct 15, Oct 22, Nov 5 and Nov 12)

Learning Outcome: 1, 2, 3, 4, 5

Six take-home task assignments will be posted on the CourseLink ANSC*3050 website throughout the semester. They will represent a task assignment related to a prior lecture series in the course, and will require additional reading, and short, essay type responses, typically 3 pages in length (plus an extra page for references). After discussion of the task assignment in class, a 'time window' will be set for each task completion (usually 2 weeks). Assignments are submitted in the Dropbox section in Courselink before the deadline. This course requires completion of all six assignments.

In-class Case Studies (10%)

Due: One lecture slot at the end of the semester (Nov 17)

Learning Outcome: 1, 2, 4

A series of three "Case Studies" will be presented in-class and group solutions to these situations will be presented for discussion and evaluation. Students are to take note and submit a summary report later that day.

Final Team Assignment (25%)

Due: Last three lectures (Nov 29, Dec 1 and Dec 3)

Learning Outcome: 1, 2, 4, 5

A review of an application for a cage aquaculture license using the OMNR/UoG Decision Support Tool will be made by 'Solution Teams'. Each team will be made up of five or more students each, depending on the class size. The background material will be presented

throughout the semester. During the final week (last 3 lectures) all teams will be required to present a formal seminar to the class detailing and defending their decision. Research literature will need to be reviewed and discussed by the team, and brainstorming sessions should attempt to evaluate the application, and identify the various issues involved. Brief (max. 15 minute) presentations will be made by each team and the entire class will debate the merits of the 'decision' presented. Teams are encouraged to be innovative in their approaches to problem-solving, and not to be afraid of taking risks with their ideas. NO IDEA is, 'TOO FAR OUT', as long as the team can present a convincing case for the solution. A written team report, including references, and a copy of the Powerpoint or other presentation materials in PDF form will be required for submission in Dropbox on Courselink, and is due on the same day as your team's presentation is scheduled. Groups will be required to rank each of their members for participation credit.

Final Exam (0%)

There will be no formal mid-term or final examinations in this course.

7 Course Statements

7.1 Dropbox Submissions on Courselink

Assignments should be submitted electronically via the online Dropbox tool. When submitting your assignments using the Dropbox tool, do not leave the page until your assignment has successfully uploaded. To verify that your submission was complete, you can view the submission history immediately after the upload to see which files uploaded successfully. The system will also email you a receipt. Save this email receipt as proof of submission.

Be sure to keep a back-up copy of all of your assignments in the event that they are lost in transition. Cloud-based back-ups (e.g. OneDrive) are recommended. Remember that **technical difficulty is not an excuse not to turn in your assignment on time**. Don't wait until the last minute as you may get behind in your work. If, for some reason, you have a technical difficulty when submitting your assignment electronically, please contact your instructor or CourseLink Support.

7.2 Late Policy

If you choose to submit assignments to the Dropbox tool late, they will **receive a mark of 0%**. You will need to contact the instructor BEFORE the deadline if you are unable to complete the assignment.

Extensions will be considered for medical reasons or other extenuating circumstances. If you require an extension, discuss this with the instructor as soon as possible and well before the due date. Barring exceptional circumstances, extensions will not be granted once the due date has passed. These rules are not designed to be arbitrary, nor are they inflexible. They are designed to keep you organized, to ensure that all students have the same amount of time to work on assignments, and to help to return marked materials to you in the shortest possible time.

7.3 Course Policy on Group Work

Please see instructor for clarification and/or concerns. It is recommended that a group contract is formed during the start of group work to ensure each individual contributes equally to the project. Incidents will be addressed on an individual basis.

7.4 Course Evaluation Information

End of semester course and instructor evaluations provide students the opportunity to have their comments and opinions used as an important component in the Faculty Tenure and Promotion process, and as valuable feedback to help instructors enhance the quality of their teaching effectiveness and course delivery. An online course evaluation will be conducted near the end of the semester.

7.5 Netiquette Expectations

The course website is considered the classroom and the same protections, expectations, guidelines, and regulations used in face-to-face settings apply. Inappropriate behaviour will not be tolerated. **Examples of inappropriate online behaviour include:**

- Posting inflammatory messages about your instructor or fellow students;
- Using offensive language;
- Copying or presenting someone else's work as your own;
- Adapting information from the Internet without using proper citations or references;
- Buying or selling term papers or assignments;
- Posting or selling course materials to course notes websites;
- Having someone else complete your quiz or completing a quiz for/with another student;
- Stating false claims about lost quiz answers or other assignment submissions;
- Threatening or harassing a student or instructor;
- Discriminating against fellow students, instructors, and/or TAs;

- Using the course website to promote profit-driven products or services;
- Attempting to compromise the security or functionality of the learning management system; and
- Sharing your username and password.

8 University Statements

8.1 Email Communication

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

8.2 When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

Graduate Calendar - Grounds for Academic Consideration

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

Associate Diploma Calendar - Academic Consideration, Appeals and Petitions

<https://www.uoguelph.ca/registrar/calendars/diploma/current/index.shtml>

8.3 Drop Date

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in their respective Academic Calendars.

Undergraduate Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>

Graduate Calendar - Registration Changes

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml>

Associate Diploma Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/diploma/current/c08/c08-drop.shtml>

8.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

8.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance and not later than the 40th Class Day.

For Guelph students, information can be found on the SAS website
<https://www.uoguelph.ca/sas>

For Ridgetown students, information can be found on the Ridgetown SAS website
<https://www.ridgetownc.com/services/accessibilityservices.cfm>

8.6 Academic Integrity

The University of Guelph is committed to upholding the highest standards of academic integrity, and it is the responsibility of all members of the University community—faculty, staff, and students—to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff, and students have the responsibility of supporting an environment that encourages academic integrity. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Undergraduate Calendar - Academic Misconduct
<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

Graduate Calendar - Academic Misconduct

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

8.7 Recording of Materials

Presentations that are made in relation to course work - including lectures - cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

8.8 Resources

The Academic Calendars are the source of information about the University of Guelph's procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.

Academic Calendars

<https://www.uoguelph.ca/academics/calendars>

8.9 Disclaimer

Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings, changes in classroom protocols, and academic schedules. Any such changes will be announced via CourseLink and/or class email.

This includes on-campus scheduling during the semester, mid-terms and final examination schedules. All University-wide decisions will be posted on the COVID-19 website (<https://news.uoguelph.ca/2019-novel-coronavirus-information/>) and circulated by email.

8.10 Illness

Medical notes will not normally be required for singular instances of academic consideration, although students may be required to provide supporting documentation for multiple missed assessments or when involving a large part of a course (e.g.. final exam or major assignment).

8.11 Covid-19 Safety Protocols

For information on current safety protocols, follow these links:

- <https://news.uoguelph.ca/return-to-campus/how-u-of-g-is-preparing-for-your-safe-return/>
- <https://news.uoguelph.ca/return-to-campus/spaces/#ClassroomSpaces>

Please note, these guidelines may be updated as required in response to evolving University, Public Health or government directives.
