ANSC*3050 - Aquaculture: Advanced Issues

Fall 2024 Course Outline
Section: 01
Credits: 0.50

Land Acknowledgement: Guelph

The University of Guelph resides on the ancestral lands of the Attawandaron people and the treaty lands and territory of the Mississaugas of the Credit. We recognize the significance of the Dish with One Spoon Covenant to this land and offer respect to our Anishinaabe, Haudenosaunee and Métis neighbours. Today, this gathering place is home to many First Nations, Inuit, and Métis peoples and acknowledging them reminds us of our important connection to this land where we work and learn.

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.
Prerequisite(s): AGR*2350 or ZOO*2090
Department(s): Department of Animal Biosciences

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 will 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 (e.g. fish farmer) and government sectors (OMAFRA and DFO), 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 and governance of aquaculture.

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.

Lecture Schedule

MonWedFri 9:30am-10:20am in ANNU*156 (9/5 to 12/13)

Instructor Information

David Huyben
Email: huybend@uoguelph.ca

Learning Resources

Required Resources

Zoom online lectures (Software)

This course will be taught hybrid delivery, so it will be in person and also on Zoom. Zoom can be found under Modules in the Content section of Courselink (https://courselink.uoguelph.ca/). Please check your system requirements beforehand to ensure you will be able to participate: https://opened.uoguelph.ca/student-resources/system-and-software-requirements (https://opened.uoguelph.ca/student-resources/system-and-software-requirements/)

Before you logon to Courselink, please download Zoom (https://zoom.us/download (https://zoom.us/download/)) and register with your **UoG email** to login easier and safer. If you do not use your UoG email, you will appear as guest and will need to be admitted to each lecture.

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

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

Check 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 or Toll-Free (CAN/USA): 1-866-275-1478

Campus Resources

If you are concerned about any aspect of your academic program: Make an appointment with a Program Counsellor (https://www.uoguelph.ca/uaic/programcounsellors/) in your degree program. If you are struggling to succeed academically: There are numerous academic resources offered by the Learning Commons (https://www.lib.uoguelph.ca/using-library/spaces/learning-commons/) including, Supported Learning Groups for a variety of courses, workshops related to time management, taking multiple choice exams, and general study skills.

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: https://www.aquacentre.uoguelph.ca/

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 '**FAQ & Links**' to aquaculture groups in Guelph, Ontario, Canada and globally at the following URL: https://www.aquacentre.uoguelph.ca/faq-and-useful-links/

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. It also includes job ads for potential careers during and after university.

* 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.

Field Trip Fees

Courses with field trips in the Department of Animal Biosciences will have associated field trip fees. Preferably, this fee will be paid for online before the field trip. A waiver form must also be signed and submitted before the field trip (via CourseLink Dropbox). Students will need to pay $20 to cover costs associated with the field trip. (please contact Prof. Huyben if you need assistance).

Library Course Reserve (Ares)

For this course, you will be required to access course reserve materials through the University of Guelph McLaughlin Library. To access these items, select **Ares** on the navbar in CourseLink. Note that you will need your Central Login ID and password in order to access items on reserve.

For further instructions on accessing reserve resources, visit How to Get Course Reserve Materials (https://lib.uoguelph.ca/find/course-reserves-ares/how-get-course-reserve-material/).

If at any point during the course you have difficulty accessing reserve materials, please contact the e-Learning Operations and Reserve Services staff at:
Tel: 519-824-4120 ext. 53621 | Email: libres2@uoguelph.ca | Location: McLaughlin Library, First Floor, University of Guelph

Course Learning Outcomes

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.

Activity Alignment with 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).

Schedule of Topics and Assignments

Week of	Topic	Activities	Due
9/9	Introduction and Course Outline Aquaculture Overview		
9/16	Aquaculture Assets and Challenges		
9/23	Sustainability and Decision Making		
9/30	Fish Physiology and Aquaculture		
10/7	Microbial Interactions in Aquaculture		
10/14		Thanksgiving Holiday	
10/16	Tour of Alma Research Station (2 hours)		
10/21	Fish Genetics and Breeding		
10/28	Nutrition and Feeds for Farmed Fish		
11/4	Production Systems		
11/11	Aquaponics and Organic Aquaculture		

11/18	Fish Diseases in Aquaculture
11/25	Team Presentations

Teaching and Learning Activities

LECTURES

In the **first lecture** we will go through the course outline and task assignments, as well as introduce each other and form groups. 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 aquaculture species.

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
- Sustainability Programs & Consumer Trends

ASSIGNMENTS

A handful of **take-home task assignments** will challenge the students to incorporate material from across selective disciplines, in order to solve problems developed from lectures and reference materials. These assignments are take home (over 2 weeks) and consist of 3 long answer questions that require at least one reference each (3 page limit).

A couple of **case studies assignments** discussed in-class will challenge students to critically analyze several real-world disasters experienced in fish research labs and commercial fish farms. A limited amount of information will be provided and students will have to answer 3 questions with the knowledge acquired from the course.

The **final team task assignment** will challenge students to co-operate in large groups, organise their time and put together a joint presentation and report that evaluates an application for a new fish farm license in Ontario. Each group will represent a stakeholder that includes several government agencies, Indigenous groups and public NGO's. Groups will meet to prepare their presentation and report over the last 6 weeks of the semester and will present during the last week of classes. We will then vote if the farm license should be approved or not.

LABS & SEMINARS

None in this course.

FIELD TRIP TO ALMA

Depending on Covid-19 restrictions, the field trip for students to visit the Ontario Aquaculture Research Centre (OARC; formerly called Alma) may occur one day during our lecture time slot. We will **vote on a time** that best suits our schedules and we need to pick either the 1 hour timeslot before or after our class since it is far and we will need 2 hours.

A **school bus** will be arranged to meet at the North side of the ANNU building. The department will cover most of this cost, but students will need to pay $10 to cover the remaining cost (please contact Prof. Huyben if you need assistance). Driving yourself or others is not recommended since it is at your own risk and it is less environmentally friendly. The station is **35min drive north of Guelph**. Proper clothing for cold and slippery conditions are

required (e.g. raincoat and boots/shoes) and please bring a water bottle and snacks if needed. 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 station 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.aquacentre.uoguelph.ca/our-facilities/

Address: 6957 Eighth Line West, RR1, Elora, Ontario, N0B 1S0
Phone: 519-669-5411

Assessment Breakdown

Description	Weighting (%)	Due Date
Task #1 - The World is My Stage	5%	Sept 20
Task #2 - It's My Pond	10%	Sep 27
Task #3 - It's Chilly in Here	10%	Oct 11
Task #4 - Case Study A: Fish Lab Limits	10%	Oct 18
Task #5 - The UniGoo Fish	10%	Nov 1
Task #6 - Tunalicious	15%	Nov 8
Task #7 - Case Study B: Fish Farm Fumbles	15%	Nov 13
Task #8 - Final Team Assignment	25%	Nov 29

Assessment Details

Assignment

Take-home Task Assignments 50

Five **take-home task assignments** will be posted on the CourseLink ANSC*3050 website throughout the semester (every 1-2 weeks). They will represent a scenario 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). Assignments are due within 2 weeks and a Word file is to be submitted in the Dropbox section in Courselink before the deadline. This course requires completion of all five assignments.

Course Learning Outcomes Assessed: 1, 2, 3, 4, 5

In-class Case Study Assignments 25

A couple of **case studies assignments** will be presented in-class that consist of 3 disasters each that have happened in fish research labs and commercial fish farms. Limited information will be provided and students will use their knowledge from the course to problem solve and suggest what went wrong and why. Students are to take notes and submit a summary report (3 page maximum) later that day.

Course Learning Outcomes Assessed: 1, 2, 4

Presentation

Final Team Task Assignment 25

Students will split up into groups for the **final team task assignment** where they will represent a stakeholder group and review of an application for a new fish farm license in Ontario. Each team will be made up of five or more students each, depending on the class size. The background material will be presented halfway through the semester (week 8) and teams will meet over the last 6 weeks of the semester to evaluate the license application from the perspective of their stakeholder group, such as government agency, Indigenous group or NGO. During the final week (last 3 lectures) all teams will be required to present (15 min maximum) to the class detailing stakeholder background, application risks and defending their decision. 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 (10 page maximum), including references, and a copy of the Powerpoint 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.

Course Learning Outcomes Assessed: 1, 2, 4, 5

Last Day to Drop Course

The final day to drop Fall 2024 courses without academic penalty is the last day of classes: November 29

After this date, a mark will be recorded, whether course work is completed or not (a zero is assigned for missed tests/assignments). This mark will show on the student's transcript and will be calculated into their average.

Course Grading Policies

Submission of Assignments

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.

Late Assignment

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.

Standard Statements for Undergraduate Courses

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 discourages misconduct. 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.

The Academic Misconduct Policy (https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/academic-misconduct/) is outlined in the Undergraduate Calendar.

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 make a booking at least 10 days in advance, and no later than the first business day in November, March or July as appropriate for the semester. Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time. For students at the Guelph campus, information can be found on the SAS website. (https://www.uoguelph.ca/sas/)

Accommodation of Religious Obligations

If you are unable to meet an in-course requirement due to religious obligations, please email the course instructor within two weeks of the start of the semester to make alternate arrangements.

See the Academic calendar for information on regulations and procedures for Academic Accommodations of Religious Obligations (https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/academic-accommodation-religious-obligations/).

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.

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 undergraduate students 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 the Undergraduate Calendar - Dropping Courses (https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/dropping-courses/).

Email Communication

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

Health and Wellbeing

The University of Guelph provides a wide range of health and wellbeing services at the Vaccarino Centre for Student Wellness (https://wellness.uoguelph.ca/). If you are concerned about your mental health and not sure where to start, connect with a Student Wellness Navigator (https://wellness.uoguelph.ca/navigators/) who can help develop a plan to manage and support your mental health or check out our mental wellbeing resources (https://wellness.uoguelph.ca/shine-this-year/). The Student Wellness team are here to help and welcome the opportunity to connect with you.

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).

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.

Resources

The Academic Calendars (http://www.uoguelph.ca/registrar/calendars/?index) are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs.

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. See the Undergraduate Calendar for information on regulations and procedures for Academic Consideration. (https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/academic-consideration-appeals-petitions/)