



# **BIOL\*4020 Integrative Problems in Biological Science**

Winter 2019

Section: C01

College of Biological Science

Credit Weight: 1.00

Version 1.00 – January 07, 2019

## **1 Course Details**

### **1.1 Course Description:**

In this course, students work in teams to explore and address an authentic biological problem using an integrative and interdisciplinary approach. General topics are proposed by an external representative and will focus on a problem related to societal needs (e.g. food, health, and environment), use of advanced technologies (e.g. genetic modification), or aspirations (e.g. sustainability). Students will apply and develop skills in problem identification and research, stakeholder analysis, ideation and implementation of solutions, and communication to address the external representative's needs. Prerequisites: minimum of 14.00 credits, Restrictions: BSCH.BIOS

### **1.2 Timetable:**

Lectures: Monday, Wednesday, Friday: 9:30 – 10:20 am, SSC3317

Seminar: Thursday 11:30 – 2:20 pm, SSC3317

### **1.3 Final Exam:**

There is no final exam; however, schedules for final team project reports, presentations and reflections will be announced.

## 2 Instructional Support

### 2.1 Instructors:

**Brian Husband, Ph.D.**

**Email:** bhusband@uoguelph.ca

**Office hours:** by appointment

**Justine Tishinsky, Ph.D.**

**Email:** jtishins@uoguelph.ca

**Office:** ANNU 340

**Office hours:** Mondays 1:00 – 3:00 pm

### 2.2 Faculty Advisor:

**Justine Tishinsky, Ph.D.**

**Email:** jtishins@uoguelph.ca

**Office:** ANNU 340

**Office hours:** Mondays 1:00 – 3:00 pm

### 2.3 Instructional Support Team:

**Special Resource:** Erin Doherty, Centre for Business and Student Enterprise (CBaSE)

**Special Resource:** Tyler Zemplak, Centre for Business and Student Enterprise (CBaSE)

**Special Resource:** Heather Pollock, Associate Dean Academic Office, College of Biological Science

**Course Coordinator:** Charlene Winchcombe-Forhan, Associate Dean Academic Office, College of Biological Science

**Experiential Learning Coordinator:** Janie Vu, Associate Dean Academic Office, College of Biological Science

## 3 Learning Resources

### 3.1 Required Resources:

**CourseLink (Website)**

<https://courselink.uoguelph.ca/shared/login/login.html>

The CourseLink website will house information related to all components of the course, including course announcements, learning outcomes, resources, lecture notes, gradebook, assignment instructions and grading rubrics.

### **3.2 Campus Resources:**

**If you are concerned about any aspect of your academic program:**

Make an appointment with a Program Counsellor <https://bsc.uoguelph.ca/>

**If you are struggling to succeed academically:**

There is a variety of services that the Learning Commons offers, including time management, working in teams, and writing services. A complete list of their services can be found at:

<https://www.lib.uoguelph.ca/get-assistance>

**If you are struggling with personal or health issues:**

[Counselling Services](#) offers individualized appointments to help students work through personal struggles that may be impacting their academic performance.

[Health Services](#) is located on campus and is available to provide medical attention.

For support related to stress and anxiety, besides Health Services and Counselling Services, [Kathy Somers](#) runs training workshops and one-on-one sessions related to stress management and high performance situations.

**If you have a documented disability or think you may have a disability:**

[Student Accessibility Services \(SAS\)](#), formerly Centre for Students with Disabilities, can provide services and support for students with a documented learning or physical disability. They can also provide information about how to be tested for a learning disability.

## **4 Learning Outcomes**

### **4.1 Course Learning Outcomes:**

Students will have the opportunity to integrate knowledge and skills developed throughout their program and apply them to a real-world problem. By the end of this course, students will develop skills in problem solving, teamwork and communication/knowledge transfer.

Specifically, by the end of the course, students should be able to:

1. Gather, integrate and critically evaluate current biological knowledge to better understand the key elements, opportunities and challenges associated with a societal issue
2. Gather and evaluate stakeholder needs and perspectives to identify and formulate an authentic, and tractable problem
3. Apply ideation techniques and constraints to identify potential solutions to a specific problem
4. Communicate effectively using written, oral and/or other forms of media to an identified audience(s)
5. Work independently, and with internal team members and external partners, to achieve a common goal
6. Reflect on and communicate the personal and professional attributes achieved within the course or throughout the program of study

## 5 Teaching and Learning Activities

### 5.1 Course Content:

Students will be assembled into teams. Over the semester, teams will identify a specific problem related to the course theme, identify plausible solutions, develop a prototype of the identified solution and present their project to a stakeholder audience. Lectures will be used to introduce course topics, key concepts and tools for developing problem solving, teamwork and knowledge transfer skills. Seminars will be used for applying tools presented in lecture and completing group projects.

Solutions will vary widely among teams, but may include a research proposal, a policy brief, a tool or widget, an educational tool, a decision-making tool, or a risk analysis. The solution will be presented as an application/proposal or a prototype, with a project management plan.

## 5.2 Activity Schedule:

Week	Topic	Mon Lec (1 h)	Wed Lec (1 h)	Thursday Seminar (3 h)	Fri Lec
1	<b>Introduction to course and problem solving</b>	Course logistics	Exploring problem solving	Scheduled activity: team charter and profile submissions	
2	<b>Introduction to problem identification and course theme</b>	Introduction of class 'problem'	Conducting a literature search, creating concept maps	Scheduled team collaboration time: gathering scientific knowledge about the problem	
3	<b>Problem identification and analysis</b>	Stakeholder analysis	Preparation for stakeholder interviews	Scheduled activity: Stakeholder interviews	Debrief interviews
4	<b>Pitching the problem</b>	Pitching a problem: tools	Pitch preparation	Scheduled activity: Presentation of pitches	
5	<b>Solution ideation-generation</b>	Identifying solutions: tools, creativity	Group work to generate 2-5 solutions	Unscheduled: team collaboration time	
6	<b>Solution ideation - refinement</b>	Teamwork consideration of stakeholders	Narrowing solutions	Unscheduled: team collaboration time	
7	<b>Solution implementation/ project plan</b>	Developing solution - project plan: tools, approaches	Communicating ideas	Unscheduled: team collaboration time	
8	<b>Solution implementation/ plan execution</b>	Executing project plan: tools and teamwork	Teamwork	Unscheduled: team collaboration time	
9	<b>Finalization of project plan</b>	Developing the final project and pitch	Q & A	Unscheduled: team collaboration time	
10	<b>Final presentations/ pitches</b>	Team pitches	Team pitches	Scheduled: feedback on pitches from advisor	
11	<b>Final project due</b>	Teamwork	Teamwork	Unscheduled: team collaboration time	
12	<b>Final reflections and team debrief</b>	Debrief discussion	Debrief discussion		

Please note, the lecture period on Fridays will be available for team work unless specified.

## 6 Assessment

### 6.1 Marking Schemes, Details and Distributions:

Form of Assessment	Weight	Due Date of Assessment	Learning Outcome Addressed
Team Assignment: Team Charter and Profile	10%	January 14, 2019	5
Individual Assignment: Annotated Bibliography and Concept Map	10%	January 21, 2019	1, 5
Team Assignment: Annotated Bibliography and Concept Map	5%	January 28, 2019	1, 5
Team Assignment: Pitch	10%	January 31, 2019	1, 2
Individual Assignment: Reflection	5%	February 4, 2019	6
Team Assignment: 2-5 Solutions	10%	February 11, 2019	3
<b>Winter Break: Reading Week</b>		<b>February 18-22, 2019</b>	
Team Assignment: Final Solution	5%	March 4, 2018	3
Team Assignment: Final Presentation	10%	Week 10	1, 2, 3, 4
Team Assignment: Final Project	25%	Week 11	1, 2, 3, 4, 5
Individual Assignment: Final Reflection	5%	Week 12	6
Individual Assignment: Peer Evaluation /Team Evaluation	5%	Week 12	5, 6

### 6.2 Assessment Details:

#### Team Charter and Profile– 10%

Teams will be asked to develop their own personalized team charter. This team charter will be used to set the social, emotional, logistical and conflict resolution norms by which the team will abide for the semester. Through the development of a team charter, team members will be asked to identify common goals based on each member's individual goals for the course. This charter will help to provide clarity regarding member's roles and lay the groundwork for a successful team experience. Each member will be required to sign the document as a commitment to the team charter.

Building on the team contract, teams will then take knowledge about themselves and their teammates and build an introductory profile for each member of the group. They will also provide an overall statement of the focus/mission of their team at a higher level. This

information might reflect that found in an “About Us” section of a company’s website. It is expected to be short and to the point, attention grabbing and meaningful to potential ‘employers’.

### **Individual Annotated Bibliography and Concept Map – 10%**

Now, with a sense of the course topic, teams will research the subject area to understand what is known and what is not known. Narrowing the topic to the team’s specific sub-group, team mates will start to brainstorm the type of information they want to collect. Following this initial brainstorming session, teams should divide up the topic and assign areas for each team member to research and build an annotated bibliography. Each team member will be required to submit their own individual annotated bibliography.

Based on the information collected from the literature, each student will build their own individual concept map to represent a summary of the main ideas related to the sub-topic and the linkages between these ideas.

### **Team Annotated Bibliography and Concept Map – 5%**

Following the collection of individual bibliographies and concept maps, along with stakeholder interviews, teams must now bring the information together to form one bibliography and concept map. This should not be simply a joining of all bibliographies and concept maps, but instead an integrative bibliography and concept map that identify the information relevant to the problem.

### **Pitch – 10%**

The importance of clearly articulating the problem a team/company is trying to solve can be key to the success of any solution. The purpose of the pitch is to clearly articulate the problem each team/company is trying to solve. Through the pitch, teams aim to build interest and increasing awareness around their problem. Through this activity, the team will try to succinctly balance both the emotional impact of the problem and the facts surrounding why the problem exists.

### **Individual Reflection – 5%**

Students will be required to complete the Formal Team Assessment Survey through the quiz tool on CourseLink. After completing the quiz, two items from it will be selected on which to reflect - one with a lower score and another with a higher score. In the reflection, students will *describe* the activity where each item was applied, *evaluate* how the performance of the team led to either the high score or low score, and then *articulate* how to use the lesson learned from the experience to change the approach to a similar situation, in the future. From the reflection, team members will determine if the team charter needs to be updated to address any issues.

### **Teams 2-5 Proposed Solutions – 10%**

Teams will be asked to choose their top 2 – 5 solutions that they believe could address their identified problem. For each solution, teams will address the following:

- Clearly state the problem; this should be the same for each solution
- Outline the solution and whether it is a novel solution or an improvement to an existing solution
- State the unique value of the solution; why is this different and why is this worth pursuing
- Challenges to the solution
- Cost, generally

Each solution description should be short and easy to read, as these proposed solutions will be circulated to relevant stakeholders for feedback.

### **Final Solution – 5%**

Teams will select the one solution they opt to support to address their problem. This will include an explanation for the reasoning behind the selection of this specific solution deduced from the value proposition canvas.

### **Final Presentation – 10%**

Building on the original pitch, teams will work to refine and improve the first pitch and to add in their solution to the identified problem. In this final presentation, teams will balance both the emotional impact of the solution and business/implementation process of the identified solution. This should represent something that that would be added to a business's website to engage its various stakeholders.

### **Final Project/Product – 25%**

Solutions to the problem could include a research proposal, a policy brief, a tool or widget, an educational tool, a decision-making model, infographic, website or a risk analysis. The solution will be presented as an application/proposal and will include a project implementation plan.

### **Peer Evaluation – 5%**

A focus of this course is to enhance teamwork skills. Following the completion of the assignments, each team member will be asked to assess their team performance, including contributions of all individual team members.

### **Final Reflection – 5%**

In the final reflection, each student will consider how their activities in this course, and even their entire program, have influenced their development with respect to key personal and professional attributes, and how they might apply them to new challenges in the future.



## 7 Course Statements

### 7.1 Role in Curriculum:

This course is the capstone course in the Biological Science program. It is designed to allow students to integrate and apply their knowledge of science and further develop skills in problem solving, professional behaviour, communication and teamwork.

### 7.2 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, including your name, ID#, and email contact. See the undergraduate calendar for information on regulations and procedures for [Academic Consideration](#).

Academic consideration, if granted, may consist of an extension on an assignment or a reweighting of remaining assessments, depending on the circumstance.

### 7.3 Grading:

Direct conflicts with assignment deadlines should be communicated to the course coordinator within the first 2 weeks of classes. Assignments are due in the CourseLink dropbox by 11:59 pm on the date specified in the instructions. Assignments submitted after the specified date will be subject to a 10% late penalty, per day.

### 7.4 Regrading:

Students who wish to have their assignments regraded must submit their assignment, with their concerns indicated, in writing, within 1 week of the return of the assignment. The entire assignment will be regraded, and the mark may go up, down or remain unchanged; however, the regrade mark must be accepted.

## 8 University Statements

### 8.1 Email Communication:

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

### 8.2 Drop Date:

The regulations and procedures for dropping courses are available in the Undergraduate Calendar. Students wishing to drop one semester courses must do so by the end of the fortieth class day; two semester courses must be dropped by the end of the last day of the add period in the second semester.

### **8.3 Copies of Out-of-class Assignments:**

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

### **8.4 Accessibility:**

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact Student Accessibility Services (formerly the Centre for Students with Disabilities), as soon as possible.

For more information, contact [Student Accessibility Services](#) at 519-824-4120 ext. 56208 or email [csd@uoguelph.ca](mailto:csd@uoguelph.ca).

### **8.5 Academic Misconduct:**

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](#) is detailed in the Undergraduate Calendar.

### **8.6 Recording of Materials:**

Recordings 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 classmate or guest lecturer. Material recorded with permission is restricted to use for that course, unless further permission is granted.