



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

Winter 2023

Section(s): C01

Department of Integrative Biology

Credit Weight: 1.00

Version 1.00 - January 06, 2023

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## **1 Course Details**

### **1.1 Calendar Description**

In this course, students work in teams to explore and address an authentic, biologically-based problem using an integrative and interdisciplinary approach. Topics are proposed by an external 'client' and will focus on a problem relating to societal needs (e.g., food, health, and environment), use of advanced technologies (e.g., genetic modification), or aspirations (e.g. sustainability). Students will explore the underlying basis for the problem, the current state of understanding, social implications, and develop a product or position to address the client's needs.

**Pre-Requisites:** 14.00 credits  
**Restrictions:** Restricted to students in BSCH.BIOS

### **1.2 Timetable**

**Lectures begin Monday, January 9th, 2023**

- Lectures take place Monday, Wednesday, and Friday from 12:30 PM - 1:20 PM in ALEX 218.

**Seminars begin Thursday, January 12th, 2022**

- Seminars take place on Thursdays from 11:30 AM - 2:20 PM in ALEX 218.

### **1.3 Final Exam**

There is no final exam for this course.

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## 2 Instructional Support

### 2.1 Instructional Support Team

<b>Instructor:</b>	Dan Grunspan
<b>Email:</b>	dgrunspan@uoguelph.ca
<b>Office:</b>	Virtual via Gather Town or Zoom
<b>Office Hours:</b>	Office hours to be determined based student availability.

### 2.2 Teaching Assistants

<b>Teaching Assistant (GTA):</b>	Shelby Bohn
<b>Email:</b>	sbohn@uoguelph.ca

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## 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 Additional Resources

#### Innovation Toolkit (Website)

<https://www.uoguelph.ca/johnfwoodcentre/faculty/innovation-toolkit>

The John F. Wood Centre for Business and Student Enterprise has created an Innovation Toolkit that overviews the design and innovation process that we will go through in this course.

While some of the resources from this toolkit will be provided in class and assigned as part of classwork, you and your group may benefit from accessing the ToolKit that is made available to UofG students, faculty, and staff on CourseLink.

To gain access, go to this link

(<https://www.uoguelph.ca/johnfwoodcentre/faculty/innovation-toolkit>) and click the "Enroll Here" button for further instructions.

#### Campus Resources (Other)

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://learningcommons.lib.uoguelph.ca/>

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.

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## 4 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.

### 4.1 Course Learning Outcomes

By the end of this course, you 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
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## 5 Teaching and Learning Activities

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.

### 5.1 Lecture

#### Week 1

**Topics:** Introduction to course structure, topic and overall premise

#### Week 2

**Topics:** Explore the course topic, problem identification and teamwork

#### Week 3

**Topics:** Problem identification and analysis

*Team Charter and Profile due January 25th*

#### Week 4

**Topics:** Problem identification and analysis, developing problem statements

*Team Bibliography and Concept Maps due February 5th*

**Week 5**

**Topics:** Pitching the problem, introduction to pitches and presentation of pitches

**Week 6**

**Topics:** Pitching the problem. Integrating feedback

*Problem pitches due*

**Week 7**

**Topics:** Solution ideation

**Week 8**

**Topics:** Solution refinement implementation and project planning

*3 Solutions due March 12th*

**Week 9**

**Topics:** Solution implementation/project plan

*Individual Annotated Bibliographies due March 19th*

**Week 10**

**Topics:** Finalization of project plan

**Week 11**

**Topics:** Final presentations

*Final Presentations on March 30th and 31st*

**Week 12**

**Topics:** Final projects, final reflection and peer evaluations

*Final Pitches*

**Week 13**

**Topics:** Final projects, final reflection and peer evaluations

*Final Project due April 14th*

*Final Reflection due April 18th*

*Peer Evaluation due April 18th*

## 5.2 Tentative Weekly Schedule [\*\*\*Schedule is subject to change\*\*\*]

<b>Week</b>	<b>Lecture 1 (Monday)</b>	<b>Lecture 2 (Wednesday)</b>	<b>Seminar (Thursday)</b>	<b>Lecture 3 (Friday)</b>
<b>1 - Jan 9-13</b> <i>Introduction to course</i>	Course and topic introduction	Design process	Design process. Exploring the problem	Exploring the problem
<b>2 - Jan 16-20</b> <i>Teams</i>	Team dynamics and conflict	Team culture	Team formation day	Team activity day
<b>3 - Jan 23-27</b> <i>Problem identification and analysis</i>	Work on Team Charters and Profile	Annotated bibliography and concept maps  <i>Team Charter and Profile due</i>	Team annotated bibliography and concept maps	Team annotated bibliography and concept maps
<b>4 - Jan 30-Feb 3</b> <i>Problem identification and analysis</i>	Team annotated bibliography and concept maps  Stakeholders	Stakeholders	Stakeholders	Stakeholders  <i>Team Annotated Bibliography and Concept Map due (Sunday night)</i>
<b>5 - Feb 6-10</b> <i>Pitching the problem</i>	Finalize problem statements  Problem pitches	Problem pitches	Problem pitches	Practice pitch presentations
<b>6 - Feb 13-17</b> <i>Solution ideation</i>	Problem pitches	Writing questions for other groups	Writing answers to problem pitch questions	<i>Responses to problem pitch questions due</i>

<b>Week</b>	<b>Lecture 1 (Monday)</b>	<b>Lecture 2 (Wednesday)</b>	<b>Seminar (Thursday)</b>	<b>Lecture 3 (Friday)</b>
		<i>Problem pitches due (before class)</i>	<i>Questions for problem pitches due (before class)</i>	<i>Individual reflections due</i>
<b>Feb 20-24</b>  <i>WINTER BREAK</i>	NO CLASS	NO CLASS	NO CLASS	NO CLASS
<b>7 - Feb 27-Mar 3</b>  <i>Solution implementation/project plan</i>	Define problem	Ideation	Ideation  Idea sharing	Ideation and refining ideas
<b>8 - Mar 6-10</b>  <i>Solution implementation/project plan</i>	Writing tips  Solution development	Work time	Work time	Work time  <i>3 Solutions due (Sunday night)</i>
<b>9 - Mar 13-17</b>  <i>Project planning</i>	Solution decisions and development	Solution decisions and development	Work time	Work time  <i>Individual annotated bibliographies due (Sunday night)</i>
<b>10 - Mar 20-24</b>	Work time	Work time	Work time	Work time
<b>11 - Mar 27-31</b>  <i>Final presentations</i>	Practice final presentations	Work time	<i>Final presentations</i>	<i>Final presentations</i>

<b>Week</b>	<b>Lecture 1 (Monday)</b>	<b>Lecture 2 (Wednesday)</b>	<b>Seminar (Thursday)</b>	<b>Lecture 3 (Friday)</b>
<b>6</b> <b>12 - Apr 3-7</b>  <i>Final projects, reflection, and peer evaluation</i>	Work time	Work time	Work time	NO CLASS
<b>13 - Apr 10-14</b>  <i>Final projects, reflection, and peer evaluation</i>	Last day of class			<i>Final projects due</i>
<b>14 - Apr 17-21</b>		<i>Final self reflections due</i>  <i>Peer evaluations due</i>		

## Assessments

Grades will be assessed based on a mixture of individual and team assignments. An overview of these assignments and their values can be found below.

Due dates for assignments can be found in the class schedule.

### 6.1 Marking Schemes & Distributions

<b>Name</b>	<b>Scheme A (%)</b>
Team Charter and Profile	10
Individual Assignment: Annotated Bibliography and Concept Map	10
Team Assignment: Annotated Bibliography and Concept Map	10
Team Assignment: Pitch	10
Individual Assignment: Reflection	5
Individual Assignment: 3 Solutions	10
Final Presentation	10
Team Assignment: Final Project	25
Individual Assignment: Final Reflection	5



Name	Scheme A (%)
Individual Assignment: Peer Evaluation	5
Total	100

## 6.2 Assessment Details

### Team Charter and Profile (10%)

Learning Outcome: 5

### Team Assignment: Annotated Bibliography and Concept Map (10%)

Learning Outcome: 1, 5

### Team Assignment: Pitch (10%)

Learning Outcome: 1, 2, 4

### Individual Assignment: Reflection (5%)

Learning Outcome: 6

### Individual Assignment: Annotated Bibliography (10%)

Learning Outcome: 1, 5

### Individual Assignment: 3 Solutions (10%)

Learning Outcome: 1, 2, 3

### Final Presentation (10%)

Learning Outcome: 1, 2, 3, 4

### Team Assignment: Final Project (25%)

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

Grades on the final project are weighted based on peer evaluation scores. Peer evaluation scores will range from 0/10 to 10/10 and it will affect a portion (50%) of the final project grade.

Final individual grades on the Final Project will be calculated as:

$[\text{Group's Final Grade} \times 0.5] + [\text{Peer Evaluation Score} \times \text{Group's Final Grade} \times 0.5]$ .

Thus, if your group scores a 90% on the final project (0.90), and you receive an average peer evaluation score of 8/10 (0.8), then your final project score would be calculated as:  
 $[0.9 \times 0.5] + [0.9 \times 0.5 \times 0.8] = 0.81$ , or 81%

### Individual Assignment: Final Reflection (5%)

Learning Outcome: 6

### Individual Assignment: Peer Evaluation (5%)

Learning Outcome: 5, 6

## 7 Course Statements

### 7.1 Draft Course Outline Disclaimer

This is a draft course outline and is subject to change up to the first day of classes, in keeping with the policy described in the University of Guelph Academic Calendar.

### 7.2 Group work

This course is structured around a semester long group project. This means that student experiences in this course depend on effective communication between team members, building and maintaining positive team dynamics, time management, and shared accountability and responsibility among teammates.

We will put a lot of effort into teamwork. Lecture content will cover effective collaboration and team culture. Teams will be responsible for creating a Team Charter that outlines ground rules for the semester. Team members will submit written reflections about their team's performance and individual contributions to their team. Lastly, individual grades on group assignments will be weighted based on end-of-semester peer evaluations performed by your teammates.

However, despite these efforts, teams will occasionally struggle with group work or interpersonal conflicts. Collaborative skills and teamwork are central to the learning goals of this course. By definition, learning means that your ability to do or understand something has improved - a process that is often uncomfortable. Thus, while the discomfort and struggles associated with team dynamics are unpleasant and something we will try to avoid, they offer important and authentic learning opportunities that are central to this course's learning goals.

Please note the following tips and policies regarding group work in this course:

- *If you will not be able to consistently show up to class to work with your peers, then this course may not be for you.*  
 Issues with group work occur most frequently in groups where team members fail to show up to class and/or do not effectively communicate with their teammates.
- *If you have to miss course time due to circumstances beyond your control, alert your team and the instructor as soon as possible.*  
 Accommodations will be handled on a case-by-case basis and will involve the

entire team. The ability to accommodate unforeseen or planned absences depends on having the situation brought to my attention at the earliest convenience.

- *Once formed, groups are permanent.*

Students will not be able to switch groups during the semester.

- *There is no option for students to complete the final project by themselves.*

The final project is large and complex, and requires a team coordinated effort to complete. Thus, students will not be permitted to submit an individual version of this assignment or other team assignments.

## 8 Department of Integrative Biology Statements

### 8.1 Academic Advisors

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

- Make an appointment with a program counsellor in your degree program. [B.Sc. Academic Advising](#) or [Program Counsellors](#)

### 8.2 Academic Support

If you are struggling to succeed academically:

- Learning Commons: There are numerous academic resources offered by the Learning Commons including, Supported Learning Groups for a variety of courses, workshops related to time management, taking multiple choice exams, and general study skills. You can also set up individualized appointments with a learning specialist.  
<http://www.learningcommons.uoguelph.ca/>
- Science Commons: Located in the library, the Science Commons provides support for physics, mathematic/statistics, and chemistry. Details on their hours of operations can be found at: <http://www.lib.uoguelph.ca/get-assistance/studying/chemistry-physics-help> and <http://www.lib.uoguelph.ca/get-assistance/studying/math-stats-help>

### 8.3 Wellness

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.  
<https://www.uoguelph.ca/counselling/>
- Student Health Services is located on campus and is available to provide medical

attention. <https://www.uoguelph.ca/studenthealthservices/clinic>

- 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.

<http://www.selfregulationskills.ca/>

## 8.4 Personal information

Personal information is collected under the authority of the University of Guelph Act (1964), and in accordance with Ontario's Freedom of Information and Protection of Privacy Act (FIPPA) <http://www.e-laws.gov.on.ca/index.html>. This information is used by University officials in order to carry out their authorized academic and administrative responsibilities and also to establish a relationship for alumni and development purposes.

For more information regarding the Collection, Use and Disclosure of Personal Information policies please see the Undergraduate Calendar.

(<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/intro/index.shtml>)

## 8.5 Course Offering Information Disclaimer

Please note that course delivery format (face-to-face vs online) is subject to change up to the first-class day depending on requirements placed on the University and its employees by public health bodies, and local, provincial and federal governments. Any changes to course format prior to the first class will be posted on WebAdvisor/Student Planning as they become available.

# 9 University Statements

## 9.1 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.

## 9.2 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>

### 9.3 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>

### 9.4 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.

### 9.5 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 make a booking at least 14 days in advance, and no later than November 1 (fall), March 1 (winter) or July 1 (summer). Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time.

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>

## 9.6 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>

## 9.7 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.

## 9.8 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>

## 9.9 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.

## 9.10 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).

## 9.11 Covid-19 Safety Protocols

For information on current safety protocols, follow these links:

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

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

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