



# MCB\*4510 Research Project in Molecular and Cellular Biology

Summer 2021

Section(s): C01

Department of Molecular and Cellular Biology

Credit Weight: 1.00

Version 1.00 - April 28, 2021

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## 1 Course Details

### 1.1 Calendar Description

This course involves independent research of a practical or theoretical nature on a specific topic in molecular and cellular biology. It is carried out under the supervision of an individual faculty member. Students should make arrangements with both a faculty advisor and the course coordinator at least one semester in advance of taking the course. The signature of the course coordinator will be required to select the course. A departmental registration form must be obtained from, and submitted to, the course coordinator no later than the 2nd class day of the semester in which the student is registered for the course.

**Pre-Requisites:** MCB\*4500. Normally, students must have completed 6 semesters in an appropriate program in the biological sciences. Minimum 70% cumulative average in science courses during the first 6 semesters of the relevant majors.

**Restrictions:** Students in programs offering project courses cannot enroll in MCB\*4510. Grade requirements may be waived in exceptional circumstances at the discretion of faculty advisor and course coordinator. Course coordinator consent required.

### 1.2 Timetable

The scheduling of your work in the research lab is based on discussion between you, your faculty advisor, and other lab members.

### 1.3 Final Exam

There is no final exam in this course.

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## 2 Instructional Support

### 2.1 Instructional Support Team

**Instructor:** Dr. Charlotte de Araujo  
**Email:** cdearauj@uoguelph.ca  
**Office:** Virtual

Your Faculty Advisor is the most important member of your Teaching team. Students should be sure that they know how to contact them for guidance and advice.

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## 3 Learning Resources

### 3.1 Required Resources

#### **Courselink (Website)**

<https://courselink.uoguelph.ca>

Information on the Courselink site include:

- Deadlines for all assignments in the Courselink Calendar
- Assignment outlines, grading rubrics with standards

#### **Zoom (Software)**

We will be using Zoom (<https://zoom.us>) for the sessions/presentations in this course.

### 3.2 Recommended Resources

#### **High speed internet connection (Equipment)**

Although high speed connection to the internet is not required, it is highly recommended so that a better online experience with the tools, videos, and other materials used in the course can be achieved.

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## 4 Learning Outcomes

The Research Project course 2 is an extension of the Research Project course 1 and the final undergraduate capstone course for students doing molecular bioscience research. The main qualities of the course are immersion in real, current research going on in a faculty advisor's laboratory, where students can apply their accumulated knowledge and experience to performing real research in a real laboratory setting.

### 4.1 Course Learning Outcomes

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

**1. Problem Solving and Critical Thinking**

- Present and assess original research results they have generated through writing a scientific manuscript in the format used for submission to the journal *Cell* and making a scientific poster presentation of their research
- Evaluate the limits of and troubleshoot experimental approaches through hands on research

**2. Communication**

- Write a scientific manuscript in the format used for submission to the journal *Cell*
- Deliver a poster presentation of their research to students and faculty

**3. Professional and Ethical Behaviour**

- Work effectively independently and in the context of a team, taking responsibility for their own research
- Demonstrate good work ethic by setting goals and meeting deadlines
- Add to their career planning by determining if they are capable of graduate school through direct experience with genuine research

**4. Scientific Method**

- Conduct and troubleshoot authentic experiments on a real research problem
- Record, analyze and interpret scientific data with relevant tools in a scientific manuscript and through a scientific poster presentation

**5. Breadth & Depth of Understanding in a Particular Discipline**

- Demonstrate advanced, contemporary and relevant knowledge in the research area of their choice through written and oral communication

**6. Scientific Technology & Techniques in a Scientific Discipline**

- Conduct and troubleshoot experiments using relevant techniques, using relevant technologies as reported through a scientific manuscript and poster presentation

## 5 Teaching and Learning Activities

The primary activities of this course are the production of a scientific manuscript outlining your research, a poster presentation of the research to an audience of your peers, and activity in a research group under the supervision of a faculty advisor.

### 5.1 Responsibilities of the Students

(See *Research Performance* Rubric for how you will be assessed for your research work)

- Participate in real research in an area of your choice
- Initiate discussions with faculty advisor or others to solve problems
- Display independence in the lab
- Conduct research in the laboratory
- Prepare a scientific manuscript outlining the research
- Present a scientific poster to other students and faculty

### 5.2 Responsibilities of the Faculty Advisor

- Provides direction to the project
- Provides safety training and a safe environment in which to work
- Provides resources for the project, including mentoring, supplies, and certifications
  - May assign a day-to-day mentor, but is ultimately responsible for supervision
- Assesses their student's scientific manuscript\*
- Assesses the scientific manuscript of another MCB\*4510 student/or students assigned by the course coordinator (the number of assigned manuscripts depends on the number of students each advisor has)
- Assesses poster presentations\*
- Assesses their student's semester research performance

**\* In the rare instance when a faculty supervisor is unable to grade course assignments, the faculty supervisor is responsible for finding another faculty member to grade in their place.**

### 5.3 Responsibilities of the Course Coordinator

- Administers the course

- Organizes and communicates the structure of the course, including sign-up, course outlines, courselink, and assessments
  - Provides access to the courselink page to all students and their faculty supervisors
  - Schedules assessment deadlines
  - Assigns second graders for the scientific manuscripts
  - Organizes seminar schedule
  - Collects and reports course grades
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## 6 Assessments

Students will find details of all Assessments on CourseLink.

### 6.1 Assessment Details

#### **Progress Report (0%)**

**Date:** Thu, Jun 17, 4:00 PM

- Ungraded Requirement
- Grader: Faculty Advisor

#### **Poster Presentation (30%)**

**Due:** Fri, Jul 23, 4:00 PM, Dropbox

- Poster presentations: July 26-30 (Tentative)
- Due to ongoing COVID-19 situation, the poster presentation session will be held using Zoom
- Grader: Faculty members

#### **Scientific Manuscript (30%)**

**Due:** Thu, Aug 5, 4:00 PM

Graders: Faculty Advisor & one other faculty member

#### **Research Performance (40%)**

Grader: Faculty Advisor

### 6.2 Poster Presentations (30%)

- See *Poster Presentation* Rubric for details of the criteria assessed and standards.

- DATES: July 26 - 30, 2021; exact schedule will be provided on CourseLink
- Students in MCB\*4510 are required to make and present a scientific poster similar to those presented at scientific conferences. You must prepare a poster summarizing your work and answer questions from faculty, and peers. Two faculty members will evaluate your poster and your knowledge of your research area, experimental design, results and conclusions.
- Submit a PDF of your poster to the CourseLink Dropbox by the due date.
- Due to ongoing COVID-19 situation, the poster presentation will be held virtually (Zoom)

### 6.3 Scientific Manuscript Writing (30%)

- See *Scientific Manuscript* Rubric for details of the criteria assessed and standards.
- DUE DATE: August 5, 2021 at 4:00 pm
- SUBMISSION: submit a pdf and a word document of your manuscript to the Courselink Dropbox by the due date
- LATE PENALTIES: 10% + 10% / day up to 50%, including weekends. A grade of zero will be assigned after 5 days late.
- Requirement: You will write a manuscript that mimics the format and style of a submission to the journal Cell. Read and follow the requirements outlined for submissions to Cell and associated webpages. Things to note are the length limits for the Summary (150 words) and that the the introduction “should be succinct, without subheadings...”
- The introduction of your report for 4510 will therefore be very different than your literature review from 4500, requiring careful thought about the essential points needed for the reader to understand the context for the results.
- **Given MCB\*4510 is a continuation of your work in MCB\*4500, some overlap between MCB\*4500 and 4510 reports will be acceptable in the methods section.**
- Manuscripts that do not conform to the required format will be returned for revision and resubmission. Late penalties will be applied if the resubmission is after the due date.
- Write your manuscript with a word processor. Insert your high-quality figures at the end of the submission. Please note that each figure is presented on its own page. It is also strongly suggested that you make use of referencing software to insert citations and format your final manuscript. Mendeley is powerful, free

reference managing software that works across computer platforms and integrates with Word.

- The final grade for the Scientific manuscript will include grades for clear, concise and grammatically correct writing. Proofreading your manuscript is essential for high quality writing. Therefore, plan your writing to have your first complete draft done a week to 5 days before the due date to provide time for others to proofread your work and allow you enough time to make the necessary changes.
- NOTE: Technical breakdowns are not a valid reason for requesting an accommodation. Important documents and drafts of documents should ALWAYS be backed up.

## 6.4 Laboratory Performance (40%)

- See *Research Performance* Rubric for details of the criteria assessed and standards.
- Students should realize that it is important that the experiments and analyses are done logically and thoroughly, so that results can be meaningfully interpreted. A lack of positive results in their project will not lead to a lower grade, as long as what has been done has been properly carried out. “Negative” results may be useful if they demonstrate that an initial hypothesis was wrong, or if it can be shown that the experimental procedures used were not appropriate.

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# 7 Course Statements

## 7.1 Resolving Conflict

Working in teams can involve differences of opinions or personalities. If you experience a conflict with a member of your lab, bring this conflict to the attention of your faculty advisor for help. If you experience a conflict with your faculty advisor that you are not able to resolve on your own, contact the Chair of the Department of Molecular and Cellular Biology for advice and assistance.

## 7.2 Submission of Assessments to Dropbox

Assessments for this course should be submitted electronically via the online Dropbox tool. When submitting your file using the Dropbox tool, do not leave the page until your file 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 files in the event that they are lost in transition. In order to avoid any last-minute computer problems, your instructor strongly recommend you save your files to a cloud-based file storage (e.g., Google Docs), or send to your email account, so that should something happen to your computer, the file could still be submitted on time or re-submitted.

It is your responsibility to submit your documents on time as specified on the Schedule. Be sure to check the technical requirements and make sure you have the proper computer, that you have a supported browser, and that you have reliable Internet access. 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.

### 7.3 Turnitin

- In this course, we will be using Turnitin, integrated with the CourseLink Dropbox tool, to detect possible plagiarism, unauthorized collaboration or copying as part of the ongoing efforts to maintain academic integrity at the University of Guelph.
- All submitted assignments will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of the Turnitin.com service is subject to the Usage Policy posted on the Turnitin.com site.
- A major benefit of using Turnitin is that students can educate and empower themselves in preventing academic misconduct. In this course, you may screen your own assignments through Turnitin as many times as you wish before the due date. You will be able to see and print reports that show you exactly where you have properly and improperly referenced the outside sources and materials in your assignment.
- Some overlap between your MCB\*4500 report and the current manuscript will be acceptable (specially in the methods section) given MCB\*4510 is a continuation of your work in MCB\*4500. However, this overlap should not ideally exceed more than 30%.

### 7.4 Netiquette Expectations

For this course the same protections, expectations, guidelines, and regulations used in face-to-face settings apply, plus other policies and considerations that come into play specifically because these courses are online. Inappropriate online behaviour will not be tolerated.

Examples of inappropriate online behaviour include:

- Posting inflammatory messages about your instructor or fellow students;
- Using obscene or offensive language online;



- 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/course coordinator online;
- 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 Department of Molecular and Cellular 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>)

## 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 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>

## 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 and academic schedules. Any such changes will be announced via CourseLink and/or class email. 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

The University will not normally require verification of illness (doctor's notes) for fall 2020 or winter 2021 semester courses. However, requests for Academic Consideration may still require medical documentation as appropriate.

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