

Department of Biochemistry Course Syllabus for Fall/Winter 2023-24

Student-Directed Research Projects – Biochemistry 4484E

The Department of Biochemistry recognizes diversity of identity and experience as a source of strength that promotes excellence, innovation, flexibility and adaptability in our discipline. We embrace, nurture, value and celebrate this diversity.



Western University is committed to a **thriving campus**; therefore, your health and wellness matter to us! The following link provides information about the resources available on and off campus to support students: <https://www.uwo.ca/health/> Your course coordinator can also **guide you** to resources and/or services should you need them.

1. Technical Requirements:



Stable internet connection



Laptop or computer



*Working microphone



*Working webcam

*Optional. Some course meetings may be held online

2. Important Dates:



Classes Begin	Reading Week	Classes End	Study day(s)	Exam Period
Sept. 7	Oct. 30 – Nov. 5	Dec. 8	Dec. 9	Dec.10–22
Classes Resume	Reading Week	Classes End	Study Day(s)	Exam Period
Jan. 8	Feb 17-25	Apr. 8	Apr. 9-10	Apr. 11-30

*September 29, 2023 is National Day for Truth and Reconciliation and is a non-instructional day

3. Contact Information



Course Coordinator	Contact Information
Dr. Brian Dempsey, he/him (course coordinator)	brian.dempsey@uwo.ca

Teaching Assistant(s)	Term	Contact Information
Boris Tchatchoua Ngassam (he/him)	FALL	btchatch@uwo.ca
Selena Vo Ha Uyen Truong (she/her)	FALL	vtruong9@uwo.ca
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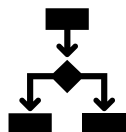
4. Course Description and Design

Delivery Mode: in-person

Extra Information: 10-15 hours per week project work
Course Weight: 1.5 credits

With faculty mentorship, student-teams will design, build, test, and defend an interdisciplinary lab-research project. The teams will assess how their project will integrate into real-world scenarios and present their research in multiple formats. The objective of this course is for students to develop their problem-solving and research abilities. The student teams will develop Synthetic Biology projects based on a research goal of their choice. The projects will require interdisciplinary work that demonstrates how the biotechnology in their project will integrate into society through deliverables that include websites, presentations, and written reports.

Prerequisites: Access to the course is restricted to students enrolled in one of the Honours Modules offered by the participating departments. Each module has its own prerequisites and requirements. The eligibility of each student is therefore determined prior to enrolment. Nevertheless, meeting the prerequisites and requirements of the thesis course remains the responsibility of the student.



Timetabled Sessions

Component	Frequency	Date(s)	Time
In person lab work*	Daily**	M/T/W/Th/F	~3 hr/day
In person class meetings	selected dates	1. General course info session 2. Fall project presentation 3. First written report details 4. Winter project outline 5. Final written report details 6. Spring Final presentation (see details below)	variable
Progress meetings	~weekly	TBD	~15-30 minutes

*Lab work may include activities not conducted in the wet-lab space. Including searching databases, reviewing literature, designing constructs and protocols, and processing data.

**Time in the wet lab is expected to be scheduled in collaboration between student groups, TAs, and Dr. Dempsey so that appropriate supervision is available.

- Asynchronous pre-work, such as preparation for progress meetings, must be completed prior to sessions.
- Attendance at all sessions is required.

All course material will be posted to OWL: <http://owl.uwo.ca>. Any changes will be indicated on the OWL site and discussed with the class.

If students need assistance, they can seek support on the [OWL Help page](#). Alternatively, they can contact the [Western Technology Services Helpdesk](#). They can be contacted by phone at 519-661-3800 or ext. 83800.

5. Learning Outcomes



Upon successful completion of this course, students will be able to:

- Utilize Synthetic Biology engineering principles to design, build, and test a research question in the laboratory.
- Be able to present, explain, and defend scientific information, to experts and lay-people, in a variety of formats including websites, presentations, and writing.
- Evaluate the impact, acceptance and entrepreneurial aspects of a proposed project in the existing biotechnology landscape.
- Select and apply appropriate advanced laboratory techniques for the assembly and evaluation of complex biological parts as well as in the use of molecular, biochemical, and cellular biology techniques.
- Be able to conduct self-evaluation and introspection in the context of team-based projects.
- Demonstrate initiative and collaboration on a team project

6. Course Content and Schedule

September: **Formation of teams + Idea Phase + Training**

- 1) Research for project topics
- 2) Feasibility assessment and Peer review
- 3) Selection of final project
- 4) Project training (safety +)
- 5) Research integrity training

October: **Design phase**

- 1) Planning of Synthetic Biology constructs
- 2) Strategy development for lab work
- 3) Assay design
- 4) Ordering DNA constructs
- 5) Preliminary lab work
- 6) First team presentation of research plan/Pitch



November-December: **Building phase**

- 1) Extensive lab work
- 2) Initial framework of project Wiki website due
- 3) Written materials due: Project rationale, Project design, Initial results, Initial analysis of real-world project integration.

January-February: **Testing phase**

- 1) Completion of lab work
- 2) Assay and testing of DNA constructs
- 3) Framework for final project report due

March: **Reporting phase**

- 1) Completion of Wiki website
- 2) Final team presentation
- 3) Final peer review
- 4) Final report due

Early September is devoted to required safety and other training courses that must be completed before starting in the lab. Students will also begin initial project research during this time.

Students will give their first oral presentation in early-November. This is intended to give students the opportunity to introduce the background and rationale to their project and outline the methods that they will use in their research project. These presentations are graded by Dr. Dempsey, TAs, and peers.

Final written reports will be due in early April (see schedule). These will be graded Dr. Dempsey. Final oral presentations will occur in early April and will again be graded by Dr. Dempsey, TAs, and peers.

Required Online Courses:

There are several online courses that do not contribute to your grade in the project course but are absolutely required to receive a grade. Upload your certificates of completion for each module on the OWL Dropbox by the required date. You will not be able to continue your project past this date until all certificates are uploaded. Any late certificates will affect your first term performance review marks.

Safety Courses:

Health & safety courses are available online: <https://www.uwo.ca/hr/learning/required/index.html>. Certificates showing completion for these courses must be submitted to your Dr. Dempsey prior to starting any work in the lab.

Required for all students:

- Worker Health & Safety Awareness
- WHMIS - Workplace Hazardous Materials Information System
- Western Safe Campus Community
- Building Inclusivity through Anti-Racism
- Supporting Disclosures of Gender-Based and Sexual Violence at Western
- AODA - Accessibility in Service
- Cyber Safety Awareness

Required for most students:

- Mental Health Interactive Learning Module
- Laboratory Safety & Hazardous Waste Management
- Biosafety

Additional training may be required depending on the project that is selected

Upon completion of a training module students should upload each completion certificate to the 4484E OWL dropbox folder. The uploaded certificate (PDF) should have a clear title, for example: BrianDempsey WHMIS Fall23

Choosing your Project

The student-teams in 4484E will develop their own research projects with guidance from Dr. Dempsey and the graduate Teaching Assistants. The projects that students develop will be Synthetic Biology based and similar in nature to the type of projects seen in the iGEM competition. Students will be able to explore iGEM projects from teams in previous competitions to help guide them in designing their research projects.

Expectations in the Lab:

Students are expected to devote an average of 15 hours per week on their project. The actual hours spent in the wet-lab will vary every week depending on what point the project is at in development. You should discuss expectations with Dr. Dempsey. Typically there will be weekly group meetings

(progress reports and project planning) that you should plan to attend. The quality of your experience in this course is highly dependent on the efforts that you put in.

NOTE: Safety regulations prohibit anyone from working alone in a research laboratory. Therefore, undergraduate research students are only permitted to work in the lab under the supervision of Dr. Dempsey or a TA.

NOTE: Labs can be hazardous places. Ask what the hazards are and know how to handle them safely. Basics will be covered in the mandatory courses at the beginning of September, but you will also receive lab-specific training when you start the in-lab part of your project.

7. Participation and Engagement



- Students are expected to participate and engage with content as much as possible
- Students should engage with Dr. Dempsey and the TAs to develop their projects
- Students should engage with their peers in the course to provide feedback and advice.

8. Evaluation

Below is the evaluation breakdown for the course. Any deviations will be communicated.

Assessment	Format	Weighting	Dates (tentative)
Project Selection & Plan	Individual	2%	Fri. Oct. 20, 2023
First Presentation	Group	8%	Fri. Nov. 10, 2023
Initial Wiki Design	Group	3%	Late Nov., 2023
First Report	Individual	10%	Mon. Jan. 15, 2024
Final Report	Individual	40%	Apr. 2, 2024
Final Presentation	Group	12%	Late Apr., 2024
Final Wiki Submission	Group	5%	Late Mar., 2024
Final Performance Evaluation	Individual	20%	Late Apr., 2024



- All assignments are due at 11:55 pm EST unless otherwise specified
- Students are responsible for ensuring that the correct file version is uploaded; incorrect submissions including corrupt files could be subject to late penalties (see below) or a zero
- Written assignments will be submitted to Turnitin (statement in policies below)
- Students will make one submission of their final document to Turnitin
- Rubrics will be used to evaluate assessments and will be posted with the instructions
- A student might not receive the same grade as their group members if it is determined that the distribution of work was not equal
- After an assessment is returned, students should wait 24 hours to digest feedback before contacting their evaluator; to ensure a timely response, reach out within 7 days
- Any grade appeals for assessments must be received within 1 week of the grade being posted (or feedback being received).

Click [here](#) for a detailed and comprehensive set of policies and regulations concerning examinations and grading. The table below outlines the University-wide grade descriptors.

	90-100	One could scarcely expect better from a student at this level
	80-89	Superior work which is clearly above average
	70-79	Good work, meeting all requirements, and eminently satisfactory
	60-69	Competent work, meeting requirements
	50-59	Fair work, minimally acceptable
	below 50	Fail

Information about late or missed evaluations:

- Late assessments without accommodation will be subject to a late penalty 10%/day. Submissions will not be accepted after they are 48 hours late.
- If a student is not able to submit an assignment by the due date and the assignment is worth less than 10% of their final course grade they should contact Dr. Dempsey to discuss how to proceed.
- If a student has a suitable reason for late submission and the assignment is worth 10% or more of their final course grade they must obtain an academic consideration. If an academic consideration is obtained, the student must immediately contact Dr. Dempsey to discuss a revised due date. If a student misses the due date for a group assessment they may be required to complete the assessment as an individual
- Refer to Section 13 on policy on Absence from Course Commitments
- First and second oral presentation, first written report, and final written report must be completed in order to pass the course. If any elements are missed an incomplete (INC) may be recorded and the student will complete it the next time the course is offered.

INC (Incomplete Standing): If a student has been approved by the Academic Counselling Office (in consultation with the instructor/department) to complete term work at a later date, an INC will be assigned. Students with INC will have their course load in subsequent terms reduced to allow them to complete outstanding course work. Students may request permission from Academic Counselling to carry a full course load for the term the incomplete course work is scheduled.

SPC (Special examination): If a student has been approved by the Academic Counselling Office to write a Special Examination and the final exam is the only outstanding course component, an SPC will be assigned. If the class has a makeup exam, the student is expected to write the makeup exam. If the class doesn't have a makeup exam or the student misses the makeup exam for reasons approved by the Academic Counselling Office, the student will write the exam the next time the course is offered. Outstanding SPCs will reduce the course load for the term the exam is deferred as outlined in [Types of Examinations](#) policy.

Project Selection and Design:

Students will research project ideas and provide a research plan. Students will initially pursue several different projects which will be assessed for feasibility by Dr. Dempsey, the TAs, and student peers. A final project will be selected for each group based on the projects initially selected and designed. Additional instructions will be provided in a separate document.

Wiki Website:

Student groups will need to maintain a wiki website detail all aspects of their project. This wiki will take the form of an OWL project site. Dr. Dempsey and the course TAs will be added as members of the site to observe the content. The project should be clearly described on the wiki with content that is logically displayed and easy to find. Additional instructions will be provided in a separate document.

First Oral Presentation: 8% of final grade

The first group oral presentation will occur early on in your project. It should be no longer than 15 min, followed by 5 min for questions (20 minutes total). Presentations that go over this time may be cut off. Students should present justification for their project design and proposed research activities, including background information and preliminary results (optional). There should be an outline of the methods that will be used. Slides should be prepared in PowerPoint or similar. Students should discuss details of content with Dr. Dempsey and the TAs prior to preparing their presentations. Oral presentations are expected to take place in-person during our scheduled class meeting time. Students must attend the entire presentation session. Dr. Dempsey, the course TAs, and student peers will grade presentations.

First Written Report: 10% of final grade (along with performance evaluation)

A written Introduction to the project is due in early January and will be submitted via the 4484E OWL site. A separate report should be written by each student in a project group. The report should be up to 3 pages long (double spaced), plus references and figures. It should provide an introduction to your project, state your research justification, and summarize your proposed experimental approach. This Introduction and your progress to date on the project will contribute to your performance evaluation.

Final Written Report: 40% of Final Grade

Final reports are due in early April and will be submitted via the 4484E OWL project site.

Reports are to be written in the style of a research paper with an Abstract, Introduction, Methods, Results, and Discussion sections. Figures and legends should be prepared as if for publication and appended at the end. References should be handled appropriately. Specifics of content and style should be discussed with Dr. Dempsey and the course TAs.

Reports should not be longer than 20 pages, double-spaced, not including abstract, figures, and references.

An outline of your report should be provided on your wiki after winter term reading week. Dr. Dempsey and the TAs can give you general feedback and guidance at this time, but can't re-write your paper for you. It is also acceptable to get feedback from your peers in the lab.

After submission, your paper will be marked by Dr. Dempsey.

Final Oral Presentation: 12% final grade

The final group oral presentation will typically occur close to the time the written report is due. It should be no longer than 15 min, followed by 5 min for questions (20 minutes total). Presentations that go over this time will be cut off. Students should present an introduction to their project, rationale, research question(s), and results from the year. Slides should be prepared in PowerPoint or similar.

Final Performance Evaluation: 20% final grade

At the end of the course, Dr. Dempsey will evaluate your overall performance in the lab. This will be based on your commitment, effort, initiative, overall understanding of the project and intellectual contribution and performance. This will, in part, be based on the, wiki and the thesis outline.

Final Note on Evaluation:

Keep in mind that different projects can have very different types of outcomes. Negative experimental results are common, especially in short time frames such as this course. Sometimes experiments just don't work. The excitement of the projects that you are undertaking is that you, your group, (and Dr. Dempsey) don't know what the outcome will be, and therefore evaluations are not based necessarily on how much data is produced. Dr. Dempsey and the TAs are experienced in what kind of effort is required for any given type of project and this will be taken into consideration at all levels of evaluation.

9. Communication:

- ☒ Students should contact their instructor(s) and teaching assistant(s) using email
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- ☒ Emails will be monitored daily; students will receive a response in 24 – 48 hours



10. Office Hours:

- ☒ Students should contact Dr. Dempsey and the TAs by email to arrange meetings.



11. Resources



- ☒ All resources will be posted in the 4484E OWL site
- ☒ Students will need to access research papers through the Western Libraries

12. Professionalism & Privacy:

Western students are expected to follow the [Student Code of Conduct](#). Additionally, the following expectations and professional conduct apply to this course:



- ☒ All course materials created by the instructor(s) are copyrighted and cannot be sold/shared (e.g., Must Knows Facebook group, Course Hero, Chegg, etc.)
- ☒ Recordings are not permitted (audio or video) without explicit permission
- ☒ Permitted recordings are not to be distributed

Western is committed to providing a learning and working environment that is free of harassment and discrimination. All **students**, staff, and faculty have a role in this commitment and have a responsibility to ensure and promote a safe and respectful learning and working environment. Relevant policies include Western's [Non-Discrimination/Harassment Policy](#) (M.A.P.P. 1.35) and [Non-Discrimination/Harassment Policy – Administrative Procedures](#) (M.A.P.P. 1.35).

Any **student**, staff, or faculty member who experiences or witnesses' behaviour that may be harassment or discrimination **must report the behaviour** to the Western's Human Rights Office. Harassment and discrimination can be human rights-based, which is also known as EDI-based, (sexism, racism, transphobia, homophobia, islamophobia, xenophobia, antisemitism, and ableism) or non-human rights-based (personal harassment or workplace harassment).

13. How to Be Successful in this Class:

Students enrolled in this class should understand the level of autonomy and self-discipline required to be successful.



1. Invest in a planner or application to keep track of your courses. Populate all your deadlines at the start of the term and schedule your time throughout the course.
2. Make it a daily habit to log onto OWL to ensure you have seen everything posted to help you succeed in this class.
3. Follow weekly checklists created on OWL or create your own to help you stay on track.
4. Take notes as you go through the lesson material. Keeping handwritten notes or even notes on a regular Word document will help you learn more effectively than just reading or watching the videos.
5. Connect with others. Try forming an online study group and try meeting on a weekly basis for study and peer support.
6. Do not be afraid to ask questions. If you are struggling with a topic, check the online discussion boards or contact your instructor(s) and or teaching assistant(s).
7. Reward yourself for successes. It seems easier to motivate ourselves knowing that there is something waiting for us at the end of the task.

14. Western Academic Policies and Statements

Absence from Course Commitments

A. Absence for medical illness:

Students must familiarize themselves with the [Accommodation for Illness Policy](#).

A student seeking academic accommodation for any **work worth less than 10%** must contact the instructor or follow the appropriate Department or course specific instructions provided on the course outline. Instructors will use good judgment and ensure fair treatment for all students when considering these requests. You are not required to disclose details about your situation to your instructor; documentation is not required in this situation, and you should not send any pictures to your instructor.

If you are unable to meet a course requirement for any **work worth 10% or greater** due to illness or other serious circumstances, you must provide valid medical or other supporting documentation to the Academic Counseling as soon as possible and contact your instructor immediately. It is the student's responsibility to make alternative arrangements with their instructor once the accommodation has been approved and the instructor has been informed. Please note that the format of a make-up test, exam, or assignment is at the discretion of the course coordinator.

A student requiring academic accommodation due to illness should use the Student Medical Certificate when visiting an off-campus medical facility or request a Record's Release Form (located in the Dean's Office) for visits to Student Health Services. The form can be found at: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf

B. Absence for non-medical reasons:

Student absences might also be approved for non-medical reasons such as religious holidays and compassionate situations. Please review the policy on [Accommodation for Religious Holidays](#). All non-medical requests must be processed by Academic Counselling. Not all absences will be approved; pay attention to the academic calendar and final exam period when booking any trips.

C. Special Examinations

A Special Examination is any examination other than the regular examination, and it may be offered only with the permission of the Dean of the Faculty in which the student is registered, in consultation with the instructor and Department Chair. Permission to write a Special Examination may be given on the basis of compassionate or medical grounds with appropriate supporting documents. To provide an opportunity for students to recover from the circumstances resulting in a Special Examination, the University has implemented Special Examinations dates. These dates as well as other important information about examinations and academic standing can be found [here](#).

Academic Offenses

Scholastic offences are taken seriously, and students are directed [here](#) to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence.

Accessibility Statement

Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Accessible Education (AE) at 661-2111 x 82147 for any specific question regarding an accommodation or review [The policy on Accommodation for Students with Disabilities](#)

Correspondence Statement

The centrally administered **e-mail account** provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at his/her official university address is attended to in a timely manner. You can read about the privacy and security of the UWO email accounts [here](#).

Discovery Credit Statement

Students are permitted to designate up to 1.0 Discovery Credit course (or equivalent) for pass/fail grading that can be counted toward the overall course credits required for their degree program. The details of this policy and the deadlines can be found [here](#).

Essay Course Guidelines

The guidelines for the minimum written assignments refer to the cumulative amount of written work in a course but excludes written work in examinations. You can read about essay course guidelines [here](#).

An essay course must normally involve total written assignments (essays or other appropriate prose composition, excluding examinations) as follows:

- Full course (1000 to 1999): at least 3000 words
- Half course (1000 to 1999): at least 1500 words
- Full course (2000 and above): at least 5000 words
- Half course (2000 and above): at least 2500 words

The structure of the essay course must be such that in order to pass the course, the student must exhibit some minimal level of competence in essay writing and the appropriate level of knowledge of the content of the course.

Turnitin and other similarity review software

All assignments will be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for

such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between Western University and [Turnitin.com](https://www.turnitin.com).

15. BMSUE Academic Policies and Statements

Cell Phone and Electronic Device Policy (for in-person tests and exams)

The Schulich School of Medicine & Dentistry is committed to ensuring that testing and evaluation are undertaken fairly across all our departments and programs. For all tests and exams, it is the policy of the School that any electronic devices, e.g., cell phones, tablets, cameras, smart glasses, smart watch or iPod are strictly prohibited. These devices MUST be left either at home or with the student's bag/jacket at the front of the room and MUST NOT be at the test/exam desk or in the individual's pocket. Any student found with one of these prohibited devices will receive a grade of zero on the test or exam. Non-programmable calculators are only allowed when indicated by the instructor. The program is not responsible for stolen/lost or broken devices.

Copyright and Audio/Video Recording Statement

Course material produced by faculty is copyrighted and to reproduce this material for any purposes other than your own educational use contravenes Canadian Copyright Laws. You must always ask permission to record another individual and you should never share or distribute recordings.

Rounding of Marks Statement

Across the Basic Medical Sciences Undergraduate Education programs, we strive to maintain high standards that reflect the effort that both students and faculty put into the teaching and learning experience during this course. All students will be treated equally and evaluated based only on their actual achievement. **Final grades** on this course, irrespective of the number of decimal places used in marking individual assignments and tests, will be calculated to one decimal place and rounded to the nearest integer, e.g., 74.45 becomes 74, and 74.50 becomes 75. Marks WILL NOT be bumped to the next grade or GPA, e.g., a 79 will NOT be bumped up to an 80, an 84 WILL NOT be bumped up to an 85, etc. The mark attained is the mark you achieved, and the mark assigned; requests for mark "bumping" will be denied.

16. Support Services

The following links provide information about support services at Western University. Western is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced sexual or gender-based violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts at

https://www.uwo.ca/health/student_support/survivor_support/get-help.html.

To connect with a case manager or set up an appointment, please contact support@uwo.ca.

[Academic Counselling \(Science and Basic Medical Sciences\)](#)

[Appeal Procedures](#)

[Registrarial Services](#)

[Student Development Services](#)

[Student Health Services](#)