

Biology 4998E – Synthetic Biology

1. General Course Information

Course name: Biology 4998E (full year; fall and winter semesters)

Class time: Tuesday, 1:30 PM to 5:30 PM. Some classes will end early.

Location: NCB-336

Office hours: Available upon request

Office location: To be determined

Prerequisite(s): Biology 3596A/B and Biochemistry 3392F/G.

Pre- or Corequisite(s): Science 3377A/B.

Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

Mode of delivery: The expected delivery method of this course is in person, however, modifications in the course delivery to an online format may be 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.

Google Chrome or Mozilla Firefox are the preferred browsers to optimally use OWL; update your browsers frequently.

2. Instructor Information

Dr. Michael Pyne (mpyne3@uwo.ca)

Contact: If you have general questions about course content or assignments, please post them to the appropriate topic in the OWL forum. You can elect to be notified about new posts by email: from the Forum tab, click on "Watch" near the top, and update your settings.

To contact your instructor directly, please use OWL messenger rather than email whenever possible. You can elect to have your OWL messages forwarded to your email: from the Messages tab, click on "Settings" near the top, click "Yes" for Auto Forward Messages, and type in your email address. If you need to contact the instructor via email (mpyne3@uwo.ca), please put "Bio4998" in the subject line. Messages from a non-Western account or those that do not include Bio4998 may be blocked by the university's anti-spam system.

Messages will be answered within 48 hours, excluding weekends. Typically, forum posts will be addressed first, followed by OWL messages, and then emails.

3. Course Description/Syllabus

In this course students will develop original project proposals in Synthetic Biology through group and peer workshops. Experiments will be performed to illustrate techniques used in synthetic biology.

Learning objectives

Upon successful completion of the course, the student will be able to:

- 1) Create a novel, plausible, and ethical proposal for development of an organism or biological system with purpose-built characteristics;
- 2) Present a synthetic biology proposal, and the outcomes of synthetic biology research to a variety of audiences, orally and in writing;
- 3) Incorporate feedback received from others into an improved project proposal;
- 4) Plan a research strategy aimed at completing a synthetic biology project using available resources within a specified time;
- 5) Perform synthetic biology experiments and interpret their results;
- 6) Identify and use effective troubleshooting strategies

Contingency plan for an in-person class pivoting to 100% online learning

In the event of a COVID-19 resurgence during the course that necessitates the course delivery moving away from face-to-face interaction, all remaining course content will be delivered entirely online, synchronously at the times indicated in the timetable. Any remaining assessments will also be conducted online as determined by the course instructor.

Tentative Schedule

Date	Topics / Activities	Deadlines
Sept 13	Course introduction Genetic parts and assembly methods Brainstorming activity	
Sept 20	View and discuss project examples Choose a project team Narrow down proposal ideas	
Sept 27	Refine project topic (incl. parts and assembly method) Determine methods	
Oct 4	Refine methods Estimate timeline for completion	
Oct 11	Proposal presentations and feedback	Proposal presentation 1 (10%) Proposal report 1 (10%)
Oct 18	Proposal presentations and feedback	
Oct 25	Incorporate feedback Detailed experimental planning (reagents, controls, etc.)	
Nov 1	<i>No class (reading week)</i>	
Nov 8	Detailed experimental planning	
Nov 15	Detailed experimental planning	
Nov 22	Detailed experimental planning	
Nov 29	Proposal presentations	Proposal presentation 2 (15%) Proposal report 2 (15%)
Dec 6	Proposal presentations	
Dec 13	<i>No class (exam week)</i>	
Dec 20	<i>No class (exam week)</i>	
Dec 27	<i>No class (winter break)</i>	
Jan 3	<i>No class (winter break)</i>	
Jan 10	Introduction to experiments	
Jan 17	Synthetic biology experiments	* Lab reports (3 x 10%) Due dates TBA
Jan 24	Synthetic biology experiments	
Jan 31	Synthetic biology experiments	
Feb 7	Synthetic biology experiments	
Feb 14	Synthetic biology experiments	
Feb 21	<i>No class (reading week)</i>	
Feb 28	Synthetic biology experiments	
Mar 7	Synthetic biology experiments	
Mar 14	Synthetic biology experiments	
Mar 21	Synthetic biology experiments	
Mar 28	Final presentations	Final presentation (10%)
Apr 4	Final presentations	Lab notebook (10%)
Apr 11	<i>No class (exam week)</i>	

4. Course Materials

Learning materials will be posted to the course OWL site. During the first term, students should bring a laptop computer or smartphone to class, if possible. During the second term, each student **must** have a lab coat, safety glasses, and laboratory notebook. Students who arrive without proper lab attire (lab coat, safety glasses, long pants, close-toed shoes, long hair tied back) may be denied entry to the lab.

Students should check OWL (<http://owl.uwo.ca>) on a regular basis for news and updates. This is the primary method by which information will be disseminated to all students in the class. Students are responsible for checking OWL on a regular basis.

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. Methods of Evaluation & Grading

The overall course grade will be calculated as follows:

First term 50%

Proposal presentation 1	10%	(due Oct 11 or Oct 18 as assigned)	Learning objectives 1,2
Proposal report 1	10%	(due Oct 11)	Learning objectives 1,2
Proposal presentation 2	15%	(due Nov 29 or Dec 6 as assigned)	Learning objectives 2,3,4
Proposal report 2	15%	(due Nov 29)	Learning objectives 2,3,4

Second term 50%

Lab reports (3 x 10%)	30 %	(due dates TBA)	Learning objectives 5,6
Final presentation	10 %	(due Mar 28 or Apr 4 as assigned)	Learning objectives 2,4,6
Lab notebook	10 %	(due Apr 4)	Learning objectives 5,6

The lab notebook is an individual assignment. All other assignments will be completed in teams. Your grade for each team assignment will be adjusted according to a peer evaluation factor.

All assignments are due by the beginning of class (1:30 PM) unless otherwise specified. Late assessments without a self-reported absence or approval from Academic Counselling will be penalized 20% per late day (including holidays and weekends), or part thereof. Late assessments with self-reported absences should be submitted within 24 hours of the end of the 48-hour period. If a student is absent from a group presentation with approval, the presentation may be rescheduled or the grade re-weighted to other course components, at the discretion of the instructor. When remaining group members present without the absent member, the adverse effect on the group will be considered when grading the presentation.

Written assignments will be submitted to Turnitin (see statement in policies below). Students will have unlimited submissions to Turnitin before the deadline.

Rubrics will be used to evaluate assessments and will be posted with the instructions. 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.

Each student is expected to contribute substantially to all group assignments, including project design, lab experiments, presentations, and reports.

Due to the focus on group work and hands-on skills, attendance is mandatory for all classes/laboratories, except in exceptional circumstances (see **section 6**). Students who miss more than two classes per semester may have to make up academic components the next time the course is offered.

Please note the university-wide grade descriptors:

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

According to university policy, a final grade ending in .45 or above will be rounded to the next highest number (e.g. 78.45 becomes 79, while 78.44 becomes 78). Grades will not be rounded up beyond this policy for any reason.

Grades for specific course evaluations will be posted regularly to the course OWL site. Appeals of specific graded items must be submitted in writing to the instructor within two weeks of the grade posting with a clear explanation of the reason for the appeal. The instructor may re-grade all or part of the assignment to look for additional errors which may lower or raise the final grade.

6. Student Absences

Academic Consideration for Student Absences

Students who experience an extenuating circumstance (illness, injury or other extenuating circumstance) sufficiently significant to temporarily render them unable to meet academic requirements may submit a request for academic consideration through the following routes (**NOT through their course instructors**):

- (i) Submitting a Self-Reported Absence (SRA) form provided that the conditions for submission are met. To be eligible for a Self-Reported Absence:
 - an absence must be no more than 48 hours
 - the assessments must be worth no more than 30% of the student's final grade
 - no more than two SRAs may be submitted during the Fall/Winter term
- (ii) For medical absences, submitting a Student Medical Certificate (SMC) signed by a licensed medical or mental health practitioner to the Academic Counselling office of their Faculty of Registration.
- (iii) Submitting appropriate documentation for non-medical absences to the Academic Counselling office in their Faculty of Registration.

Note that in all cases, students are required to contact their instructors as soon as possible, and no later than within 24 hours of the end of the period covered.

Students should also note that individual instructors are not permitted to receive documentation directly from a student, whether in support of an application for consideration on medical grounds, or for other reasons. **All documentation required for absences that are not covered by the Self-Reported Absence Policy must be submitted to the Academic Counselling office of a student's Home Faculty.**

For the policy on Academic Consideration for Student Absences – Undergraduate Students in First Entry Programs, see:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_illness.pdf

and for the Student Medical Certificate (SMC), see:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf

Religious Accommodation

When a course requirement conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request accommodation for their absence in writing at least two weeks prior to the holiday to the Academic Counselling office of their Faculty of Registration. Please consult University's list of recognized religious holidays (updated annually) at

<https://multiculturalcalendar.com/ecal/index.php?s=c-univwo>

7. EDI statement

The pronouns used by Dr. Michael Pyne are typically he/him. Please communicate with your instructor if you want to be sure that she knows your correct name and/or pronouns.

8. Land acknowledgement

We acknowledge that Western University is located on the traditional lands of the Anishinaabek, Haudenosaunee, Lūnaapéewak and Attawandaron peoples, on lands connected with the London Township and Sombra Treaties of 1796 and the Dish with One Spoon Covenant Wampum. This land continues to be home to diverse Indigenous peoples (e.g. First Nations, Métis and Inuit) whom we recognize as contemporary stewards of the land and vital contributors of our society.

More information about Indigenous Services (<https://indigenous.uwo.ca/>) and this Land Acknowledgement (<https://communications.uwo.ca/comms/land-acknowledgement/>) are available.

9. Accommodation and Accessibility

Students with disabilities work with Accessible Education (formerly SSD) which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The Academic Accommodation for Students with Disabilities policy can be found at:

[https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic Accommodation disabilities.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Accommodation_disabilities.pdf)

10. Academic Policies

The website for Registrarial Services is <http://www.registrar.uwo.ca>

In accordance with policy,

https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf

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.

Students must write their papers in their own words and properly cite ideas that are not their own.

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf

Review Biology 2290 learning outcomes. You are expected to know what plagiarism is at this stage of your program.

Turnitin ***aids*** in identifying plagiarism. All required papers may 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 The University of Western Ontario and Turnitin.com (<http://www.turnitin.com>).

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 or the students are copyrighted and cannot be sold/shared without explicit permission from the authors
- Recordings are not permitted (audio or video) without explicit permission
- Permitted recordings are not to be distributed

10. Support Services

Please visit the Science & Basic Medical Sciences Academic Counselling webpage for information on add/drop courses, academic considerations for absences, appeals, exam conflicts, and many other academic related matters: <https://www.uwo.ca/sci/counselling/>

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Student Accessibility Services (SAS) at 661-2147 if you have any questions regarding accommodations.

Learning-skills counsellors at the Student Development Centre (<http://www.sdc.uwo.ca>) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Students who are in emotional/mental distress should refer to Mental Health@Western (<http://www.health.uwo.ca/mentalhealth>) for a complete list of options about how to obtain help.

Additional student-run support services are offered by the USC: <https://westernusc.ca/your-services/>