

Course outline  
Biology 2910: Laboratory biology  
FAO section  
2024W

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**THE BASICS**

- Lecturer
  - Dr. David Law
  - Office: OA 3004
  - email: [dlaw@lakeheadu.ca](mailto:dlaw@lakeheadu.ca)
  - Office hour: No scheduled office hour; email me to make an appointment to talk in person or on Zoom.
  - Phone: None; email me to make an appointment to talk in person or on Zoom.

Use either the lakeheadu.ca email address above or the email within D2L. I will check my email daily Monday to Friday, and will try to respond to your questions as quickly as possible during those days.

- Lab instructor
  - Dr. Usha Menon
  - Office: OA 3003
  - email: [umenon@lakeheadu.ca](mailto:umenon@lakeheadu.ca)
  - Contact Dr. Menon directly to discuss the 3-h weekly lab.

**Class info**

Biology 2910 lab sessions are in-person. The 1-h weekly review/lecture is on Zoom.

All course material is posted on MyInfo/D2L; check there for the latest course updates and information.

### Lectures

- Live (synchronous) on Zoom
- Mondays, 10:30 AM - 11:20 AM

### Labs

- OA 3002
- Lab session 1 (3 h/week): Tuesdays 11:30 AM -2:30 PM
- Lab session 2 (2 h/week): Wednesdays 9:30 -11:30 AM
- See lab-specific information on course D2L (WDE) site

Note the following other [important dates](#), as per the [academic schedule of dates](#):

- Final date to add a course for 2024W: Fri. Jan. 19
- Final date to withdraw from a course without academic penalty (a/k/a drop date): Fri. March 8
  - We aim to provide you with at least 25% of your final mark by this date so that you can make an informed decision about your progress and projected future performance in the course.

### [Calendar description](#)

Biology 2910 | Laboratory Biology

Introduction to basic laboratory techniques: pipetting, preparation of media, aseptic technique, cell disruption, protein purification and analysis, electrophoresis, chromatography. Development of skills in such areas as: laboratory note-keeping, reporting, graphical presentation of data, information searching.

- Credit Weight: 0.5
- Prerequisite(s): Biology 1050 and 1.0 FCE Chemistry
- Offering: 0-0; 1-5

- Notes: An additional fee (see Miscellaneous Fees) is required for this course.
- Course Classifications: Type C: Engineering, Mathematical and Natural Sciences

## LEARNING OUTCOMES

The goal of this course is to create a meaningful and creative laboratory experience for students who are interested in exploring experimental biology, and give you the skills necessary to work or study in many other related areas, such as medicine, environmental studies, forensics or biotechnology.

### During this course, you will...

- develop and improve hard skills necessary for lab-based molecular biology, including
  - pipetting
  - weighing
  - spectrometry
  - buffer preparation
  - tissue collection and homogenization
  - centrifugation
  - chromatography
  - antibodies to detect proteins
  - electrophoresis
  - biomacromolecule purification, identification and characterization
- develop and improve soft biological skills, such as
  - working with your peers
  - conceiving, writing and delivering written work by applying information obtained in lecture, from your textbook and from other scientific sources

### By the end of this course, you will be able to...

- work safely in the lab
- perform various laboratory techniques using DNA and protein
- perform laboratory experiments
- write formal lab reports by applying information obtained in lecture, from your textbook and from other scientific sources to the data you obtain in the lab
- work effectively as a member of a research team
- keep effective records of your work in the laboratory
- find information necessary to do laboratory work using the university library
- understand common terms used in laboratory biology
- feel comfortable asking questions based on the scientific content of your and others' work

- discuss topics relevant to laboratory biology, which may include genomics, protein structure, and array technology

## IN-PERSON LABS AND ZOOM LECTURES

All 5 h of weekly labs will be delivered in-person.

The 1-h weekly Monday review/lecture is via Zoom. I'll provide links to the Zoom sessions in Calendar on the right hand side of the D2L course homepage. Note that I will record the Monday lectures and post these in D2L for your later review. As with all Zoom recordings, the images and voices of students present may be recorded. These recordings are strictly confidential and may be used only by the instructor and students registered in the course only for purposes related to the course, and may not be otherwise shared or distributed. Students who are concerned about being recorded may ask me in an email to exclude them from the recording to the greatest extent possible while recognizing that this may not always be possible. These recordings are made under the authority of sections 3 and 14 of [the Lakehead University Act, 1965](#). Questions about the collection of images and sounds in these recordings may be directed to the chair of biology, Dr. Azim Mallik ([amallik@lakeheadu.ca](mailto:amallik@lakeheadu.ca)).

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### Be courteous and participate in class

We should all try to be patient and kind to others during labs and lectures. Dr. Menon and I appreciate feedback letting us know what does and doesn't work. Speak up right away so we can attempt to fix any issue you may have.

I ask a lot of questions during lectures. I welcome volunteers to answer. I also plan to call on students by name to answer some simple questions during class, so be prepared for that. This isn't to embarrass you but rather to make you more comfortable participating in group work and offering your opinion in front of others, both of which will be a major part of your university life and future career.

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### Attend lectures to receive participation marks

I'll ask questions during the Zoom sessions using Zoom polling. You have to be present during lectures to participate in the polling questions and receive participation marks.

Note that this course is listed in the academic calendar as "1,5", meaning that each week there are 5 hours of lab work (spread over 2 lab sessions) and a 1-hour lecture/tutorial.

Lectures will be review sessions based on what you covered that week in the lab sessions. We will also do some practice problems to hone your calculation and logic skills prior to writing up your labs and writing the final exam in April. If we have time, we'll discuss the upcoming week's labs too.

Dr. Menon and I post all course information in D2L. New info will be in the Announcements section, so check it regularly for information. I will send emails to the class only for urgent matters (e.g., class cancellation).

Note that the 2024W study break is Feb. 19 to 23.

## LECTURE AND LAB SCHEDULE

### Lectures:

Following is a **preliminary** schedule of the material we'll cover in the lectures and lab sessions.

Since the lectures are mostly review sessions, material won't be posted beforehand, but I will record the sessions and post them on D2L for your review afterwards. Zoom polling will take place at the start of each session and will be a brief review of the previous week's lecture and lab material.

### Labs:

These will follow the preliminary schedule below. The schedule may change due to lab and/or weather challenges.

Week #	Week start date	Material covered
1	Jan. 8	<ul style="list-style-type: none"> <li>• No lab, but complete your WHMIS training and submit certificate to Usha via email</li> </ul>
2	Jan. 15	<ul style="list-style-type: none"> <li>• Lab orientation</li> <li>• WHMIS</li> <li>• Lab safety</li> <li>• Safety quiz</li> <li>• Lab notebooks</li> <li>• Excel/Sheets graphing</li> <li>• Report writing</li> </ul>
3	Jan. 22	<ul style="list-style-type: none"> <li>• Pipetting</li> <li>• Measuring</li> <li>• Balance</li> <li>• How to make solutions</li> <li>• pH</li> <li>• Molarity</li> </ul>
4	Jan. 29	<ul style="list-style-type: none"> <li>• Chlorophyll extraction and measurement</li> </ul>
5	Feb. 5	<ul style="list-style-type: none"> <li>• Protein extraction</li> <li>• Bradford assay</li> <li>• Protein quantification</li> </ul>
6	Feb. 12	<ul style="list-style-type: none"> <li>• Protein utilization in peas</li> </ul>



7	Feb. 26	<ul style="list-style-type: none"><li>● Size exclusion/gel filtration chromatography</li></ul>
8	Mar. 4	<ul style="list-style-type: none"><li>● Protein extraction I<ul style="list-style-type: none"><li>○ SDS/PAGE gel electrophoresis</li><li>○ Gel staining</li></ul></li></ul>
9	Mar. 11	<ul style="list-style-type: none"><li>● Protein extraction II<ul style="list-style-type: none"><li>○ Western/immunoblot</li><li>○ Immunodetection</li></ul></li></ul>
10	Mar. 18	<ul style="list-style-type: none"><li>● DNA extraction</li><li>● PCR</li><li>● Agarose gel electrophoresis</li></ul>
11	Mar. 25	<ul style="list-style-type: none"><li>● Review</li></ul>
12	Apr. 1	<ul style="list-style-type: none"><li>● All reports due</li></ul>

## LEARNING MATERIALS

### Textbook

There is no official textbook. Any readings will either be freely available online or posted on the course D2L site.

### Marking scheme

The major emphasis in the course is on lab skills; this is reflected in the course marking scheme below:

Component	% final mark
2 Experimental reports* (2 x 10%)	20
3 Technical reports* (3 x 5%)	15
Pre-lab quizzes**	20
Lab book	10
Lab technique and lab participation	5
Lecture participation via Zoom polling	5
Final test on lecture content of the course	25
<b>TOTAL</b>	<b>100</b>

Notes:

\*Format and expectations for both types of reports are outlined in the lab write up module. Any assignment handed in late will have 5% of its grade deducted for each day late. Please follow the lab schedule and outline to see what type of report each lab exercise has. Students can choose to submit 2 Experimental reports and 3 Technical reports that will be graded.

\*\*Before each lab, there will be a quiz based on the pre-lab questions that tests your preparation for the lab.

Final exam

Date TBA. Covers material from the 1-h Monday lectures only.

## STUDENT PARTICIPATION

Student participation sessions will use **Zoom polling** during the Monday lectures only. You don't have to do anything on your end except vote for a multiple choice question when I ask it during class.

Five percent of your final mark is allocated to lecture participation. In each lecture, you will answer questions that are based on the course material. The 5% participation mark will be equally weighted for

- attendance (2.5%), and
- correct answers (2.5%).

Therefore, to receive a high participation mark, you have to be both physically and mentally present in class.

You may miss 2 lectures without penalty to your participation mark. For example, if there are 11 classes where we poll, you need to be present for 9 of these to receive full credit for attendance.

## EXAMS AND DUE DATES

This class has a large number of deliverables: lab reports, quizzes, etc. You'll have to have good time management skills to meet deadlines. Late lab reports will be accepted, but for each day after the due date, 10% will be deducted from the assignment grade. If you miss a weekly lab quiz, you may write a replacement test, but you must provide acceptable supporting documentation within 48 h of the missed test to me and Dr. Menon. If required, there will be one date for a make-up test and no make-up test can be written after the test results have been returned to the class. This also applies to students registered with SAS. Missed final exams require you to follow the protocol provided by Enrolment Services.

If you're having trouble finishing quizzes or lab reports in the assigned time, contact me and/or SAS to find a solution.

## ACADEMIC DISHONESTY

Lakehead has a [Student Code of Conduct – Academic Integrity](#). All students in this course should read the Code and become familiar with it.

To summarize the relevant parts of the Code, the penalty for plagiarism or cheating on any part of this or any other course is zero for the work where the student is caught. Serious or repeated plagiarism, including cheating on an examination or test, will result in a mark of zero for the course and may result in expulsion from Lakehead.

There are three particular places in this course where cheating might occur:

1. submitting written work that you did not research and write;
2. using written or electronic notes to confer with another person in a test or examination; or
3. voting electronically in place of another person during polling.

Academic dishonesty for any of these areas will result in a mark of **zero** for the work concerned.

To ensure academic fairness for students who work hard, rest assured that the course instructors will take **every precaution** to ensure that potential cheaters are caught and subjected to the appropriate penalty.

## AI USE IN COURSEWORK

Before deciding to use AI to complete coursework, read Lakehead's [checklist for its appropriate use](#). If you use AI, you may violate the Lakehead [Academic Integrity Code \(Section III\)](#) and be subject to disciplinary action. It's best to check with me or Dr. Menon prior to using it if you are unsure. There is no shame in doing so; we're very aware of these tools. As this technology evolves, it's up to your instructors to ensure that student marks reflect their own work. Our current solution to this challenge is to shift the marking scheme towards more work done in class like quizzes and lab notebook completion.