LAKEHEAD UNIVERSITY
LABORATORY BIOLOGY BIOL2910WA
Winter 2016

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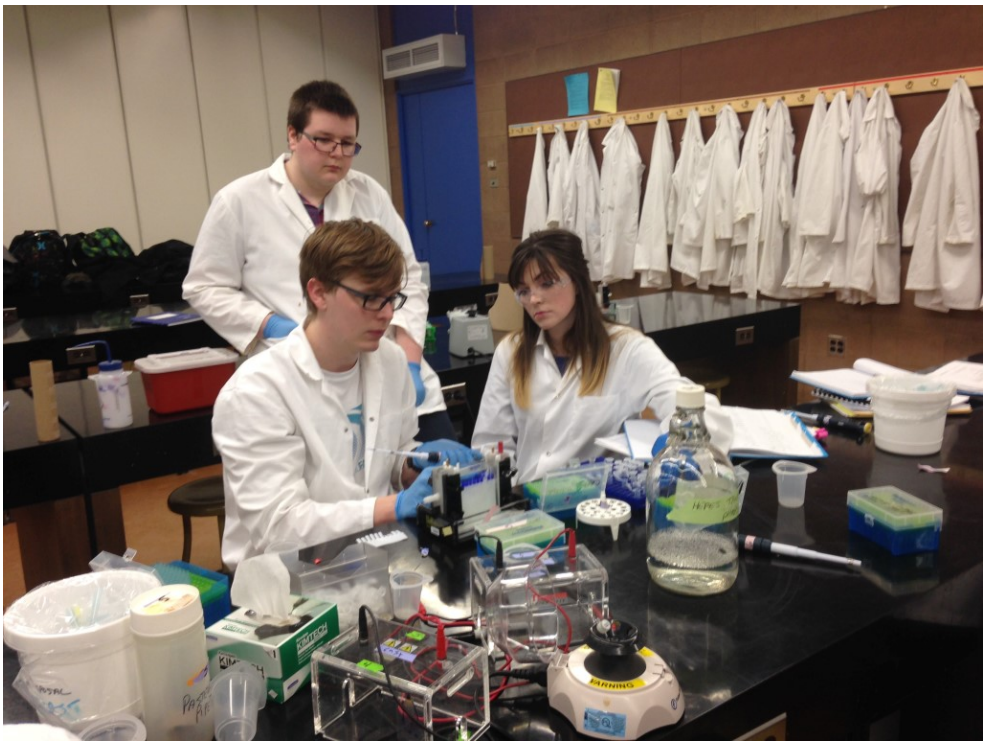

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A. Introduction

The goal of this course is to create a meaningful and creative laboratory experience for students who are first opening their eyes to the exciting world of experimental biology. We hope to prepare you for performing experiments and writing lab reports in upper level courses in Microbiology, Biochemistry, Molecular Biology, etc. Perhaps you will be inspired to continue in these fields after you graduate. Even if you do not continue, this course will provide you with skills required to work or study in other related areas, including medicine, environmental studies, forensics or biotechnology.

B. Course syllabus

a. Course instructor

Dr. Lada Malek
CB4050, ext. 8709
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b. Lab technician

Dr. Susanne Walford
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c. Teaching assistants

Ashley Nemac-Bakk M.Sc. candidate
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Cassandra Eckman M.Sc. candidate
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d. Timetable

This course is scheduled for 6 hours per week; one hour per week is for lecture material and five hours per week for lab exercises. Since this a practical course, students are expected to attend the full six hours each week.

There will be longer lectures and tutorials in the first week or two of the course, i.e. more than the scheduled 1 hour. During the rest of the course, you will have five to six hours per week to complete the labs.

e. Textbooks

There are no required textbooks for this course. Various books from personal libraries are available for use during course time. Although students prefer to use web-based information and Internet resources, be cognizant of the fact that a lot of scientific information on the Internet is not peer reviewed and edited, and hence may contain errors. Whenever possible use primary literature, reviews and books. Lecture notes will be posted on Desire to Learn (D2L) under MyCourseLink.

This version of the laboratory manual is required. Every attempt will be made to cover relevant materials PRIOR to each lab, but this is not always possible. Help each other, particularly with the computer tasks! If you don't have your own computer, use one of the many scattered around campus.

Computer applications (graphing, statistics, literature searches) will be introduced at appropriate points in the course. Please help each other.

f. Mark breakdown

A major emphasis in the course is on lab skills, which is reflected in the course mark breakdown. NOTE: any assignment handed in late will have 10% of its grade deducted for each day late.

Formal experiment reports:		45%
First report	15%	
Second report	30%	
Technique reports (equal weight)		25%
Pre-lab questions		15%
Theory exam [Feb. 29]		15%
TOTAL		100%

g. Lecture topics

Tentative lectures dates for 2016. See D2L for any changes to this schedule. The theory exam takes place during a lecture or lab time slot. There is no final exam during the formal exam period.

- Course introduction and curriculum (January 4)
- Learning science and study skill development (January 4)
- Graphics and graphing (January 5)
- Notebooks and note keeping (January 11)
- Pigments (January 18)
- Cell breakage and buffers (January 25)
- Protein chromatography (January 26)
- Electrophoresis (February 1)
- Enzymology (February 8)
- *** FAMILY DAY AND READING WEEK *** NO CLASSES FEB 15-19
- THEORY EXAM MONDAY FEBRUARY 29
- Antibodies as detection tools (March 21)
- Experiment 2 lab report consultation (March 29)

h. Lab notebooks

Lab notebooks are essential not only for your own records, but can become legal documents in situations where priority of a discovery or invention has to be established by the legal system. In addition to the lecture, you can find a lot of information on the Internet, demonstrating that this is a real world issue. Examples of some websites are below. Do not use software based note keeping, as this is not current recognized by the law!

http://www.ruf.rice.edu/~bioslabs/tools/notebook/notebook.html http://techtransfer.tufts.edu/resources/tufts-policies/lab-notebooks/ http://www.iphandbook.org/handbook/ch08/p02/

Although a formal lab notebook is NOT required for this course, you may be expected to use one in upper year courses and you WILL need to use one for academic research projects! For this course, you may record results directly into your lab manual.

i. Lab due dates

Pre-lab questions are due BEFORE the lab starts. Submit these as hard copies unless otherwise instructed. **Technique reports** are due **1 week** after the relevant lab (as per the D2L DropBox closing times). Please submit these as electronic reports to the DropBox; SAVE AS A PDF! If you are not sure how to convert your file to a PDF, please ask for help BEFORE the first one is due. The exact method you use will be dependent on your word processing system. Typically there is a "Save as..." PDF option. Another choice is using a free program such as CutePDF (if downloading, ensure you uncheck the boxes for any additional software it may want to install).

The first experiment report is due **Friday February 5, 2016**. Place in the wooden drop box in the hallway between CB3010A and CB3008. The second experiment report is due **Tuesday April 2, 2016**. Dr. Malek will specify a time!

j. Lab schedule

Course and lab materials will closely follow the schedule outlined in Table 0.1. Some modifications may be required. This is a "hands-on" course! Students are expected to attend all lab sessions. Typically, lectures are Mondays from 2:30 to 3:30 pm and labs Mondays 3:30 to 5:30 pm and Tuesdays 2:30 to 5:30 pm. Note that some weeks there are only lectures and some weeks where there is no lecture and we use the entire time for the lab. In any event, you are expected to be available for the entire 6 h time slot each week. Pay close attention to schedule

changes mentioned during lectures! See the D2L calendar for details.

C. Types of lab reports and requirements

There are two types of laboratory exercises performed during this course:

1. Learning important **techniques** and skills.
2. Performing true **experiments** in which a specific scientific question is asked, answered and reported on.

The **technique labs** are a necessary prerequisite to good performance and practice in any laboratory. The report format is simplified, involving the answering of questions and performing calculations. The true **experiments** resemble the approach used in academic research and thesis work, where a specific biological question is asked and answered through experimentation (i.e. the scientific method).

Both technique and experiment reports must be TYPED and DOUBLE-SPACED. Include a cover page with your name, student number and title of the technique or report. Standard writing convention is to *italicize* foreign words, including Latin and Greek. Hence, peas written as its scientific name is *Pisum sativum* L. (i.e. **MUST** to be in italics; genus capitalized, specific epithet lower case; L. denotes it was named by Linnaeus). Common English names of organisms are only capitalized at the beginning of a sentence. Therefore, write about peas and dogs, not Peas and Dogs! Detailed requirements for technique and experimental labs are outlined below.

a. Format for technique reports

Laboratory reports on "techniques" are not as lengthy as experiment reports. However, the communication of material must be clear, concise and in the same format as experiments (Section b). Reports are to be typed. Your TA will mark the technique reports in consultation with the technician and professor.

Each technique report will be worth **10 marks**. Reports must include:

- **Results**: Submit all data condensed into graphical **OR** tabular form (i.e. figures or tables). Never present data twice! Include appropriate legends and captions (see Table 0.2 and Fig. 0.1). Always begin this section with a factual statement that describes the result verbally. Refer to Section b for more detail. Lab specific details are included with each lab **2 points.**