PATHOLOGY 4980E

SEMINAR AND RESEARCH PROJECT

METHODOLOGY, EXPERIMENTATION AND COMMUNICATION IN PATHOLOGY
Department of Pathology and Laboratory Medicine
Schulich School of Medicine & Dentistry
Western University

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Support Staff:
Cheryl Campbell, Undergraduate Program Administrator
1. GENERAL OUTLINE

Pathology overlaps the disciplines of both the basic and the clinical sciences. Within the Department of Pathology and Laboratory Medicine at Western University, clinical and basic scientists conduct research into diseases that affect Canadians, using both animal models and human tissues, and conduct service work within the Department of Pathology and Laboratory Medicine (London Health Sciences Centre). In addition, we enjoy collaborations with other basic and clinical scientists at Schulich School of Medicine & Dentistry, and London's research institutes to study the mechanisms and outcomes of disease.

The honors specialization modules in Pathology and with Pathology will introduce you to basic principles within pathology and to the effects of a variety of chemicals (drugs, toxins, etc.) in living organisms. The goal of this methodology- and research-based course is to develop qualitative and quantitative skills required to pursue a career in research. Students will have the opportunity to gain familiarity with a variety of research techniques. The course will allow students to conduct an independent research project under the supervision of a faculty member.

This will involve:

a) formulation of a research proposal and research hypothesis,
b) collection of data to test your hypothesis,
c) statistical analysis of the data (as appropriate),
d) interpretation of the data, and
e) oral and written presentation of the methodology, results and conclusions.

Independent study, self-directed experimental/research design and analysis, and effective communication skills will be emphasized in the course. In the classroom and within the laboratory, you will learn a number of techniques that are used in modern pathology research (e.g. epidemiological data, immunohisto- and immunocyto-chemistry, quantitative PCR, gene knockdown and knockout, measures of cellular activity, microscopic examination and image analysis).

Students are required to spend at least 10-15 hours/week in their laboratory or on the research project. This is in addition to time spent in preparing for the presentation and class reports. Specific times will be worked out between the student and supervisor early in September.

In addition, we will hold a weekly seminar session on Wednesdays from 10:30 am to 1:30 pm., but there is some flexibility in order to accommodate supervisor's schedules during those sessions in which you will present your proposals or final research projects. You will be required to present your project proposal report during the Fall term (in written and oral form), and a final report (written and oral form) during the Winter term.

Students registered in Pathology 4980E may use the facilities of the Leslie S. Valberg Resource Centre (VERC, MSB M150 and satellite computer labs DSB 4006, 4007 or 4008). The VERC has a number of networked computers, and programs and image databases that pertain to pathological, pharmacological, and toxicological concepts.
2. COURSE OUTLINE

INTRODUCTION & ORIENTATION

During the first 2-3 weeks of September, sessions addressing laboratory safety and biosafety will be held and all Pathology 4980E students will be expected to attend before starting to work in their research laboratories. Additional sessions addressing hospital-based issues may be given to those student(s) who may be working within the hospital. These sessions will address additional concerns regarding laboratory safety and biosafety (e.g. handling of human tissues) and issues of confidentiality and privacy of patient information within a hospital setting, particularly with reference to dealing with forensic cases.

i. LABORATORY & RESEARCH TECHNIQUES

Students will pursue a research project in one of the university, hospital or research institute-based pathology research laboratories.

*Within your supervisor's research laboratory or facility, you will learn a number of techniques related to your research project (e.g. collection of epidemiological data, immunochemistry, cell staining, cell tissue culture, RNA and protein analysis). Specific techniques learned will depend upon the research project and the techniques being used within the supervisor's laboratory and research field.*

Those student(s) who pursue a more clinically-oriented research project within the LHSC-based clinical pathology laboratories (e.g. with the forensic pathologist) will also be expected to acquire the necessary technical or research skills during the Fall term and undertake a full research project (that will continue and be completed in the Winter term). The student may also have the opportunity to learn policies and procedures related to hospital and coroners' autopsies in the Autopsy Suite (Regional Forensic Pathology Unit).

ii. RESEARCH PROJECT

You should have reviewed the project outlines and set up at least 2 or 3 meetings with potential research supervisors during September. Each student and faculty member will be asked to rank their choices and a final matching of students with supervisors will take place following the interviews/meetings. Once the laboratory placements are finalized, the students should report to their faculty supervisor to discuss weekly hours, research projects and the initial research proposal.

A written research project proposal is due in December (copy to supervisor and copy to Dr. Z. Khan). The final written research project report will be due in April (copy to supervisor and to Dr. Z. Khan).
iii. SCIENTIFIC COMMUNICATION

During the weekly seminar sessions, students will have an opportunity to practice their oral presentation skills and to present their initial research proposal (in November) and a final research project report (March-April). We will also have a Research Day where you will be expected to present your work-in-progress in the form of a poster and be available to answer questions from fellow students and faculty (typically scheduled during the last week of March).

You will also present a critique of one of the key journal articles in your topic area during January as you develop your project proposal and participate as a discussant in other journal critiques.

3. OBJECTIVES AND EVALUATION

I. Laboratory & Research Techniques
Objectives: To develop a familiarity with a variety of methodologies in common use in pathology laboratories.

II. Research Projects
Objectives:
- To develop skills in the formulation of hypothesis and the design and execution of a research project.
- To develop the analytical skills required to conduct research in Pathology, perform the associated data analysis and to derive appropriate conclusions.
- To develop skills in critical evaluation of medical and scientific information.

III. Scientific Communication
Objectives: To develop skills in oral and written communication.

EVALUATION:

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<td>I. Laboratory techniques</td>
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<td>II. Research Project</td>
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a Supervisors will take into consideration evidence of competency and particular excellence in laboratory investigation/technique as well as good laboratory habits.

b Research Proposal – The proposal should be prepared in consultation with your supervisor. Detailed guidelines will be provided to all students before the submission deadline. In brief, proposal reports should include the following sections:
- **Background/Knowledge to date**
  A brief introduction and evidence that led to formulation of hypothesis

- **Hypothesis**
  A concise working hypothesis

- **Specific Aims**
  Objectives of the study

- **Methodology/Experimental Design**
  How are you going to explore/test your hypothesis, including experimental model and approaches (qualitative or quantitative including statistical analyses) to be used?

- **Significance of Research**
  What is the significance of the study? You may also include the expected results.

- **References**
  A complete list of literature cited.

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**c** Poster presentation – Evaluation provided by invited faculty and course coordinator. General format to include: Objectives & Aims, brief outline of Methodology, Results to date, Summary and Significance of Research. Student will also be evaluated on how well they understood the research methodology, results and significance of research in answering questions.

**d** Final Report – The written report should be in the format of a scientific article (can use an appropriate format for submission, e.g. Toxicology and Applied Pharmacology; Archives of Pathology & Laboratory Medicine; Clinical and Experimental Pathology, Laboratory Investigation, etc.). Reports may also include:

1. a general discussion of the problems encountered and the possible solutions,
2. the direction of the research if the project were to be continued.

**e** Participation - Regular *attendance and participation* in class *discussions* is expected and will be evaluated by the course coordinator.

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4. **ADDITIONAL INFORMATION & STATEMENTS**

**Statement on Use of Electronic Devices:** Tablets and computers permitted in the lectures/learning sections.

**Statement on Academic Offences:** 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 website:

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

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5. **ABSENCE FROM COURSE COMMITMENTS**

**A. Absence for medical illness:** Students must familiarize themselves with the Policy on Accommodation for Medical Illness for Undergraduate Students, located at:

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

**Statement from the Academic Counselling Office, Faculty of Science (for Science and BMSc students):** If you are unable to meet a course requirement due to illness or other
serious circumstances, you must provide valid medical or other supporting documentation to the Academic Counselling Office 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 by the Academic Counselling Office and the instructor has been informed. In the event of a missed final exam, a "Recommendation of Special Examination" form must be obtained from the Academic Counselling Office immediately. For further information, please see:
http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf

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: Absences presentations or assignments will be permitted for compassionate reasons. However, documentation is required and must be submitted by the student directly to the instructor. The instructor will determine if accommodation is warranted.

6. STATEMENT ON EVALUATION OF UNDERGRADUATE ACADEMIC PERFORMANCE

This course is exempt from the 15% assessment policy (www.uwo.ca/univsec/pdf/academic_policies/exam/evaluation_undergrad.pdf).

7. COPYRIGHT 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.

8. ROUNDING OF MARKS

Across the Basic Medical Sciences Undergraduate Education programs and within the Department of Pathology and Laboratory Medicine, 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 will be rounded up to the next whole integer, e.g. a 73.5 becomes a 74 and marks WILL NOT be bumped to the next grade or GPA, e.g. a 79 will NOT be rounded up to an 80, an 84 WILL NOT be rounded up to an 85, etc. The mark attained is the mark you achieved and the mark assigned; requests for mark “bumping” will be denied.

9. SUPPORT SERVICES

Registrarial Services: http://www.registrar.uwo.ca

Academic Counselling (Science and Basic Medical Sciences): http://www.uwo.ca/sci/undergrad/academic_counselling/index.html

USC Student Support Services: http://westernusc.ca/services/

Student Development Services: http://www.sdc.uwo.ca
Student Health Services: http://www.shs.uwo.ca/

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