

Physiology and Pharmacology 9550 - Molecular Techniques

COURSE ADMINISTRATORS:

Manager – Dr. Peter Stathopoulos (peter.stathopoulos@schulich.uwo.ca)

Confirmed Lecturers – Samantha Medwid, Fabiana Crowley, Dany Ivanova, Peter Stathopoulos, Rithwik Ramachandran, Cheryle Seguin, Frank Beier

Teaching Assistants and Co-coordinators – Anish Engineer, Melissa Fenech, Zachary Easton

COURSE DESCRIPTION:

Phys/Pharm 9550 is a two week intensive laboratory course which will be offered to graduate students between **August 20th and August 31st, 2018**. This course integrates both molecular biology theory and practice in a total of 6 modules which include Subcloning and Characterizing DNA Fragments (lecture and wet lab), Isolation and Analysis of RNA (lecture and wet lab), Protein Expression and Cellular Localization (lecture and wet lab), Analysis of Protein Interactions (lecture and wet lab), Human Gene Transfer and Manipulating the Mouse Genome (lectures) and Internet-based Tools in Molecular Biology (demonstration). This year we will also include theory and application lectures on CRISPR/Cas gene editing and on the fluorescence microscopy equipment available for use at the Robart's Confocal Microscopy Core Facility. Students will be given standard protocols, solution recipes, hands-on instruction and troubleshooting discussion for each experiment taught. The overall aim of the course is to prepare students to investigate molecular questions and solve problems associated with their own research projects in the coming years.

COURSE OBJECTIVES:

- To enable students to appropriately select, apply and adapt experiments for answering molecular questions, including all essential controls.
- To teach students the basic techniques involved in performing the molecular experiments.
- To train students to effectively analyze and interpret results associated with a molecular technique.
- To enable students to begin performing molecular procedures associated with their own project (with some assistance) and to formulate troubleshooting strategies for experiments.

COMPONENTS OF THE COURSE:

Phys/Pharm 9550 is worth 1.0 credit and will be taught in the Phys/Pharm student laboratory and adjacent lecture rooms (DSB 2005, 2010 and 2016). Students will be expected in the laboratory between approximately 8:30 am and 6:00 pm daily. During that time, both lectures will be given and wet laboratory experiments will be performed. Student evaluation will be based on the following criteria:

- Module quizzes (20% of grade).
 - 1 quiz per wet laboratory module.
- Module figure legends (10% of grade)
 - 1 figure legend per wet laboratory module.
- Participation (20% of grade).

- contribution to the execution of experiments, careful following of the protocols, appropriate clean-up, input into class discussions, appropriately maintaining a laboratory notebook.
- Final exam (50% of grade).
 - essay style exam that includes both lecture and laboratory module material.

** Students will not be graded on the success of experiments but rather, on the understanding of molecular techniques (as determined by quizzes, writing of figure legends and the final exam).

COURSE MATERIAL:

Students will be sent wet laboratory rationale and procedures prior to the start of each module. Students will also be given the recipes for all solutions that are not proprietary. Students will be tested on material taught in lecture and discussed during wet laboratory procedures. No textbook is required. A recommended textbook available at the UWO bookstore is “Applied Molecular Genetics” by Miesfeld (for students who would like a more comprehensive background on molecular techniques). In addition to the handouts, a variety of other information sources can be consulted. These include general handbooks (e.g. Maniatis [now Sambrook and Russell], or the Promega protocols book) and product-specific handbooks.