SC/BIOL 2070 3.0

Research Methods in Cell and Molecular Biology

Course description:

The course focuses on laboratory techniques in the life sciences. Practical research skills are developed through experiential learning (via integrated and relevant laboratory techniques). Research skills include scientific writing, data analysis/interpretation, experimental design and hypothesis testing. Practical experience with current techniques in cellular/molecular biology is gained in the laboratory. One online lecture hour* and six laboratory/practical hours **per week**. One term. Three credits. (*Lectures are provided using multimedia formats.)

Prerequisites: SC/BIOL 1010 6.0 or SC/BIOL 1000 3.0 and SC/BIOL 1001 3.0.

Course Coordinators: Dr. V. Saridakis & Dr. Y. Sheng

Course TA coordinator: Keith Dadson

Course web site: https://moodle11.yorku.ca

Course email: biol2070@yorku.ca

Modules

Module 1: Genetics (wet) in Life Sciences Building (LSB) 221
Module 2: Cell Biology (wet) in Life Sciences Building (LSB) 223
Module 3: Biotechnology (wet) in Life Sciences Building (LSB) 225
Module 4: Scientific Writing (dry) in CC 335 on Wednesday and Thursday, CB 120 on Monday and BC 322 on Tuesday

The Life Sciences Building (LSB) is new and located behind the Petrie and Chemistry buildings. Wet labs will be on the 2nd floor of the LSB and can be accessed starting on Wednesday September 7th 2011. Please use the designated entrance and make your way to the 2nd floor.

Learning Objectives

-Experimental design and hypothesis testing;
-Data interpretation, including standard curve interpolation (graphing) and determining molecular weight of an unknown protein or genotype;
-Critical thinking and assessment of current scientific publications;
-Scientific writing of results and data analysis;
-Use of model organism(s);

-Spectrophotometry, chromatography and enzymatic assays;
-Making dilutions and buffers;
-Genetic engineering in microorganisms (e.g., bacteria, yeast);
-Protein analysis via SDS-PAGE;
-DNA analysis, including DNA extraction, use of restriction enzymes, polymerase chain reaction and gel electrophoresis;
-Identification of genetic inheritance patterns based on genotype and phenotype including sex-linked traits;
-Fluorescence microscopy procedures and identification of cellular components.

BIOL2070 Resource Book

Robert H. Reed, David Holmes, Jonathan Weyers, Allan Jones (2007) Practical Skills in Biomolecular Sciences, 3rd ed. Pearson Education.

Lab Mark Breakdown

Lab	Percent (%)
Genetics (Wet)*	20
Microscopy (Wet)*	20
Biotechnology (Wet)*	20
Scientific Writing (Dry)	20
Final Exam	20
Total	100

In each module, learning will be evaluated in following formats:

Lab Quizzes

Quizzes are based upon material from the current lab. In some cases the dry lab will refer you to material in your textbook, which is considered testable material. Lab quizzes will take place in the lab or online.

Mini Assignments

On occasion there may be a short assignment in a wet lab session. These are designed to reinforce concepts and knowledge presented during the lab exercise.

Experimental Data Analysis

At the end of EACH wet lab session you MUST have your experimental data initialed by your TA (including numerical data and descriptive observations).

Lab reports

Communication is an important art of science. You are expected to write part or complete lab reports to summarize your experimental data.

All lab submissions should be well-organized, in good English, and bound together with your raw data sheets and any other required material (*e.g.,* flow-sheets, rough sketches of graphs).