BIOL 367/01 2016 Molecular Biology

Fall Semester 2016
Biology Department
Concordia University, Montreal, Canada

Instructor: Dr. Aida Abu-Baker

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Office hours: Wednesday from 11:30 to 12:30 and Friday from 11:30 to 12:30

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Lectures: Wednesday and Friday 10:15 AM -11:30 AM, Room HB-130

Tutorials: Tuesday 1:15 PM - 2:30 PM, Room CC 321 LOY
Wednesday 1:15 PM - 2:30 PM, Room CC 112 LOY

Teaching assistant: Karina Mastronardi

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Course Description

Molecular biology is the study of biological systems at the molecular level. Molecular biology deals with nucleic acids and proteins and how these molecules interact within the cell to promote proper growth, division, and development. It is a large and ever-changing discipline.

The topics covered include; the structure and replication of DNA, chromosome organization, the molecular mechanisms underlying the recombination of DNA, the molecular basis of gene regulation and how gene expression is tied to intracellular and extracellular factors by signal transduction pathways. To provide students with an appreciation of the experimental approaches used to do research in molecular biology several important experiments including the methodologies used to perform them will be covered. This will introduce students to recombinant DNA methodologies such as gene cloning, DNA sequencing and in vitro mutagenesis. Emphasis will be placed on understanding basic concepts and on the integration of these concepts for problem

solving. To reflect this pedagogical approach, the mid-term and final exams are open book.

Course Objectives

This course is designed to provide students with a background in molecular genetics. The two main learning objectives of this course are; the development of an understanding of gene expression and gene regulation, and the familiarization of students with the experimental approaches used in molecular biology.

Grading:

Molecular Biology technique assignment 15% (Deadline Friday November 4th).
Instructions on how to prepare the assignment will be posted on Course's Moodle.

Midterm 1 20% (Wednesday October 12th) & Midterm 2 20% (Friday November 25th)

Final 45% (The final exam is cumulative)

No make-up exams will be given. Please contact me immediately if you have a medical emergency. You will need to provide a medical note from your doctor.

Textbook:

Robert F. Weaver, *Molecular Biology,* 5th edition. This textbook is available at the bookstore. In addition, students should have access to recent textbooks in genetics, biochemistry and cell biology.

Notes

All lectures will be available on Moodle 367/01

Moodle site: Review notes, problem set and lecture slides.

Tutorials: Sample problems, questions arising from lectures and some supplementary materials will be covered in the tutorials.

Students should take advantage of the **lectures**, **tutorials** and **office hours**. It is **recommended** that students attend all classes, read the assigned materials regularly, and participate in all activities.

Please feel free to **ask me any question** during the class lectures, office hours or by email.

This is a large class but you are not a small part of it! To make our time together as valuable as possible, we both have to work hard at it. The following basic principles may give us some guidelines (Code of Rights and Responsibilities, Concordia University):

• Every student has the right to learn as well as the responsibility not to deprive others of their right to learn.

• Every student is accountable for his or her own actions.

Please respect the focus of students and professor and **arrive on time.**

Disruption (e.g. talking, making loud or distracting noises, leaving the classroom without authorization) **will not be tolerated in this class.** The disruptive student(s) will be asked to leave the classroom immediately.

Your cell phone and laptop computers should be turned off in class time.

Course Outline

Introduction to DNA and genes

The molecular nature of genes (Chapter 2)

An introduction to gene function (Chapter 3)

Methods in molecular biology

Molecular cloning methods (Chapter 4)

Molecular tools for studying gene expression (Chapter 5)

DNA replication and recombination

DNA replication: Mechanism and enzymology

DNA recombination: Mechanisms and enzymology

Translation

Overview of translation and translation control

Transcription in prokaryotes

Transcription in prokaryotes (Chapter 6)

Operons (Chapter 7)

Major shifts in prokaryotic transcription (Chapter 8)

DNA protein interactions (Chapter 9)

Transcription in eukaryotes

RNA polymerases and their promoters (Chapter 10)

General transcription factors (Chapter 11)

Transcription activators (Chapter 12)

Chromatin structure and transcription (Chapter 13)

Post-transcriptional events

Splicing (Chapter 14)

Capping and polyadenylation (Chapter 15)

Post-transcriptional control of gene expression (Chapter 16)

Code of Rights and Responsibilities

http://web2.concordia.ca/Legal_Counsel/policies/english/BD/BD-4.html

Plagiarism

The most common offense under the Academic Code of Con- duct is plagiarism which the Code defines as “the presentation of the work of another person as one’s own or without proper acknowledgement.”

This could be material copied word for word from books, journals, internet sites, professor’s course notes, etc. It could be material that is paraphrased but closely resembles the original source. It could be the work of a fellow student, for example, an answer on a quiz, data for a lab report, a paper or assignment completed by another student. It might be a paper purchased through one of the many available sources. Plagiarism does not refer to words alone -it can also refer to copying images, graphs, tables, and ideas. “Presentation” is not limited to written work. It also includes oral presentations, computer assignments and artistic works. Finally, if you translate the work of another person into French or English and do not cite the source, this is also plagiarism.

In Simple Words: ***Do not copy, paraphrase or translate anything from anywhere without saying where you obtained it!*** *(Source: The Academic Integrity Website: http://provost.concordia.ca/academicintegrity/plagiarism/).*

List of Student Services

http://www.concordia.ca/info/currentstudents/studentservices/

• Concordia Counselling and Development: http://cdev.concordia.ca/ (offers career psychological services, student learning services, etc.)

• The Concordia Library Citation and Style Guides:

http://library.concordia.ca/help/howto/citations.html

• Advocacy and Support Services http://supportservices.concordia.ca/

• Student Transition Centre http://stc.concordia.ca/