

Syllabus, Molecular Basis of Human Disease, BIMM 110, winter 2021

Time: 5:00PM to 6:20PM, Monday and Wednesday. Lectures will be synchronous on Zoom during the designated class time and recorded for asynchronous viewing.

Instructor: Professor Dong-Er Zhang

Course Description:

This course presents 1) genetic, biochemical, and molecular biological approaches used to identify the molecular basis of human diseases; 2) the current understanding of selected major human diseases at molecular and cellular levels with resulted physiological consequences; 3) successful and possible therapeutic treatment of these human diseases. This is an upper level undergraduate class. It is expected that students who take BIMM 110 already have a good background in molecular biology, metabolic biochemistry, and genetics.

There is no required course textbook. Lecture slides will be posted on the Canvas website and are available for download.

Week 1:

January 4, Lecture 1: Diseases, genes, cell cycles, and chromosomes

January 6, Lecture 2: Human disease pedigree and hemophilia

Week 2:

January 11, Lecture 3: Gene expression, mutation, and diseases of red blood cells

January 13, Lecture 4: Identification of disease genes by analyzing human genome

Week 3:

January 18, Martin Luther King Jr. Day (No Class)

January 20, Lecture 5: Cell lines and animal models to study human diseases

Week 4:

January 25, Midterm exam 1

January 27, Lecture 6: Epigenetics in gene expression, human diseases, and X-inactivation

Week 5:

February 1, Lecture 7: Meiotic disjunction and chromosomal numerical abnormalities

February 3, Lecture 8: Muscle disorders

Week 6:

February 8, Lecture 9: Human Mitochondrial Diseases

February 10, Lecture 10: Cystic Fibrosis

Week 7:

February 15, Presidents' Day (No Class)

February 17, Midterm exam 2

Week 8:

February 22, Lecture 11: Neurodegenerative diseases - I

February 24, Lecture 12: Neurodegenerative diseases - II

Week 9:

March 1, Lecture 13: Cancer and oncogenes

March 3, Lecture 14: Tumor suppressors and immunotherapies

Week 10:

March 8, Lecture 15: Gametogenesis, embryo development, and infertility

March 10, Lecture 16: Stem cells and related therapies

Week 11:

March 15, Final exam (start from 7:00 PM)

Discussion Sections headed by Instructional Assistants (start from week 2)

Discussion sections will be synchronous on Zoom during the designated class time.

Office hours of IAs. Office hours will be synchronous on Zoom

Professor Office Hours: Professor Zhang will hold her office hours via Zoom on Friday from 4:00 PM to 5:00 PM

Exams will be given in a window of time that spans 24 hours. Students will have the flexibility to start the exams anytime within the time window and to submit within a time limit. However, IAs and Professor Zhang will only be available to address your questions during the scheduled zoom time (Midterm 1: 5:00-6:20pm on January 25; Midterm 2: 5:00-6:20pm on February 17; and Final Exam: 7:00-9:59pm on March 15).

All exams will be open book/computer/your own notes. There will be zero tolerance to any cheating behavior. The format of midterm and final exams will be similar, i.e. short answers to short questions. All questions on both exams will be derived from lectures and assigned reading materials.

The midterm and final exam questions with answers from a previous year will be at our class website to assist you to prepare for the exams. However, since the exams will be in the open book style this year, please expect the increased difficulties.

Overall course letter grades will be calculated: Midterm 1 (25 points) + Midterm 2 (25 points) + Final (50 points) = score

Course grading

Current plan is to grade on a curve: one third of class receive A, one third B, and one third below B (53-64 – D, 0-52 – F)