

CHEM 490/684: Molecular Imaging for Drug Discovery (3 credits: Fall 2020)

CLASS DESCRIPTION

This class is designed for students who are interested in learning how chemical and biochemical concepts are integrated to explore biological processes in cellular contents and further how such advanced knowledge is incorporated to develop high-throughput screening assays for novel drug discovery. The class will not only introduce the fundamentals of biochemical concepts/techniques that are conventionally applied in biochemistry, but also present their recent applications in life sciences and translational medicine.

This class is intended for junior/senior-level undergraduates and graduate students in the disciplines of biochemistry, chemistry, or biology. Undergraduate students who have involved in research lab are highly encouraged to take this class to broaden their knowledge of current interdisciplinary sciences. Graduate and undergraduate students in the engineering and physics departments are strongly recommended to consult with the instructor prior to commitment. Instruction used to include both lectures and laboratory modules, but due to the COVID19 pandemic, hands-on laboratory activities will be replaced by student-led presentation and discussion. The course is redesigned to be 100% online.

Course Objective: Upon successful completion of this course, students will broaden their knowledge of cross-disciplinary experimental methods spanning from biochemistry to biology. In addition, the students will learn how to identify and implement optimal experimental platforms to advance our knowledge of respective research topics with the long-term goals for drug discovery.

Laboratory Activities: Not being offered in Fall 2020 due to the COVID19 pandemic.

Class Instructor Information

Songon An, Ph.D.
Office: Chemistry Building 462A
Tel.:410-455-2514
Email: san@umbc.edu

Office hours

TBA

Class Location and Time

Tuesday and Thursday 8:30 AM – 9:45 AM
Webex Online

Textbook

There is no formal textbook. I will use a number of handouts for study as well as the modern scientific literature.

Grading

20% Exam #1
20% Exam #2 (Accumulative)
30% Group Project
Literature Presentation (25+5 min) per 490 students
Literature Presentation (40+15 min) per 684 students
30% Final Exam (Comprehensive)

SYLLABUS (details may be subject to change)

August 27, 2020: First Day of Class:

Overview

September-October 2020:

Chemistry in Living Cells

Crosslinking *in vitro* and *in vivo*

Labeling Proteins *in vitro* and *in vivo*

Exam #1 (tentatively, Oct 8, 2020)

** Note: The date will be confirmed at least a week before the exam*

October-November 2020:

Labeling *Fixed* and *Live* Cells

FRET – From the principle to *in vitro* and *in vivo* applications: Protein-Protein Interactions

Biosensors for Cell Biology: Spatial Regulation in Cells

Dynamics of Proteins and Macromolecular Complexes *in vitro* and *in vivo*

Cell-based High-throughput Screening Assays for Drug Discovery

Exam #2 (tentatively, Nov 19, 2020)

** Note: The date will be confirmed at least a week before the exam*

November - December 2020:

Assigned Literature Presentation

Final Exam (tentatively, Dec 8, 2020)

** Note: The date will be confirmed at least a week before the exam*

December 8, 2020: Last Day of Class

ENROLLMENT DATES AND DEADLINES: Students must be familiar with the academic policies and enrollment dates and deadlines as published in the [Undergraduate Catalog](#) and the [Academic Calendar](#). They are also responsible for managing their course enrollment(s) accordingly.

TECHNOLOGY: ACCESS, REQUIREMENTS, RESOURCES, SUPPORT: To help ensure that UMBC students are equipped for academic success, the Division of Information Technology (DoIT) provides a wealth of resources and support, including tips for getting online and minimum specifications to consider when purchasing a computer. UMBC does require all students to be technologically self-sufficient, which entails having a reliable personal computer (preferably a laptop with webcam) and Internet access. It is important to note that this university requirement has been factored into UMBC's official "[cost of attendance](#)," which can be funded by student financial aid. To learn more about the resources and support that DoIT offers to students, visit doit.umbc.edu/students.

MAKEUPS: will be given in accordance with University policy. Missed exams that are not "excused" receive 0. Make up exams will be given if a signed and readable note on letterhead paper from a physician, a police report, a certificate from a funeral home, etc, is submitted.

ATTENDANCE: Come to class! I will not officially take attendance, except for the lab activities. Nor will I only follow what is in the recommended/required reading materials. You need to come to class prepared to take copious notes. Typing on a computer is not advisable; you may need to be drawing lots of structures and schemes which are not rapidly done on a PC.

ACADEMIC CONDUCT: students are required to comply with the University rules of conduct, as described at <https://conduct.umbc.edu/resources/student-code-of-conduct/#article1> and related links. Students found to be violating these rules (e.g., plagiarizing on assignments, cheating on exams, etc.) will immediately receive a grade of “0” for that assignment, be reported to the Provost’s Office of Academic Conduct as well as potentially be dismissed from the course and receive a grade of “F”.

ACADEMIC INTEGRITY IN THE ONLINE INSTRUCTION ENVIRONMENT: Academic integrity is an important value at UMBC. By enrolling in this course, each student assumes the responsibilities of an active participant in UMBC’s scholarly community in which everyone’s academic work and behavior are held to the highest standards of honesty. Cheating, fabrication, plagiarism, and helping others to commit these acts are all forms of academic dishonesty, and they are wrong. Academic misconduct could result in disciplinary action that may include, but is not limited to, suspension or dismissal. These principles and policies apply in both face-to-face and online classes. Resources for students about academic integrity at UMBC are available at <https://academicconduct.umbc.edu/resources-for-students/>.

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