CHEM 490/684: Molecular Imaging for Drug Discovery (3 credits: Fall 2019)

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 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 obtain pre-approval from the instructor. Instruction includes both lectures and laboratory modules.

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: are designed [i] to provide students with hands-on live-cell imaging experiences, [ii] to encourage students to critically think their methods of choice and experimental data that they will perform and collect from the lab activities, and [iii] to practice a semi-formal research presentation with open-ended subjects. Briefly, students will carry out fluorescence imaging and/or immunofluorescence imaging. Nikon imaging software available in Dr. An's lab and the *ImageJ* processing package freely available from NIH are used for imaging and post-imaging analyses. A detailed description is attached below. **Note that beginning fall 2018, every student should complete an online lab safety training prior to the lab activity. The experiments are in compliance with the University and IBC requirements.**

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 10:00 AM – 11:15 AM
Meyerhoff Chemistry Building 351

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
- Summary Report per Group
- Presentation (25+5 min) per Group
- (*Literature Presentation by CHEM684 Students)

30% Final Exam (Comprehensive)

SYLLABUS (*details may be subject to change*)

August 28, 2019: First Day of Class:

September 2019:
Chemistry in Living Cells
Crosslinking *in vitro* and *in vivo*
Labeling Proteins *in vitro* and *in vivo*
*Exam #1 (**tentatively, Oct 8, 2019**)*
** Note: The date will be confirmed at least a week before the exam*

October-November 2019 (including a Laboratory activity):
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
*Exam #2 (**tentatively, Nov 26, 2019**)*
** Note: The date will be confirmed at least a week before the exam*

November - December 2019:
Cell-based High-throughput Screening Assays for Drug Discovery
Group Presentation (including Presentation by Grad Students)
*Final Exam (**during the week of final exams: TBA**)*
** Note: Check on-line university final exam schedule for any updates or changes*

December 11, 2017 (Tue): Last Day of Class:

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".

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. To read the full Student Academic Conduct Policy, consult the UMBC Student Handbook, the Faculty Handbook, or the UMBC Policies section of the UMBC Directory.