Biochemistry & Molecular Biology (BMB) 829
Special Problems in Macromolecular Analysis and Synthesis
Fall Semester 2024

Module 3: Discovery and Analysis of Molecular Interactions
Course Syllabus, Policies, and Schedule

Credit Hours: 1
Course meeting days and time: Tuesday/Thursdays 1:00 – 2:20, 10/1/2024 – 10/31/2024
(No class 10/22/2024 for MSU Fall Break)
Course location: Room 402 Biochemistry

Instructors

Charles G. Hoogstraten; BMB 829 Course Coordinator and Module 3 Lead Instructor
hoogstr3@msu.edu
302D Biochemistry Building
Office hours: By appointment

Min-Hao Kuo, Module Instructor
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401A Biochemistry Building
Office hours: By appointment

Outline of Module Topics: BMB 829

Module 1: Introduction to Methods in Biochemistry & Molecular Biology

Module 2: Recombinant DNA & Genome Editing

Module 3: Discovery and Analysis of Molecular Interactions

Module 4: Separation and Analysis of Cells & Biomolecules

Module 5: Molecular Structure Determination and Analysis

Course Description and Objectives

BMB 829 is a modular course that seeks to introduce students to modern molecular and structural/analytical techniques of interest in the biochemistry and molecular biology laboratories. Students may enroll in each of sections 301, 302, 303, 304, and 305 (corresponding to modules 1 through 5) once for a total of up to five credits; however, *Module 1 must be completed before any of the remaining modules can be taken.*

Required Textbook & Course Materials:
No required textbooks; required reading material will be provided by instructors on D2L.

Format:
This course will be taught in-person, with any exceptions announced by the instructor both in class and on D2L. Lectures may be recorded (audio and video feeds) and posted to D2L at the discretion of the instructor. These recordings are *not* a replacement for class attendance, but students are encouraged to make use of them in cases of positive COVID testing or the observation of symptoms in order to avoid possible viral spread. Note that lecture recordings will not be possible in cases of hands-on workshops, facility visits, or technical difficulties.

Required Technologies:
This course will make extensive use of the D2L platform at Michigan State (d2l.msu.edu) to communicate course materials of various sorts. An internet connection and device capable of downloading documents, displaying Microsoft Word and PowerPoint and Adobe PDF documents and displaying video are required.

Recommended Texts & Other Materials:
Additional recommended reading and viewing materials will be provided on D2L.

COVID-19 Statement:
BMB 829 fully supports and expects compliance with all stated University policies relating to infectious disease safety. Students declining to follow guidelines relating to appropriate viral safety will be asked to leave the classroom.

The BMB 829 instructors are fully cognizant of the difficulties the pandemic has posed for many students. Our goal is to see all of our students succeed despite the ongoing challenges of the pandemic. Should you find yourself in scheduling, academic, or mental or emotional health difficulties, you are urged to contact the current course instructor and Prof. Hoogstraten as soon as possible so that appropriate accommodations may be made. In addition, MSU has made extensive resources available through the Keep Learning section of the University website, including academics (https://remote.msu.edu/learning/additional-resources.html) and for students facing challenges related to mental health (https://remote.msu.edu/learning/mental-health.html). Students are encouraged to make full use of any or all of these resources as the need arises.

Learning Continuity Statement:

Should students be unable to attend class for an extended period of time, they should communicate this to the Course Coordinator/Module Lead (hoogstr3@msu.edu) as soon possible once the situation becomes evident. Students should work with course instructors to develop a schedule for regular communication and reasonable timelines for completing assignments including exams.

Course Continuity Statement:
Should an instructor be required to be absent for an extended period of time, scheduling of different course modules may be adjusted accordingly. Students may communicate with either the Course Coordinator or any of the other course instructors regarding grading and assessment modifications.

Prerequisites:
Recommended background equivalent to BMB 462. For all modules except Module 1, prior completion of Module 1 is expected.

Late Work Policy:
Full credit for late submissions will only be considered if arranged with the instructor in advance of the due date. Otherwise, point penalties may be assigned or late work may not be accepted at the discretion of the individual instructor. Communication with the instructor about situations leading to late work as soon as possible is *strongly* advised.

Student Expectations:
All participants in this class are held to the standard set by MSU's Policy on Integrity of Scholarship and Grades. The policy can be read in full at the MSU Ombudsperson's website.

On March 22, 2016, The Associated Students of Michigan State University (ASMSU) adopted the following Spartan Code of Honor:
"As a Spartan, I will strive to uphold values of the highest ethical standard. I will practice honesty in my work, foster honesty in my peers, and take pride in knowing that honor is worth more than grades. I will carry these values beyond my time as a student at Michigan State University, continuing the endeavor to build personal integrity in all that I do."

Disability Access:
Students must inform the instructor and course coordinator at the beginning of the course, or as soon as reasonably possible after a situation arises during the semester, of any accommodations needed. Information related to disability access is available on the Resource Center for Persons with Disabilities (RCPD) website. Students: to make an appointment with a specialist, call: (517) 353-9642 Or TTY: (517) 355-1293 or visit the RCPD website.

Module Outline and Schedule

Assessments:
Grading for this module will be based on attendance and in-class participation (35%) and on several graded assignments and projects that will be discussed in class (65%). Letter grades will be assigned at the end of the module and will be curved based on the final distribution of student scores.

Course Outline:
The planned schedule of lecture presentations is presented in the table below, with class meeting number, dates, instructors, and tentative lecture topics.

#	Date	Instructor	Topic
1	10/1/2024	Kuo	Yeast two-hybrid system for detecting protein-protein interactions (PPI)
2	10/3/2024	Kuo	Y2H derivatives
3	10/8/2024	Kuo	Biochemical proteomics for PPI
4	10/10/2024	Kuo	In vivo methods for detection of protein-chromatin interactions
5	10/15/2024	Hoogstraten	*In vitro* selection of functional RNAs: Aptamers *In vitro* analysis of binding curves: K_d, thermodynamics, and kinetics
6	10/17/2024	Hoogstraten	NMR: Basic principles
	10/22/2024		No class, MSU Fall Break
7	10/24/2024	Hoogstraten	NMR: 2D spectroscopy and the role of isotope labeling NMR as a probe of macromolecular interactions
8	10/29/2024	Hoogstraten	NMR: Allostery, dynamics, and catalysis
9	10/31/2024	Hoogstraten	Biophysical analysis of macromolecular interactions with ITC and SPR

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