

**Biochemistry & Molecular Biology (BMB) 829
Special Problems in Macromolecular Analysis and Synthesis
Fall Semester 2022**

**Module 1: Introduction to Methods in Biochemistry & Molecular Biology
Course Syllabus, Policies, and Schedule**

Credit hours: 1
Course modality: In person
Course meeting days and time: Tue & Thu 2:40 – 4 pm
Course location: BCH 101

Instructors

Charles G. Hoogstraten; BMB 829 Course Coordinator

hoogstr3@msu.edu

302D Biochemistry Building

(517) 353-3978 (only checked occasionally)

Office hours: By appointment

Erich Grotewold; BMB829-301 Module 1 Lead Instructor

grotewol@msu.edu

201 Biochemistry Building

Office hours: By appointment

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.

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 (hoogstr3@msu.edu) and/or lead instructor for the module (grotewol@msu.edu) as soon as 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 semester, 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 the module will be based on brief tests administered at the beginning classes #4, #7 and #9 based on the topics already covered in the module and aimed at assessing basic concepts and understanding through problem-solving questions. Students are expected to attend all the lectures and site visits. Unless communicated in advance of the class by e-mail or in writing with a medical excuse, absences are not allowed and missing one or more classes without a valid justification will result in failing the course. Letter grades will be assigned at the end of the semester and will be curved based on the final distribution of student scores.

Course Schedule Outline:

The planned schedule of lecture presentations and visits to facilities is presented in the table below. Changes are possible since the course schedule depends on the availability of several facilities.

Class #	Date	Instructor	Topic
1	Thursday, September 1	Erich Grotewold Melinda Frame	Model organisms, macromolecules and their interactions, microscopy. Visit to the Center for Advanced Microscopy
2	Tuesday, September 6	Erich Grotewold	Introduction to recombinant DNA methods I (PCR, cloning, vectors, nucleic acid isolation, analysis and quantification, electrophoresis of nucleic acids)
3	Thursday, September 8	Erich Grotewold Kevin Childs	Introduction to recombinant DNA methods II (nucleic acid modifications, nucleic acid sequencing and analysis). Visit to the Genomics Core
4	Tuesday, September 13	Erich Grotewold	Quiz Introduction to protein analysis and characterization I (recombinant protein expression, protein quantification, electrophoresis and protein analysis, antibodies)
5	Thursday, September 15	Erich Grotewold	Introduction to protein purification (ultracentrifugation, protein precipitation and differential solubilization, liquid chromatography, pull-down methods)
6	Tuesday, September 20	Erich Grotewold	Introduction to protein-protein, protein-nucleic acid and protein-small molecule interactions (yeast one- and two-hybrid, co-immunoprecipitation, tryptophan fluorescence, surface plasmon resonance, isothermal titration calorimetry, chromatin immunoprecipitation, electrophoretic mobility shift assays, cross-linking immunoprecipitation)
7	Thursday, September 22	Erich Grotewold Erika Lisabeth	Quiz Visit to the Drug Discovery Core

8	Tuesday, September 27	Ben Orlando	Introduction to protein structure analysis (X-ray crystallography, NMR, cryo-EM, computational predictions)
9	Thursday, September 29	Erich Grotewold Tony Schillmiller	Quiz Introduction to Mass Spectrometry – visit to the Mass Spectrometry Core