

Biochemistry & Molecular Biology (BMB) 829
Special Problems in Macromolecular Analysis and Synthesis
Fall Semester 2026

Module 5: Molecular Structure Determination and Analysis
Course Syllabus, Policies, and Schedule

Credit Hours: 1

Course meeting days and time: Tuesday/Thursdays 1:00 – 2:20, 11/10/26 - 12/13/26

Course locations: Room 402 Biochemistry; 2nd floor Biochemistry Computer Lab

Instructors

Kristin Parent; BMB 829 Course Coordinator and Module 5 Lead Instructor

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510A Biochemistry Building

Josh Vermaas, Module Instructor

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1130 Molecular Plant Sciences

Maksymilian Chruszcz, Module Instructor

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107 Biochemistry Building

Jian Hu, Module Instructor

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Ben Orlando, Module Instructor

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For all instructors, office hours: By appointment

Outline of Module Topics

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 rare 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.

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 (kparent@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 will be assigned. If late by less than 3 days post assignment due date, 90% of the credit can be earned. If more than 3 days late post assignment due date, 50% of the credit can be earned. All assignments must be completed by 12/13/2026 in order to pass the course. 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](#).

Inclusion in BMB 829:

It is our intention that this class is a safe and productive learning environment for every person. However, we recognize that inclusion is a complex issue and we still have much to learn about and from the diverse backgrounds and perspectives of students. If actions of the instructional team or other students make you feel uncomfortable, please let us know and we will do our best to correct the situation. If you do not feel comfortable discussing this directly, you can reach us through your academic advisor, another student, or another avenue that is more comfortable.

Module Outline and Schedule**Assessments:**

Attendance is mandatory. Grading for each module will be based on take-home assignments (40%) and graded assignments of research papers (60%). ***Generative AI cannot be used to write text in homework assignments.*** Generative AI will be used as part of learning how to use AI tools for structure prediction and determination. Letter grades will be assigned at the end of the module and will be curved based on the final distribution of student scores. ***More than three***

unexcused absences will result in failure to complete the course. More than three missing assignments will result in failure to complete the course.

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	Location
1	11/10/2026	Vermaas	Alpha Fold and homology modeling (Pt 1)	Computer lab
2	11/12/2026	Vermaas	Alpha Fold and homology modeling (Pt 2)	Computer lab
3	11/17/2026	Parent	What if Alpha Fold doesn't work—what do we do now?	402 Bch
4	11/19/2026	Chruszcz	Intro to X-ray Crystallography	402 Bch
5	11/24/2026	Hu	Analyzing X-ray Crystallography Data	Computer lab
	11/26/2026	N/A	NO CLASS-THANKSGIVING BREAK	N/A
6	12/01/2026	Orlando	Intro to Cryo-EM (Pt 1)	402 Bch
7	12/03/2026	Orlando	Intro to Cryo-EM (Pt 2)	Computer lab
8	12/08/2026	Parent	Analyzing Structures in 3D (Pt 1)	Computer lab
9	12/10/2026	Parent	Analyzing Structures in 3D (Pt 2)	Computer lab

Assignment	Due Date	pts
Alpha Fold Predictions Homework	11/16/2026	10
Alpha Fold paper review review	11/16/2026	15
Validating structures paper review	11/23/2026	10
Crystallography Homework Assignment (Chruszcz)	11/30/2026	12.5
Crystallography Homework Assignment (Hu)	11/30/2026	12.5
Cryo-EM homework	12/07/2026	10
Cryo-EM paper review	12/11/2026	15
EMDB/PDB scavenger hunt homework	12/11/2026	15
Total points: 100		