



**Biochemistry 551:
Biochemical Methods
Fall 2023**

Course Credits: 4

Course Designations and Attributes:

Breadth – Physical Sci counts toward the Natural Sci req

Level – Advanced

L&S credit – Counts as Liberal Arts and Science credit in L&S

Course Description: Lab and student seminar. Introduction to modern biochemical laboratory techniques and current biochemical literature. Students will present a seminar based upon scientific literature that parallels experiments they will perform in the lab. For advanced undergraduates and non-biochemistry graduate students.

Requisites: Biochem 501 or 507 or concurrent enrollment

Credit Hour Definition: The credit standard for this course is met by an expectation of a total of 180 hours of student engagement with the course's learning activities, which include in-person class sessions and labs, online lectures, reading, writing, and other student work as described below.

Instructional Modality: Hybrid

Meeting times and locations:

M 11-11:50: seminar; rooms will be assigned during the first week of class

W 11-11:50: in-person lecture activities; Biochemistry 1120. Some lecture materials are provided asynchronously online.

Lab section 301: M 12:30-4:00 Biochemistry 2118

Lab section 302: T 12:30-4:00 Biochemistry 2118

Lab section 303: W 12:30-4:00 Biochemistry 2118

Lab section 304: R 12:30-4:00 Biochemistry 2118

Regular and Substantive Student-Instructor Interaction

Regular and substantive student-instructor interaction, as defined by the US Department of Education (Within [34 C.F.R. §600.2](#)), is always a requirement of UW-Madison for-credit learning activities. In this course, this interaction includes:

- Weekly live in-person lecture activities
- Personalized feedback on quizzes, exams, and lab assignments
- Asynchronous lecture material Q&A
- Regularly scheduled in-person and live virtual office hours

Instructors:

Lab instructor/course coordinator: Dr. Erica Shu, xshu32@wisc.edu

2139A Biochemistry, 420 Henry Mall

Office hours: Mondays 4-5pm and by appointment

Prof. Alessandro Senes
415C Biochemistry Labs, 433 Babcock Dr, senes@wisc.edu
Office hours: By appointment

Teaching Assistants:

Julia Flood (section 302): jrflood@wisc.edu
Tessa Hoffman (section 304): tahoffman3@wisc.edu
Emily Johnson (section 301): etjohnson22@wisc.edu
Tamalika Kar (section 303): tkar@wisc.edu
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Seminar Instructors:

Thomas Hosseini: thosseini@wisc.edu
Moses Milchberg: milchberg@wisc.edu
Dr. Erica Shu: xshu32@wisc.edu
Eden Xu: xu588@wisc.edu
Kylie Zawisza: zawisza@wisc.edu

Course Learning Outcomes:

By the end of Biochemistry 551, students should be able to:

1. Discuss the theory of several fundamental biochemical techniques that form hypotheses based on biochemical principles.
2. Form hypotheses based on biochemical principles.
3. Design and perform experiments to address a hypothesis.
4. Collect sound scientific data.
5. Critically analyze ones' own data as well as data from other sources.
6. Communicate scientific theory and findings on both oral and written forms.
7. Evaluate the importance of collaboration in biochemistry research.

Course Website: <https://canvas.wisc.edu/courses/358454>

Learning Management System & Digital Instructional Tools

This course will utilize Canvas. Support can be found here:

<https://it.wisc.edu/services/canvas/>

In addition, office hours will be offered via Zoom. Zoom support can be found here:

<https://it.wisc.edu/learn/guides/uw-madison-zoom-101-tips-training/>

Required Course Materials:

-Lab manual. Available free digitally at: <https://wisc.pb.unizin.org/biochemistry551/> A print version is also available as an optional purchase. To purchase the printed lab manual, go to [COURSE PACKET SALES](#) and select Bio Chemistry; alternatively, go to printing.wisc.edu – click ordering tab – click course packets. Course packets will be shipped to you.
-Lab notebook
-Safety goggles
-Software: PyMOL (available through DoIT) and Prism (available as a free trial; don't start the trial until needed)

Grading:

| Points | Grade |
|---------|-------|
| > 900 | A |
| 850–900 | AB |
| 800–849 | B |
| 750–799 | BC |
| 700–749 | C |
| 600–699 | D |
| < 599 | F |

Assignments:

| Assignment | Points per assignment | Total Points |
|----------------------------------|-----------------------|--------------|
| Exams (2) | 100 | 200 |
| Lecture quizzes (9) | Varies | 85 |
| Oral lab report | | 100 |
| Final lab report | | 150 |
| Lab mini reports (7) | 10 or 15 | 85 |
| Pre-lab quizzes (10) | 5 | 50 |
| Lab performance | | 100 |
| Online surveys (3) | 5 | 15 |
| In-Class Participation (10) | 1.5 | 15 |
| Literature seminar | | 150 |
| Literature seminar participation | | 50 |
| Total | | 1000 |

Exams, Quizzes, Papers & Other Major Graded Work

- Exams: Two exams will be given; students will complete the exams in-class using computers. Students needing alternative exam arrangements should reach out to Dr. Shu as soon as possible. Note that there is no final exam; the summary period is instead used as a due date for the final lab report (see below).
- Online quizzes and graded surveys: See Canvas for due dates and assignment details. Proctoring software will *not* be used. If a student is unable to complete a quiz/assignment by the due date, please reach out to Dr. Shu, who will provide instructions for completing the quiz/assignment for partial credit.
- Mini lab reports: are due at the start of each lab period. Refer to Canvas for details. Students may have a 24-hour extension, but there is a 50% point penalty. Mini lab reports are never accepted after 24 hours past the deadline.
- Seminar assignments: Student presentations and discussions will take place in-person. Seminar assignments are due to either in-person or online (see seminar syllabus of your section)
- Oral lab report: must be presented at the assigned date and time in-person. Time and room information will be communicated to you via announcement during the semester. In case of emergency, contact Dr. Shu and your TAs immediately to discuss options.
- Final lab report: due to Canvas on Sat 12/16 at 9:45 am (course period conclusion time). Late final lab reports will not be accepted under any circumstances.
- Lab attendance: is required. If you must miss lab, please inform Dr. Shu and your TAs as soon as possible, who will work with you to arrange a makeup assignment.

Privacy of Student Information & Digital Tools: Teaching & Learning Analytics & Proctoring Statement

The privacy and security of faculty, staff and students' personal information is a top priority for UW-Madison. The university carefully reviews and vets all campus-supported digital tools used to support teaching and learning, to help support success through [learning analytics](#), and to enable proctoring capabilities. UW-Madison takes necessary steps to ensure that the providers of such tools prioritize proper handling of sensitive data in alignment with FERPA, industry standards and best practices.

Under the Family Educational Rights and Privacy Act (FERPA which protects the privacy of student education records), student consent is not required for the university to share with school officials those student education records necessary for carrying out those university functions in which they have legitimate educational interest. 34 CFR 99.31(a)(1)(i)(B). FERPA specifically allows universities to designate vendors such as digital tool providers as school officials, and accordingly to share with them personally identifiable information from student education records if they perform appropriate services for the university and are subject to all applicable requirements governing the use, disclosure and protection of student data.

Privacy of Student Records & the Use of Audio Recorded Lectures

See information about [privacy of student records and the usage of audio-recorded lectures](#). Lecture materials and recordings for this course are protected intellectual property at UW-Madison. Students in this course may use the materials and recordings for their personal use related to participation in this class. Students may also take notes solely for their personal use. If a lecture is not already recorded, you are not authorized to record my lectures without my permission unless you are considered by the university to be a qualified student with a disability requiring accommodation. [Regent Policy Document 4-1] Students may not copy or have lecture

materials and recordings outside of class, including posting on internet sites or selling to commercial entities. Students are also prohibited from providing or selling their personal notes to anyone else or being paid for taking notes by any person or commercial firm without the instructor's express written permission. Unauthorized use of these copyrighted lecture materials and recordings constitutes copyright infringement and may be addressed under the university's policies, UWS Chapters 14 and 17, governing student academic and non-academic misconduct.

Campus Resources

- [University Health Services](#)
- [Undergraduate Academic Advising and Career Services](#)
- [Office of the Registrar](#)
- [Office of Student Financial Aid](#)
- [Dean of Students Office](#)

Course Evaluations

Students will be provided with an opportunity to evaluate this course and your learning experience. Student participation is an integral component of this course, and your confidential feedback is important. Please watch for an email at the end of the semester containing instructions for accessing the digital course evaluation.

Students' Rules, [Rights & Responsibilities](#)

During the global COVID-19 pandemic, we must prioritize our collective health and safety to keep ourselves, our campus, and our community safe. As a university community, we must work together to prevent the spread of the virus and to promote the collective health and welfare of our campus and surrounding community.

UW-Madison [Badger Pledge](#)

Diversity & Inclusion Statement

[Diversity](#) is a source of strength, creativity, and innovation for UW-Madison. We value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals. The University of Wisconsin-Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background – people who as students, faculty, and staff serve Wisconsin and the world.

Academic Integrity Statement

By virtue of enrollment, each student agrees to uphold the high academic standards of the University of Wisconsin-Madison; academic misconduct is behavior that negatively impacts the integrity of the institution. Cheating, fabrication, plagiarism, unauthorized collaboration, and helping others commit these previously listed acts are examples of misconduct which may result in disciplinary action. Examples of disciplinary action include, but are not limited to, failure on the assignment/course, written reprimand, disciplinary probation, suspension, or expulsion. For more information, refer to <https://conduct.students.wisc.edu/academic-misconduct/student-resources/>

Below are a number of specific expectations for maintaining academic integrity in Biochem 551:

- Take online quizzes individually and do not share correct or incorrect answers with classmates.

- Do not plagiarize published work. You must use proper citations in your written lab reports *and oral presentations* (i.e., do not copy text from a paper and paste into bullet points in a powerpoint).
- Do not use others' work as your own. Critical discussions of ideas and data are encouraged; however, your reports and other assignments must be completed individually (or, where specified, with a partner).

Please note that 551 uses the Turnitin plagiarism service built in to Canvas. All of your submitted assignments will automatically be compared to a repository of 551 student work as well as website content, journals and periodicals. Turnitin generates an “originality report,” which you will have access to, that assists staff in identifying cases of potential plagiarism.

Accommodations for Students with Disabilities Statement

The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform faculty [me] of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. Faculty [I], will work either directly with the student [you] or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA. (See: [McBurney Disability Resource Center](#))

More information on the McBurney Center can be found here:

Web: [How to Become a McBurney Client](#)

Phone: (608) 263-2741

Email: mcburney@studentlife.wisc.edu

Text: (608) 225-7956

Fax: (608) 265-2998

NOTE: Students with disabilities who need accommodation are encouraged to contact the course instructor as soon as possible. While recommendations from the McBurney Center are helpful, students are not required to be registered with McBurney to request accommodations.

Academic Calendar & Religious Observances

If you experience a conflict with a course expectation due to a religious observance, please contact the teaching staff as soon as possible.

See: <https://secfac.wisc.edu/academic-calendar/#religious-observances>

Course Schedule:

| Week (Dates) | Seminar (Mondays) | Lecture Topics | Lab |
|------------------------------------|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| 1 (Sept 6-8) | None | Course Intro | NO LABS THIS WEEK! |
| 2 (Sept 11-15) | Online assignment | (1) Protein structure and function (AS) (2) PCR/Cloning 1 (ES) | Lab 1: Structural analysis using PyMOL 1 |
| 3 (Sept 18-21) | Instructor seminar | (3) PCR/Cloning 2 (ES) (4) PCR/Cloning 3 (ES) | Lab 2: Primer design and PCR |
| 4 (Sept 25-29) | Student seminar 1 | (5) PCR/Cloning 4 (ES) (6) CRISPR/Cas9 (ES) | Lab 3: DNA electrophoresis |
| 5 (Oct 2-6) | Student seminar 2 | (7) Electrophoresis (AS) | Lab 4: Gibson Assembly cloning |
| 6 (Oct 9-13) | Student seminar 3 | (8) Overexpression 1 (ES) (9) Overexpression 2 (ES) | Lab 5: Screening for positive clones |
| 7 (Oct 16-20) | Student seminar 4 | (10) Protein purification (AS) In-class writing workshop: hypothesis | Lab 6: Induction of protein overexpression in <i>E. coli</i> |
| 8 (Oct 22-27) | Student seminar 5 | Exam 1 | Lab 7: Protein purification |
| 9 (Oct 30- Nov 3) | Student seminar 6 | (11) UV/Vis (AS) (12) Fluorescence (AS) | Lab 8: SDS-PAGE |
| 10 (Nov 6-10) | Student seminar 7 | (13) Data analysis (ES) (14) Protein folding (AS) | Lab 9: Protein stability |
| 11 (Nov 13-17) | Student seminar 8 | (15) Enzyme kinetics (AS) In-class writing workshop: data presentation Department Assessment due Thurs Nov 18 (<i>Tentative due date</i>) | Lab 10: Enzyme kinetics |
| 12 (Nov 20-22) *Thanksgiving | Student seminar 9 | NO CLASS THIS WEEK! | NO LABS THIS WEEK! |
| 13 (Nov 27-Dec 1) | Student seminar 10 (if needed) | (16) Ligand binding (ES) (17) High-throughput DNA technologies (AS) | Lab 11: Ligand binding |
| 14 (Dec 4-8) | Student seminar 11 (if needed) | Exam 2 | Independent lab |
| 15 (Dec 10-16) | Student seminar 12 (if needed) | No lectures | Oral reports Final lab report Sat 12/16 at 9:45 am (course conclusion time) |