



**MARTHA BRADLEY EVANS**  
**Center for Teaching Excellence**  
THE UNIVERSITY OF UTAH

**CHEM 5750 – Advanced Chemical Biology Lab**

Spring A Semester 2024

Lab Lectures: TTh, 9:40-10:30 AM; HEB 2006

Labs: TTh 1-5 pm; 5-9 pm; WF 1-5 pm; 5-9 pm

**Instructor:** Ming Chen Hammond

**Email:** [ming.hammond@utah.edu](mailto:ming.hammond@utah.edu)

**Phone Number:** 801-213-0892

**Office Hours:** During lab section or by appointment

**Office Location:** CSC 224B

**Zoom Link:** <https://utah.zoom.us/j/94945207024> (passcode: 5750)

- **IMMEDIATE RESPONSE:** The preferred way to contact Prof. Hammond directly is to speak with her in-person before or after lecture, or during lab sessions.
- **SAME-DAY RESPONSE:** For same-day response, please contact Prof. Hammond by calling and **leaving a detailed voicemail** to 801-213-0892.
- **EXPECTED 1 WEEK TURNAROUND:** Another way to contact Prof. Hammond is to use the *Inbox*, located in the far left Canvas menu, or email [ming.hammond@utah.edu](mailto:ming.hammond@utah.edu).

### **Required Materials**

Materials required for this course are:

- Safety glasses (by Lab 1)
- Lab notebook with carbon-copy pages (can use previous lab notebook if there are empty pages) (by Lab 2)

Materials provided for this course include:

- Lab coat (issued in Lab 1)
- Experimental protocols, background readings, and slides will be posted on Canvas or provided as hand-outs in lab

### **Course Description**

Two lecture and two laboratories per week for 7.5 weeks. Laboratory emphasizing the use of modern instrumental and synthetic techniques for the exploration of phenomena at the interface of Chemistry and Biology

### **Course Outcomes**

At the end of this course, students will:

- Gain hands-on experience with experimental methods and data analysis for nucleic acids (DNA and RNA) and peptides
- Apply background concepts from biochemistry and organic chemistry to understand experiments conducted in the field of chemical biology

- Practice reading experimental protocols, researching experiment ideas, performing data analysis, and communicating results in written and oral formats

### Teaching and Learning Methods

Chem 5750 is a half-semester upper-division lab course designed to provide undergraduate students with an exposure to select experimental procedures in chemical biology through a set of guided lab exercises that comprise two main projects and a final research project. This semester, you will learn to synthesize and characterize an RNA-based fluorescent biosensor and a mystery peptide. You also will have the opportunity to design, perform, and troubleshoot a research project. Lab lectures will provide background and discussion of experiments, practical tips and safety notes, and connections between the lab exercises and contemporary research and industry applications. You will also practice communicating your experimental results via lab reports and oral presentations.

*Attendance & Punctuality:* Students are expected to arrive on time to lab sessions in order to receive necessary safety tips and other instructions from the TA. Failure to be punctual will affect their In-Lab Effort score. Students are expected to attend and be punctual to lab lectures that are assigned to their section. Failure to be punctual will affect their Lecture Participation score.

### Assignments

Students can work with lab partners and other students on assignments, but must submit their own work. A detailed assignment schedule will be posted on Canvas before the start of Lab 1.

Prelab assignments must be submitted to your TA at the start of the lab session. All other assignments must be submitted to Prof. Hammond at the start of the lab lecture.

Assignment Types	Submission Type(s)	Due Dates and Times
Pre-labs	Written in lab notebook (check) Carbon copy turned in (graded)	By start of associated lab session
Lecture Participation	Participation During Lecture	Assigned – See Assignment Schedule
In-Lab Observations/ Analysis/Effort	Written in lab notebook (check) Carbon copy turned in (graded)	Due the following week - See Assignment Schedule
Project Reports / Presentation	Upload to Canvas Upload to Canvas + Symposium	Nucleic Acid (Project 1) Report: due Feb 20 Research Project Presentation: due Feb 27-28 Peptide Project Report: due Mar 5

### Grading Policy (Evaluation Methods & Criteria)

**Regrade Policy:** It is the student's responsibility to ensure the accuracy of all recorded assignment grades. If you see any error in your grades on Canvas, please reach out to the instructor as soon as possible.

**Incompletes:** According to university policy, to be considered for an incomplete, a student must have 20% or less of the course work remaining and be passing the course with a C or better. You must request an incomplete grade and I will consider giving that grade only under exceptional circumstances.

**Grading:** Final grade will be calculated based on a normalized grading scale, where the average of top scores will be set as the final point total (for example, 465 points is set as 100% instead of the theoretical max 500 points). Typically, 100+ to 95 = A, 94-90 = A-, 89-

85 = B+, 84-80 = B, and so on. Usually the majority of students put in similar amounts of effort and perform well to receive A's.

## Course Schedule

		Lab Schedule	Lecture Schedule	Deadlines
WEEK 1	8 M			<b>All prelabs are due on day of lab</b>
	9 T	NO LAB - Prep		
	10 W	NO LAB - Prep		<b>All other assignmtns are due in lecture</b>
	11 Th	NO LAB - Prep		
	12 F	NO LAB - Prep		
WEEK 2	15 M			
	16 T	Lab 1 - Check-in, Safety, Pipetting	Pre-labs 1 and 2	
	17 W	Lab 1 - Check-in, Safety, Pipetting		
	18 Th	Lab 2 - RNA synthesis + DNA analysis	Safety lab 2, prelab 3	Prelab 2
	19 F	Lab 2 - RNA synthesis + DNA analysis		Prelab 2
WEEK 3	22 M			
	23 T	Lab 3 - RNA purification + DNA/RNA quant	<b>Safety lab 3, prelab 4 (GUEST)</b>	Prelab 3
	24 W	Lab 3 - RNA purification + DNA/RNA quant		Prelab 3
	25 Th	Lab 4 - Fluorescence assays	Safety lab 4, prelab 5 (ZOOM)	LEC: Labs 1, 2 In-labs; Prelab 4
	26 F	Lab 4 - Fluorescence assays		Prelab 4
WEEK 4	29 M			
	30 T	Lab 5 - Solid phase peptide synthesis	Safety lab 5, prelab 6	Prelab 5
	31 W	Lab 5 - Solid phase peptide synthesis		Prelab 5
Feb	1 Th	Lab 6 - Peptide cleavage, trituration	Safety lab 6, prelab 7	LEC: Labs 3, 4 In-labs; Prelab 6
	2 F	Lab 6 - Peptide cleavage, trituration		Prelab 6
WEEK 5	5 M			
	6 T	Lab 7 - HPLC/LCMS analysis, prep for 2D NMR	Safety lab 7, project planning	Prelab 7
	7 W	Lab 7 - HPLC/LCMS analysis, prep for 2D NMR		Prelab 7
	8 Th	Lab 8 - Report 1, pt 1; Project Day 1	Lab report 1	LEC: Labs 5, 6 In-Labs; Prelab 8
	9 F	Lab 8 - Report 1, pt 1; Project Day 1		Prelab 8
WEEK 6	12 M			
	13 T	Lab 9 - Report 1, pt 2; Project Day 2	2D NMR	Prelab 9-10
	14 W	Lab 9 - Report 1, pt 2; Project Day 2		Prelab 9-10
	15 Th	Lab 10 - 2D NMR; Project Day 3	2D NMR	LEC: Lab 7,8 In-Lab
	16 F	Lab 10 - 2D NMR; Project Day 3		
WEEK 7	19 M			
	20 T	Lab 11 - Report 2; Project Day 4	Lab report 2	LEC: <b>Project 1 due;</b> Prelab 11-12
	21 W	Lab 11 - Report 2; Project Day 4		Prelab 11-12
	22 Th	Lab 12 - Prep presentation; Project Day 5	Presentation rubric	LEC: Lab 9,10
	23 F	Lab 12 - Prep presentation; Project Day 5		
WEEK 8	26 M			
	27 T	Lab 13 - Presentations / Check-Out	PRESENTATIONS	LEC: Lab 11,12; <b>Presentations DUE</b>
	28 W	Lab 13 - Presentations / Check-Out		
	29 Th			
Mar	1 F			
	4 M			
	5 T			<b>Project 2 due</b>

## University Policies

1. ***The Americans with Disabilities Act.*** The University of Utah seeks to provide equal access to its programs, services, and activities for people with disabilities. If you will need accommodations in this class, reasonable prior notice needs to be given to the Center for Disability & Access, 162 Olpin Union Building, (801) 581-5020. CDS will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in an alternative format with prior notification to the Center for Disability & Access.
  - ***If in-class attendance is a necessary component of the course for pedagogical reasons (e.g., laboratories, studios, or artistic training), state it explicitly.***

***Use this standard language:*** “Given the nature of this course, attendance is required and adjustments cannot be granted to allow non-attendance. However, if you need to seek an ADA accommodation to request an exception to this attendance policy due to a disability, please contact the Center for Disability and Access (CDA). CDA will work with us to determine what, if any, ADA accommodations are reasonable and appropriate

[*Strongly recommended*] ***Basic Needs Student Support Statement.*** Success at The University of Utah includes learning about and using available resources. The [Basic Needs Collective](#) (BNC) is a coordinated resource referral hub. They educate about and connect students to campus and community resources to help them meet their basic needs. As a central location for resource referrals related to food, housing, health insurance, managing finances, legal services, mental health, etc., any student experiencing difficulty with basic needs is encouraged to contact them. Drop into their office located in the Union basement or schedule with them online for an in-person or virtual visit through their webpage: <https://basicneeds.utah.edu/>.

[*recommended addendum*] In compliance with ADA requirements, some students may need to record course content. Any recordings of course content are for personal use only, should not be shared, and should not be made publicly available. In addition, recordings should be destroyed at the conclusion of the course

2. ***University Safety Statement.*** The University of Utah values the safety of all campus community members. To report suspicious activity or to request a courtesy escort, call campus police at 801-585-COPS (801-585-2677). You will receive important emergency alerts and safety messages regarding campus safety via text message. For more information regarding safety and to view available training resources, including helpful videos, visit <https://safeu.utah.edu>

3. **Addressing Sexual Misconduct.** Title IX makes it clear that violence and harassment based on sex and gender (which includes sexual orientation and gender identity/expression) is a civil rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, color, religion, age, status as a person with a disability, veteran's status or genetic information. If you or someone you know has been harassed or assaulted, you are encouraged to report it to the Title IX Coordinator in the Office of Equal Opportunity and Affirmative Action, 383 South University Street, 801-581-8365, or the Office of the Dean of Students, 270 Union Building, 801-581-7066. For support and confidential consultation, contact the Center for Student Wellness, 426 SSB, 801-581-7776. To report to the police, contact the Department of Public Safety, 801-585-2677(COPS).

- a. [recommended addendum] **Lauren's Promise:** Lauren's Promise is a vow that anyone – faculty, staff, students, parents, and community members – can take to indicate to others that they represent a safe haven for sharing incidents of sexual assault, domestic violence, or stalking. Anyone who makes Lauren's Promise vows to: 1.) listen to and believe those individuals who are being threatened or experiencing sexual assault, dating violence or stalking; 2.) represent a safe haven for sharing incidents of sexual assault, domestic violence, or stalking; and 3.) change campus culture that responds poorly to dating violence and stalking. By making Lauren's Promise, individuals are helping to change campus cultures that respond poorly to dating violence and stalking throughout the nation.

4. **Academic Misconduct Statement.** It is expected that students adhere to University of Utah policies regarding academic honesty, including but not limited to refraining from cheating, plagiarizing, misrepresenting one's work, and/or inappropriately collaborating. This includes the use of generative artificial intelligence (AI) tools without citation, documentation, or authorization. Students are expected to adhere to the prescribed professional and ethical standards of the profession/discipline for which they are preparing. Any student who engages in academic dishonesty or who violates the professional and ethical standards for their profession/discipline may be subject to academic sanctions as per the University of Utah's Student Code: <https://regulations.utah.edu/academics/6-410.php>

[The following statements **are encouraged** by the University for every syllabi. It is up to the instructors to determine if it is appropriate for their class.]

5. [recommended] **Diversity Statement.** I stand in support of compassion, dignity, value-of-life, equity, inclusion and justice for all individuals regardless of color, race/ethnicity, sexual orientation, religion, language, socioeconomic status, ability, gender, gender identity or expression, immigration status, or any type of marginalization. I stand in support of making our society more inclusive, just, and equitable for all individuals. I stand against individual and systemic racism in all its various forms.

6. *[recommended]* **Undocumented Student Support Statement.** Immigration is a complex phenomenon with broad impact—those who are directly affected by it, as well as those who are indirectly affected by their relationships with family members, friends, and loved ones. If your immigration status presents obstacles to engaging in specific activities or fulfilling specific course criteria, confidential arrangements may be requested from the Dream Center. Arrangements with the Dream Center will not jeopardize your student status, your financial aid, or any other part of your residence. The Dream Center offers a wide range of resources to support undocumented students (with and without DACA) as well as students from mixed-status families. To learn more, please contact the Dream Center at 801.213.3697 or visit [dream.utah.edu](http://dream.utah.edu).
7. *[recommended]* **Drop/Withdrawal Policies.** Students may drop a course within the first two weeks of a given semester without any penalties. Students may officially withdraw (W) from a class or all classes after the drop deadline through the midpoint of a course. A “W” grade is recorded on the transcript and appropriate tuition/fees are assessed. The grade “W” is not used in calculating the student’s GPA. For deadlines to withdraw from full-term, first, and second session classes, see the U’s Academic Calendar.
8. *[recommended]* Other important information to consider including:
  - a. Student Code: <http://regulations.utah.edu/academics/6-400.php>
  - b. Accommodation Policy (see Section Q):  
<http://regulations.utah.edu/academics/6-100.php>
9. *[recommended]* **Student Mental Health Resources**
  - *If you need help dealing with burnout, anxiety, depression, isolation, and loneliness, or other mental health issues please, reach out. Here are some [campus mental health resources](#), including free counseling, trainings and other support.*
  - *Consider participating in a [Mental Health First Aid](#) or other [wellness-themed](#) training provided by our Center for Student Wellness and sharing these opportunities with your peers, teaching assistants and department colleagues*
10. *[recommended]* **Diverse Supports for Students.** Your success at the University of Utah is important to all of us here! If you feel like you need extra support in academics, overcoming personal difficulties, or finding community, the U is here for you.

### *Student Support Services (TRIO)*

TRIO federal programs are targeted to serve and assist low-income individuals, first-generation college students, and individuals with disabilities.

Student Support Services (SSS) is a TRIO program for current or incoming undergraduate university students who are seeking their bachelor's degree and need academic assistance and other services to be successful at the University of Utah.

For more information about what support they provide, a list of ongoing events, and links to other resources, view their website or contact:

**Student Support Services (TRIO)**

801-581-7188

[trio.utah.edu](http://trio.utah.edu)

Room 2075

1901 E. S. Campus Dr.

Salt Lake City, UT 84112

*American Indian Students*

The AIRC works to increase American Indian student visibility and success on campus by advocating for and providing student centered programs and tools to enhance academic success, cultural events to promote personal well-being, and a supportive “home-away-from-home” space for students to grow and develop leadership skills.

For more information about what support they provide, a list of ongoing events, and links to other resources, view their website or contact:

**American Indian Resource Center**

801-581-7019

[diversity.utah.edu/centers/airc](http://diversity.utah.edu/centers/airc)

Fort Douglas Building 622

1925 De Trobriand St.

Salt Lake City, UT 84113

*Black Students*

Using a pan-African lens, the Black Cultural Center seeks to counteract persistent campus-wide and global anti-blackness. The Black Cultural Center works to holistically enrich, educate, and advocate for students, faculty, and staff through Black centered programming, culturally affirming educational initiatives, and retention strategies.

For more information about what support they provide, a list of ongoing events, and links to other resources, view their website or contact:

**Black Cultural Center**

801-213-1441



[diversity.utah.edu/centers/bcc](https://diversity.utah.edu/centers/bcc)

Fort Douglas Building 603  
95 Fort Douglas Blvd.  
Salt Lake City, UT 84113

### *Students with Children*

Our mission is to support and coordinate information, program development and services that enhance family resources as well as the availability, affordability and quality of child care for University students, faculty and staff.

For more information about what support they provide, a list of ongoing events, and links to other resources, view their website or contact:

#### **Center for Childcare & Family Resources**

801-585-5897  
[childcare.utah.edu](https://childcare.utah.edu)  
408 Union Building  
200 S. Central Campus Dr.  
Salt Lake City, UT 84112

### *Students with Disabilities*

The Center for Disability & Access is dedicated to serving students with disabilities by providing the opportunity for success and equal access at the University of Utah. They also strive to create an inclusive, safe, and respectful environment.

For more information about what support they provide and links to other resources, view their website or contact:

#### **Center for Disability & Access**

801-581-5020  
[disability.utah.edu](https://disability.utah.edu)  
162 Union Building  
200 S. Central Campus Dr.  
Salt Lake City, UT 84112

### *Students across Intersectional Identities and Experiences*

The Center for Equity & Student Belonging (CESB) creates community and advocates for academic success and belonging for students across inter-sectional identities and experiences among our African, African American, Black, Native, Indigenous, American Indian, Asian, Asian American, Latinx, Chicanx, Pacific Islander, Multiracial, LGBTQ+, Neurodiverse and Disabled students of color.

For more information about what support they provide, a list of ongoing events, and links to other resources, view their website or contact:

**Center for Equity and Student Belonging (CESB)**

801-581-8151

[diversity.utah.edu/centers/CESB/](https://diversity.utah.edu/centers/CESB/)

235 Union Building

200 S. Central Campus Dr.

Salt Lake City, UT 84112

*English as a Second/Additional Language (ESL) Students*

If you are an English language learner, there are several resources on campus available to help you develop your English writing and language skills. Feel free to contact:

**Writing Center**

801-587-9122

[writingcenter.utah.edu](https://writingcenter.utah.edu)

2701 Marriott Library

295 S 1500 E

Salt Lake City, UT 84112

**English Language Institute**

801-581-4600

[continue.utah.edu/eli](https://continue.utah.edu/eli)

540 Arapeen Dr.

Salt Lake City, UT 84108

*Undocumented Students*

Immigration is a complex phenomenon with broad impact—those who are directly affected by it, as well as those who are indirectly affected by their relationships with family members, friends, and loved ones. If your immigration status presents obstacles that prevent you from engaging in specific activities or fulfilling specific course criteria, confidential arrangements may be requested from the Dream Center.

**Arrangements with the Dream Center will not jeopardize your student status, your financial aid, or any other part of your residence.** The Dream Center offers a wide range of resources to support undocumented students (with and without DACA) as well as students from mixed-status families.

For more information about what support they provide and links to other resources, view their website or contact:

**Dream Center**

801-581-3470

[dream.utah.edu](http://dream.utah.edu)

1120 Annex (Wing B)  
1901 E. S. Campus Dr.  
Salt Lake City, UT 84112

*LGBTQ+ Students*

The LGBTQ+ Resource Center acts in accountability with the campus community by identifying the needs of people with a queer range of [a]gender and [a]sexual experiences and responding with university-wide services.

For more information about what support they provide, a list of ongoing events, and links to other resources, view their website or contact:

**LGBTQ+ Resource Center**

801-587-7973

[lgbt.utah.edu](http://lgbt.utah.edu) (Links to an external site.)

409 Union Building  
200 S. Central Campus Dr.  
Salt Lake City, UT 84112

*Veterans & Military Students*

The mission of the Veterans Support Center is to improve and enhance the individual and academic success of veterans, service members, and their family members who attend the university; to help them receive the benefits they earned; and to serve as a liaison between the student veteran community and the university.

For more information about what support they provide, a list of ongoing events, and links to other resources, view their website or contact:

**Veterans Support Center**

801-587-7722

[veteranscenter.utah.edu](http://veteranscenter.utah.edu) (Links to an external site.)

418 Union Building  
200 S. Central Campus Dr.  
Salt Lake City, UT 84112

*Women*

The Women's Resource Center (WRC) at the University of Utah serves as the central resource for educational and support services for women. Honoring the complexities of women's identities, the WRC facilitates choices and changes through

programs, counseling, and training grounded in a commitment to advance social justice and equality.

For more information about what support they provide, a list of ongoing events, and links to other resources, view their website or contact:

**Women's Resource Center**

801-581-8030

[womenscenter.utah.edu](http://womenscenter.utah.edu)

411 Union Building  
200 S. Central Campus Dr.  
Salt Lake City, UT 84112

*Food Pantry*

The University of Utah food pantry provides non-perishable, nourishing food for our students, their families, faculty, and staff.

For more information about what support they provide and links to other resources, view their website:

**Feed U Pantry**

[feedufoodpantry@gmail.com](mailto:feedufoodpantry@gmail.com)

[union.utah.edu/resources-spaces/feed-u-pantry/hours-about-us/](http://union.utah.edu/resources-spaces/feed-u-pantry/hours-about-us/)

Union Building (Pantry is located on the basement level)  
200 S. Central Campus Dr.  
Salt Lake City, UT 84112

*Tutoring*

The Learning Center offers free services to currently-enrolled University of Utah students.

For more information about what support they provide and links to other resources, view their website.

**Learning Center**

801-581-5153

[learningcenter.utah.edu](http://learningcenter.utah.edu)

1705 J. Willard Marriott Library  
295 S. 1500 E  
Salt Lake City, UT 84112

*Other Student Groups at the U*

To learn more about some of the other resource groups available at the U, check out:

[getinvolved.utah.edu/](http://getinvolved.utah.edu/)

[studentsuccess.utah.edu/resources/student-support](http://studentsuccess.utah.edu/resources/student-support)