

## **CHEM 520A: Advanced Chemical Biology**

**Units:** 2

**Semester:** Fall 2020

**Days:** 1 h 20 min, Tues 9:30 to 10:50 am

**Location:** Zoom (Links can be found in Blackboard; Meeting ID: 964 6547 5471, pass: 6x316u)

### **Instructor:**

Matthew Pratt

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Office Hours: over Zoom by appointment

### **Course Description:**

CHEM 520A: Advanced Chemical Biology is designed for graduate students and advanced undergraduates who are interested in chemical biology and chemical methods to control transcription and protein expression. This chemistry course will provide students with a solid understanding of the fundamental processes of transcription and translation, as well as modern chemical biology techniques to control these processes. The course will be taught in four modules, starting with the chemistry and structure of DNA and chemical methods to affect transcription. The course will then move on to discuss RNA, RNA structure and function, and chemical methods that exploit RNA. The class will then cover translation, the thermodynamics of protein folding, and chemical methods to effect protein folding and control proteins. It will then describe the process of peptide and protein chemistry and methods to site-specifically label proteins. Overall, CHEM 520A will provide students with a firm foundation in the techniques, theories, and methods to investigate transcription, translation, and proteins in their own projects and critically interpret the work of other scientists in the field.

### **Learning Objectives:**

Students will be asked to demonstrate verbal and written comprehension of the concepts in chemistry, biochemistry, and cell biology that are pertinent to the overall theme of the course. Students will be expected to take the concepts presented to them in lecture and apply that knowledge to similar but different situations on exams. They will solve problems requiring the development of skills in such specific areas as organic chemistry, statistics, enzyme inhibition kinetics, derivation of mathematic equations, etc.

**Prerequisite(s):** None

**Co-Requisite(s):** None

**Concurrent Enrollment:** None

**Recommended Preparation:** CHEM 322a & b: Organic Chemistry and BISC 330 (or equivalent)

### **Course Notes**

Class Materials will be available through Blackboard.

### **Required Readings and Supplementary Materials**

None

### **Assignments and Exams**

Grades will be calculated based on group projects, problem sets, and a presentation.

**Group Projects:** There will be two group projects involving the creation of a short written proposal and an oral defense of that proposal. The subject of the proposals will be based mainly on a chemical biology technique from class and more details will be provided during the semester. The oral defense of the proposal will take place on Zoom during normal class times. All members of the group will need to participate in the oral defense of the proposal.

**Problem Sets:** Two problem sets will be assigned during the semester consisting of long-form answers based on material presented in lecture. These homework assignments will be due two-weeks after they are assigned. *No late homework assignments will be accepted.* Assignments will be handed-in on the due date, typically at 5 pm.

**Seminar Attendance:** You will be required to attend the Chemical Biology Seminar Series (Select Thursdays 12:30 - 1:30 pm on Zoom). These are worth 10 points each for just showing up. The seminar dates for Fall 2019 are: 10/17 & 11/5. If you have another class at these times, you will be excused from this portion of the class.

**Make-up Assignments:** An excused absence from an exam will be granted by the instructor only on the basis of proper documentation. For example, a missed exam because of serious medical reasons will be excused only if a certification is provided by a physician.

**Contesting Grades:** Mistakes can be made during the grading process, and students will have the opportunity to contest grades; however, there is an explicit policy for doing so. A grade on an individual Exam or Assignment must be contested within two weeks of receiving the grade. *There will be no exceptions.*

### Grading Breakdown

There will be two group projects (100 points each), two problem sets (50 points each), and presentation of a publication from the literature (50 points).

Group projects	200 points
Problem sets	100 points
Seminar attendance	20 points

**Total**                      **320 points**

### Academic Conduct

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Section 11, *Behavior Violating University Standards*: <https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions/>. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct: <http://policy.usc.edu/scientific-misconduct/>.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the *Office of Equity and Diversity*: <http://equity.usc.edu/> or to the *Department of Public Safety*: <http://capsnet.usc.edu/department/department-public-safety/online-forms/contact-us>. This is important for the safety whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. *The Center for Women and Men*: <http://www.usc.edu/student-affairs/cwm/> provides 24/7 confidential support, and the sexual assault resource center webpage [sarc@usc.edu](mailto:sarc@usc.edu) describes reporting options and other resources.

### Support Systems

A number of USC’s schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the *American Language Institute*: <http://dornsife.usc.edu/ali>, which sponsors courses and workshops specifically for international graduate students. *The Office of Disability Services and Programs*: [http://sait.usc.edu/academicsupport/centerprograms/dsp/home\\_index.html](http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html) provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, *USC Emergency Information*: <http://emergency.usc.edu/> will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.