

# Macromolecular, Supramolecular & Nanoscale Systems

## Section 01 CHEM 170A

Spring 2023 1 Unit(s) 01/25/2023 to 03/15/2023 Modified 01/17/2023

### Contact Information

Instructor: Prof. Madalyn Radlauer

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Pronouns: she/her/hers

#### Office Hours

Tuesday, 1:00 PM to 3:00 PM, DH 517

or by appointment

Note: Office hours on 1/31 will be moved to 2/1 from 2:00 to 4:00 pm due to Dr. Radlauer giving a seminar off campus on 1/31.

### Course Description and Requisites

Introduction to macromolecular, supramolecular, and nanoscale systems and the principles that govern them including preparation, characterization, and physical properties, with an emphasis on applications of these materials in chemistry and beyond.

Prerequisite(s): CHEM 112B (with grades of "C" or better; "C-" not accepted) or with instructor consent

Letter Graded

### \* Classroom Protocols

#### Safe and Respectful Community

I hope that the classroom will serve as an environment that will promote learning and the development of new ideas, as well as be a safe and respectful community. If anything in the classroom makes you feel uncomfortable or disrespected, especially if it is something that I say or do, please bring it to my attention. You all are students, but you are people first and foremost, and the classroom should be a place you feel welcomed and respected.

#### Attendance

As a show of respect to your fellow classmates and me, please be on time to class; we will start at 4:30 pm in DH 351.

If we end up having to move to online classes, please find a place where you will be able to use your microphone and webcam. Unless an alternative plan is determined with me before the second class period, I expect everyone to be able to do "face-to-face" discussions so that you can participate during the class period. Virtual backgrounds are acceptable as long as they are appropriate and respectful.

*Please do not come to class if you do not feel well.* Email me and we can set up one of two options for you.

1. If you would like to attend class virtually, we can set up a Zoom meeting *as long as you email me by 4:00 pm the day of class.*
2. We can arrange for you to make up the work.

#### Email

I receive a lot of emails, so to be sure that I see your email, all Chem 170A emails should have Chem 170A in the subject line. I will do my best to respond to class-related emails within 1 business day of receiving them, however, keep in mind that this may not always be possible. You can also message me via Canvas and I will target a similar turnaround time.

# COVID-19 and Masking

With respect to COVID-19 precautions, we will follow the requirements set by SJSU and the SJSU College of Science. That said, the safer thing is to mask, and I ask that you do if you wouldn't mind, even if it is not actively required by the university.

As you know, everyone at SJSU is required to be fully vaccinated and boosted against COVID-19.

If you have COVID symptoms, a positive COVID test, or are exposed to someone who tests positive for COVID, DO NOT COME TO CAMPUS. Email me and I will send you a follow up email with the appropriate protocols to follow.

## Course Goals

The first goal of this course is to introduce you to macro-, supra-, and nanomolecular chemistry (MSN), specifically regarding the preparation, characterization, and physical properties of these often inhomogeneous materials. The second goal is to have you consider and evaluate how research and developments in MSN are communicated.

## Course Learning Outcomes (CLOs)

Upon successful completion of this course, students will be able to:

CLO 1: Define and explain characteristics that differentiate macromolecules, supramolecular assemblies, and nanomaterials from small molecules especially inhomogeneity and emergent properties and how these characteristics are measured.

CLO 2: Recognize and evaluate various applications for macromolecules, supramolecular assemblies, and nanomaterials in everyday life.

CLO 3: Examine and reflect on different modes of communication about MSN.

## Course Materials

### Library Resources

You should have a student library account with the King Library that allows you access the library electronic databases. If you plan to access the library services from off-campus, you may need to obtain a password and/or proxy to do so. Check the Library website for information. The reference Librarian for Chemistry is Anne Marie Engelsen and her email is [annemarie.engelsen@sjsu.edu](mailto:annemarie.engelsen@sjsu.edu).

## Course Requirements and Assignments

Graded work will include participation (30 points), reflections (40 points), and a final project (30 points), which will all contribute to the course learning outcomes. The class will be graded out of 100 points.

Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course for instruction or preparation/studying or course related activities. This course has been condensed into half a semester so that we will have ample time for in-class discussions. That means it will feel like a 2-unit course for the first 8 weeks of the semester, but then you only have revisions to your final project (optional) and a course feedback survey (optional, extra credit) to work on for the remainder of the semester. In other words, you should expect to do an average of ~4 hours of work outside of class each week for the first 8 weeks of the semester.

### Participation: In-class and Canvas Discussions

Participation during in-class discussions about the course material and assigned readings and videos will account for 15 points (15%) of your grade.

Participation in Canvas discussions about the course material and assigned readings and videos will account for 15 points (15%) of your grade.

### Reflections

There will be 4 short writing assignments each worth 10 points (40 points total, 40%) of your grade. They will cover different topics from the course. They will be completed outside of class, but discussed during class time.

### Final Project

Instead of a final exam, you will complete a final project. For this project you will choose a recent (from the last 5 years) peer-reviewed publication on a topic directly related to this course that you are interested in learning more about (3 pts). After reading the paper, you will write a report on it (20 pts). You will also review the report of one of your classmates (7 pts). In addition to the peer review, you will receive

comments on your report from me and you will have the opportunity to make revisions for additional credit (optional, due 5/15/23).

## ✓ Grading Information

All assignments should be submitted on or before the assigned deadline, but I will do my best to be accommodating for unforeseen circumstances if I receive appropriate communication. Please contact me with as much of a heads up as possible (ideally before the assignment deadline) if you have to miss an assignment and we can discuss the situation.

### Breakdown

Grade	Range	Notes
A plus	96 and above	
A	92 to 95.9	
A minus	88 to 91.9	
B plus	84 to 87.9	
B	80 to 83.9	
B minus	76 to 79.9	
C plus	72 to 75.9	
C	68 to 71.9	
C minus	64 to 67.9	
D plus	60 to 63.9	
D	50 to 59.9	
F	less than 50	

## University Policies

Per [University Policy S16-9 \(http://www.sjsu.edu/senate/docs/S16-9.pdf\)](http://www.sjsu.edu/senate/docs/S16-9.pdf), relevant university policy concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance, counseling, and other resources) are listed on [Syllabus Information web page \(https://www.sjsu.edu/curriculum/courses/syllabus-info.php\)](https://www.sjsu.edu/curriculum/courses/syllabus-info.php). Make sure to visit this page to review and be aware of these university policies and resources.

## Course Schedule

When	Topic	Notes
<b>Class 1</b> 01/25/2023 4:30 PM - 6:10 PM DH 351	Introduction	What are macromolecules, supramolecular assemblies, and nanomaterials and what do they have in common? What do we mean by inhomogeneity and emergent properties?
<b>Assignment deadline</b> 2/01/2023	Reflection #1	Submit Reflection #1 prior to class on 2/1. Be ready to share your findings in the class discussion.
<b>Class 2</b> 02/01/2023 4:30 PM - 6:10 PM DH 351	Macromolecules 1	Molar mass and dispersity: How we think about (and measure) macromolecular size?  Introduction to macromolecules: Synthesis, characterization, and applications
<b>Assignment deadline</b> 2/08/2023	Reflection #2	Submit Reflection #2 prior to class on 2/8. Be ready to share your findings in the class discussion.

When	Topic	Notes
<b>Class 3</b> 02/08/2023 4:30 PM - 6:10 PM DH 351	Supramolecular Assemblies 1	Introduction to supramolecular assemblies: Synthesis, characterization, and applications
<b>Assignment deadline</b> 2/15/2023	Paper choice	Submit your paper choice for your final project by class time on 2/15.
<b>Class 4</b> 02/15/2023 4:30 PM - 6:10 PM DH 351	Nanomaterials 1	Introduction to nanomaterials: Synthesis, characterization, and applications
<b>Assignment deadline</b> 2/22/2023	Reflection #3	Submit Reflection #3 prior to class on 2/23. Be ready to share your findings in the class discussion.
<b>Class 5</b> 02/22/2023 4:30 PM - 6:10 PM DH 351	Macromolecules 2	Polymers: Our consumer-based economy/why there is a plastic island in the ocean  Plastic recycling and sustainable materials
<b>Assignment deadline</b> 3/01/2023	Reflection #4	Submit Reflection #4 prior to class on 3/1. Be ready to share your findings in the class discussion.
<b>Class 6</b> 03/01/2023 4:30 PM - 6:10 PM DH 351	Supramolecular Assemblies 2	Supramolecular materials: Molecular machines and drug delivery
<b>Assignment deadline</b> 3/08/2023	Report (draft)	Submit your report draft prior to class on 3/8. This will go to a classmate for review right after class.
<b>Class 7</b> 03/08/2023 4:30 PM - 6:10 PM DH 351	Nanomaterials 2	Nanomaterial applications: Distinguishing from the bulk
<b>Assignment deadline</b> 3/15/2023	Peer review	Submit peer review prior to our final class period on 3/15.
<b>Class 8</b> 03/15/2023 4:30 PM - 6:10 PM DH 351	Final class	Given what we have learned, where can we go from here?
<b>Assignment deadline (optional)</b> 5/15/2023	Revisions and course survey	If you would like to boost your paper grade, you can submit revisions based on the peer review and comments you received from me.  There will be an optional course survey that you can complete for extra credit.