

Chemistry & Biochemistry Senior Thesis/Capstone

Senior Capstone Prospectus

The student, with the aid of the chosen research mentor, must write a Senior Capstone Prospectus of not more than two pages that includes: 1) a statement of the problem, 2) background information, 3) methods to be used, 4) expected outcomes, and 5) references. Chemistry and Biochemistry students can enroll for credit with Olivia Mendoza, at the CBC Advising Office, in Old Chemistry 210, after obtaining signatures from the proposed Research faculty mentor and if a Biochemistry Major your assigned BIOC faculty advisor. Biochemistry majors wanting to work in laboratories of a Research faculty mentor who is not part of the Chemistry & Biochemistry Department must obtain permission from their BIOC faculty advisor. The process of obtaining approval of the Senior Capstone must be completed prior to the start of the first semester of research. This would normally be in the spring semester of the junior year.

Laboratory Safety Training**

Before you will be approved to register for CHEM/BIOC 498(h), you will also need to pass the online laboratory safety course if you have not done so already for another independent research laboratory experience. All of the information you need to pass this course can be found at: <http://d2l.arizona.edu> by logging in using your UA NetID and password. Click on "Self Registration" in the blue navigation bar on the top left. Look through the list of courses offered and click on the link to "Laboratory Chemical Safety." On the Laboratory Chemical Safety course description (Step 1), click on the "Register" button. On the registration form (Step 2), complete all required registration fields (marked with a *) and then click on the "Submit" button. On the confirmation page (Step 3), click on the "Finish" button. On the registration summary page, click on "Go to Laboratory Chemical Safety" to begin the training or click on the "Done" button if you don't wish to start the training now. Once you are registered for the course, you can return as often as you like by going to "My Home" from the red navigation bar at the top left and then you will see Laboratory Chemical Safety listed in your courses.

Responsible Conduct of Research Workshop/Certificate (RCR)**

Students wanting CHEM/BIOC 498(h) units will need to complete the RCR undergraduate certificate program. You must complete either the in-person "Research: Introduction to the Responsible Conduct of Research" workshop OR the "Research:Online CITI RCR Training" module. Follow the directions found at <http://rgw.arizona.edu/research-compliance/rcr/certificate-program#undergraduateRCR> to register and complete requirements.

100% Engagement Component

This course is an Engaged Learning course in which you will participate in significant experiential learning and reflection designed to prepare you to apply skills and knowledge to the types of problems you may encounter beyond the classroom. If you earn a grade of C or better [in the case of courses with an alternative grade, P or better], you will earn the notation "Engaged Learning Experience: Completed" on your UA transcript. The completion of this course will also appear on your Student Engagement Record in UAccess (available late Fall 2015).

The course has been designated with the following Engaged Learning attributes:

Engagement Activity: Discovery

Engagement Competency: Innovation & Creativity

The University policy on Engaged Learning is available at http://catalog.arizona.edu/2015-16/policies/engagemt_guidelns.htm

For more information on Engaged Learning, you may also visit <http://ose.arizona.edu/100-engagement>

SUMMARY OF STEPS REQUIRED FOR THE Chemistry and Biochemistry SENIOR THESIS

1. Secure a Research faculty mentor and Biochemistry majors have it approved by your BIOC Faculty Advisor.
2. Discuss an arrangement for the capstone experience with your research mentor. Determine what your project should entail and what tasks you will be required to do over the next two semesters. Also, check the Honors College's web site for information regarding your the thesis if you are an Honors student. <http://www.honors.arizona.edu/what-senior-honors-thesis>.
3. Pass the online Laboratory Safety Training through the D2L website (see above). Complete the Undergraduate RCR Certificate Program through UAccess Learning (see above).
4. At the start of your first semester complete and submit the *Senior Capstone/Thesis Approval Form – First Semester*.
5. At the end of your first semester, your Research faculty mentor will assign you a grade based on the agreed upon criteria in the registration form. Before your second semester of CHEM/BIOC 498(h) begins, meet with your Research faculty mentor and review your objectives for completing the laboratory research and the sr. thesis.
6. At the start of your second semester, again, complete and submit the *Senior Capstone/Thesis Approval Form – Second Semester*. Use the form to help you plan out your writing tasks for this semester.
7. With the help of your Research faculty mentor and BIOC faculty advisor reach each of the three milestones required to receive a passing grade in CHEM/BIOC 498(h):

First milestone – week 7: An outline of the sr. thesis must be approved and signed by your Research faculty mentor. Use the sr. thesis outline approval form that is attached.

Second milestone – week 13: Biochemistry major must submit the completed sr. thesis in “scientific paper format” (see guideline) for approval by their BIOC faculty advisor. The BIOC faculty advisor will not read the sr. thesis - or approve it - unless the Research faculty, mentor has first signed the title page (with date), signifying approval of the sr. thesis for both scientific content, scope of the sr. thesis, and writing style. Chemistry majors can show a draft of their thesis to Olivia Mendoza prior to completion.

Third milestone – week 14: The sr. thesis must be submitted to the CBC Advising Office, OC 210 no later than one week prior to the last day of classes in order to receive a passing grade for CHEM/BIOC 498(h).

8. At the end of the semester, honors students must submit their Senior Honors Thesis to the Honors College by the last day of classes. The deadline to submit your thesis is usually one week before finals. Research advisors/mentors will assign grades for the senior experience. Please check on their website.

**Registration Form for
Chemistry and Biochemistry Senior Thesis/Capstone
First Semester**

Please complete and return this form to **Olivia Mendoza, located at the CBC Advising Office, Old Chemistry 210a**. This form is for department records. Forms are due on the first day of classes, per CBC.

****Attach completed lab safety and RCR results to this form**

◆ Students who submit this form **on or before the 9th day of classes for the fall/spring semester (or before the first day of classes for summer)** can be registered **manually** for credit by CBC and will not need to fill out a Change of Schedule Form, as long as the addition of credit does not result in a total of more than 19 units.

◆ Students submitting this form **after the 9th day of classes for the fall/ spring semester or after the first day of classes for the summer**, must also complete a Change of Schedule (Drop/Add) Form and submit it to the Registrar's Office (Administration Building, Room 210) to add CHEM/BIOC 498(h) units to their schedule.

PLEASE ATTACH SENIOR CAPSTONE PROSPECTUS

Student Name: _____ Student ID #: _____

Student Phone #: _____ Student E-mail: _____

Student Major(s): _____

Anticipated date of Graduation: _____

CHEM/BIOC Course Number (check): 498H (Senior Honors Thesis) 498 (Senior Capstone)

Section # _____ (leave blank, if you do not know)

[Note: The U of A and the Board of Regents require a minimum of 45 hours of course work for each unit of credit awarded; approximately 3 hours per week worked for each unit of credit in a 16-week semester]

Semester (check): Fall Spring Summer I Summer II Year: _____

PROJECT INFORMATION & REQUIREMENTS

Research Mentor Name: _____ Research Mentor's Phone #: _____

Research Mentor's UofA email address: _____

Home Department of Research Mentor: _____

Title of Project: _____

Hours per week student will spend on project: _____ Mentor/Student contact hours per week: _____

Date(s) for mid-semester evaluation of student performance: _____ [Note: At least one mid-semester evaluation should be done before the drop deadline]

If appropriate, name of another person who will help supervise the student: _____

Supervisor email: _____

The student will be required to attend lab meetings (check): Yes No

The student will be required to maintain a laboratory notebook (check): Yes No

Techniques the student will learn/utilize as part of this research project (list):

Tangible products the student will be submit as part of this research project, such as papers, posters, data, Power Point presentations, stocks, strains, etc. (list):

Additional requirements for this research project (list):

The University of Arizona would like to ensure that research experiences for undergraduates continue to be of high quality, reflecting the true nature of the directed or independent research agreed upon. In order to define the research experience for both the student and the research mentor, detailed information regarding the research project is necessary. This Approval Form should be **as specific as possible** so that both the project advisor and student are aware of the expectations for the project, as well as what criteria will be used to award a grade. The full listing of University of Arizona Policies for Independent Study is available at <http://catalog.arizona.edu/>

CHEM/BIOC 498(h) is a writing course for BIOC majors. By signing this form, the both the research mentor and the Biochemistry faculty advisor certify that he/she will read the prospectus and the final senior thesis and will assess both the content and the writing style.

REQUIRED SIGNATURES:

STUDENT _____ DATE _____

Research Mentor _____ DATE _____

For Biochemistry Majors only

BIOC Faculty Advisor _____ DATE _____

**Registration Form for
Chemistry and Biochemistry Senior Thesis/Capstone
Second Semester**

Please complete and return this form to **Olivia Mendoza, located at the CBC Advising Office, Old Chemistry 210A**. This form is for department records. Forms are due on the first day of classes, per CBC.

◆ Students who submit this form **on or before the 9th day of classes for the fall/spring semester (or before the first day of classes for summer)** can be registered **manually** for credit by CBC and will not need to fill out a Change of Schedule Form, as long as the addition of credit does not result in a total of more than 19 units.

◆ Students submitting this form **after the 9th day of classes for the fall/ spring semester or after the first day of classes for the summer**, must also complete a Change of Schedule (Drop/Add) Form and submit it to the Registrar's Office (Administration Building, Room 210) to add CHEM/BIOC 498(h) units to their schedule.

PLEASE ATTACH REVISED SENIOR CAPSTONE PROSPECTUS

Student Name: _____ Student ID #: _____

Student Phone #: _____ Student E-mail: _____

Student Major(s): _____

CHEM/BIOC Course Number (check): 498H (Senior Research Honors Thesis) 498 (Senior Capstone)

Section # _____ (leave blank, if you do not know)

[Note: The U of A and the Board of Regents require a minimum of 45 hours of course work for each unit of credit awarded; approximately 3 hours per week worked for each unit of credit in a 16-week semester]

Semester (check): Fall Spring Summer I Summer II Year: _____

PROJECT INFORMATION & REQUIREMENTS

Research Mentor's Name: _____ Research Mentor's Phone #: _____

Research Mentor's UofA email address: _____

Home Department of Research Mentor: _____

Title of Project: _____

Hours per week student will spend on project: _____ Mentor/Student contact hours per week: _____

Date(s) for mid-semester evaluation of student performance: _____ [Note: At least one mid-semester evaluation should be done before the drop deadline]

If appropriate, name of another person who will help supervise the student: _____

Supervisor email: _____

Specific criteria for writing project (e.g. required page length, number of sources/citations, formatting, etc.):

SCHEDULE OF TASKS (e.g. due dates for outline, rough draft, literature review, etc.)

The purpose of this project is to create a high quality written document - based on literature research and experimental results. Creating quality written documents takes time. Therefore, we ask that the student-mentor team devise a plan that sets deadlines for submission of appropriate segments by the student (e.g. methods section, results sections, figures) as deemed appropriate for the project. Similar deadlines for return of critical review should be set for the faculty mentor. Consequences for failure to comply with the established deadline should be clearly defined.

Task:

Date to be completed by:

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

The University of Arizona would like to ensure that research experiences for undergraduates continue to be of high quality, reflecting the true nature of the work agreed upon. In order to define the experience for both the student and the project advisor, detailed information regarding the writing project is necessary. This Approval Form should be **as specific as possible** so that both the research mentor and student are aware of the expectations for the project, as well as what criteria will be used to award a grade. The full listing of University of Arizona Policies for Independent Study is available at <http://catalog.arizona.edu/> these apply to the Senior Capstone project.

CHEM/BIOC 498(h) is a writing course for BIOC majors. By signing this form, the thesis advisor certifies that he/she will read the prospectus and the final senior thesis and will approve both the content and the writing style

REQUIRED SIGNATURES:

STUDENT _____	DATE _____
Senior Thesis Research Mentor _____	DATE _____
<i>For Biochemistry majors only</i>	
BIOC Faculty Advisor _____	DATE _____

Approval of the Senior Thesis/Capstone Outline

The Senior Thesis/Capstone Outlines are not due until your second semester of Chem/Bioc 498(h). An email reminder will be sent to you.

PLEASE ATTACH SENIOR THESIS OUTLINE

REQUIRED SIGNATURES:

STUDENT _____ DATE _____

Research Mentor _____ DATE _____