

## BC 499A Research-Based Thesis Guidelines

### Definition of the Thesis

The BC 499A thesis is designed to provide a culminating experience that allows students to explore scientific areas of their most passionate interests, engage in the process of discovery, and make a creative contribution in their areas of interest and expertise.

The BC 499A thesis experience is supervised by a faculty thesis mentor. Students can have additional committee members if the mentor deems it to be appropriate. The thesis has writing and speaking components. The written component of the BC 499A thesis will be 20 pages minimum, 30 pages maximum, double-spaced (1" margin, 12 pt type, Times or similar font). The BC 499A thesis style will be based on that of a "Journal of Biological Chemistry" article. The speaking component consists of a fifteen-minute formal presentation by the student and responses by the student to questions from the mentor and audience.

### BC 499A Thesis Preliminary Outline

The preliminary outline is intended to help you begin to outline your thesis. You will develop the proposal with your faculty thesis mentor, and he or she must approve the preliminary outline before it is submitted to the Biochemistry Office prior to registration for BC 499A. Your mentor will guide you through the process of creating the preliminary outline. You must submit it to the Biochemistry Department office by last course add date of the semester you are registering for BC 499A credit, usually Monday of the second week of the semester. The *BC 499A Thesis Preliminary Outline* form is included in the back of these guidelines. You will receive the hidden class code to allow you to register for BC 499A at this time.

### BC 499A Thesis Outline

The BC 499A Thesis Outline is a comprehensive statement about your thesis content. You will work with your faculty research/thesis (BC 475/495) mentor to develop the outline. Your faculty thesis mentor must approve and sign your outline. The approved outline must be submitted to the Biochemistry Department office before the eighth week of classes in the semester (half way through) you are registered for BC 499A. If you wish to change your topic after submitting the outline, another outline must be approved by your thesis mentor and submitted to Biochemistry Department. The *BC 499A Thesis Outline* form is included in the back of these guidelines.

### BC 499A Thesis Credit (3 credits)

You may register for Senior Research-Based Thesis credit, BC 499A, either the first or second semester of the year you intend to complete your degree (senior year). BC 499A is the culmination of your independent study (BC 475/495) during which you are working directly with your faculty thesis mentor to create the learning experience. Therefore, it is important for you and your faculty thesis mentor to outline your goals, timeline, and expectations of the thesis by the beginning of the semester. To give you an idea of the hours involved, three credits are equivalent to approximately 135 hours of work per semester, which breaks down to nine hours of work per week. (This is the same amount of time any 300- or 400-level class typically requires.) As you can see, it will take a serious commitment of time and effort to complete your senior thesis! BC 499A is graded on a traditional grading scale (A, B, etc.). Your faculty thesis mentor decides your final grade based on the quality of your thesis and presentation.

## **BC 499A Thesis Presentation**

The senior thesis presentation is an opportunity to orally present your creative activities. You must give a presentation on your thesis by the fifteenth week of classes in the semester (the last week before finals) that you are taking BC 499A. The senior thesis presentation differs from a graduate thesis defense in that it is less formal and more of a celebration of your learning experience.

The BC 499A thesis presentation is approximately fifteen minutes in duration followed by a question and answer session with the mentor and audience. The formal presentation should draw upon the speaking skills you have developed in the Freshman and Senior Seminar courses (BC 192 and 493).

Early in the semester, students should work with the Biochemistry Department staff on the logistics of the presentation, which include coordinating the time with the mentor and reserving a room for the presentation.

The senior thesis presentation is open to the public, and students are responsible for notifying the Biochemistry Office of the time and location so that it may be announced ahead of time. If more than two presentations are expected in a semester, the Department may organize a mini symposium. Faculty, staff, students, family members, and other interested individuals are welcome to attend. Presentation at the mini symposium is encouraged. The Department also encourages students to put their presentations together in the form of a poster for presentation at the Department of Biochemistry and Molecular Biology awards ceremony.

Following the presentation and question and answer session, the faculty thesis mentor will discuss how well the presentation went with the student. The faculty thesis mentor will also assign a letter grade for the student's work with 10 percent based on the quality of the student's oral presentation.

## **Final Thesis Copy**

Students submit the penultimate draft of their thesis paper to their mentor two weeks before the thesis presentation (the thirteenth week of classes in the semester registered for BC 499A, two weeks before the last week of classes) so that the mentor has time to review it prior to the presentation. The faculty thesis mentor will compile comments and feedback, and give them to the student after the thesis presentation. The student will incorporate agreed-upon changes suggested by the faculty thesis mentor into the final thesis copy.

Students must submit a paper copy of their final version of their thesis to their faculty thesis mentor and an electronic to the Biochemistry department office by the end of finals week in the semester registered for BC 499A to receive a passing grade.

Specifications for the final copy of the senior thesis:

1. The written thesis must consistently follow a writing style appropriate for the type of research in the thesis. The style and standards are determined by your thesis mentor, but in general will follow those of an article submitted to the Journal of Biological Chemistry.
2. The written thesis must be submitted in electronic and paper format.
3. Students who are completing a BC 499A thesis need to provide the following information (in addition to the written thesis in a separate document): (a) an assessment of the importance of the thesis research and how it contributed to their learning process, and (b) a brief reflection about the overall thesis experience.

## **Section Two: Faculty Thesis Mentor: Selection and responsibilities**

If the faculty mentor is not a member of the Biochemistry Department, your Biochemistry Academic Advisor must sign your preliminary outline and final outline, as well. Explain the requirements of the Biochemistry senior thesis, articulate your expectations for their participation, and give them a copy of the *Senior Thesis Guidelines*, which is available in the Biochemistry Department office and on the departmental website at [http://www.bmb.colostate.edu/undergrad/BC499A\\_Guidelines.pdf](http://www.bmb.colostate.edu/undergrad/BC499A_Guidelines.pdf) .

To be a faculty thesis mentor, he or she must:

- > Work at Colorado State University as a regular full-time, regular part-time, or transitional academic faculty above the rank of instructor;
- > Have attained a doctorate (Ph.D.) or the terminal degree in his or her field;
- > Be on campus during the semester in which you are completing your research (e.g., not on sabbatical); and
- > Be familiar with the Biochemistry senior thesis requirements.

*Your Biochemistry academic advisor and the Biochemistry Undergraduate Affairs Committee must approve exceptions to these criteria.*

You and your faculty thesis mentor may select additional committee member(s) who will review the penultimate draft of your paper and provide comments to the faculty thesis mentor, participate in the thesis presentation, and forward recommendations for the final grade to the faculty thesis mentor.

## **Section Three: Thesis Methods and Writing**

### **Selecting a topic**

The BC 499A thesis topic will be your BC 475/495 research project.

We encourage you to read through past theses to get a better feel for how to write your thesis. Examples of past theses can be found in the BC499\_Theses folder in the GUndergrad shared folder. This share can be accessed automatically on the computers in the Biochemistry Undergraduate Computer Lab (MRB 103) or through the GROUPS share on the BMB departmental server.

### **Thesis Methods and Approaches**

It is important to meet with your faculty thesis mentor to discuss accepted writing styles for your thesis. An excellent resource for writing style by discipline can be found on the Writing Center webpage <http://writing.colostate.edu/>. This site discusses many aspects of writing such as using print and electronic sources and citing sources.

### **Writing Styles**

Specific writing styles vary by discipline, so you should consult with your faculty thesis mentor for guidance about the writing style appropriate for your topic. Your thesis should be based on the style of a manuscript to be submitted for publication in the Journal of Biological Chemistry. For each style, there are manuals to help you understand and stay within the boundaries of your discipline. In addition, the Writing Center has writing guides available online.

The written component of the thesis experience must incorporate the fundamentals of writing that you have learned in your composition courses. You need to pay particular attention to:

- > organizing your writing for your audience;
- > engaging in writing as a process which includes formal and informal writing, and writing multiple drafts that are reviewed and subsequently revised;
- > utilizing the writing expertise you have learned while writing summaries, syntheses, evaluations, and arguments in your Freshman Seminar and composition courses;
- > cohesion;
- > editing and proofreading, and
- > utilizing appropriate documentation styles.

**Finally, a thesaurus and dictionary are essential tools to good writing. Comic and sometimes tragic results come from relying solely on your computer spell check. Although it is invaluable, it is not foolproof.**

## **Section Five: Forms**

- (1) BC 499A Thesis Preliminary Outline – due last course add day of semester registering for BC 499A.
- (2) BC 499A Thesis Outline – due before the eighth week of classes in the semester (half way through) registered for BC 499A.
- (3) BC 499A Thesis Presentation: Affirmation and Evaluation Form – must present before finals week in the semester registered for BC 499A.

**BC 499A THESIS  
PRELIMINARY OUTLINE**

Please complete the preliminary outline form with your faculty thesis mentor and submit it to the Biochemistry Office by the last course add date of the semester in which you are taking BC 499A (usually Monday of the second week of the semester). **Please type.**

Name: \_\_\_\_\_ eID: \_\_\_\_\_

Phone: \_\_\_\_\_ E-mail: \_\_\_\_\_

Major(s) and Minor(s): \_\_\_\_\_

Semester and year you intend to graduate: \_\_\_\_\_

Faculty thesis mentor: \_\_\_\_\_ Department: \_\_\_\_\_

Faculty thesis mentor e-mail: \_\_\_\_\_

Tentative thesis title: \_\_\_\_\_

Thesis description: Briefly (bullet points) describe the question(s) addressed in your thesis project, the methods and/or approaches you have used, and the expected outcomes.

\_\_\_\_\_  
Student signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Faculty thesis mentor signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Academic Advisor signature (if mentor not BMB faculty)

\_\_\_\_\_  
Date

## BC 499A THESIS OUTLINE

Please complete your final outline and submit it with this approved form to the Biochemistry Office before the eighth week of classes (half way through) in the semester you are registered for BC 499A. Approval by your faculty thesis mentor is required. **Please type.**

Name: \_\_\_\_\_ eID: \_\_\_\_\_

Semester and year enrolled in BC 499A: \_\_\_\_\_

Faculty thesis mentor: \_\_\_\_\_ Department: \_\_\_\_\_

Email: \_\_\_\_\_ Phone: \_\_\_\_\_

Committee member\*: \_\_\_\_\_ Department: \_\_\_\_\_

Email: \_\_\_\_\_ Phone: \_\_\_\_\_

**Please attach a description of your thesis that provides the following:**

- > Thesis title.
- > An outline of your thesis:
  - I. Introduction topics,
  - II. Methods and Materials,
  - III. List of Figures and Results,
  - IV. Summary and Discussion Points.
- > A list of resources and references (e.g., books, people, journal articles) used in preparation of your thesis using proper citation format (you should start putting them all into an Endnote library).

**Approvals:**

\_\_\_\_\_  
Faculty thesis mentor signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Academic Advisor signature (if mentor not BMB faculty)

\_\_\_\_\_  
Date

\*Additional committee members are optional.

**BC 499A THESIS PRESENTATION:  
AFFIRMATION AND EVALUATION FORM**

The BC 499A thesis presentation is the formal oral presentation of the student's thesis work. For Biochemistry Majors, it serves as the last of three formal oral presentations in the curriculum. Section I affirms the completion of the thesis presentation. Section II provides feedback about the student's speech communication abilities. **Please submit this completed form to the Biochemistry Department Office, Room 316 Molecular and Radiological Biosciences Building.**

**SECTION I: Affirmation Statement:**

I affirm that \_\_\_\_\_ completed the thesis presentation of their  
(Student's name)

BC499A Senior Thesis on \_\_\_\_\_.  
(Date)

Faculty Thesis Mentor:

Name: \_\_\_\_\_

Department: \_\_\_\_\_

Signature: \_\_\_\_\_

Committee Member(s)\*:

1. Name: \_\_\_\_\_

Department: \_\_\_\_\_

Signature: \_\_\_\_\_

\*Additional committee members are optional.

*Continued on back*

## SECTION II

### Speech communication abilities:

Please assess the student's speech communication skills according to the criteria listed below.

#### **Key:**

<u>+</u>	Excellent
<u>√</u>	Satisfactory
<u>-</u>	Needs Improvement
<u>0</u>	Failed to Complete

#### Introduction

- Captured audience attention/interest
- Previewed main points

#### Body:

- Main points clear
- Main points supported
- Organization logical
- Sources cited
- Clarity of visual aides
- Management of visual aides

#### Conclusion:

- Summarized main points
- Addressed audience questions

#### Delivery:

- Volume
- Rate
- Articulation
- Eye Contact
- Enthusiasm

#### Overall Impression:

#### Comments:

BC 499A and 499B THESIS  
PERMISSION TO POST FORM

The Biochemistry and Molecular Biology Department would like to post examples of BC 499A and 499B theses from previous semesters to a folder on the departmental server visible from the Undergraduate Resource Room in MRB 103 to current BC 499A/B students to clarify the thesis requirements and format and to assist them in coming up with ideas for potential areas of interest for their own research topics.

Theses will be posted for a period of time to be determined by the Department as "Read Only" .pdf files, filed by semester. Files will normally be posted within the week prior to the beginning of the semester following completion of the thesis.

Please complete the following if you are willing to allow your thesis to be read by other students.

\_\_\_\_\_  
(Your Name--Please Print)

\_\_\_\_\_  
Your Signature

\_\_\_\_\_  
Date

Office Use Only:

File posted to dep't. drive:

\_\_\_\_\_  
By (Name)

\_\_\_\_\_  
Date