



Biological Sciences

Graduate Student Handbook

Department of Biological Sciences
California State University, Long Beach

www.csulb.edu/biology

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NOTICE: Updates to this document and critical information will be sent to you through the Biological Sciences Graduate Programs Canvas site.

You must turn on your email notifications in Canvas and check your CSULB email.

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Introduction and Expectations

Welcome to Graduate School in the Biological Sciences Department at CSULB!

This handbook was developed to guide graduate students and faculty in some of the processes associated with completing an M.S. degree in this department. This document is a **supplement** to the University Regulations Governing the Master's Degree listed in the current CSULB Catalog under Graduate Degree Information and the departmental requirements outlined in the Biological Sciences section.

This handbook is not an official document. Always follow the current CSULB Catalog; if you find any discrepancies in requirements information, contact the Department Graduate Advisor and Graduate Services Coordinator for clarification.

Knowledge and Skill Proficiency Expectations of our M.S. Degree Graduate Students

We expect that graduate students:

1. will be able to interpret data from their specific area of study as well as from related fields;
2. will understand appropriate research design, methods, and techniques relevant to the student's area of expertise;
3. will be able to effectively communicate their research and related biological concepts in written and verbal form to general public and professional audiences;
4. have advanced knowledge in their degree field (Biology or Microbiology);
5. be able to design and implement experiments, and analyze and interpret data from a study using methods appropriate in their field;
6. be able to effectively communicate their scientific research in oral and written forms at a professional level (e.g. regional or national scientific meetings, professional abstracts, posters, grant proposals, peer-reviewed publications and reports);
7. be knowledgeable of ethical expectations of a professional scientist; and
8. spend at least one semester working as a Teaching Associate, Instructional Student Assistant, or Student Assistant (required), which provides important professional development. This requirement can be waived by the Department Chair or Graduate Advisor under special circumstances.

Personnel



Interim Dean of Graduate Students

Dr. Dina Perrone

Promotes graduate student success through recruitment, collaboration with admissions, policy development, and program partnerships, while overseeing surveys, communication, and the Graduate Center.



Interim Vice Provost of Academic Programs

Dr. Pei-Fang Hung

Oversees all matters of academic program planning, educational policy, curriculum review, and institutional/programmatic assessment.



Dean of Graduate Students – College of Natural Sciences and Mathematics

Dr. Babette Benken

Provides input to faculty and students concerning the degree program and University requirements.



Graduate Services Coordinator – Department of Biological Sciences

Jenn Carrillo

HSCI-108B, 562.985.7928, Jennifer.Carrillo@csulb.edu

Oversees graduate application process; maintains graduate files; tracks the adherence of programs and student progress to Department and University requirements; and serves as a resource person.

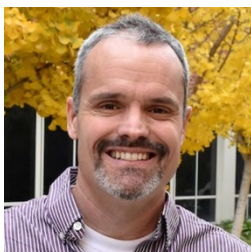


Graduate Advisor – Department of Biological Sciences

Dr. Kevin Sinchak

HSCI-140, 562.985.8649, Kevin.Sinchak@csulb.edu

Oversees the acceptance, proposal establishment, and completion processes; resolves problems between students and faculty, serves as final departmental quality control on the thesis.



Chairperson – Department of Biological Sciences

Dr. Jesse Dillon

HSCI-104, 562.985.4806, Jesse.Dillon@csulb.edu

Determines TA and GA assignments, resolves problems between students and faculty, final signature on the thesis.

The First Year

Besides taking your classes, doing research, and possibly fulfilling duties as a teaching assistant or instructional student assistant, or student assistant, listed below are the general steps that need to be completed during the first year of your MS program. Not fulfilling these requirements by the end of your second semester is cause for Academic Warning and Disqualification, which can result in dismissal from the graduate program.

Checklist

- Establish a thesis committee.
- Write your thesis proposal.
 - Disseminate to your committee.
 - Set a date for a committee meeting to present your Thesis Proposal.
- Establish an official Graduate Program of Study during the Thesis Proposal.
 - Bring a tentative plan/draft of the Program of Study Form* to the meeting for discussion.
 - Complete and launch the DocuSign Program of Study Form once your plan is approved.
- Present and defend your Thesis Proposal at the Thesis Proposal meeting.
- Completed and launch the DocuSign Thesis Proposal Cover Sheet* at your meeting.

**These forms are available on the Biological Sciences Graduate Programs Canvas site, under forms.*

If you complete these items you will receive, within a few months, a letter from the Director of Graduate Studies indicating that you have advanced to candidacy.

Coursework

In consultation with your Thesis Chair and Thesis Committee, and/or the Graduate Advisor, enroll in courses that match your general research area at the upper division level (300, 400, 500, or 600 numbers). Most courses that you take before you establish a formal Program of Study may be put on this program, up to a total of 12 units. See “Establishing a Program Of Study” below.

Six units per semester is a typical academic load for a Biology graduate student. Students may take seven units or more if appropriate, for additional tuition. For additional information on tuition and fees, please see [Student Records: Tuition and Fees](#).

Thesis Advisor (Chair)

As indicated in your acceptance letter, a professor in the Biological Sciences Department has agreed to be your Thesis Advisor and is in most cases your Thesis Chair. Their research interests should match your own. You should sign up for Directed Studies (BIOL 697*) with your research advisor. This course allows you to learn what types of research are done in your research group and how you might fit into that program. However, early on in your studies you may find that you wish to work with someone else, and it is possible to request to change labs during your first year. It is also useful to talk to other graduate students and faculty about the various research interests of the other faculty, and who might have an opening for a new graduate student. Requesting a change

of Thesis Chair/Advisor may require you to receive an extension for the Thesis Proposal submission and ultimately Advancement to Candidacy.

*697 – Directed Research (from the course catalog): Research on a specific topic approved and directed by a faculty member in the Biological Sciences. Written report required. NOTE: the research must be different from the research for your Master's thesis project.

Role of the Thesis Advisor

The primary role of the Thesis Advisor is to guide and mentor a graduate student working in their laboratory throughout the thesis research and academic program, ensuring the student is making continued satisfactory progress towards completion of the degree.

The Thesis Advisor is responsible for:

1. providing the Graduate Services Coordinator formal notification of their willingness to advise a particular applicant to the graduate program. This acknowledgement must be provided in writing prior to the review of the student's application by the Graduate Studies Committee.
2. helping graduate students identify an appropriate research topic, develop a thesis proposal, form a Thesis Committee, and successfully defend the proposal.
 - a. Development and writing of the thesis proposal is associated with the BIOL 696A course. The Thesis Advisor is required to edit and approve the proposal that is being written during the course. The proposal written for the course is meant to be the proposal that is associated with the student's Advancement to Candidacy.
3. providing laboratory space, equipment and supplies, and mentoring necessary for successful completion of the research project.
4. advising graduate students about degree program requirements in consultation with the Graduate Services Coordinator.
5. helping graduate students find financial support through grant proposals, scholarships, and fellowships.
6. ensuring that the written thesis is sufficiently edited prior to timely distribution to the committee and Graduate Advisor.
7. ensuring that the graduate student is adequately prepared for the public thesis defense.
8. aiding the graduate student with publishing their thesis work and preparing the graduate student to present oral and/or poster presentations at scientific meetings.
9. ensuring that the graduate student and resulting thesis meet Department and University standards for knowledge in the field and research quality.

A Thesis Advisor is allowed to resign from a graduate student's committee if they feel that the student is:

- not making satisfactory progress towards their degree.
- not heeding the advice of the Thesis Advisor.
- failing to communicate with the graduate advisor for over one semester.

If students are not making progress and feel as though they are not receiving sufficient advising, a meeting will be organized by the Graduate Advisor with the Thesis Committee and a member of the Graduate Studies Committee. The committee will provide recommendations to the student and the Thesis Committee on how to

resume progress towards the thesis. In the absence of a resolution of identified problems or repeated requests for committee reviews, the Thesis Advisor will work with the Department Chair to develop an appropriate mentoring plan.

Forming a Thesis Committee

Members of the Thesis Committee should be in place at least one month ahead of the proposal defense. In addition to the faculty member who has agreed to be your Thesis Chair, two other thesis committee members need to be selected. These members should have some interest and expertise in your research field so that they may constructively add to your research efforts. **At least two members (including the Thesis Chair) must be tenured/tenure-track faculty from the Department of Biological Sciences;** one or more additional members may be from outside of the department. It is the responsibility of the student/Advisor to supply a CV and contact information for any committee member who is not tenured/tenure-track faculty at CSULB to the Graduate Services Coordinator. This must be submitted at least a month before the thesis proposal defense and must be approved by the Graduate Advisor.

If the Thesis Advisor is from outside of the department (the Chair must be faculty on campus), it is the responsibility of the student to ensure that the other committee members remain updated on thesis progress. The Graduate Studies Committee may terminate a Thesis Committee if it is obvious that departmental faculty are not actively involved in the student's research program.

Role of the Thesis Committee:

The primary role of a Thesis Committee member is to provide assistance, advice, and guidance to a graduate student to ensure that the thesis research and resulting thesis meets the Department and University standards.

A Thesis Committee member is responsible for:

1. reviewing the graduate student's thesis proposal and providing feedback that will enable them to make satisfactory progress in their research.
2. assisting the thesis advisor in formulating a program of study for the student.
3. providing the student with feedback on their thesis updates.
4. providing the student with written edits and comments on their thesis within seven days of receiving the thesis advisor approved thesis.
5. attending the public and private thesis defense.
6. ensuring that the thesis, and the public and private defense meet Department and University standards.

A committee member is entitled to withhold approval for any thesis defense or written thesis that they feel does not meet the Department or University standards.

A committee member is entitled to resign from a student's committee if they feel the student is:

- not making satisfactory progress towards their degree,
- not heeding the advice of the committee, or
- has not made contact within the last year.

Establishing a Program of Study

You and your Thesis Chair should complete the Program of Study/"Graduate Program for the Master of Science" DocuSign form available on Canvas with a tentative list of courses; these courses will be discussed for approval at the first Thesis Committee meeting. Only one 300-level class is permitted on the M.S. in Biology Program of Study, and two specific 300-level courses may be included on the M.S. in Microbiology Program of Study. Refer to the University Catalog for other university and departmental restrictions.

Thesis Proposal Meeting

Notify the Thesis Committee of the proposed meeting date and provide all members of the Thesis Committee with a copy of your Thesis Proposal and a list of suggested courses for the program at least one week prior to the meeting.

Before Finals week of your second semester you will work with your committee members to find a time to meet. You may request a meeting room from the Graduate Services Coordinator. During the meeting you will give a 20- to 30-minute presentation of your proposed research to the Thesis Committee, followed by a discussion of your proposal. Towards the end of the meeting, you will leave the room while the committee discusses the proposal, and decides whether it is acceptable.

Following the decision on the acceptability of your proposal, you will be provided requirements for the final draft of the proposal. You and your committee will also determine the class requirements for your Program of Study for the graduate program during this meeting. Plan at least an hour for the committee meeting. Ask your committee members to electronically sign the final Program of Study form and the Thesis Proposal Cover Sheet; both are DocuSign forms which are available in Canvas. If revisions are required, committee members should approve the changes before signing these forms. Send the final acceptable version of your proposal to your Thesis Committee members **and** upload the written Thesis Proposal to Assignments in Canvas. This fulfills one of the requirements for your Advancement to Candidacy (see below).

Definition and Regulations for Graduate Theses and Projects

Based on [Academic Senate Policy: Definition and Regulations for Graduate Theses and Projects](#).

Thesis Proposal

The proposal will be double-spaced and font shall be either Arial or Times New Roman and no smaller than 11pt. For more information see section below on “Writing a Thesis Proposal.”

Your proposal should include the following sections:

1. an Introduction that contains a project summary and subheadings for the Background, Significance, and Specific Aims of the proposal,
2. a Methods section detailed enough so that someone familiar with your specialty can discern the appropriateness of the research design and methodology,
3. a Preliminary Results section may be included if you have started working on your research,
4. sections with the headings Expected Results and Alternative Outcomes,
5. a References Cited section, and
6. a Budget page where the costs of the project are presented along with the sources of the necessary funds.
7. a timetable that generally describes when you will complete each part of the research.

Off-Campus Research

If the majority of the thesis research is to be done and supervised at an off-campus site, the Thesis Proposal must clearly delineate the contributions by CSULB Thesis Committee members and the off-site personnel. Research funding from non-CSULB sources must also be clearly identified in the Budget.

Program of Study

The Program of Study is comprised of the courses that you and your Thesis Committee determine will fit the needs for your degree. This may include no more than 12 units taken prior to the Committee’s approval of the Program of Study. In addition, only 9 units are permitted from a different college or university. Each program must contain the following courses:

- Research Design (BIOL 696A; 3 units)
- Scientific Communication (BIOL 696B; 3 units)
- Seminars (BIOL 580)
- Graduate seminar classes (BIOL 66x; 2 units each, total 4 units)
- Thesis (BIOL 698; 6 units)
- Thesis Workshop (BIOL 696C; 1 unit)
- Directed Research (BIOL 697; 1-6 units)

A minimum of 30 units must appear on the program, including seminar and thesis units, but you may take other courses that are relevant or that you find interesting. *See the current CSULB Catalog for information on course requirements.* The courses on the formal program may be changed at a later date if approved by your Thesis Committee. Note: the seven-year limit to the graduate program begins on the date of completion of the earliest completed course on this program.

Graduate Credit Earned as a Senior Undergraduate

Guidelines on using these credits can be found in the [Academic Senate Policy: Credit Earned as a Senior, Graduate or other Post-Baccalaureate](#).

Failure to complete these first-year requirements by the end of the second semester in residence will result in the student being placed on Academic Warning.

Advancement to Candidacy

Advancement to candidacy signifies approval of a plan of study by the student's major department and college. Advancement to candidacy also confers catalog rights on graduate students. This means that if the student maintains continuous attendance and does not change their program of study or thesis proposal, they may graduate based on the requirements of the degree as set forth in the Catalog at the time the student advances to candidacy.

The requirements for advancement to candidacy are:

1. approval of a Thesis Proposal and Program of Study by the student's Thesis Committee, Department, and College.
2. completion of at least six units of courses required on the student's program of study with a minimum grade-point-average (GPA) of 3.0.
3. a cumulative, graduate GPA of at least 3.0 calculated on all upper-division and graduate-level coursework attempted by the student at CSULB after completion of a baccalaureate degree.
4. satisfactory completion of any assessments of competence that the Department/Graduate Studies Committee may require.

Within one week after your thesis proposal committee meeting, upload your revised thesis proposal to the Canvas Biological Sciences – Graduate Programs Assignments under Thesis Proposal Meeting for the correct semester. Provide the final Program of Study and Thesis Proposal Cover Sheet through DocuSign to your committee members; make sure they sign it and that it is complete. When both forms have been signed by all committee members, the forms will be automatically routed to the Graduate Advisor and the Graduate Services Coordinator. The Graduate Services Coordinator will forward your documentation to the College of Natural Sciences and Mathematics for final approval.

Second and Third Year

Besides taking your classes, doing research, and possibly fulfilling duties as a teaching assistant or graduate assistant, listed below are the requirements to complete your degree. Not fulfilling these requirements is cause for Academic Warning and Disqualification which can result in dismissal from the graduate program.

Checklist

- Complete courses on the official Graduate Program of Study and maintain a minimum GPA of 3.0.
- Apply to graduate online through your MyCSULB Student Center (by the preceding March 1 for Fall or Winter graduation, and by the preceding October 15 for Spring or Summer graduation). Dates appear at [Apply to Graduate \(Graduate Students\)](#).
- Finish the Research Project and have a well-formed draft of the Thesis (*before the start* of the graduation semester).
- Graduate students are encouraged to attend departmental seminars as part of their professional training.
- Submit a Research Progress Update (RPU) twice per year.
- Maintain continuous enrollment until graduation (GS700).

Research Progress Updates

The Research Progress Update (RPU) is a formal document that is an important part of the Master of Science program. It allows your thesis committee and the Graduate Studies Committee to assess your progress within the program. The RPU is not only important for continuing the program, but may be used to determine whether you will receive scholarships and TA/ISA/SA positions. These RPUs are a description of what you have accomplished during the period since the previous RPU or thesis proposal. It is important to keep your committee informed with your progress and to continue to make satisfactory progress in your research. Make sure to ask your committee members to help you when you get stuck. **First year graduate students do not submit RPUs.**

Masters students must submit the RPU at the beginning of the second academic year and continue to submit RPUs until the thesis is submitted to the Thesis and Dissertation Office. The RPU is due twice each year, at the beginning of the fall semester (September 30) and at the end of the spring semester (May 31).

Format

Begin your RPU with a brief summary of your project. Do not assume that your committee members remember the general idea or specifics of your project. The format of the RPU should follow the steps outlined in the Research Progress Update instructions from Canvas. Included should be a short summary of the project, hypothesis, specific aims that include data collected, analyzed, and the interpretation of those data. In addition, you should include what you are planning to do next and what is left to do for your thesis.

Your RPU will be formatted as a Word document or pdf. will upload your RPU to the appropriate semester's RPU folder in Canvas under Assignments. Also send it as an email attachment to your Thesis Committee members and the Graduate Advisor.

Notice: Not providing a Research Progress Update for a year indicates that you are not progressing and is a reason for termination from the MS degree program via the Administrative Academic Warning process. See the definition by the Academic Senate and in the University Catalog at following the links:

- [Academic Senate Policy: Academic Warning and Disqualification](#)
- [University Catalog](#)

Annual Review of Student Progress

A Student Progress Review will be implemented when concerns about student progress are raised. Instructions for this review will be sent to you by the Graduate Studies Committee when we ask to meet with you and your committee. The goal of the formal review is to:

1. ensure that a student progresses smoothly on their degree work, completing it approximately two years after their official MS degree program was established (Advancement to Candidacy);
2. identify problems with the scope and methods of the thesis research and resolve these problems in a timely fashion with input from the whole committee;
3. provide the Department Chair with information used in making TA/ISA/SA assignments (“satisfactory progress toward the degree” is one of the criteria the Chair uses to make assignments).
4. complete all requirements of the degree program within seven (7) years of the date the student initiated the program (i.e., the date [semester] when the student first completed a course appearing on the student's program of study).

Maintaining Continuous Enrollment

Students who fail to maintain continuous enrollment must **re-apply** to the University and to the Department of Biological Sciences for admission to the graduate program and be accepted (this includes having a thesis advisor agree to accept you). **Every semester, graduate students must be enrolled in at least one course (depending on your status).** If you have completed all of the courses on your Program of Study, you may then enroll in Graduate Studies 700 (GS 700) to maintain continuous enrollment, or you may take an educational leave. You may not be on education leave during your graduation term. See Leaves of Absence section below.

Enrolling in GS 700

For the first two terms of Graduate Studies (GS) 700, you must request an enrollment permit from the Graduate Services Coordinator, which will allow you to enroll online through MyCSULB. If you need a third term or more of GS 700 in order to complete your thesis, your thesis advisor must request permission from the Graduate Advisor and provide evidence of your progress and justification for the additional term(s).

GS 700 is offered through the CSULB College of Professional and Continuing Education (CPaCE). Class Numbers, registration deadlines, and other course information is available on [CPaCE: Graduate Studies 700](#), and is updated each term.

There are no late adds to GS 700. The Administration will not make exceptions! Reread the above for the ramifications of not signing up for GS 700 on time. The [Academic Senate Policy: Graduate Studies 700](#) is also available.

Leaves of Absence

In order for you to do research on your thesis, you must be registered at CSULB for each semester. If you must leave CSULB, you will need to file for an educational or medical leave of absence. Unapproved absences for one semester will result in the invalidation of your formal program (refer to CSULB Catalog under University Requirements). You must then reapply to the University as well as the MS program in Biology/Microbiology and find a faculty member that will agree to be your thesis chair/advisor. **Although it is not strictly required, you are encouraged to notify your thesis advisor, the Graduate Advisor, the Graduate Services Coordinator, or Department Chair if you are taking leave.** You do not need to specify whether you are taking educational or medical leave.

According to the CSULB Catalog:

Any registered undergraduate or graduate student, in good academic standing, may request an Education Leave. The student requesting an Education Leave must submit the Leave of Absence request in their MyCSULB Student Center. Requests from post-baccalaureate students require approval of the students' program or graduate advisor.

[-Academic Senate Policy: Education Leave](#)

Academic Warning

Graduate students must maintain a 3.0 GPA in all courses taken while at CSULB (since the B.A./B.S.) and must have a 3.0 GPA in courses on the formal Program of Study (any course on the Program of Study with a grade lower than a "C" will not count for the M.S. Degree and must be retaken). Any student whose GPA falls below a 3.0 will have one semester to bring the GPA up to 3.0; failure to do so in the next semester will trigger the termination of the student's degree program due to Academic Disqualification. Academic Disqualification will bar the graduate student from registering as a matriculated student at CSULB. See links on Policies on Academic Warning (formerly known as Academic Probation) and Disqualification for the definition and stipulations:

- [Academic Senate Policy: Academic Warning and Disqualification](#)

Changes in the Thesis Objectives or Committee

The Thesis Committee must approve any major changes in the thesis proposal, and a new proposal approval form needs to be filed with the Graduate Services Coordinator.

It sometimes becomes necessary to change the Thesis Committee membership, including the Thesis Advisor. This normally is not a major problem; it requires a formal Request for Change in Graduate Program form and, perhaps, a new thesis proposal. Consult with the Graduate Advisor.

Writing a Thesis Proposal

There are no universal rules for writing a thesis proposal. The purpose here is to give you some guidelines to follow and to let you know what is expected for your written thesis proposal. The outline below is a very common and logical layout that should be used when organizing your proposal. However, discuss the format of the thesis proposal with your advisor, because they may have specific reasons for you to alter this general format. The GSC highly recommends that you look at past proposals in your field that are considered high quality examples of how a proposal should be formatted and written (you can also learn from reviewing the bad ones for what not to do).

The quality of your written thesis proposal must satisfy your committee members **and** the Graduate Advisor. The Graduate Advisor will receive the final edited version of your proposal and will read the document for approval. It is possible that the Graduate Advisor will ask you for additional revisions even after your committee approves.

In general, it is wise to format your thesis proposal in the same format as your actual Master's thesis that will be submitted to the library. For example, the document will be double-spaced with one inch margins and proper page numbering. It should also follow the general design of a thesis with an Introduction (literature search, preliminary studies/results) that leads to a hypothesis being tested, Experimental Design and Methods, Results that are Preliminary and/or Expected, Discussion of potential results, a Discussion of potential alternate outcomes that may occur, and References. A budget for the expenses associated with your proposed project and a time table (which are not a part of the thesis) are the last sections of your thesis proposal.

Title Page

(1 page). This should look similar to the title page of the final thesis. It should list the Title, author and author affiliation, month and year of proposal, committee members, and Graduate Advisor.

Project Summary

(1 page). This is normally a one to two page abstract of your proposed project. It should introduce the background leading to the specific aims (hypothesis being tested) and provide a general experimental design, expected results, and general comments on the scientific significance of the outcome of the project.

Writing the Project Summary may be easier after writing the next four sections, as you will then have a more complete picture of the scope and nature of the work you are proposing as a thesis project.

Specific Aims

(Up to 1 page). Describe one to three specific aims of your project for a total of one paragraph to one page in length. Begin with an introductory section that includes a **clearly-written overall hypothesis**, followed by a description of each specific aim given (often as one sentence each). It is a good idea to highlight (e.g., bold, italics, etc.) the words **hypothesis** and **specific aims**. Alternatively, you may intersperse your Aims and Hypotheses with the next section, Background and Significance, if this fits better with the structure of your proposal. Consult with your Thesis Advisor.

Background and Significance

(5-10 pages). This is an important section of your proposal. It describes *background and details* about each of the specific aims given above. This section includes a more in-depth introduction of your scientific field. This section should include an extensive review of the literature important for understanding the hypothesis being tested. Some students may choose to introduce how each specific aim fits into the field and emphasize the significance of the proposed research to their field of biology. The information in this section should logically progress towards a final paragraph that culminates in the hypothesis(es) being tested in your set of experiments.

Preliminary Data

You may have already integrated your preliminary data in the Background and Significance portion of the proposal. If so, you do not need to have a Preliminary Data section.

If you have not integrated preliminary data into the previous section, then in this section, describe the preliminary data you have obtained (if any) that lead to and support your proposed hypothesis for your thesis research. In this section you will also demonstrate to your thesis committee that you are *capable* of doing a portion of the project (you understand the necessary techniques, etc.). It is also very useful if you refer your readers to the particular specific aim for which the preliminary data are applicable.

Research Design and Methodology

(5-10 pages). This is the most important section of your proposal. Here you will describe the design and methods of the experiments you plan to do under each specific aim. One approach is to first provide an overall general experimental design for each experiment followed by the detailed methods of the techniques used.

It is important that your readers are able to determine exactly what you are going to do in your experiments. If your committee cannot understand the design and methods then you are going to have a difficult time defending your proposal.

In addition, you will describe in this section how your data will be analyzed for each experiment. This includes the types of statistical analyses used for each experiment. You will also mention any collaboration you have with other scientists and how their work fits into your project.

Expected Results, Alternate Outcomes and Interpretations

(2-5 pages). Given that your thesis should be hypothesis driven, in most cases there will be clear expectations for the results of your study. You should describe the expected results and how they relate back to your hypothesis. Conversely, your hypothesis may not be correct, therefore you will provide alternative results, and indicate how they would modify your data interpretation and alter your hypothesis and potentially the other experiments in the proposal. You may choose to include a figure with hypothetical data to demonstrate the types of results you expect and how you plan to analyze and exhibit them in your thesis.

References Cited

See the official Master's Thesis Format available in this handbook. You should use a bibliography/citation manager (e.g. Endnote, Mendeley, RefWorks etc.) that is used within the laboratory. This will save you a lot of time and energy, especially if your lab already has a reference library.

Figures and Figure Legends

Figures should be formatted like a manuscript. The axes should be properly labeled with complete legends that explain the figure. Define the acronyms and statistical icons used in the legend. Find journal articles that are in your field to use as examples. Make sure your figures look professional.

Budget

The budget is not meant to be an in-depth analysis of costs. Rather, it is meant to provide an approximation of the total costs of doing your thesis research. Work with your Thesis Advisor on writing this brief budget.

Timetable

A realistic timetable should be included that describes when specific aims will be accomplished.

Published Manuscripts

If one of your chapters has been published in a journal, you may include a pdf of the paper as an appendix at the end of your thesis. You may not substitute the paper pdf in place of a chapter. Information from the published paper may also appear in the thesis chapters, but the text of the thesis chapters must conform to the library formatting specifications for theses.

Revision of Thesis Proposal after Committee Meeting

Following your proposal committee meeting, the committee will likely have suggestions and edits to the proposed research. The committee-approved, revised version of your written thesis proposal will be the version that you turn in to the Graduate Advisor for advancement to candidacy. **Upload an electronic version of your proposal to Canvas Assignments under “Revised proposal after Proposal committee meeting” for the correct semester.** In addition, email a PDF copy of the final proposal with the thesis committee signed paperwork to the Graduate Services Coordinator. It is possible that you may have this returned to you for further editing if the Graduate Advisor does not approve of the edited version.

Public Thesis Defense Information

Your Thesis Advisor should see a first draft of your written thesis approximately *two months* prior to the Public Defense to allow time for revisions. To prepare for the public defense and completion of your degree, be sure to complete the following:

1. Did you file a Request to Graduate with Enrollment Services for the appropriate semester/year?
 - Filing dates are listed in the Schedule of Classes, on [Student Records: Apply to Graduate](#).
 - Deadlines are established each year, and the Thesis and Dissertation Office deadline has no flexibility.
2. Register for an academic course or GS700 during the term you graduate, including Summer if you are graduating in Summer. (Otherwise, you do not need to enroll during the Summer to maintain continuous enrollment. The same is true for Winter. Only enroll in GS700 if you will graduate in Winter term.)
3. Make an appointment to meet with the Graduate Services Coordinator before registration ends during your last semester. This is to review your Graduate Program of Study and be sure you have actually completed all of your required courses to graduate.
4. Schedule a date and time for your Public Thesis Defense with your Thesis Committee early in the semester. Please plan for a two-hour session. Email the Graduate Services Coordinator with the following information, **one month in advance**:
 - a. the date/time of your Defense
 - b. your current thesis title
 - c. names of your committee members

With this information the Graduate Services Coordinator will schedule a room, post flyers, notify faculty and students, arrange to have a member of the Graduate Studies Committee attend the defense, and prepare a Thesis Defense sign-off form on DocuSign. The scheduling of a room can be difficult at the end of the semester, so please plan accordingly. The entire Thesis Committee and a member of the Graduate Studies Committee must be in actual or virtual attendance at the public defense.

The student may not defend the thesis during Final Exam Week or during the summer or winter terms.

5. The written thesis must be given to your Thesis Committee **three weeks prior** to the defense. Otherwise you must seek and be granted the approval of your thesis committee members and the Graduate Advisor in order to give your written thesis to your Thesis Committee with fewer than three weeks before your defense.
 - a. An electronic version must also be submitted to the Canvas Biological Sciences – Graduate Programs Assignments folder for “Thesis Uploads PRE Defense.”
 - b. Committee Members will read the thesis and provide feedback prior by the day of the defense.

6. Prepare for your oral public defense: Your oral public defense should be 30-40 min long and designed to appeal to a broad audience, yet demonstrate your research acumen. Be prepared to defend your work. Faculty, students, and members of the public can ask you questions and you must be able to defend your work, or you may not pass your defense. *Attend other students' Public Defenses to understand what is expected of you when you defend your research and what kinds of questions to expect.*

The Thesis Defense will begin with an introduction by the thesis advisor, followed by a public presentation by the student, and will end with questions from the audience. When the public question session concludes, everyone but the student and committee will be dismissed from the room. Immediately following, the student, the thesis committee, and a representative from the Graduate Studies Committee will hold a private in-depth discussion and defense of the research findings. It is very important that you are fully knowledgeable about your work and can adequately defend it. At the end of this private session with your committee and the GSC member, a decision by the Thesis Committee and GSC member will be made to approve or not approve the oral defense.

Your committee may:

- a. fail your oral defense and require you to orally defend your thesis again;
 - b. pass your oral defense of your thesis but require major or minor revisions to the written thesis that may require:
 - full committee approval;
 - approval by some of the committee members or only the Thesis Committee Chair approval.
7. Final thesis approval: After your defense you will be given a timeline to finish your revisions to submit to your Thesis Committee. The members of your Thesis Committee must approve of the revisions.
 - a. Once your committee agrees to all revisions, they will sign the signature page of your thesis through DocuSign. For Electronic Signature Page instructions, please see Electronic Signature Page.
 8. Submit the final Thesis Committee approved thesis to the Graduate Advisor via Canvas by the deadlines stated on the Canvas Announcements page.
 - a. The Graduate Advisor will read through the thesis and send it to the Chair of Biological Sciences for their signature. An electronic version of the final thesis must be submitted to Assignments on the Graduate Student Canvas site under the section "Thesis Uploads POST Defense." The folder "FINAL THESIS UPLOAD after Defense for APPROVAL to get CHAIRS SIGNATURE" will be clearly labeled on the Assignments page.
 - E-mail the Graduate Advisor that you have uploaded the final version of your thesis to the Dropbox folder.
 - IMPORTANT – this version should be as close to the Thesis and Dissertation Office submission as possible. The Graduate Advisor will deny Chair signature if there are glaring formatting/grammar errors or other issues.

If at any point in the review the Graduate Advisor feels that you have not done an adequate job preparing the thesis for the final review process, the Graduate Advisor will cease reading it and return

it to your Thesis Committee Chair. If this delay means that you miss the library deadline then you will have to postpone your graduation.

After you receive an approval email from the Graduate Advisor, the Department Chair will sign your thesis signature page through DocuSign.

9. Submit the Department-approved thesis to the Thesis and Dissertation Office. **You are responsible for knowing and following the [University Style Guide Manual](#).**

Tip: Use someone else's thesis (e.g., a recent graduate) as a template, and just type over it. The library has recently changed the formatting requirements, so use a thesis that conforms to the current style.

10. If you do not meet the deadlines for turning in your thesis to the Thesis and Dissertation Office, you need to:
 - a. change your graduation date, and
 - b. sign up for GS 700 for the next term.

The key to accomplishing these steps with minimum stress is to have a well-formed draft of your thesis approved by your thesis chair before the start of the semester in which you wish graduate.

Pro Tips for Graduate Students Preparing for Thesis Defense and Graduation

1. All Thesis Committee members and a Graduate Studies Committee member must be present at the thesis defense. Please notify the Committee members and the Graduate Services Coordinator as soon as possible if there are last minute changes to the defense time and place.
2. All Thesis Committee members and the graduate advisor must receive a copy of your thesis at least three weeks before your thesis defense date.
3. Thesis Committee members are busy and may be unavailable on short notice. Do not put off planning your thesis defense until the week before the departmental thesis deadline. If a member of your committee is not available, you will be forced to delay graduation. Arrange your defense date well ahead of the departmental deadlines. Committee members are allowed to be present at the defense via video. If you are planning on doing this then send them your presentation slides in advance so they can follow along. Before the public defense you should test your video call connection with the computer you will be using.
4. When a date and time have been agreed upon for your defense, schedule a room for the defense by emailing the Graduate Services Coordinator with your date and time, thesis title and members of the Thesis Committee.
5. Monitor who has signed DocuSign forms (the thesis signature page and library clearance form) and send polite reminders to those who haven't signed yet when deadlines are approaching.
6. The library thesis deadlines are strict. You will not receive an extension on the thesis submission deadline for any reason.

Thesis Preparation

The thesis should be written as if for publication in a scientific journal in your research field. The thesis should have **fewer than 100 pages**; remember not everything that is done on a project necessarily needs to go into the publication. This is not your magnum opus. Be sure to refer to the thesis preparation guidelines available on the Library web site. Just referring to a recently bound thesis is not enough guidance. The "Literature Cited" section must be formatted according to departmental guidelines as listed on the library website.

Do you remember that you took the BIOL 696 series in your first year of your program where you learned how to present information in an organized, coherent fashion? Please review your notes and efforts in that class, especially the advice on how to write captions for Figures and Tables.

Seven Year Limit

If you have not finished your program by the end of the seventh year (including official and unofficial leaves of absence) since you completed the first course on your program, your program will be Academically Disqualified and terminated from the MS degree program. You will receive a warning of this very important impending deadline during your sixth year. Talk to the Graduate Advisor or Graduate Services Coordinator if you do not understand this paragraph!

Thesis and Dissertation Office Website

The [Thesis and Dissertation Office](#) has a website that you can review for thesis information, deadlines, review process, etc.

Warnings Concerning the Thesis Review Done by the Thesis and Dissertation Office

The Thesis and Dissertation Office expects to review a perfect thesis in terms of format, punctuation, and grammatical usage. You must pay attention to the material from the reviewer on format; you and your committee should have already corrected other items that needed revision.

In the "literature cited" section, **you** must make certain that every citation in the text is correct and is listed in the "literature cited" section **and** that all listed references are, in fact, cited in the text. The best way to check this is to print out the Literature Cited section and read through your thesis, marking off references on the hard copy as you come across the in-text citation. Don't forget to include citations in figure captions in the Literature Cited.

Style Guidelines for Literature Cited for Masters Theses

These style guidelines refer to the references listed in the Literature Cited section of your thesis and the style of the in-text citations. The style required by the Biological Sciences Department is APA. There is no standard format for Biological Science journals so you will need to revise your literature cited formatting to submit your thesis work for publication. For this reason, we strongly encourage you to use citation software so all of the changes can be made quickly.

Each reference used in the text should correspond to one listing in the Literature Cited section and vice versa. This must be correct so that a reader can find your citations. **Please double check that all citations match in the text of your thesis and the literature cited section.**

Literature Cited Format

Basic Form

Author, A. A., Author, B. B., & Author, C. C. (Year). Title of article. *Title of Periodical*, volume number (issue number), pages. <http://doi.org/xx.xxx/yyyy>

Article in Journal with a Single Author

Scruton, R. (1996). The eclipse of listening. *The New Criterion*, 15(3), 5-13.

Article in Journal with Two Authors

Wegener, D. T., & Petty, R. E. (1994). Mood management across affective states: The hedonic contingency hypothesis. *Journal of Personality and Social Psychology*, 66, 1034-1048.

Article in Journal with 3-7 Authors

Kernis, M. H., Cornell, D. P., Sun, C. R., Berry, A., Harlow, T., & Bach, J. S. (1993). There's more to self-esteem than whether it is high or low: The importance of stability of self-esteem. *Journal of Personality and Social Psychology*, 65, 1190-1204.

Article in Journal with More than 7 Authors

Miller, F. H., Choi, M. J., Angeli, L. L., Harland, A. A., Stamos, J. A., Thomas, S. T., . . . Rubin, L. H. (2009). Web site usability for the blind and low-vision user. *Technical Communication*, 57, 323-335.

For two or more works by the same author list them chronologically by year.

If an author has works as a sole author and as the first author of a group then list the one-author works first chronologically.

If there are two or more works by the same author in the same year then assign a letter suffix to the year for each work.

Berndt, T. J. (1981a). Age changes and changes over time in prosocial intentions and behavior between friends. *Developmental Psychology*, 17, 408-416.

Berndt, T. J. (1981b). Effects of friendship on prosocial intentions and behavior. *Child Development*, 52, 636-643.

Book

Calfee, R. C., & Valencia, R. R. (1991). *APA guide to preparing manuscripts for journal publication*. Washington, DC: American Psychological Association.

Chapter in an Edited Book

O'Neil, J. M., & Egan, J. (1992). Men's and women's gender role journeys: A metaphor for healing, transition, and transformation. In B. R. Wainrib (Ed.), *Gender issues across the life cycle* (pp. 107-123). New York, NY: Springer.

Electronic Book

Davis, J. (n.d.). *Familiar birdsongs of the Northwest*. Available from <http://www.powells.com/cgi-bin/biblio?inkey=1-9780931686108-0>

Dissertation or Thesis from a Database

Biswas, S. (2008). *Dopamine D3 receptor: A neuroprotective treatment target in Parkinson's disease*. Retrieved from ProQuest Digital Dissertations. (AAT 3295214)

Online Datasets

United States Department of Housing and Urban Development. (2008). *Indiana income limits* [Data file]. Retrieved from http://www.huduser.org/Datasets/IL/IL08/in_fy2008.pdf

Computer Software (specialized software only; do not cite standard software like Microsoft Office)

Hayes, B., Tesar, B., & Zuraw, K. (2003). OTSoft: Optimality Theory Software (Version 2.1) [Software]. Available from <http://www.linguistics.ucla.edu/people/hayes/otsoft/>

In-Text Citation Format**Basic Form**

Use the author's last name and the year of publication in parentheses.

(Jones, 1998)

Two Authors

Research by Wegener and Petty (1994) supports...

(Wegener & Petty, 1994)

More than Two Authors

(Kernis et al., 1993)

Resources And Facilities

Navigating Grad Studies at The Beach

[Navigating Grad Studies at the Beach](#) provides a centralized online space for all grad students to learn about campus resources, student support services, and the path to graduation.

Graduate Center

The [Graduate Center](#) is located on the second floor of the library, and provides graduate school related resources and events for prospective and current post-bac students related to graduate studies.

Computer Facilities

Department Computing Facilities

There is a computer with statistical software dedicated to large dataset analysis in HSCI 128 for Biology students.

Campus Computing Facilities

There are two open computer labs on campus, (1) the Steve and Nina Horn Center, north campus, and (2) Spidell Technology Center on the first floor of the Main Library. Information may be found on [Computer Labs at the University Library](#).

CSULB Email

Every active student is provided their own CSULB email address and BeachMail account upon matriculation. For assistance with your email account or for additional information, please visit the following web page: [BeachMail Student Email](#).

Library Facilities

In order to assist graduate students, the library has many services that can maximize your efficiency in conducting research. Assistance with journals and other reference material is available at the Reference Desk on the first floor of the library, adjacent to the Spidell Technology Center. Students are encouraged to seek help and to inquire about the abstracts that are available for their topic of interest. You can access many library services online, including requesting papers and books that our library does not subscribe to through [BeachReach](#).

Graduate Student Mailboxes

Each graduate student is provided with a mailbox in the form of a hanging file folder, located in the filing cabinet in the main office.

Graduate Student Offices

Desks are available for student use in HSCI 135 and MIC 101 and may be used by TAs to host office hours. Use of these facilities are governed by the following rules:

1. Use of these rooms is a privilege that can be revoked at any time.
2. The rooms must be kept clean.
3. In order to obtain keys to either of these rooms, **please inquire in the department office, HSCI 104.**
 - a. For MIC 101, you must submit a key request with your faculty advisor's signature.
 - b. For HSCI 135, space is very limited, and access can only be granted to a small number of students. The department maintains a waitlist of interested students. They will coordinate your request and keep track of who has a key.
 - c. You will also be given a key to the large file cabinet next to the dividing screen in MIC 101. This cabinet is for students to store their valuables/food/etc. and **must be kept locked at all times.** Only students with keys may use this cabinet. Students will be charged for replacement keys to the cabinet.
4. The outside door does not automatically lock. It must be kept locked at all times. The door can be propped open for office hours.
5. The refrigerator is for food, but must be kept clean.
6. If there is food waste in the room, it must be taken out and placed in the dumpster in the HSCI parking lot. This is especially true on Friday afternoons or the weekend. It is the responsibility of the graduate students to monitor and carry this out.
7. MIC 101 will sometimes be used for meetings, such as graduate committee meetings or other departmental committee meetings when no other room is available. Students may be asked to vacate the room for the duration of the meeting.
8. Students can lay claim to the small desks with drawers, but there are no keys to lock them. Try to share the room and get along.

Campus Student Services

University Student Services are available in such areas as:

- [Bob Murphy Access Center \(BMAC\)](#) - accommodations and resources for students with disabilities
- [Basic Needs Program](#) - campus food pantry, emergency meal and housing assistance
- [Counseling and Psychological Services \(CAPS\) Office](#) - personal and health counseling
- [Community Clinic for Counseling and Educational Services](#)
- [Office of Financial Aid](#)
- [Veterans Service Center](#)

Teaching Associate, Instructional Student Assistant, and Student Assistant Positions

Details regarding available Teaching Associate (TA), Instructional Student Assistant (ISA), or Student Assistant (SA) positions are posted on [Jobs - Biological Sciences](#).

Consult your Graduate Advisor and the CSULB course catalog for classes/labs that fit your skill set and interests. Questions about applying for a TA, ISA, or SA can be directed to the Department Coordinator.

Application

See the [Biological Sciences Department](#) for updated instructions.

A complete application package for a new TA/ISA/SA must include the following completed documents*:

- Application Form
- Form SC-1
- Curriculum Vitae
- Official Transcripts
- 3 Letters of Recommendation

*You should have already submitted some of these documents during your application to the graduate program, which can be also used for your TA/ISA/SA application. If not, these must be provided. Returning TA/ISA/SA only need to fill out the application form.

Application forms can be downloaded from [Jobs - Biological Sciences](#).

Form SC-1 can be downloaded from [Faculty Affairs Forms](#) under Appointments/Recruitment.

The application process may have been modified after this handbook was revised; be sure to check the website for most recent procedures and forms for applying for these positions.

NOTE: TA/ISA/SA positions are not guaranteed. They are limited. Further, your performance as a student and whether you have worked as a TA/ISA/SA in the past can impact your chances of receiving a TA/ISA/SA position.

A teaching workshop series for TAs is offered by the Department of Science Education during the Fall semester. First-time TAs are expected to attend the workshop. Details may be found on [CNSM TA Professional Development Workshop](#) and are updated for each term the workshops run.

Department of Biological Sciences Graduate Student Awards

These awards are to be offered by the Department of Biological Sciences for graduate students in Biology and Microbiology. Awards will be given pending availability of Department funds. Nominations for awards will be reviewed and evaluated by the Biology Department Graduate Studies Committee and the Department Chair. If the Graduate Studies Committee decides there are no qualified nominees, then no award will be made in a given year. Call for nominations will occur in Spring of each academic year and will close at the end of April. The evaluation committee will make award decisions and the awards will be given at the Spring Biology Department Graduate Student- Faculty mixer.

Outstanding Graduate Teaching Associate

The outstanding graduate teaching associate award is for graduate student TAs in Biology department courses who have demonstrated superior teaching performance in the classroom. TAs may be nominated by faculty or staff who have direct supervision of the TA and can evaluate their performance and student evaluations.

Eligibility

To be eligible the nominee must have taught for at least two semesters. The student must be in good standing in their graduate program and making sufficient progress towards their thesis (e.g., completed thesis proposal, signs of significant research progress in biannual thesis updates, and graduate class performance). A student on Academic Warning for low GPA is ineligible for the award for at least 1-year following reinstatement. A student may only receive the award once in their graduate tenure.

Evaluation Criteria

Evidence of TA excellence should be based on faculty or staff evaluation of teaching performance, student evaluations, and student GPA for the lab. The student must have demonstrated excellence in classroom instruction while maintaining rigor and the highest level of professionalism. Nominators must include the following information in their letters of support: examples of teaching acumen, lab GPAs, and some description about how the TA ranks among peers in comparable courses. Evidence of teaching assistant excellence may include examples where student has presented innovative methods for communicating information in the classroom, while following standards established to ensure consistency among lab sections, high quality grading and commenting on student writing assignments while maintaining appropriate rigor, and providing supplemental office hours and review sessions that may benefit all students within the lab.

Outstanding Graduate Researcher

The outstanding graduate researcher award is for graduate students in the Department who have demonstrated exceptional performance in research related activities. Students may be nominated by faculty who have direct supervision of students and can evaluate their performance relative to other graduate students in the program and within their field.

Eligibility

Student must be advanced to candidacy and still matriculated in order to be eligible. Student must be in good standing in their graduate program and making sufficient progress towards their thesis (e.g., completed thesis proposal, signs of significant research progress in biannual thesis updates, and graduate class performance). A student on Academic Warning for low GPA is ineligible for the award for at least one year following reinstatement. A student may only receive the award once in their graduate tenure.

Evaluation Criteria

Evidence of excellence in research should be based on faculty or staff evaluation of work performance, external awards, and quality of research products. The student must have demonstrated excellence in research (e.g., professional society best student paper awards, high quality peer-reviewed publications, competitive scholarships and fellowships, competitive external research grants). Nominators must include the following information in their letters of support: examples of research excellence and quality, how these achievements stand out within the field, and description of how the student researcher ranks among peers in comparable programs at other Universities.