

**GRADUATE PROGRAM GUIDELINES**

**BIOLOGICAL SCIENCES DEPARTMENT**

**CALIFORNIA POLYTECHNIC STATE UNIVERSITY**

**SAN LUIS OBISPO, CALIFORNIA**

**Revised September 2009**

These graduate guidelines of the Biological Sciences Department supplement those given in the University Catalog. The information given here pertains to departmental requirements for

admission to the degree program, and to procedures and requirements for the pursuit of a Master of Science degree in Biological Sciences. Other information regarding the requirements and procedures for admission to the University as a graduate student is given in the University Catalog.

## CURRICULUM SUMMARY

### Standard Master's Degrees in Biology

The Biological Sciences Department offers programs leading to a Master's of Science and Master's of Arts degrees in Biology. A student may work toward a standard Master's Degree in Biological Sciences through either of two plans, one involving a research Thesis (M.S. degree) and the other involving additional course work and an independent study project (i.e., the M.A. degree). Students interested in working toward a Teaching Credential in addition to a Master's Degree should contact the Teacher Preparation Coordinator in Biological Sciences immediately upon enrollment.

The formal program of study for both Master's Degrees must include 45 units of committee-approved graduate work, at least 30 units of which must be at the 500-level. At least 18 units of the formal program of study must be completed after the student has been advanced to candidacy. A grad point average of 3.0 or higher is required in all courses included in the Formal Plan of Study (see below).

Required units of approved courses in the Biological Sciences Department at the 400- and 500-levels are as follows:

	<u>M.S. Plan</u>	<u>M.A. Plan</u>
Cellular Biology (BIO 501)	4	4
Biology of Organisms (BIO 502)	4	4
Population Biology (BIO 503)	4	4
Seminar in Biology (BIO 590)	3	3
Thesis, including oral defense (BIO 599)	9	—
Individual Study, including written report (BIO 500)	—	4
Selected from 500-level courses	6	11
Additional 400- and 500-level courses	15	15
Comprehensive Exam	Part I	Part I & II
<b>TOTAL UNITS</b>	<b>45</b>	<b>45</b>

- NOTE: (1) 32 units of course work must be taken in residence within the Biological Sciences Department at Cal Poly.
- (2) Only 4 units of College Teaching Practicum (BIO 575) can be used on the Formal Study Plan.
- (3) Parts I and II of the Comprehensive Exam are explained on page 5.
- (4) Three units of Bio 500 can be used as 500-level units for the M.S. plan.

## **M.A./M.S. Specialization in Stem Cell Biology**

In addition to the standard Biology M.S. and M.A. degrees, the Department will be offering a specialization in Stem Cell Biology. In the Fall of 2009, we will be finalizing the details of this specialization and will formally update and include this information in this Graduate Handbook as soon as the plan is approved by the Academic Senate. Fall 2009 graduate students in this program will be advised on specific (known) courses and requirements as well as the finalized degree plan during this transition. Stem Cell students should plan on filing the same forms (e.g. formal study plan, advancement to candidacy etc.) and meeting the same overall unit and GPA requirements as other students in the Biology Master's programs.

### **OUTLINE OF ADMISSION STEPS, REQUIREMENTS AND TIMELINE**

#### **Admission**

- ◆ Eligibility determined by Admissions Office
- ◆ Acceptance determined by Graduate Coordinating Committee of the Biological Sciences Department
- ◆ Admission classification categories:
  - Graduate Classified-students believed to have necessary background and preparation
  - Graduate Conditionally Classified-students with deficiencies in their background

#### **Informal Study Plan**

- ◆ must be prepared at the time of initial enrollment

#### **Graduation Writing Requirement**

- ◆ should be attempted by the second quarter of enrollment

#### **Core Courses (BIO 501, BIO 502, BIO 503)**

- ◆ should be taken the first or second year

#### **Choice of Advisor for either the M.S. or M.A. Plan**

- ◆ as soon as possible, but no later than the end of the third quarter of enrollment

#### **Formal Study Plan**

- ◆ filed by the end of third quarter of enrollment

#### **Choice of Thesis Committee (Thesis Plan)**

- ◆ as soon as possible after choosing an advisor, but no later than the end of the third quarter of enrollment

#### **Advancement to Candidacy**

- ◆ clearance for completion of the degree
- ◆ documents completion of requirements (Graduate Writing Requirement, Formal Study Plan, satisfaction of any conditions of admission, and 3.0 GPA)
- ◆ by the end of the second year of enrollment

#### **Completion of Comprehensive Exam Part I: Graduate Record Examination in Biology**

- ◆ a scaled score of 650 or more is considered passing
- ◆ should be completed by the third year of enrollment

**For M.S. degree students:**

**Approval of Thesis Proposal**

- ◆ as soon as possible but no later than the time of Advancement to Candidacy

**Oral Defense of Thesis**

- ◆ no later than the eighth week of the quarter in which a student plans to graduate

**Approval of Thesis Content**

- ◆ by student's advisor and thesis committee

**Approval of Thesis Format**

- ◆ by Research and Programs Graduate Office and accepted by Kennedy Library

**For M.A. degree Students:**

**Completion of Comprehensive Exam Part II: Essay**

- ◆ essay exam covering three general areas of biological sciences (see page 5)

**Request for Graduation Evaluation & Application for Master's Degree**

- ◆ establishes quarter of graduation (maximum of 7 years from initial work completed on Formal Study Plan) and identifies any unmet requirements prior to registration for the last quarter of enrollment
- ◆ **Degree Posted and Diploma Sent**

## CHOICE AND ROLE OF ADVISOR AND COMMITTEE

The Chairperson of the Graduate Coordinating Committee (GCC) is the initial advisor for all graduate students; however, students are expected to select a Graduate Advisor from among the faculty of the Biological Sciences Department as soon as possible, but no later than the end of their third quarter. The faculty member must inform the Chairperson of the GCC, in writing, that he/she has agreed to act as the Graduate Advisor for the student (or use attached Graduate Committee form). Each graduate student should keep the Chairperson of the GCC updated on his/her progress toward the degree by communicating with the Chairperson each quarter.

The **Graduate Advisor for a Course Work Plan student** is involved in helping the student with his/her Formal Study Plan, and in selecting and planning a project for the Individual Study- (BIO 500) requirement. The advisor has the responsibility of approving the Request for Advancement to Candidacy as well as the Formal Study Plan. The Graduate Advisor for a Course Work Plan student is also involved in preparing and grading the essay portion (Part II) of the Comprehensive Examination.

The **Graduate Advisor for a thesis student** is involved in helping the student with his/her Formal Study Plan, selecting and planning the thesis research project, and selecting a Thesis Committee. The advisor has the responsibility of approving the Request for Advancement to Candidacy as well as the Formal Study Plan.

The **Thesis Committee** is composed of the Graduate Advisor (Chairperson) and at least two other Biological Sciences Department faculty members selected by the advisor and the student. At least one of these must represent an area of biology outside the student's field of interest. Cal Poly Faculty members from outside the department are permissible; however, a majority of the committee must be faculty members of the Biological Sciences Department. The Department chair is an ex officio member of all thesis committees. Additional persons outside the Biological Sciences Department may serve in a consultative capacity as nonvoting members. The functions of the student's Thesis Committee include helping the student develop a suitable thesis project, evaluating the oral defense of the thesis, and approving the thesis. **The student should complete and submit the signed Thesis Committee form to the Graduate Coordinator no later than the end of the third quarter of enrollment.**

Thesis students are urged to select a Graduate Thesis Advisor (Chairperson of the Thesis Committee) and members of the Thesis Committee carefully, so that the committee is composed of a well-balanced set of experts who can advise the student in the various fields encompassed by the research project. To ensure continuity of advice and feedback as the research progresses, the committee should remain intact throughout the graduate program of each student. Unavoidable changes in committee composition of thesis topic must be mutually acceptable to all persons involved. Students should schedule a formal committee meeting during the first year to discuss the study plan and thesis proposal. Subsequent meetings should be held to formally approve the thesis proposal.

If a student would like to change advisors or a faculty member wishes to dismiss a student, a formal written request for change must be submitted to the Chair of the Graduate Coordinating Committee by either the student or advisor. The Chairs of the GCC and Department will meet with both the advisor and student to determine whether the dispute can be resolved. If both student and the faculty advisor agree, a formal change of advisor must be filed (forms to be created) and the GCC will evaluate the request.

## INFORMAL STUDY PLAN

At the time of initial enrollment in the Biological Sciences Department graduate program, each student should prepare, with the help of an advisor, an Informal Study Plan (see pamphlet alley or Graduate Coordinator for forms). The Informal Study Plan will include at least 12 units of approved course work. The course work must be at the 400 or 500 level. Up to 2 units of Seminar in Biology (BIO 590) may be included in these 12 units. Completion of the Informal Study Plan with a GPA of 3.0 or higher is used as an indication of whether or not the student will be allowed to continue graduate studies in the Biological Sciences Department. These 12 units subsequently may be included in the Formal Study Plan following courses cannot be used for either the Informal Study Plan or the Formal Study Plan:

- Special Problems for Advanced Undergraduates (BIO 400)
- Senior Project (BIO 461 and BIO 462)

## FORMAL STUDY PLAN

The Formal Study Plan (see attached form) indicates whether a student is completing a Thesis or the Course Work Plan and specifies the courses to be taken to fulfill the requirements for the Master's Degree. The Formal Study Plan must comply with minimal requirements and regulations of the California Education Code and Cal Poly regulations (see the University Catalog) as well as requirements of the Biological Sciences Department. These include:

1. Completion of a minimum of 45 units within seven years after admission to the graduate program.
2. Completion of not less than 32 units in residence.
3. Completion of not less than 30 units in courses organized primarily for graduate students (500-level).

The Formal Study Plan must specify the following:

1. At least 40 units of non-seminar courses at the 400- and 500-levels. Twelve of these 40 units must be in Cellular Biology (BIO 501), Biology of Organisms (BIO 502), and Population Biology (BIO 503), which should be taken during the first two years of enrollment. Inclusion of more than 6 units taken in another department of the University on the Formal Study Plan requires special consideration and consensus approval by the student's thesis committee (or GCC for Course Work Plan students). If Curriculum and Methods in Biological Sciences (BIO 424) is part of the Formal Study Plan, no more than 3 units may be used from another department.
2. A minimum of 3 (but no more than 5) units of Seminar in Biology (BIO 590).
3. For M.A. students, at least 4 units of Individual Study (BIO 500). A written report of the results of each Individual Study must be approved by the student's advisor and maintained in the student's file. Individual Study (BIO 500) may not be used on the Formal Study Plan of thesis students.
4. For M.S. students, at least 9 units of Thesis (BIO 599). Requirements for the thesis are given below.

### **The Formal Study Plan should be filed by the end of the third quarter**

All background course work deficiencies should be completed by this time. Students should have satisfied the Writing Proficiency Exam by this time.

## **Advancement to Candidacy**

Advancement to candidacy is a step that clears the student to complete his/her degree. It certifies that 1) the Graduate Writing Requirement has been completed, 2) the Formal Plan of Study filed, 3) any conditions of admissions have been completed and 4) the student has maintained a GPA of at least 3.0.

### **ADDITIONAL REQUIREMENTS FOR THE M.A. PLAN**

Students in the Course Work Plan must also satisfactorily complete both sections of a Comprehensive Examination. The Comprehensive Examination includes Part I (Biology GRE) and Part II (Essay).

**Part I of the Comprehensive Examination** consists of the Graduate Record Examination (GRE) in Biology. A scaled score of 650 or more on the GRE exam in Biology is considered a passing score for Part I of the Comprehensive Examination. A student should apply to take the Biology GRE no later than four months prior to the quarter in which he/she expects to graduate. If the student does not pass on the second attempt, he/she may be disqualified from the graduate program.

**Part II of the Comprehensive Examination** consists of essay questions in three areas of biology selected by the student in consultation with the student's advisor. The student's advisor and two other faculty will help guide the student in studying for this exam and will prepare essay questions for the student in these areas. The student must answer 75% of the essay questions to the satisfaction of the advisor and the faculty that prepare the exam. Up to eight hours will be allowed for Part II of the Comprehensive Examination. The student should apply to the Graduate Coordinator to take Part II of the Comprehensive Examination before the end of the second week of the quarter in which the examination is to be taken. Each of the two parts of the Comprehensive Examination may be repeated once. In the event that only one part is failed, only that part need be repeated. If the student does not pass on the second attempt, he/she may be disqualified from the graduate program.

### **ADDITIONAL REQUIREMENTS FOR THE M.S. PLAN**

Thesis students must satisfactorily complete **Part I of the Comprehensive Examination** consisting of the Graduate Record Examination in Biology. A scaled score of 650 or more on the GRE exam in Biology is considered a passing score. A student should apply to take the Biology GRE no later than four months prior to the quarter in which he/she expects to graduate. Thesis Plan students must complete a research thesis and enroll in Thesis (BIO 599). The thesis is based on a student's own research. Thesis (BIO 599) is open only to a graduate student having the approval of the student's Graduate Advisor. Satisfactory progress on the thesis will result in a grade of SP for the quarters the student is enrolled for thesis. Letter grades will be assigned by the advisor for all 9 units only after the thesis is approved by the student's Thesis Committee

#### Thesis Proposal

**Each thesis student is expected to present a thesis proposal in both written and oral forms at a meeting with his/her Thesis Committee by their fourth quarter of enrollment at the latest.** The student must provide the committee members with a copy of the research proposal **at least one week before the meeting.** The proposal should outline the overall research plan in sufficient detail so that the committee may evaluate its feasibility and acceptability as an appropriate research project. The Thesis Committee may require modification of a thesis proposal until all persons involved mutually agree upon the objectives, methodology, and other aspects of the proposal. Since the thesis proposal constitutes a formal statement of research to be

completed for the degree, the student should have a reasonable expectation that the thesis will be acceptable if all elements of the proposal are completed in a satisfactory and timely manner. Since the Thesis Committee assumes the responsibility of advising the student to assure the success of a student's research, the department expects that the student will seek regular reviews of the research by the Thesis Advisor as well as periodic reviews by the committee. The committee will provide constructive feedback such that potential excesses or deficiencies in the research become apparent to the student at a time when corrective measures can be taken to rectify any problems.

#### Thesis and Oral Defense of the Thesis

**A complete and essentially final copy of the thesis must be provided to all committee members no less than four (4) weeks before the oral defense of thesis is scheduled.** The GCC highly recommends that a complete first draft of the thesis be reviewed before the defense is scheduled. The style of the thesis should follow that specified in the Council of Biological Editors Style Manual; however, students are urged to contact the Research and Graduate Programs Office for specific information on the acceptable format of theses submitted to that office. The student, advisor and committee may reserve the right to reschedule the oral defense if the guidelines have not been met. The oral defense of the thesis is scheduled by the Thesis Advisor no later than the eighth week of the quarter in which a student plans to graduate. Failure to meet this deadline may mean that the student will not graduate that quarter. The time and place of the thesis defense must be announced to all faculty and graduate student body of the department no less than one (1) week prior to the time of the defense. The thesis defense will be open to all interested individuals. The student should be prepared to give a seminar discussing the immediate and related subject areas as well as the results of the thesis. After that seminar, the student will meet with his/her committee for a more in depth discussion of the thesis (defense). The committee may require modifications in the thesis following the defense. The student is expected to have any such modifications reviewed by his/her committee before submitting a final draft of the thesis to the Research and Graduate Programs Office. Acceptance of a thesis by the department consists of approval by a majority of the committee members and signing of the Thesis Acceptance Form.

The candidate's advisor should notify the Chairperson of the GCC of the results of the defense in writing within two class days of the defense. When the final draft of the thesis is completed, the student must submit it to the Graduate Studies Office for final approval. Once the GSO approves the thesis, it must be submitted to the library (Digital Commons) electronically. See the GRP website for specific instructions.

### **OTHER REQUIREMENTS FOR GRADUATION**

1. All graduate students are required to maintain a GPA of 3.0 or higher in all courses included on the Formal Study Plan. A GPA below 3.0 for two sequential quarters of enrollment will result in the GCC reviewing the student's record(s) and the possibility of recommending to the office of the Dean of the College of Science and Mathematics the dismissal of the student.
2. All graduate students must fulfill the Graduate Writing Requirement as specified by the Trustees of the CSU system. This can be done by passing the Writing Proficiency Examination or passing an approved English composition or literature course with a C or better and receiving certification of writing proficiency.

3. Students should submit a Request for Graduation Evaluation to the Records Office at least one quarter prior to the quarter in which they expect to graduate.
4. When all requirements for the degree have been completed, students must submit an Application for Graduation to the Records Office.

### **ADDITIONAL EXPECTATIONS OF GRADUATE STUDENTS**

Graduate programs include a variety of academic experiences beyond formal course work. Ideally these experiences should occur in an environment with scholarly exchange of ideas and information between faculty and students as well as among peers. Several activities are organized by the Biological Science Department to foster this scholarly exchange and graduate students are expected to participate in each of them.

The Biological Science Department conducts a Speaker Series forum in which notable off-campus experts from various fields are brought to campus to give seminars and interact with students. The visiting scientists often consult with graduate students concerning their thesis projects. **Graduate students are expected to attend Seminar Series events.**

As part of the culminating experience of a M.S. student's thesis program he/she must present a formal seminar on his/her research project at a "thesis defense". This seminar is open to the public and is a venue to showcase the student's work as well as serve as a guide for the student's thesis committee members whether the student has satisfactorily completed his/her thesis requirements. Attendance at thesis defense seminars is an important part of the scholarly exchange process and provides a positive showing of support for one's colleagues. **Graduate students are expected to attend thesis defense seminars.**

### **ADMISSION REQUIREMENTS**

In addition to Cal Poly university-wide admission requirements (see catalogue or admission form), admission into the graduate program in the Biological Sciences Department requires the following:

- ◆ A minimum G.P.A. of 3.0 in the last 90 quarter units (60 semester units) taken as an undergraduate.
- ◆ Satisfactory scores on the Graduate Record Examination Aptitude Test. The sum of the Verbal and Quantitative section scores should be at least 1000.
- ◆ Two letters of reference from persons familiar with recent academic or work performance of the applicant.
- ◆ Two official transcripts in sealed envelopes from each college or university previously attended. Transcripts should be sent to the University Admissions Office.
- ◆ A one page typed Statement of Purpose describing your reasons for pursuing graduate study in the Biological Sciences at Cal Poly, your specific areas of interest, and any other information you consider pertinent. This Statement of Purpose is critical in the evaluation of candidates.

Candidates with GPA or GRE scores below the minimum will be considered only under extenuating circumstances

Course work in the following areas is considered as important background for success in the program and is a prerequisite for attaining Classified status. Students who are deemed to have deficiencies in their preparation are Conditionally Classified and required to take courses to strengthen their background. These courses cannot be included as part of the Formal Study Plan.

Prerequisites for attaining Classified Status:

- ◆ One year of introductory course work in biology including, but not limited to, general biology, general zoology, general botany, and general microbiology.
- ◆ One course in each of the following areas:  
genetics, ecology, physiology, taxonomy (systematics of a major group of organisms), general inorganic chemistry, organic chemistry, physics, college algebra & trigonometry.

Admission for Fall quarter is the standard policy; admission at other times will be considered only under extenuating circumstances. **The deadline for applications for Fall quarter admission is February 1<sup>st</sup>.** This is a departmental policy, and differs from the University deadline listed in the current catalog.

### FORMS

Copies of the forms most commonly used by graduate students are attached.

1. Faculty Advisor and Committee form
2. Informal Study Plan
3. Formal Study Plan (note if there are changes, students will also need to submit an Amendment to the Formal Study Plan)
4. Advancement to Candidacy
5. Application for Essay Examination
6. Application for Graduation
7. Thesis Acceptance Form