



**Master of Science in Biology**  
***Graduate Student Guide***  
***2013-2015***

California State University, Bakersfield  
Department of Biology

**CSUB Master of Science in Biology Program  
Graduate Student Guide  
2013-2015**

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## **1. INTRODUCTION**

Greetings prospective and entering graduate students!

The Biology faculty developed this handbook to introduce our Master of Science program in Biology. If you are considering CSUB as a possible choice for graduate school, our handbook will give you some insight into our goals, curriculum, and strengths. If you are already admitted to our program, the handbook will inform you of our policies, procedures, and requirements. In any event, our handbook will be a useful tool toward determining your graduate school and professional objectives.

Todd McBride, Ph.D.  
Professor and Chair

Anna L. Jacobsen, Ph.D.  
Assistant Professor and Biology Graduate Coordinator

## **2. PROGRAM DESCRIPTION**

**Department Chair:** Dr. Todd McBride

**Program Coordinator:** Dr. Anna Jacobsen

**Program Office:** Science Building I, 114

**Program Office Telephone:** (661) 654-3089

**Program Office email:** [vmayorga@csub.edu](mailto:vmayorga@csub.edu)

**Website:** [www.csub.edu/Biology](http://www.csub.edu/Biology)

**Graduate Faculty:** D. Germano, A. Jacobsen, C. Kloock, A. Lauer, T. McBride, L.M. Moe, R.B. Pratt, P. Smith, A. Stokes, K. Szick

The Department of Biology offers a graduate program leading to a Master of Science in Biology degree. The Master of Science with a thesis option is intended to prepare students for professional positions, such as in state and federal agencies and environmental consulting, and for further graduate studies. The Master of Science with a non-thesis option is intended for working professionals, especially public school teachers, and emphasizes course work. A broad range of faculty research interests, easy access to diverse biological environments, and a range of modern research facilities permit the student to select from a broad spectrum of research topics.

Faculty interests include field biology, conservation biology, physiology, comparative morphology, plant ecophysiology, plant anatomy, micro- and molecular biology, vertebrate paleontology, evolution, ecology, systematics, and behavior.

Some of the special features of our program include:

- Close, individual guidance by highly skilled faculty
- Incorporation of science pedagogy and teaching experience
- Late afternoon and evening course offerings, making the program accessible for persons who work during the day
- Close partnerships with the private and public sector. With appropriate approval, students will be able to conduct their thesis research off campus in a partnership with a company or governmental agency.
- Well-equipped, modern laboratory facilities and access to numerous field sites in the area

Laboratory and/or field research is an integral component of the program, which emphasizes a “hands-on” approach with close faculty mentoring. Research experience also enables students to hone investigative skills relating to experimental design, implementation, data analysis, and interpretation. On-campus research facilities include an ~20 acre Environmental Studies Area, the Facility for Animal Care and Treatment where raptors are treated and rehabilitated (located within the ESA), and two modern greenhouses. In addition, faculty research labs within the department contain state-of-the-art research facilities for physiology, molecular, genetics, biotechnology, histology/anatomy, and morphology research. This includes several growth chambers, an ultracentrifuge, digital gel documentation systems, three -70° C freezers, several thermal cyclers, a 2D protein analyzer, refrigerators, access to a shared scanning electron microscope (operated through the Department of Geology), and several research-grade light microscopes.

### **3. GRADUATE PROGRAM PERSONNEL**

**ASSOCIATE VICE PRESIDENT FOR ACADEMIC PROGRAMS** • oversees all CSUB graduate programs; approves or disallows petitions to change or to grant waivers to the University and Department Graduate Degree Requirements as published in the CSUB Catalog.

**DEAN OF NATURAL SCIENCES, MATHEMATICS AND ENGINEERING** • provides input to faculty and students concerning the degree program.

**DEPARTMENT OF BIOLOGY GRADUATE COORDINATOR** • reviews admissions files and notifies Admissions and Records of departmental admissions decisions, advises incoming students, advises non-thesis students, administers non-thesis exams, coordinates graduate activities of the Department of Biology, and serves as the Biology Department liaison to other graduate programs and the Graduate Student Center.

**DEPARTMENT OF BIOLOGY GRADUATE COMMITTEE** – three-person committee (including Graduate Committee Chair) selected by the Department of Biology that oversees that program, reviews admissions files, and reviews petitions (e.g. admissions petitions or to extend the 5 yr program time to completion limit) submitted to the MS Biology program.

**GRADUATE COMMITTEE CHAIR** • a tenured or tenure-track faculty member from within the CSUB Department of Biology who oversees the acceptance, program establishment, progress, and completion processes as the advisor to a thesis student; resolves problems between thesis students and faculty and informs thesis students of departmental regulations; serves as final departmental quality control on thesis projects.

**GRADUATE COMMITTEE** • three-person committee (including Graduate Committee Chair) selected by the thesis graduate student that oversees progress and completion processes. This committee must contain at least two tenured or tenure-track faculty members from within the CSUB Department of Biology. One outside member of the committee is permitted as long as they are an expert within the student's field of research and have attained a minimum of a BS degree within their field of expertise.

## **GRADUATE FACULTY IN THE DEPARTMENT OF BIOLOGY\***

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<b>NAME</b>	<b>INTERESTS</b>
Dr. David J. Germano	Vertebrate Biology, Ecology, Conservation Biology
Dr. Anna L. Jacobsen	Plant Structure Function, Plant Evolution and Ecology
Dr. Carl T. Kloock	Science Education, Behavioral Ecology
Dr. Antje Lauer	Microbiology, Marine Biology
Dr. Todd McBride	Human/Muscle Physiology
Dr. L. Maynard Moe	Botany, Ecology, Taxonomy, Evolution
Dr. R. Brandon Pratt	Plant Physiological Ecology
Dr. Paul T. Smith	Entomology, Systematics & Evolution, Genetics
Dr. Amber Stokes	Chemical Ecology & Animal Physiology
Dr. Kathy Szick	Molecular and Cell Biology

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\*see the Department of Biology website for additional information about faculty and their research interests.

#### **4. APPLICATION PROCESS AND PROGRAM REQUIREMENTS**

##### **Application for the Master of Science in Biology**

To apply the Master of Science Degree in Biology, please visit [www.csumentor.com](http://www.csumentor.com) to initiate the application process. In addition to the online application form, prospective students must provide the following:

1. Completed Departmental Application Form available from the Biology Department website: <http://www.csub.edu/biology/>
2. Official transcripts from all colleges and universities attended.
3. Score reports for the GRE General Test (international students must also submit TOEFL scores).
4. Three (3) letters of recommendation from persons familiar with your performance in the classroom and potential for independent research.

##### **Application deadlines:**

Fall Quarter: March 15

Winter Quarter: September 15

Spring Quarter: January 15

*Send all completed departmental application materials to:*

**Graduate Admissions  
c/o Renee Rugnao  
Office of Graduate Studies  
California State University, Bakersfield  
9001 Stockdale Highway  
Bakersfield, CA 93311-1022**

If you have any questions, please contact Dr. Jacobsen, the Biology Graduate Coordinator (email: [ajacobsen@csub.edu](mailto:ajacobsen@csub.edu); phone: (661) 654-2572).

## **5. ADMISSIONS REQUIREMENTS FOR THE MASTER OF SCIENCE IN BIOLOGY**

1. A bachelor's degree in biological or related sciences from an accredited 4-year college or university.
2. An undergraduate GPA of at least 3.0 in the last 90 quarter or 60 semester units of course work.
3. Graduate Records Examination (GRE) scores that are at the 50<sup>th</sup> percentile or greater for both the verbal and quantitative sections.
4. Formal acceptance into the program following review of completed application materials by the Graduate Program faculty within the Department of Biology.

\*Students interested in pursuing the thesis-option are encouraged to contact individual faculty members to learn more about their research programs and/or to find out if they are accepting graduate students.

## **6. GRADUATE STUDENT CLASSIFICATIONS**

**Unclassified Post Baccalaureate Status** - The Unclassified Post Baccalaureate status allows students to take graduate level courses on a course-by-course basis without being formally accepted into the MS program. Requirements for Post Baccalaureate status are listed below.

1. An acceptable baccalaureate degree from an accredited institution.
2. An undergraduate GPA of at least 3.0 in the last 90 quarter (60 semester) units of course work or an approved petition to the Graduate Committee of the Department waiving this requirement by proposing other evidence of adequate prior academic preparation.

**Classified Graduate Student** - Acceptance as a Classified Graduate Student indicates that space has been made available for the student within the program and that the student has met the minimum preparation requirements to commence the program as listed below.

1. An acceptable baccalaureate degree from an accredited institution.
2. An undergraduate GPA of at least 3.0 in the last 90 quarter (60 semester) units of course work and Graduate Records Examination scores of 50<sup>th</sup> percentile or greater (verbal and quantitative), or an approved petition to the Departmental Graduate Committee waiving this requirement by proposing other evidence of adequate prior academic preparation.
3. Acceptance into an academic advising relationship with a departmental faculty member (thesis-option).
4. Acceptance will only be granted if space is available for the student in the program.

**Conditionally Classified Graduate Status** - Students who fail to meet entirely one or more of the criteria for admission as a Classified Graduate Student may, at the discretion of the Biology Graduate Admissions Committee, be admitted as a Conditionally Classified Graduate Student. These conditions may include, but are not limited to, specific prerequisite courses, GPA, GRE scores, etc. Once the student has "remedied" all conditions specified by the Biology Graduate Admissions Committee, the student classification will be changed to Classified Graduate Student.

Students admitted as a Conditionally Classified Graduate Student are not allowed to enroll in any 600-level courses. They are restricted to 500- and 400-level courses for which they have met prerequisites.

Admission to Classified Status must be accomplished within two calendar years after acceptance as a Conditionally Classified Graduate Student. No more than three courses (15 units) may be taken for graduate credit until all prerequisites have been satisfied.

**Advancement to Candidate Status** - Acceptance as a candidate indicates that the student has completed at least 30 quarter units within the approved Plan of Study and that there is a reasonable expectation that the student will complete all remaining requirements within one year. Classified Graduate Students will be advanced to Candidate Status when they have met the following criteria:

1. Completion of all requirements for Classified Status.
2. Completion of at least 30 quarter units of courses applicable to the Master of Science Degree in Biology with a grade of "B-" or better and graduate GPA of at least 3.0.

Students in the thesis track must also:

3. Obtain approval of the student's Master's thesis research topic by the student's Departmental of Biology Graduate Thesis Chair and Thesis Committee.
4. Obtain certification by the student's thesis advisor that there is a reasonable expectation that the student will satisfactorily complete the Master's thesis within one year.

Admission to Candidate Status must be attained within two calendar years after acceptance as a Classified Graduate Student.

All requirements and graduation are to be completed within five calendar years after initial acceptance as either a Classified or a Conditionally Classified Graduate Student. The five-year time limit can be extended by petition to and approval from the Departmental Graduate Committee.

Completion of all requirements for the Master of Science in Biology requires satisfactory completion of all courses in an approved Plan of Study and satisfactory completion of an exit examination (non-thesis) or thesis, including oral examination and any revisions required by the Thesis Committee or Departmental Graduate Committee (thesis), and maintaining a 3.0 GPA. Additionally, students must have received at least a C in a course in order for the course to count toward their required graduate courses and students must have taken at least 50% of their course units at the 500- or 600- level.

## **7. COURSE REQUIREMENTS FOR THE MASTER OF SCIENCE IN BIOLOGY**

### **Thesis-Option (45 units):**

BIOL 505 Current Topics in Biology (9 units)  
BIOL 510 Advanced Writing and Experimental Design (4 units)  
BIOL 605 Seminar in Biology (3 units)  
BIOL 690 Thesis (8 units)  
BIOL 691 Thesis Defense & Submission (1 unit)  
\*ELECTIVES (400-, 500-, or 600-level courses) (20 units)

### **Non-thesis-Option (50 units):**

BIOL 505 Current Topics in Biology (9 units)  
BIOL 510 Advanced Writing and Experimental Design (4 units)  
BIOL 605 Seminar in Biology (3 units)  
BIOL 680 Non-thesis Examination (1 unit)  
\*ELECTIVES (400-, 500-, or 600-level courses) (33 units; minimum of 8 units of these at the 500- or 600- level)

### **\*ELECTIVE COURSES offered in Biology**

BIOL 404 Conservation Biology  
BIOL 406 Advanced Ecology  
BIOL 424 Evolutionary Genetics  
BIOL 430 Advanced Molecular Genetics  
BIOL 433 Developmental Biology  
BIOL 451 Functional Analysis of Vertebrate Structure  
BIOL 455 Physiological Measurements  
BIOL 462 Physiological Plant Ecology  
BIOL 470 Evolution  
BIOL 477 Special Topics in Biology  
BIOL 540 Graduate Practicum in Teaching of Biology  
BIOL 577 Advanced Topics in Biology  
BIOL 580 Research

\*Selection of elective courses must be approved by Graduate Coordinator (non-thesis option) or Thesis Committee (thesis option). If approved prior to course registration, elective courses may include appropriate graduate-level courses offered by departments other than Biology.

**Graduate students must also pass the Graduation Writing Assessment Requirement (GWAR) with a score of 8 or above.** It is recommended that students take this writing proficiency examination in the first year of their graduate studies.

## **COURSE DESCRIPTIONS**

**BIOL 505 Current Topics in Biology (3)** Current topics of special interest to graduate students in Biology. Topics and content will vary as announced but will include contemporary or interdisciplinary areas of interest. Two hours lecture and three hours laboratory. Repeatable. Prerequisites: Graduate standing or consent of instructor and an upper division course appropriate to the topic.

**BIOL 510 Advanced Experimental Design and Analysis (4)** Course covers how to effectively communicate biological science to the scientific community, effective methodology in experimental design, and proposal writing, including writing specific aims and creating a budget. Three hours lecture and three hours laboratory. Prerequisites: Graduate standing or consent of instructor.

**BIOL 540 Graduate Practicum in the Teaching of Biology (3)** Theory and practice in teaching biology at the undergraduate level. Regular meetings with the faculty sponsor and supervised experience in course design, lecturing, tutoring, laboratory preparation and delivery, administering and scoring examinations, and leading classroom discussions. One hour lecture and six hours laboratory. Prerequisites: Graduate standing.

**BIOL 577 Advanced Topics in Biology (5)** Laboratory or field-based graduate level biological topics in a specialized area of contemporary biology, such as genetics, ecology, microbiology, physiology, behavioral biology, systematics, or molecular biology. Topics will be announced. May be repeated for credit as topics change. Two hours lecture and nine hours laboratory. Prerequisites: Graduate standing or consent of instructor and an upper division course appropriate to the topic. Lab fee required.

**BIOL 580 Research (1-5)** Independent research: the student formulates a problem and research design in consultation with the faculty, conducts the investigation, compiles and analyzes the data, and presents the findings in written form. Repeatable. Although repeatable, a maximum of five units may be applied towards the Master's degree. Available by consent of the advisor.

**BIOL 605 Seminar in Biology (3)** Student presentation and discussion of reviews and reports focusing on current literature and scientific research in the areas of Biology. Two hours lecture and three hours laboratory. Prerequisites: Graduate standing.

**BIOL 680 Non-Thesis Examination (1)** Comprehensive examination of graduate-level breadth administered by the Departmental Graduate Committee. Can be repeated only once. Prerequisites: Approved petition for advancement to candidacy and consent of the graduate advisor.

**BIOL 690 Thesis (1-8)** Laboratory, field investigation, or a combination of both investigating a research problem. Repeatable. Although repeatable, a maximum of eight units may be applied towards the Master's degree. Prerequisites: Approved petition for advancement to candidacy.

**BIOL 691 Thesis Defense (1)** Preparation, completion (including final submission to the library), and oral defense of a written thesis approved by the Thesis Committee and the Departmental Graduate Committee. Prerequisites: Approved petition for advancement to candidacy and consent of the thesis advisor.

*List of Acceptable Elective Courses from within the Department of Biology:*

BIOL 404 Conservation Biology (5) Study of problems related to biological conservation, including endangered species issues, environmental laws, and mitigation solutions required by regulations. Includes site visits to conservation areas, collection of biological data, preparation of assessment reports, and study of elements of environmental impact reports. Two hours lecture and nine hours laboratory. Prerequisites: BIOL 301 and 306, or equivalent, or consent of instructor.

BIOL 406 Advanced Ecology (5) Advanced study of ecology. Emphasis includes evolutionary perspectives of physical and biological environments, population dynamics, and ecosystem stability. Laboratory emphasis will be placed on analytical methods used in the field. Laboratory includes weekend field trips. Two hours lecture and nine hours laboratory. Prerequisites: BIOL 301 and 306, or equivalent, or consent of instructor. Field trip fee required.

BIOL 424 Evolutionary Genetics (5) Contributions of molecular genetics to the understanding of evolution. Emphasis is placed on the processes of mutation, selection, and random genetic events as they affect the genetic architecture of natural populations and the process of speciation. Topics include quantitative inheritance, population genetics, phylogenetics, conservation genetics, and bioinformatics. Two hours lecture and nine hours laboratory. Prerequisites: BIOL 301 and 304, or equivalent, or consent of instructor.

BIOL 430 Advanced Molecular Biology (5) Advanced concepts of molecular genetics, including DNA damage and repair, homologous recombination, transposition, alternative splicing and posttranscriptional regulation of gene expression. Additional topics that contribute to an understanding of gene expression will include recent advances in genomics, proteomics and bioinformatics. Two hours lecture and nine hours laboratory. Prerequisite: BIOL 301 and 330, or equivalent, or consent of instructor.

BIOL 433 Developmental Biology (5) Development and growth of plants and animals at the cellular and organismic level. Embryogenesis of organisms from fertilization to the establishment of organ systems. Two hours lecture and nine hours laboratory. Prerequisites: BIOL 301 and 304, or equivalent, or consent of instructor. Lab fee required.

BIOL 451 Functional Analysis of Vertebrate Structure (5) Anatomy of vertebrates interpreted in terms of function including support, running, jumping, digging, climbing, swimming, flying and feeding. These functions are studied in their environmental context and as evolutionary adaptations. Independent student project will focus on one of these adaptations. Two hours lecture and nine hours laboratory. Prerequisites: BIOL 351, or equivalent, or consent of instructor. Lab fee required.

BIOL 455 Physiological Measurements (5) Physiological measurement techniques focusing on data collection and analysis of selected vertebrate organ systems. Discussion topics include electrical properties of nerve, cardiac and skeletal muscle tissues, pulmonary and metabolic function, and sensory physiology. Emphasis will be placed on understanding the mechanisms of how each system works and the benefits and limitations of the measurement techniques currently

available. Two hours lecture and nine hours laboratory. Prerequisites: BIOL 255 or 357, BIOL 301 and BIOL 305, or equivalent, or consent of instructor. Lab fee required.

BIOL 462 Physiological Plant Ecology (5) The physiological basis of growth, reproduction, survival, abundance, and geographical distribution of plants. The ecological context of these processes will be examined by considering how plants are affected by interactions with the physical, chemical, and living components of their environment. Topics include the adaptive significance and evolutionary origins of plant functional traits. Two hours lecture and nine hours laboratory. Prerequisites: BIOL 301 and 305, or equivalent, or consent of instructor. Lab fee required.

BIOL 470 Evolution (4) Study of the processes of organic evolution. Three hours lecture and three hours laboratory. Prerequisites: Open only to graduate students and senior Biology majors who have completed 40 units of Biology courses.

BIOL 477 Special Topics in Biology (1-5) Contemporary or interdisciplinary problems of current interest. Typical topical areas might include pollution, population or integrative biological phenomena. Although repeatable for different topics, a maximum of 5 units may be applied to the major or minor, subject to advisor approval.

## **8. ADDITIONAL ACADEMIC INFORMATION**

### **MENTORING**

It is our belief that the quality of a student's graduate experience is, in large measure, a reflection of mentoring. Too often, especially in graduate programs that have large faculty-student ratios, students do not receive adequate faculty supervision. In our program, each student is carefully mentored throughout his/her tenure at CSUB. No student will be without an adviser at any time in his/her course of study. Our aim is to include our graduate students in the “every-day life” of the department: offering teaching opportunities, inviting participation in faculty research programs, and welcoming involvement in departmental social events.

Upon acceptance into our program, a student will be advised by a faculty advisor/committee chair (thesis option) or the Graduate Coordinator will serve as advisor for students in the non-thesis option. The thesis student should consult with the Committee Chair to select two other committee members and complete a COMMITTEE MEMBERSHIP & CONCENTRATION OUTLINE form.

### **ACADEMIC COURSE LOAD**

Eight quarter units of graduate course work per academic term are considered the minimum full-time graduate unit load. Typical enrollment is 8-12 units per term.

### **CONTINUED ENROLLMENT**

Graduate students must maintain continuous enrollment in the graduate program. An unauthorized leave of absence of more than 2 consecutive quarters (i.e. the student is not enrolled in any courses or continuing enrollment units) requires that a student reapply to the biology graduate program and reapply to the university (including payment of the non-refundable application fee). Graduate courses that a student completed prior to their leave of absence from the program will be reassessed and will not be automatically accepted for credit in the graduate program upon reapplication. Applicants will be required to meet all program and university admissions requirements at the time of reapplication and, if accepted, will be accepted under the catalog and graduate handbook of their renewed admissions year.

### **CONCENTRATION OUTLINE**

Each thesis graduate student must file a signed COMMITTEE MEMBERSHIP & CONCENTRATION OUTLINE form that will detail the approved courses for the Master of Science degree. The COMMITTEE MEMBERSHIP & CONCENTRATION OUTLINE form must be completed before the student advances to candidacy.

The requirements for the Master's Degree in Biology (thesis) includes 45 units of committee approved graduate work, **at least 50% of which must be at the 500/600-level.** Additional courses (prerequisites and/or deficiencies) of study may be required, but are not counted as part of the 45 units of committee approved course work. The program of study should be developed in consultation with the chair of the student's graduate committee with a focus on gaining depth of knowledge in a particular sub-discipline of biological science. The formal program of study must be submitted for approval to the student's graduate committee before the end of the second quarter after admission to the program.

The requirements for the Master's Degree in Biology (non-thesis) includes 50 units of graduate coordinator (or other Biology faculty advisor) approved graduate work, at least 50% of

which must be at the 500/600-level. Additional courses (prerequisites and/or deficiencies) of study may be required, but are not counted as part of the 50 units of approved course work. The formal program of study must be submitted for approval to the Graduate Coordinator before the end of the second quarter after admission to the program.

### **ACADEMIC CONTINUATION**

Graduate students must maintain an overall GPA of 3.0 and earn at least a C (2.0) in all courses, except those graded credit/no credit. Students who are conditionally classified because of GPA deficiencies may not earn less than a B (3.0) in the courses on their approved CONCENTRATION OUTLINE. Any student whose overall GPA falls below 3.0 for two consecutive quarters, or who receives more than three grades of C (2.0) or lower in any graduate course, will be placed on academic probation and/or dismissed from the program.

### **NON-THESIS/THESIS PROGRAM CHANGE**

Students may wish to change their track within the MS Biology program during their tenure as a student. A student must obtain the written consent of their current or future thesis advisor as well as the Biology Graduate Coordinator to switch their status within the program between non-thesis and thesis tracks (see appendix for the Thesis/Non-thesis Change Form).

### **NON-THESIS COMPREHENSIVE EXAM**

A comprehensive written examination will be the culminating experience for each student in the Master's program (non-thesis option). The exam will be offered once each quarter: at 9 AM on the first Friday of November, the first Friday of March, and the first Friday of May (the exam date may change depending on annual variations in holiday schedules, but any deviations from the above posted schedule would be announced within the first three weeks of each quarter). It is the responsibility of the student to make sure that they are available to take the exam during the term they intend to graduate. It is the student's responsibility to sign-up with the graduate coordinator to take the exam on the scheduled exam date.

### **THESIS**

Research leading to the thesis will be the culminating experience for each student in the Master's program (thesis option). The thesis will be a substantial product of original empirical research carried out under the close supervision of the student's Committee Chair and two additional committee members.

It is expected that the student and his/her committee chair will work closely together to identify elective courses and possible research topics for a thesis. Together the chair and student will select and ask two additional members to serve on the graduate committee. A minimum of two Committee members must be tenured/tenure-track faculty members in the Department of Biology. Upon approval of the Committee Chair, a faculty member from another department or a professional member from the community or a faculty member from another university with pertinent background to the research topic and the appropriate terminal degree (Ph.D.) may sit on the committee as the third member.

A student must obtain the written consent of each member who will serve on the thesis committee (see Appendix for COMMITTEE MEMBERSHIP & CONCENTRATION OUTLINE form).

In some cases a student will rely primarily on the Committee Chair for thesis development; in other cases the committee members will be consulted more substantively. It is the student's responsibility to keep all committee members informed of his/her progress and to ask their Committee Chair for guidance in determining the appropriate level of involvement for the committee members. Students are encouraged to meet with their committee at least twice per year to discuss progress.

Students should be enrolled in BIOL 690 (Thesis) while work toward the thesis is being conducted, analyzed, and written. Thesis students must be enrolled in BIOL 691 during the quarter in which their thesis is defended (including a publically announced and presented thesis talk as well as an oral defense of the thesis with their graduate committee) and approved. If the student does not complete their thesis during this quarter, they will be assigned a grade of NC (no credit) and must re-enroll in BIOL 691 in the quarter in which they defend their thesis. Credit for BIOL 691 will only be received once the approved thesis has been submitted to the library.

Information regarding thesis guidelines and submission procedure are maintained by CSUB's Walter Stiern Library and may be accessed at:

[www.csub.edu/library/MasterThesisApp.pdf](http://www.csub.edu/library/MasterThesisApp.pdf)

## **COMMENCEMENT**

Students will be allowed to participate in the graduation ceremony if, and only if, the student's thesis has been defended and approved by their graduate committee or they have successfully passed the non-thesis comprehensive exam. **Students should therefore not make plans for participating in the graduation ceremony until it becomes evident that the thesis/comprehensive examination will indeed be completed and passed on time!**

**In addition, students are reminded that they need to apply to the University for Graduation. More information on university graduation application deadlines can be found at: <http://www.csub.edu/admissions/graduation/>.** Note: the application for graduation is due to the university well before the expected quarter of graduation. Students should make sure that they are checking these deadlines and that they submit their application into the university on time.

## **9. FINANCIAL ASSISTANCE**

**Graduate Equity Fellowship:** Graduate Equity Fellowships are renewable for a maximum of six academic terms, pending available monies and satisfactory performance in one's graduate program. The fellowships are based upon financial aid eligibility. Fellows are expected to be full-time graduate students and to complete their degree requirements within the one- or two-year time frame of their respective Master's program. Applicants are also encouraged to pursue advanced degrees (PhD, etc.) upon completion of study at CSUB, an issue worth consideration in the development of the Personal Statement. Fellows may be expected to participate in some special activities during the academic year. Although renewable, students must reapply for the fellowship in spring term for the next academic year.

**Graduate Student Tuition Fee Waiver (GSTFW) Program:** A minimal number of graduate student tuition fee waivers are available each year. The goals of the GSTFW program include 1) increasing the number of CSUB graduate students who would otherwise not attend without financial assistance; 2) to provide student assistant support to graduate programs that have demonstrated notable enrollment growth; and, 3) to assist graduate programs to recruit students from underrepresented groups. Nominations by faculty are requested toward the end of spring quarter.

**Graduate Assumption Program of Loans for Education (Graduate APLE):** Once a Graduate APLE participant has obtained a graduate degree, the California Student Aid Commission (Commission) may assume a total of \$6000 in outstanding educational loans in return for a cumulative total of three consecutive full-time years of eligible teaching service at one or more colleges or universities in California. Check the Financial Aid Home Page for additional information and programs.

**Graduate Teaching Assistantships:** A limited number of paid teaching assistantships are available. See the biology website for application forms.

**Graduate Research Assistantships:** Inquire with thesis advisor regarding availability.

**Students are encouraged to check with the office of Financial Aid & Scholarships for additional information on programs, scholarships, and fellowships.**

## **10. TIMELINE AND GRADUATE CHECKLIST**

Listed below are some of the steps that need to be completed during each year of your tenure in the MS Biology program. Additional information about some of these steps is included below the checklist for each year.

### **Year 1**

\_\_\_\_\_ 1) If required, pass the writing proficiency examination (GWAR). (More information is included below).

\_\_\_\_\_ 2) Complete any course deficiencies if admission was granted as a conditionally classified graduate student (or complete any other requirements needed to in order to be admitted as a fully classified student). Deficiency courses do not count toward completion of units for the MS Biology program. Admission to Classified Status must be accomplished within two calendar years after acceptance as a Conditionally Classified Graduate Student. No more than three courses (15 units) may be taken for graduate credit until all deficiencies have been satisfied. Once deficiencies have been remedied, students should submit an APPLICATION FOR ADMISSION TO CLASSIFIED STATUS to the Biology Graduate Coordinator.

\_\_\_\_\_ 3) Pass the GRE General test if acceptance into the program was granted without passing test scores (The 50th percentile or 1000 combined score on verbal and quantitative sections is required for passing; or the equivalent of this score in the new scoring system). Check CSUB Testing office for dates.

\_\_\_\_\_ 4) Establish your formal Program of Study by completing a CONCENTRATION OUTLINE form in consultation with the Chair of your Graduate Committee (thesis) or with the Graduate Coordinator (non-thesis). Most courses that you take before you establish a formal Program of Study (in your Concentration Outline) may be put on this program and count toward your degree completion credits, up to a total of 15 units.

Non-thesis students: meet with the Graduate Coordinator to determine a CONCENTRATION OUTLINE.

Thesis students: Establish a graduate committee and complete and file a COMMITTEE MEMBERSHIP and CONCENTRATION OUTLINE form.

\_\_\_\_\_ 5) Thesis students should meet with their Graduate Committee and present a thesis research proposal (orally and in writing) by the end of their first year. Students should work with their Graduate Committee Chair to develop an approved draft of the thesis project which will then be circulated among the other members of the Committee for comments. Students must complete any and all revisions suggested by the Committee before being accepted as a candidate.

**PASS THE WRITING PROFICIENCY EXAMINATION (GWAR)** –All graduate students who apply for a master's degree must demonstrate upper-division writing competency. If the student has completed this requirement during his/her baccalaureate program with a score/grade

that meets the minimal requirements specified by the graduate program, then certification of the upper-division writing competency will be accepted. Students who have not yet completed this requirement must register for and pass the Graduation Writing Assessment Requirement (GWAR) with a score of 8 or above. The exam is administered three times each academic year.

### **Years 2-4**

\_\_\_\_\_ 1) For students admitted as Conditionally Classified, deficiency courses or requirements must be completed by the end of Year 2. Once deficiencies have been remedied, students should submit an APPLICATION FOR ADMISSION TO CLASSIFIED STATUS to the Biology Graduate Coordinator (if this was not completed in Year 1).

\_\_\_\_\_ 2) Complete graduate course work as outlined in the student's approved Concentration Outline. At least 50% of all graduate coursework must be at the 500- or 600- level.

\_\_\_\_\_ 3) File for advancement to Candidacy by completing the APPLICATION FOR ADVANCEMENT TO CANDIDACY. Admission to candidate status must be attained within two calendar years after acceptance as a Classified Graduate Student and when there is a reasonable expectation that a student will satisfactorily complete the MS Biology program within one year.

Non-thesis: Non-thesis students may file for advancement to candidacy after they have completed 30 units of graduate course work as outlined in their approved Program of Study. They must have Classified status in the program, have completed 30 course units with no less than a B- in any course, and have a GPA of at least 3.0. Applications for Advancement to Candidacy for Non-thesis students are submitted to the Biology Graduate Coordinator for evaluation.

Thesis: Thesis students may file for advancement to candidacy after they have completed 30 units of graduate course work as outlined in their approved Program of Study. They must have Classified status in the program, have completed 30 course units with no less than a B- in any course, and have a GPA of at least 3.0. Additionally, thesis students must have successfully defended their thesis proposal prior to advancement to candidacy. Applications for Advancement to Candidacy for Thesis students are submitted to their Committee Chair.

### **Year 5**

\_\_\_\_\_ 1) All requirements and graduation are expected to be completed within five calendar years (most students will graduate within 2 to 3 years of being admitted as a Classified Graduate Student). The five-year time limit can be extended by petition to and approval from the Biology Department Graduate Committee.

## **Year of Graduation**

\_\_\_\_\_ 1) Apply to the University for Graduation (<http://www.csub.edu/admissions/graduation/>). Note, the application for graduation is due to the university well before the expected quarter of graduation. Students should make sure that they are checking these deadlines and that they submit their application into the university on time.

\_\_\_\_\_ 2) Non-thesis students must pass the comprehensive written examination for non-thesis students. The exam will be offered once each quarter, most quarters the exam will be offered at the following dates and times: at 9 AM on the first Friday of November, the first Friday of March, and the first Friday of May (check with the Graduate Coordinator to confirm the test date). It is the responsibility of the student to make sure that they are available to take the exam on the date and time that it is offered during the term they intend to graduate. It is the student's responsibility to sign-up to take the exam with the graduate coordinator.

\_\_\_\_\_ 3) Thesis students should enroll in BIOL 691 in their final quarter after they have finished their thesis research and writing. A Thesis Defense should be scheduled. The Thesis Defense will consist of a research presentation and must be announced publicly at least 2 weeks prior to the presentation. This formal presentation should be a detailed review of the Thesis research and should involve slides and/or video displays. The presentation should be 40-50 minutes in duration with an additional 10-15 minutes for questions from the general audience.

Following the presentation, the Candidate will field additional, specific, and in-depth questions from their Graduate Committee. After this question and answer session is completed, the Committee will excuse the Candidate and, in private, decide to accept or reject the thesis. Credit for BIOL 691 will only be granted if the thesis is successfully completed and accepted by a student's Graduate Committee. And following submission of the completed thesis to the library by the required date for completion within that quarter.

\_\_\_\_\_ 4) Thesis students must submit their thesis to the Walter Stiern Library before they will be approved for graduation and allowed to walk. Information regarding thesis guidelines and the submission procedure are maintained by CSUB's Walter Stiern Library and may be accessed at: [www.csub.edu/library/MasterThesisApp.pdf](http://www.csub.edu/library/MasterThesisApp.pdf)

## **11. TWO-YEAR RECOMMENDED COURSE PLANS**

Following the two provided course plans below (these are meant as rough-guidelines and include flexible recommendations) may assist students in completing their MS degree within the recommended two-year completion time.

MS BIOLOGY						T
Thesis Track Full-time* Sample Schedule (8 quarter units required to be full-time):						
	Fall		Winter**		Spring	
Year 1	Course	Units	Course	Units	Course	Units
	BIOL 505	3	BIOL 510	4	BIOL 505	3
	BIOL 577 or 4xx***	5	BIOL 577 or 4xx***	5	BIOL 580	5
	Total units:	8	Total units:	9	Total units:	8
			<i>If applicable, student should apply for admission as a fully classified student at the end of this quarter.</i>		<i>BIOL 580 units are typically used for thesis proposal preparation and defense.</i>	
Summer	<i>Many thesis students choose to conduct thesis research over the summer following their thesis proposal defense.</i>					
	Fall		Winter		Spring	
Year 2	Course	Units	Course	Units	Course	Units
	BIOL 505	3	BIOL 577 or 4xx***	5	BIOL 605	3
	BIOL 577 or 4xx***	5	BIOL 690	4	BIOL 690	4
	Total units:	8	Total units:	9	BIOL 691*****	1
					Total units:	8
	<i>Student can apply for Advancement to Candidacy after successful completion of 30 units, formation of committee, and successful proposal defense and completion of a Plan of Study.</i>		<i>Applications for graduation are due early in this quarter--students should check on-line for application due dates. Students should make sure that they have met university graduation requirements (for example, the</i>		<i>Graduation!</i>	
<b>Total Units:****</b>						<b>50</b>
*Depending on financial aid requirements, students may not need to be on a full-time schedule. The schedule included above is designed to assist students that require full-time enrollment and who are trying to graduate within two years.						
**Students who are conditionally classified should apply for admission as a classified graduate student at the end of the second quarter of their first year. Only 15 units of course work can be applied toward degree as a conditionally classified student. Requirements for admission as a classified student should be addressed in the first two quarters of enrollment.						
***More than 50% of units must be taken at the 500- or 600-level. Thesis students should not take more than 4 courses at the 400-level.						
****Only 45 units are required for graduation--students not requiring full-time enrollment may wish to not enroll in one of the BIOL 577/4xx courses listed above).						
*****This course can be repeated if students do not successfully complete their thesis defense and thesis submission to the library on the first course attempt.						

**MS BIOLOGY** **NT**

**Non-thesis Track Full-time\* Sample Schedule (8 quarter units required to be full-time):**

	Fall		Winter**		Spring	
<b>Year 1</b>	Course	Units	Course	Units	Course	Units
	<b>BIOL 505</b>	3	<b>BIOL 510</b>	4	<b>BIOL 505 or 540****</b>	3
	<b>BIOL 577 or 4xx***</b>	5	<b>BIOL 577 or 4xx***</b>	5	<b>BIOL 577 or 4xx***</b>	5
	Total units:	8	Total units:	9	Total units:	8
			<i>If applicable, student should apply for admission as a fully classified student at the end of this quarter.</i>		<i>Student should meet with the Graduate Coordinator to confirm their Plan of Study.</i>	
	Fall		Winter		Spring	
<b>Year 2</b>	Course	Units	Course	Units	Course	Units
	<b>BIOL 505 or 540****</b>	3	<b>BIOL 505 or 540****</b>	3	<b>BIOL 577 or 4xx***</b>	5
	<b>BIOL 577 or 4xx***</b>	5	<b>BIOL 577 or 4xx***</b>	5	<b>BIOL 605</b>	3
			<b>BIOL 680****</b>		<b>BIOL 680</b>	1
	Total units:	8	Total units:	8	Total units:	9
	<i>Student can apply for Advancement to Candidacy after successful completion of 30 units and development of a Plan of Study in consultation with the Graduate Coordinator for biology.</i>		<i>Applications for graduation are due early in this quarter--students should check on-line for application due dates. Students should make sure that they have met university graduation requirements (for example, the</i>		<i>Graduation!</i>	
					<b>Total Units:</b>	<b>50</b>

\*Depending on financial aid requirements, students may not need to be on a full-time schedule. The schedule included above is designed to assist students that require full-time enrollment and who are trying to graduate within two years.

\*\*Students who are conditionally classified should apply for admission as a classified graduate student at the end of the second quarter of their first year. Only 15 units of course work can be applied toward degree as a conditionally classified student. Requirements for admission as a classified student should be addressed in the first two quarters of enrollment.

\*\*\*More than 50% of units must be taken at the 500- or 600-level. Students should not take more than 4 courses at the 400-level.

\*\*\*\*Students are not eligible for BIOL 540 until after they have successfully completed at least one quarter of graduate course work and until after they are a classified graduate student. BIOL 540 may only count toward the degree once.

\*\*\*\*\*Students may consider taking the comprehensive exit exam (BIOL 680) during the winter quarter so that they have an additional quarter to re-take the exit exam if needed. This course can be retaken if students do not pass exam on their first attempt.

## **APPENDICES**

### **Additional forms and concentration outlines**



## APPLICATION FOR ADVANCEMENT TO CANDIDACY (THESIS)

### PART I

1. STUDENT NAME: \_\_\_\_\_

2. ID #: \_\_\_\_\_

### PART II

As Committee Chair for the above named student, I recommend his/her advancement to candidacy. The student has demonstrated a satisfactory level of scholastic competence by meeting the criteria established for this program of study.

The student has completed \_\_\_\_\_ units with a \_\_\_\_\_ grade point average.

A concentration outline has been completed and approved. A copy is attached.

The following members comprise the student's thesis graduate committee:

Name _____	Position _____
Name _____	Position _____
Name _____	Position _____

The program requires that the student complete a thesis project proposal before advancement to candidacy can occur. The student completed this requirement on \_\_\_\_\_ (date).

The thesis/project is tentatively entitled:

\_\_\_\_\_

### SIGNATURES

STUDENT \_\_\_\_\_ Date \_\_\_\_\_

COMMITTEE CHAIR \_\_\_\_\_ Date \_\_\_\_\_

GRADUATE COORDINATOR \_\_\_\_\_ Date \_\_\_\_\_

### PROCEDURES

A graduate student who has been granted classified standing is normally advanced to candidacy by his/her Committee Chair. Essentially, the chair is providing an affirmative recommendation of eligibility to continue with the program, attesting to the student's demonstration of a satisfactory level of scholastic competence.

Along with the Committee Chair recommendation, students must prepare and submit an approved Committee Membership & Concentration Outline form. The Committee Chair must complete and submit this form along with an approved study plan to the Office of Admissions & Records to record the information requested for advancement to candidacy.

**APPLICATION FOR ADVANCEMENT TO CANDIDACY (NON-THESIS)**

**PART I**

3. STUDENT NAME: \_\_\_\_\_

4. ID #: \_\_\_\_\_

**PART II**

As the Graduate Coordinator and on behalf of the Graduate Committee, I recommend his/her advancement to candidacy. The student has demonstrated a satisfactory level of scholastic competence by meeting the criteria established for this program of study.

The student has completed \_\_\_\_\_ units with a \_\_\_\_\_ grade point average.

A concentration outline has been completed and approved. A copy is attached.

**SIGNATURES**

STUDENT \_\_\_\_\_ Date \_\_\_\_\_

GRADUATE COORDINATOR \_\_\_\_\_ Date \_\_\_\_\_

**CONCENTRATION OUTLINE**  
**DEPARTMENT OF BIOLOGY**  
 MS Degree (Non-Thesis Option)  
 Catalog (2013–2015)

Name: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 ID#: \_\_\_\_\_

Coursework

BIOL 505: (9 units)

	<u>Date</u>	<u>Units</u>
a) _____	_____	_____
b) _____	_____	_____
c) _____	_____	_____

BIOL 510 (4 units)

\_\_\_\_\_

BIOL 605 (3 units)

\_\_\_\_\_

BIOL 680 (1 unit)

(Non-Thesis Comprehensive Exam Passed)

\_\_\_\_\_

ELECTIVES: (33 units; min. 8 units at 500- or 600- level)

a) _____	_____	_____
b) _____	_____	_____
c) _____	_____	_____
d) _____	_____	_____
e) _____	_____	_____
f) _____	_____	_____
g) _____	_____	_____

**TOTAL**  
**(50)**

\_\_\_\_\_

GWAR satisfied

\_\_\_\_\_

Overall GPA > 3.0 with a C or higher in all graded courses

\_\_\_\_\_

Notes: \_\_\_\_\_

**APPROVAL**

\_\_\_\_\_

Date

Advisor

Date

Department Chair

**CONCENTRATION OUTLINE**  
**DEPARTMENT OF BIOLOGY**  
 MS Degree (Thesis Option)  
 Catalog (2013–2015)

Name: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 ID#: \_\_\_\_\_

**Coursework**

**Date**

**Units**

BIOL 505: (9 units)

- a) \_\_\_\_\_
- b) \_\_\_\_\_
- c) \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

BIOL 510 (4 units)

\_\_\_\_\_

BIOL 605 (3 units)

\_\_\_\_\_

BIOL 690: (8 units)

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

BIOL 691 (1 unit)

(Successful Completion of Thesis and Thesis Defense)

\_\_\_\_\_

Degree should be withheld until completed thesis has been submitted to Walter Stiern Library.

ELECTIVES: (20 units)

- a) \_\_\_\_\_
- b) \_\_\_\_\_
- c) \_\_\_\_\_
- d) \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**TOTAL**  
**(45)**

\_\_\_\_\_

GWAR satisfied

\_\_\_\_\_

Overall GPA > 3.0 with a C or higher in all graded courses

\_\_\_\_\_

Notes:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**APPROVAL**

\_\_\_\_\_  
 Date                                  Advisor                                  Date                                  Department Chair

### Request for MS Program Non-thesis/Thesis Change

**Student Information:**

<b>Name:</b> _____		<b>Campus ID #</b> _____	
Last	First	M.I.	
<b>Address:</b> _____			
Street	Apt. #	City	State Zip Code
<b>Student Signature</b> _____		<b>Date</b> _____	

**Change Request:**

<b>Present:</b>		<b>Request is submitted to Change to:</b>	
<b>Degree Objective:</b> MS Biology		<b>Degree Objective:</b> MS Biology	
<b>Track (Circle One):</b>		<b>Track (Circle One):</b>	
Thesis          Non-Thesis		Thesis          Non-Thesis	

**Approval (Both signatures are required):**

<b>Approved:</b> _____	_____	<b>Date:</b> _____
Print Name	Signature	
<b>Thesis Advisor</b>		
(If changing from Thesis to Non-thesis this should be the signature of the current thesis advisor)		
(If changing from Non-thesis to Thesis this should be the signature of the faculty member who will become the thesis advisor)		
<b>Approved:</b> _____	_____	<b>Date:</b> _____
Print Name	Signature	
<b>Biology Graduate Coordinator</b>		

**NOTE: Students must ALSO submit a REQUEST TO CHANGE PROGRAM/PLAN (POST-BACCALAUREATE) to the office of Admissions and Records to change between the thesis/non-thesis tracks!**

<http://www.csub.edu/admissions/OfficialForms/ProgramPlanChange.pdf>

