

# BIOLOGY, MASTER OF SCIENCE

## About the Master's Program

The Master of Science Program in Biology is a two-year program in which a student must complete a series of both core and elective courses and engage in independent scientific research that culminates in a thesis. This graduate program is designed to be a flexible degree that can help students reach their career goals, whether that be further study in a doctoral program or employment in science education, health sciences or environmental fields.

In the first semester of the program, the student will choose a research mentor who will provide guidance for the thesis research and help the student set their curriculum. Three members of the student's thesis committee, including the research mentor, will need to be selected by the end of the first year of the program.

To accommodate students with other professional commitments, many graduate classes are scheduled in the late afternoon and evening.

## Admission Requirements

Requirements for admission as a classified graduate student are a bachelor's degree in biology or a related field with a minimum grade point average of 2.75 in upper division courses, and completion of the Graduation Writing Assessment Requirement (GWAR) at the graduate level. Students should also have strong motivation in conducting original research. All students should have completed a course in each of the subject areas listed below:

### Subject Area

- Cell Biology or Evolution or Ecology
- Genetics
- Upper Division Experimental Laboratory
- Physiology or Developmental Biology
- Statistics or Calculus

Students who do not satisfy all these requirements may complete the requirements while enrolled through Extended Education. Students who meet all but one requirement may be admitted as a conditionally classified graduate student at the discretion of the Biology Graduate Committee. They must meet any conditions by the end of the first year as a conditional graduate student.

The Biology Graduate Committee makes all final decisions on graduate admissions.

## Admission Procedures

All applicants are required to complete a Cal State Apply application. The following documents should be submitted in the 4th Quadrant at Cal State Apply:

1. CV/resume,
2. Unofficial transcripts (submit official transcripts to the Office of Admissions),
3. A personal statement, and
4. Three letters of recommendation.

Applicants with a baccalaureate degree from a non-English speaking university are also required to submit proof of English proficiency. Please visit <http://www.csudh.edu/englishproficiency> (<http://www.csudh.edu/englishproficiency/>) for details. Applicants should address in their personal statement why they are interested in the program and which research area(s) they wish to pursue. Applicants interested in ecology and/or evolutionary biology must contact the appropriate faculty member(s) in the Biology Department before submitting their Cal State Apply application. Applicants interested in cellular and molecular biology should indicate potential research mentors in their personal statement, and they are also encouraged to contact possible mentors.

For more information regarding the university application for admission, please visit: <https://www.csudh.edu/future-students/apply/graduate/>

## Requirements

### Degree Requirements (30 units)

The Master of Science Degree in Biology requires completion of 30 units, at least 15 of which must be graduate (500-level) courses in biology.

Code	Title	Hours
<b>Required Courses</b>		
BIO 501	Biological Literature	3
BIO 502	Biostatistics	3
BIO 504	Research Techniques in Biology	3
BIO 510	Urban Environmental Science	3
or BIO 520	Adv In Cell & Molecul Bio	
BIO 590	Graduate Seminar <sup>1</sup>	2
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<b>Electives</b>		
Select 14 units from the following: <sup>2</sup>		14
Other graduate (500 level) courses in biology <sup>3</sup>		
Upper division (400 level) courses in biology		
BIO 597	Directed Reading <sup>4</sup>	
BIO 598	Directed Research <sup>4</sup>	
BIO 599	Thesis <sup>4</sup>	
CHE 450	Biochemistry I	
CHE 451	Biochemistry I Lab	
CHE 452	Biochemistry II	
CHE 453	Biochemistry II Lab	
Students doing research in ecology can also take the following courses:		
GEO 408	Remote Sensing and Image Processing	
GEO 415	Geographic Information Systems	
<b>Total Hours</b>		<b>30</b>

<sup>1</sup> Students will take BIO 590 Graduate Seminar twice for a total of 4 units.

<sup>2</sup> Students might also take 400 or 500-level courses from other departments if approved by the research mentor and the Biology Graduate Program Coordinator.

<sup>3</sup> A required course indicated as being repeatable may be used both as a required course and as an elective.

<sup>4</sup> **Note:** Students may count a maximum of nine units of BIO 597 Directed Reading, BIO 598 Directed Research, and BIO 599 Thesis combined.

However, no more than six units of BIO 599 Thesis may be applied to the degree.

Students must take all courses within five years of the date of graduation from the Master's degree. If approved by the Graduate Committee and the Graduate Dean, a student may revalidate a limited number of courses. However, under no circumstances can a course taken more than seven years before graduation be revalidated and counted in the program.

## Grades

To graduate, students must maintain an overall "B" (GPA: 3.0), and they must pass courses with a grade of "B-" or above.

## Thesis

Each student should select a major advisor to guide them in their program. The student and the major advisor will select two or more faculty to serve as the student's graduate committee. At least two of the committee, including the chair, must be faculty from the CSUDH biology department. When additional expertise is required, the third member may be a faculty member from another department, or other academic institution.

The thesis is appropriate for all students and a necessity for those who plan a career in research and plan to continue a doctoral program. The student and his or her major advisor will prepare a one or two page hypothesis-based proposal of the thesis research along with the time line of no more than two years to completion. This proposal is also to be approved by the two other members of the student's thesis committee and submitted to the Biology Graduate Committee for review and approval.

Upon the completion and acceptance of the thesis, the student and his or her advisor will arrange for an oral defense of the thesis. This ordinarily takes the form of a seminar to which the faculty, students, and public are invited to attend.

## Continuing Student Status

Students should maintain continuous enrollment throughout their time in the graduate program. Students who have completed their course work and are working on their thesis may enroll in BIO 600: Graduate Continuation Course (0 units) to maintain continuous attendance. Eligible students may request a Planned Graduate Student Leave. Students must be enrolled the semester they graduate.

## Biology Graduate Program Policy on Revalidation of Outdated Course Work

The Biology Department requires that all course work taken in the master's degree program be completed within five years immediately preceding the date of graduation.

Revalidation of outdated course work may be requested from the University Graduate Studies Office through the Biology Graduate Coordinator. Outdated course work means courses that were completed earlier than five years, and no more than seven years, immediately preceding the date of graduation. The request must be accompanied by a petition from the Biology Graduate Committee that verifies that the student has done one of the following:

- repeated the course and passed it with a grade of "B" or better;
- taken the exams and completed the assignments of the course as it is currently offered and earned a grade of "B" or better;

The choice of the revalidation method is at the discretion of the Biology Graduate Committee,

## Classified Standing

If a student has been admitted as conditionally classified, they must fulfill the conditions for classified standing by the end of the first year after admission. The student must submit an application for classified standing to the Dean of Graduate Studies, who will forward the request to the Biology Graduate Coordinator. To receive classified standing, the student must have completed all prerequisite courses and requirements, a grade point average of 3.0 or better in all courses taken at CSUDH, and received a grade of "B-" or better in all courses,

## Advancement to Candidacy

An application for advancement to candidacy is submitted when the student has completed most of the course work and is completing the thesis. Application is made through the Biology Graduate Coordinator and must be done before the student can complete the thesis. This application will list the student's program of courses and other requirements which must be completed for the degree.

The student should have:

- classified standing;
- completed all required courses;
- maintained a minimum grade point average of 3.0 and received a grade of "B-" or better in all courses taken in the graduate program;
- approval of their thesis proposal by their committee and the Biology Graduate Committee.

## Master's Requirements

In addition to the program requirements, students must meet all university requirements for the master's degree. Students should consult the section of the catalog entitled "Requirements for the Master's Degree."

## Program Learning Outcomes

1. Critically read, comprehend, and summarize original research papers in biology
2. Write in a variety of scientific formats, including manuscript describing experimental results, thesis, grant proposals, conference abstract, and literature review.
3. Apply appropriate statistical analyses to experimental design and experimental results
4. Make oral presentations in acceptable formats describing information in the scientific literature and describing personal research results.
5. Apply the scientific method to answer questions in biology through the design and conduct of hypothesis-driven experimental research projects.
6. Demonstrate a thorough and sophisticated knowledge base in biology and describe in detail the current knowledge in at least one specialized field of the biological sciences.
7. Defend the thesis in a seminar setting.

8. Demonstrate responsible ethical and professional conduct related to biology in all facets of their education.
9. Communicate scientific concepts and issues to a general audience.