

# MS IN BIOTECHNOLOGY

Units required for MS: 30 includes units required in areas of concentration.

## Program Description

The graduate programs in Biological Sciences offer advanced training and independent investigations in biology that lead to a Master of Science (MS) in Biotechnology. This degree program allows students who successfully complete the program to upgrade their qualifications for careers in the biotechnology sector or for educational advancement to doctoral programs. The MS in Biotechnology requires original research in a biotechnology-centered discipline and completion of a thesis.

All students are required to complete a thesis involving laboratory research. Research for the thesis may be conducted on campus with a biology faculty member or at an off-campus location. In either case, the student's research must make a new contribution to the field of biotechnology. If the research is conducted off campus, a biology faculty member must be identified as the student's graduate advisor. Following admission to the program, students are advised by a graduate advisor who will supervise their thesis research.

For additional information regarding the Biological Sciences Graduate Program, visit the Biological Sciences website (<http://www.csus.edu/bios/>).

## Admission Requirements

Admission as a classified graduate student to the MS in Biotechnology requires:

- a baccalaureate degree;
- completion of a major in biological sciences or closely related field; or completion of 24 units of upper division biological sciences courses or courses in closely related fields, each of which must be passed with a "C-" or better;
- a minimum GPA of 2.75 in all biology courses and a minimum GPA of 3.0 in upper division biology courses;
- two letters of recommendation from persons qualified to judge the applicant's potential for successful graduate study; and
- a statement of purpose.

It is important to note that meeting all admission requirements does not guarantee acceptance into the graduate program. Students who have deficiencies in admission requirements that can be removed by specified additional preparation may be admitted with conditionally classified graduate status. Admission as a conditionally classified graduate student does not guarantee fully classified status. Fully classified graduate status is conferred when all deficiencies identified at the time of admission are removed and a biology faculty member has agreed to serve as their thesis advisor. Any deficiencies in admissions requirements will be noted on a written response to the admission application.

## Admission Procedures

Applicants must complete a university application by the posted application deadline date for the term applying:

- an online Cal State Apply application for admission; and
- one set of official transcripts from all colleges and universities attended, other than Sacramento State. For more admissions information and

application deadlines, please visit (<https://www.csus.edu/graduate-studies/future-students/graduate-programs-deadlines.html>)

In addition, all prospective graduate students must submit the following application materials directly to the Department of Biological Sciences:

- an online departmental application for admission;
- one set of unofficial transcripts from all colleges and universities attended, other than Sacramento State;
- two letters of recommendation; and
- a statement of purpose.

Departmental applications for admission are due February 15. There is currently no general call for admission for students to begin in the spring semester. Approximately eight to ten weeks after the application deadline, a decision regarding admission will be emailed to the applicant.

**No units from the following are acceptable toward the master's degree:**

Code	Title	Units
BIO 106	Genetics: From Mendel to Molecules	3
BIO 194	Biology-Related Work Experience	6 - 12
BIO 195	Biological Internship	1 - 2
BIO 197A	Laboratory Teaching Assistant	1 - 2
BIO 197B	Laboratory Techniques	1 - 2
BIO 197C	Co-curricular Activities in Biology	1 - 2
BIO 198A	Honors Proseminar and Research	2
BIO 198B	Honors Research and Seminar	2
BIO 199A	Introductory Undergraduate Research	1 - 2
BIO 199B	Directed Readings	1 - 2

## Minimum Units and Grade Requirement for the Degree

Units required for MS: 30

Minimum Cumulative GPA: 3.0

## Advancement to Candidacy


The Advancement to Candidacy process serves to ensure that a student is qualified for and making good progress toward successfully completing the Master's degree. Each classified graduate student must file an application for Advancement to Candidacy, indicating a proposed program of graduate study. This procedure should begin as soon as the classified graduate student has:

- removed any deficiencies in admission requirements;
- completed at least 12 units in the graduate program with a minimum 3.0 GPA, including at least one course at the 200-level;
- begun a preliminary study for the thesis; and
- taken the Graduate Writing Intensive (GWI) course in their discipline within the first two semesters of coursework at California State

University, Sacramento and passed the course with a grade of B or better.

An Application for Advancement to Candidacy forms are available on the Office of Graduate Studies Web site and the Department of Biological Sciences Web site. The student fills out the form after planning a degree program in consultation with his/her Biological Sciences graduate advisor. After approval by the Biological Sciences Graduate Committee and the student's thesis committee, the completed form is routed to the Office of Graduate Studies for approval. All requirements for the Master of Science degree must be completed within seven (7) years starting from the time the first course is used to meet the master's degree requirements.

## Program Requirements <sup>1</sup>

Code	Title	Units
<b>Required Core Courses (19 Units)</b>		
BIO 220	Introduction to Scientific Inquiry 	2
BIO 221A	Cell and Molecular Methods and Techniques	2
BIO 222	Molecular Biology	3
BIO 225	Stem Cell Biology and Manufacturing Practices	1
BIO 227	Development and Regenerative Medicine	3
BIO 293	Research Conference	2
BIO 294A	Seminar in Molecular and Cellular Biology <sup>2</sup>	1
BIO 299	Problems in Biological Sciences	4
<b>Culminating Requirement (6 Units)</b>		
BIO 500	Master's Thesis	6
<b>Additional Requirements (5 Units)</b>		
Select one of the following:		5
BIO 223	Human Molecular Genetics	
BIO 224	Genomics, Proteomics, and Bioinformatics	
BIO 245	Host/Pathogen Interactions	
BIO 247	Contemporary Topics in Immunology	
BIO 282	Evolution	
CHEM 230	Separation Methods in Chemistry	
CHEM 145/245	Applications of Computational Chemistry	
CHEM 260	Protein Biochemistry	
CHEM 261	Nucleic Acid Chemistry	
<b>Total Units</b>		<b>30</b>

<sup>1</sup> The 30 units must include a minimum of 23 units of 200-level courses.

<sup>2</sup> BIO 294A must be taken twice for a total of 2 units.