

# BIOLOGICAL SCIENCES, M.S.

Credits: 32  
CIP Code: 260101

## Program Overview

The Master of Science Degree program provides specialized training, research experiences, and the optional opportunity for students to gain teaching experiences. All students in the program are required to complete a **minimum of thirty-one (31)** credits. Research by Master's students centers on topics in cell biology, molecular biology, biochemistry, microbiology, and neurobiology. Other areas of specialized training are available through collaborations with other institutions and government agencies.

## Admissions Requirements

Applicants to the **Master of Science Degree in Biological Sciences** must meet the General Admissions Requirements as published in this Catalog and have completed a **minimum of twenty-four (24)** undergraduate credits in Biology including biochemistry and one year each in general chemistry, organic chemistry, physics, and mathematics, including calculus.

## Program Objectives

- Introduce student to multidisciplinary aspects of modern biological sciences.
- Prepare student to examine, write, and present scientific literature.
- Prepare students for advanced studies, professional careers in biological and biomedical fields, or other scholarly endeavors.

## Student Learning Outcomes

Students pursuing the **Master of Science Degree in Biological Sciences** will:

1. Apply biological concepts, theories, and techniques to conduct independent scientific experiments.
2. Effectively communicate information on biological and/or biomedical science in written and oral formats to scientific and non-scientific audiences.
3. Apply biological principles and analytical techniques to execute an original research project through hypothesis development, experimental design, and analytical interpretation of the data.
4. Practice professional ethics in the conduct of scientific inquiry, scholarly research, and independent scientific thinking.

## Degree Requirements

In addition to the General Degree Requirements as published in this Catalog, candidates for the **Master of Science Degree in Biological Sciences** must complete the following requirements:

Code	Title	Hours
<b>Core Courses</b>		
CBIO 501	Biology Seminar <sup>1</sup>	0
CBIO 502	Instructional Practicum	0
CBIO 504	Molecular Genetics	3
CBIO 506	Cell Biology	3
CBIO 509	Methods & Techniques in Bio.	3
CBIO 511	Biochemistry I	3

CBIO 512	Biochemistry II	3
CBIO 551	Biostatistics	3

### Laboratory Rotation Requirements

During the first year of study, all students pursuing the Master of Science Degree in Biological Sciences are required to complete at least two (2) laboratory rotations (10 hours per week). Laboratory rotations provide graduate students with exposure to a variety of research projects and techniques conducted in faculty research training laboratories. The rotations will also give students opportunities to make a decision regarding the research laboratory in which they will conduct their thesis research.

### Advanced Courses in the Area of Specialization

Select six credits of the following:		6
CBIO 556	Bioinformatics	
CBIO 633	Advances in Molecular Biology	
CBIO 635	Advances in Cellular Biology	
CBIO 643		

### Research in Biology

Select six credits of the following: <sup>2</sup>		6
CBIO 661		
CBIO 671	Research in Molecular Biology	
CBIO 681	Research in Cellular Biology	

### Thesis Research

CBIO 801	Thesis Consultation	1
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**Total Hours** **31**

<sup>1</sup> Students must enroll continuously in CBIO 501 Biology Seminar till matriculation.

<sup>2</sup> This course is required for M.S. students to present their dissertation/rotational research.

## Final Examination

Each student must successfully defend a thesis based on original research. These are formal departmental requirements and as such must be scheduled during regular academic year or summer session. The following procedures are to be followed to complete these requirements:

1. The MS candidate should hold a formal meeting with his/her research committee to present a concise overview of finalized research data.
2. Upon approval by the committee, a final signed draft of the thesis should be submitted to the department chair.
3. A research seminar/oral defense is required. The candidate or the advisor should schedule the seminar/oral defense based on the Office of Graduate Programs thesis submission timeline.
4. The seminar/oral defense is scheduled as a formally announced departmental event. Biology faculty and graduate students are invited to attend and actively participate in the same as a scientific/intellectual interaction between the candidate and the attendees. The seminar/oral defense is to be professionally prepared with appropriate visual aids.
5. Announcement must be posted one week prior to the seminar/oral defense. The Department of Biological Sciences considers the opinion of the total faculty in attendance in arriving at a consensus on the scientific/professional caliber of the seminar. Serious concerns indicated by a consensus of the attending faculty may result in the candidate having to repeat this departmental requirement.

6. At the conclusion of the seminar/oral defense, the research advisor should ensure that the Seminar and Oral Presentation Approval Forms are completed and signed by all faculty members in attendance including the Department Chair.

## Biology, M.S.

Course	Title	Hours
<b>First Year</b>		
<b>First Semester</b>		
CBIO 501	Biology Seminar <sup>1</sup>	0
CBIO 504	Molecular Genetics	3
CBIO 509	Methods & Techniques in Bio.	3
CBIO 511 or CCHE 551	Biochemistry I or Advanced Biochemistry I	3
Laboratory Rotation I		
<b>Hours</b>		<b>9</b>
<b>Second Semester</b>		
CBIO 501	Biology Seminar <sup>1</sup>	0
CBIO 506	Cell Biology	3
CBIO 551	Biostatistics	3
CBIO 512 or CCHE 552	Biochemistry II or Advanced Biochemistry II	3
Laboratory Rotation II		
<b>Hours</b>		<b>9</b>
<b>Third Semester</b>		
CBIO 6XX	Research in Biology	3
<b>Hours</b>		<b>3</b>
<b>Second Year</b>		
<b>First Semester</b>		
CBIO 501	Biology Seminar <sup>1</sup>	0
CBIO XXX	Advanced Course in Biology	3
CBIO 6XX	Research in Biology	3
<b>Hours</b>		<b>6</b>
<b>Second Semester</b>		
CBIO 502	Instructional Practicum <sup>1</sup>	0
CBIO 556	Bioinformatics	3
CBIO 801	Thesis Consultation	1
<b>Hours</b>		<b>4</b>
<b>Total Hours</b>		<b>31</b>

<sup>1</sup> Students must enroll continuously in CBIO 501 Biology Seminar or CBIO 502 Instructional Practicum.

All M.S. students must enroll and attend CBIO 501 Biology Seminar Biology Seminars until matriculation.

This course is required for M.S. students to present their dissertation/rotational research.