BIOLOGY MS

Co-Directors:

- Dr. Bela Peethambaran (https://directory.sju.edu/bela-peethambaran/)
- Dr. Edwin Li (https://directory.sju.edu/edwin-li/)
- Dr. Kenneth Myers (https://directory.sju.edu/kenneth-myers/)

Mission Statement

The Master of Science in Biology program at Saint Joseph's University is designed to provide training in technical and professional skills for students who wish to join the workforce as proficient scientists, or for students who desire to pursue a doctoral or professional degree.

Description of Program

The MS program requires completion of traditional courses and an extensive research project that culminates with a written thesis. The degree is typically completed within two years. Students can choose to specialize in one of the following concentrations: (1) **Cell and Molecular Biology**, and (2) **Ecology, Evolution and Behavior**.

Learning Goals and Outcomes

Goal 1: Students will develop proficiency in subject content, train in cutting-edge technologies, and appropriate professional skills that will aid in their overall development as a scientist.

> **Outcome 1.1:** Students will be informed about prospective careers for life scientists in government, industry, and academia as well as learn about the professional and ethical expectations for scientists.
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> **Outcome 1.2:** Students will be familiar with the appropriate set of research, laboratory and/or field skills used by specialists in their subfields of choice.

Goal 2: Students will develop skills in experimental design and the presentation of scientific information.

> **Outcome 2.1:** Students will be able to design an experiment, operate basic laboratory equipment, reduce and present data that includes the interpretation of statistical tests.
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> **Outcome 2.2:** Students will be able to develop cogent written and oral presentations of scientific content.
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> **Outcome 2.3:** Students will be able to locate, read, interpret, evaluate, and discuss primary literature in biology.

Requirements

The MS degree requires completion of 30 credits of graduate level courses.

Code	Title	Hours
Core Courses:		
BIO 785	Introduction to Research (not required for students in the BS/MS 4+1 program)	1
BIO 786	Research Ethics	1
BIO 801	Scientific Discourse (each semester of enrollment)	2-4
BIO 887	Graduate Colloquium	1
MAT 704	Statistics for Research	3
BIO 799	Master's Research	12-14
Electives:		
Two (2) Biology electives (600 level or higher) are required (3-4 credits each).		6-8
Total Hours		**26-32**

Thesis Requirements

The MS degree requires completion of a research project in the biological sciences under the supervision of a research mentor. The findings are published in thesis form. A Thesis Committee will be formed to follow the progress of the candidate, evaluate the final thesis, and administer a final oral examination (thesis defense) based on the thesis research. The thesis must be acceptable in both scholarship and literary quality. To be recommended for the Master of Science degree in Biology, the candidate must receive approval of the majority of the committee members.

Concentrations

Students in the MS Biology program may elect to declare one of the following concentrations: **Cell and Molecular Biology** or **Ecology, Evolution and Behavior**. The concentration is optional. Students are not guaranteed a particular sequence of courses to ensure the completion of a concentration.

Concentration in Cell and Molecular Biology

For the concentration in **Cell and Molecular Biology**, students must complete two of the following elective courses:

Code	Title	Hours
Choose two (2) of the following:		
BIO 602 & 602L	Advanced Cell Biology and Advanced Cell Biology Lab	4
BIO 604	Biochemistry	3
BIO 611 & 611L	Molecular Genetics and Molecular Genetics Lab	4
BIO 612 & 612L	Neurobiology and Neurobiology Lab	4
BIO 615 & 615L	Immunology and Immunology Lab	4
BIO 616 & 616L	Microbiology and Microbiology Lab	4
BIO 617 & 617L	Systemic Physiology and Systemic Physiology Lab	4
BIO 620 & 620L	Bioinformatics and Bioinformatics Lab	4
BIO 621 & 621L	Molecular&Cellular Biophysics and Mol & Cel Biophysics Lab	4
BIO 624 & 624L	Biotechnology and Biotechnology Lab	4
BIO 625 & 625L	Bacterial Pathogenesis and Bacterial Pathogenesis Lab	4
BIO 628 & 628L	Histopathology and Histopathology Lab	4
BIO 630 & 630L	Neurological Disorders and Neurological Disorders Lab	4
BIO 710	Fundamentals of Brewing Scienc	3

Concentration in Ecology, Evolution and Behavior

For the concentration in **Ecology, Evolution and Behavior**, students must complete two of the following elective courses:

Code	Title	Hours
BIO 601 & 601L	Animal Behavior and Animal Behavior Lab	4
BIO 609 & 609L	Ecology and Ecology Lab	4
BIO 613 & 613L	Plant Physiological Ecology and Plant Physiological Eco Lab	4
BIO 619 & 619L	Invertebrate Zoology and Invertebrate Zoology Lab	4
BIO 620 & 620L	Bioinformatics and Bioinformatics Lab	4
BIO 622 & 622L	Applied & Environ Microbiology and Applied & Environ Micro Lab	4
BIO 623 & 623L	Evolution and Evolution Lab	4
BIO 629 & 629L	Environmental Science and Environmental Science Lab	4