

BIOLOGY M.S.

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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 M.S. 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**. Non-matriculated students may also, with permission, enroll for isolated credit.

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.

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.

Outcome 2.2: Students will be able to develop cogent written and oral presentations of scientific content.

Outcome 2.3: Students will be able to locate, read, interpret, evaluate, and discuss primary literature in biology.

Requirements

Degree Requirements

The M.S. degree requires completion of 30 credits of graduate level courses.

Code	Title	Hours
Core Courses:		
BIO 785	Introduction to Research	1-2
BIO 786	Research Ethics	1
BIO 801	Scientific Discourse (at least 4 semesters)	2
BIO 887	Graduate Colloquium	1

MAT 704	Statistics for Research	3
BIO 799	Master's Research	1-9

Electives:

Two (2) Biology electives (600 level or higher) are required.

Thesis Requirements

The M.S. 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 M.S. Biology program may elect to declare one of the following concentrations: (1) **Cell and Molecular Biology**, and (2) **Ecology, Evolution and Behavior**. The concentration is optional. Students are not guaranteed a particular sequence of courses to ensure the completion of a concentration. The concentration must be declared by the end of the Add-Drop period in the last semester of enrollment.

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
BIO 602 & 602L	Advanced Cell Biology and Advanced Cell Biology Lab *	4
BIO 861	Cell and Molecular Biology *	3
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

*Students can take BIO 602/602L or BIO 861, but not both.

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