

# BIOMEDICAL SCIENCES, MS

The Biomedical Sciences Department offers a program of graduate education providing an advanced level of study for students interested in biology as it relates to human health, medicine, and disease. Major emphasis in the program is placed on developing an understanding of the mechanisms involved in human diseases and providing broad-based training in both basic and applied biomedical sciences. In-depth training is offered in selected areas of emphasis, such as immunology, the pathogenesis of infectious diseases, toxicology, pharmacology, neurodegeneration, and cancer biology. The MS degree has two tracks.

1. **Thesis Track** requirements include a thesis based on hypothesis-driven research conducted by the student to enhance problem-solving abilities and the student's capacity to function more effectively in the biomedical field.
2. The **Non-Thesis Track** is designed for students who want to gain knowledge in the biomedical sciences by taking courses focused on human health and disease without a research component. This track may be suitable for a variety of students, including those who currently work in a laboratory setting and wish to obtain a higher degree and those requiring a degree beyond the bachelor's level to teach.

## Admission Requirements

### Application Deadlines

Application deadlines vary by program, please review the application deadline chart (<http://uwm.edu/graduateschool/program-deadlines/>) for specific programs. Other important dates and deadlines can be found by using the One Stop calendars (<https://uwm.edu/onestop/dates-and-deadlines/>).

### Admission

An applicant must meet Graduate School requirements (<http://uwm.edu/graduateschool/admission/>) plus the following requirements to be considered for admission:

1. The program primarily enrolls individuals with backgrounds in biomedical sciences or related fields who have completed a bachelor's degree at an accredited institution. For students entering without a degree in a related area, the faculty determines deficiencies to be overcome prior to admission. Applications will not be reviewed until all required materials are obtained by the program. Students are admitted to the Program in the Summer/Fall or Spring terms; applicants specify the term for which they intend to enroll. For enrollment beginning in the Summer or Fall terms, all completed applications received prior to January 15th will receive consideration. For enrollment beginning in the Spring term, all completed applications received prior to October 15th will receive consideration. Completed applications received after these deadlines may be considered for their respective terms if there is available space in the program. Students may enroll on a full-time or a part-time basis.
2. Applicants may be admitted to regular status if their grade point average is the equivalent of 2.75 or above (scale of 4.0). Averages below 2.75 may be considered for admission on a probationary basis, in which case particular attention is given to the last 60 hours completed in the undergraduate program, with special emphasis on performance in biomedical science-related courses. Probationary

status is removed after successful completion of the first eight graduate credits with a grade point average of 3.0 or above.

3. Graduate Record Examination (<http://uwm.edu/graduateschool/admission/#gre>) scores on the General Test are optional, although encouraged.
4. Three letters of reference, preferably from academic and/or research sources or supervisors, must be provided.
5. The applicant must provide a statement of not more than 1,000 words providing career objectives and reasons for seeking a degree in the UWM Biomedical Sciences Graduate Program.
6. Students **must identify**, at the time of applying, whether they seek enrollment in the Thesis Track or Non-Thesis Track. Students wishing to change tracks after admission must receive approval of the program.

## Credits and Courses

The minimum degree requirement is 32 graduate credits.

### Thesis Track

Eighteen (18) core curricular credits and a minimum of 8 credits in research (BMS 799) must be taken. Substitutions to these courses require approval of the Program.

Code	Title	Credits
BMS 710	Seminar in Biomedical Sciences (1 credit per semester; 3 credits total)	3
BMS 717	Laboratory Technology-Theory and Practice	2
BMS 718	Experimental Design and Research in Biomedical Sciences	1
Choose one of the following in Immunology:		3
BMS 750	Infection and Immunity	
BMS 751	Immunopathology	
Choose one of the following in Molecular Biology:		3
BMS 705	Molecular Pathology	
BMS 756	Current Concepts in Cancer	
BMS 765	Molecular Pathophysiology	
Choose one of the following in Pathogenesis:		3
BMS 701	Human Pathophysiology I	
BMS 702	Human Pathophysiology II	
BMS 775	Mechanisms of Infectious Disease	
Choose one of the following in Statistics:		3
PSYCH 510G	Advanced Psychological Statistics	
KIN 702	Statistical Analysis in the Health Sciences	
PH 702	Introduction to Biostatistics	
PH 712	Probability and Statistical Inference	
BMS 799	Research in Biomedical Sciences	8
<b>Total Credits</b>		<b>26</b>

The remaining 6 credits required for the degree are electives, of which at least 3 must be taken for graduate credit from within the BMS Program. Program approval is required for BMS 590 credits to be applied towards the degree. BMS 599: Independent Study does not count toward completion of the degree. No more than 3 credits of BMS 999: Advanced Independent Study will be counted for the Thesis Track.

## Non-Thesis Track

Fourteen (14) core curricular credits (one from each of the four categories below and BMS seminar), as well as the 2 credit Capstone Course (BMS 890) must be completed. Substitutions to these courses require approval of the Program.

Code	Title	Credits
BMS 710	Seminar in Biomedical Sciences (1 credit per semester; 2 credits total)	2
Choose one of the following in Immunology:		3
BMS 750	Infection and Immunity	
BMS 751	Immunopathology	
Choose one of the following in Molecular Biology:		3
BMS 705	Molecular Pathology	
BMS 756	Current Concepts in Cancer	
BMS 765	Molecular Pathophysiology	
Choose one of the following Pharmacology/Toxicology:		3
BMS 610G	Pharmacology	
BMS 615G	Cellular and Molecular Toxicology	
Choose one of the following in Pathogenesis:		3
BMS 701	Human Pathophysiology I	
BMS 702	Human Pathophysiology II	
BMS 775	Mechanisms of Infectious Disease	
BMS 890	Capstone Project	2
<b>Total Credits</b>		<b>16</b>

Of the remaining 16 credits required for the degree, a minimum of 6 credits (excluding BMS 999) must be taken for graduate credit within the BMS Program. Up to ten credits may be taken as elective courses at the graduate level. These elective courses may be within the BMS Program or outside of the Program. BMS 999 will not be counted toward the Non-Thesis Track without approval from the Program.

## Additional Requirements

### Major Professor as Advisor

For thesis track, the student must have a major professor to advise and supervise the student's studies. Non-thesis students should work with the Graduate Program Coordinator as their advisor throughout the program.

### Thesis (Thesis Track)/Capstone (Non-Thesis Track)

Students enrolled in the Thesis Track must write an acceptable thesis based on original research and pass a final oral examination in defense of the thesis under the supervision of a major professor. Students in the Non-Thesis Track must complete the course requirements, including the BMS Capstone Course (BMS 890).

### Time Limit

The student must complete all degree requirements within seven years of initial enrollment.

## Biomedical Sciences MS Learning Outcomes

Students graduating from the M.S. program in Biomedical Sciences will be able to:

- Explain basic and advanced concepts in, and apply critical thinking and analysis skills in, Biomedical Science disciplines.
- Comprehend and analyze fundamental content and cutting-edge content of scientific literature.
- Explain and defend scientific concepts universal to research in biomedical sciences.
- Write and speak about biomedical concepts clearly, accurately, and in a logical and professional manner.
- Proficiently and safely use instruments, equipment, and materials in the biomedical sciences research laboratories through lab work performed in their laboratory classes and work performed in the research laboratories. (Thesis track)
- Identify all aspects of methodical experimental design and apply that knowledge in the field of biomedical research. (Thesis track)

## Accelerated Program Option

This program is offered as part of an accelerated graduate program. For more information, see Accelerated Graduate Degrees (<https://catalog.uwm.edu/opportunities-resources/accelerated-graduate-degrees/>).