Goals of the Program
The program provides advanced training in the theory and application of molecular biology, in conjunction with supervised independent research culminating in a research thesis. Graduates perform at an advanced technical level in biotechnology and related industries or continue their education in Ph.D. or professional programs.

The faculty of the Master of Science in Applied Molecular Biology Program have active research programs in the following areas: prokaryotic and eukaryotic gene expression, genome organization, gene structure and DNA-protein interaction, microbial pathogenesis, insect genetics and molecular biology, molecular evolution, phylogenetic analysis, reproductive physiology, enzymology, and protein biochemistry.

Course of Study
There are two routes to a master of science degree in applied molecular biology: (a) a two-year graduate program in which students with a B.S. degree in biology, biochemistry, chemistry, or one of the life sciences may enroll; (b) a five-year combined B.S./M.S. program into which UW-Parkside undergraduates in the molecular biology and bioinformatics major are accepted at the end of their third year. At the end of their fourth year, these students receive a B.S. in molecular biology and bioinformatics.

Admission Requirements

Plan A: Two-year Program
To qualify for admission an applicant must have:

1. B.S. or B.A. degree from a regionally accredited institution.
2. Grade point average (GPA) of at least 3.00 in their major (4.00 basis).
3. Satisfactory Graduate Record Examination scores.
4. Completed the following courses, or their equivalents:
   Chemistry: two semesters of general chemistry, two semesters of organic chemistry.
   Biology: two semesters of introductory biology with laboratory, one semester of genetics, one semester of biochemistry, one semester of molecular biology.
   Physics: two semesters of physics.
   Mathematics: two semesters of calculus, or one semester of calculus and one semester of discrete mathematics or probability.

Plan B: Combined B.S./M.S. Program
Students in the molecular biology and bioinformatics B.S. program can apply for admission to the M.S. program in the spring of their junior year. To qualify for admission an applicant must have:

1. Cumulative GPA of at least 3.30 (4.00 basis).
2. Approval of the Molecular Biology Programs Committee.

Application deadlines
To be considered for a fall semester entrance into the program, completed applications need to be submitted by February 1st. To be considered for a spring entrance into the program, completed applications need to be submitted by September 1st.

International students - please note that international student applications take longer to process, so it is recommended that international student applications be submitted at least one month prior to the official deadline as stated above.

Application Procedure
All applications must be submitted online. Please visit https://www.uwp.edu/apply/admissions/graduate/ to submit the following:

1. A completed online application form.
2. A non-refundable application fee, payable to University of Wisconsin-Parkside.
3. A cover letter that states how obtaining a MAMB degree fits with the applicant’s goals and identifies at least three UW-Parkside faculty whose research is of interest to the applicant.
4. GRE scores
5. Official transcripts from each undergraduate and postgraduate institution the applicant attended.*
6. Curriculum vitae.*
7. Three letters of recommendation.* All submitted letters much have the official letterhead of the recommender's institution.

8. (Optional) Additional materials such as those listed below for applicants seeking probationary admission.
   * Items marked with an asterisk are not required for students completing their B.S. degree at UW-Parkside.

International students are required to meet the additional requirements in the section below.

**International Student Application**

In addition to submitting the above application materials, international applicants must submit the following items:

1. A completed online Application for Graduate International Student Admission.
2. Application fee.
3. If applicant’s native language is not English then an Official Test of English as a Foreign Language (TOEFL) score must be obtained. A score of 525 on the paper test (197 computer based or 71 internet based) is required. For information regarding the location of the test centers nearest you and for making arrangements to take the TOEFL test visit the website: http://www.ets.org/toefl.
4. A Sponsorship Statement Form documenting support for one year of study.
5. Original bank statement or bank letter documenting sufficient funds for one year of study. Photocopies and FAX cannot be accepted.
6. Official transcripts from all secondary schools, colleges and universities attended. Records must be in the original language with certified English translations. Official records should include all exam, test results, certificates, diplomas or degrees received.
7. To receive transfer credits from a foreign university a prospective student must have their transcripts evaluated through one of the recommended companies:
   - ECE (Educational Credential Evaluators)
   - WES (World Education Services)
   - One Earth International Credit Evaluators

   Potential Graduate students must purchase the “Catalog Match Request” to ensure transferability of coursework.

**Transfer Student Admissions**

Transfer applicants who are admitted to the master of science in applied molecular biology program receive a statement of advanced standing indicating which courses have been accepted from the previous institutions and how they equate to UW-Parkside courses; the statement also identifies their adviser. Students should contact their adviser as soon as possible after receiving the statement of advanced standing. Generally, students are allowed to transfer up to 12 credits of graduate work from regionally accredited institutions.

**Continuation**

1. The master of science in applied molecular biology program requires a cumulative GPA of 3.00 (B) or better in all graduate courses taken in the program unless conditions for probationary status require higher grades.
2. With approval of the department’s graduate committee, students with a grade of C in a graduate course may be allowed to continue. However, a maximum of two C’s is allowed.
3. Students who have finished all course and credit requirements (30 credits) and are still working on a thesis project require a continuous registration of at least 1 credit each fall and spring semester. Students who have not maintained continuous registration must apply for reinstatement.
4. Students should select a faculty adviser at the time of matriculation or at least by the end of the first semester. With the assistance of the adviser, the student will formulate a research problem. The adviser will provide space, equipment and supplies, and technical assistance when possible. By the end of the first semester, the student should select a thesis committee that consists of the faculty adviser and two other faculty members. The thesis committee provides oversight of the student’s research progress and approves the student’s course of study. The program culminates in a written thesis that thoroughly documents the research activity, and an oral presentation open to the public.

**Time Limit**

It is expected that most students will complete the degree within two years. A candidate for the master of science degree who fails to complete the degree within three years will be placed on probation for one semester before being dropped from the program. Exceptions to this limit require authorization by the Molecular Biology Programs Committee.

**Financial Assistance**

Stipends (research assistantships, traineeships) are available to a limited number of students; most cover only part of the cost of attendance.

**Requirements for the Master of Science in Applied Molecular Biology (30 credits)**

**PLAN A: TWO-YEAR GRADUATE PROGRAM**

The curriculum is divided into three components: the core, electives and thesis. A minimum of 30 graduate credits (courses numbered 500-799) are required for the degree. Some graduate courses are cross-listed with undergraduate offerings (courses numbered 300-499). These are marked with an asterisk (*) in the list below. Courses taken at the undergraduate level cannot be repeated.

**A. Required Core Courses (7 credits)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOS 675</td>
<td>Advanced Molecular Biology</td>
<td>3 cr</td>
</tr>
<tr>
<td>BIOS 731</td>
<td>Seminar in Molecular Biology</td>
<td>4 cr</td>
</tr>
</tbody>
</table>
B. Elective Courses (6-8 credits)

Students must complete a minimum of 6 elective credits. Electives must be approved by the student’s thesis committee. Electives will be chosen to complement the student’s previous education and experience, and to support the student’s educational and career goals.

Choose two courses:

- BIOS 611 Microbial Physiology and Diversity 3 cr
- BIOS 614 Molecular Evolution 3 cr
- BIOS 653 Molecular Biology and Bioinformatics of Nucleic Acids 4 cr
- BIOS 655 Protein Biochemistry and Bioinformatics 4 cr
- BIOS 680 Bioinformatics Programming 4 cr
- BIOS 690 Advanced Topics in Molecular Biology 1-4 cr
- BIOS 699 Independent Study 3 cr
- CHEM 620 Advanced Biochemistry 3 cr

C. Thesis Requirement (15-17 credits)

Students are required to complete a research thesis. Students enroll in BIOS 711 for 17 credits or less depending on the number of elective credits. Fulfillment of the thesis requirement depends upon satisfactory completion, documentation, and oral presentation of the thesis research, as judged by the student’s thesis committee.

PLAN B: COMBINED B.S./M.S. PROGRAM

Students in this program meet Plan A requirements with the following modifications: only 2 credits of BIOS 731 are required; research completed to meet the undergraduate senior thesis requirement may be applied to completion of the M.S. thesis. A minimum of 30 graduate credits (courses numbered 500-799) are required for the degree. Elective course requirements are defined by each student’s thesis committee.

Biology (BIOS) Courses in Applied Molecular Biology

503 Microbiology 4 cr
Prereq: BIOS 260 or consent of instructor. Freq: Spring.
Advanced treatment of the structure, growth and activities of microorganisms including medical microbiology, microbial pathogenesis, and environmental microbiol. Three-hour lecture; three-hour lab.

509 Molecular Biology 3 cr
Prereq: BIOS 260, CHEM 322 or consent of instructor. Freq: Spring.
Regulation of DNA, RNA, and protein synthesis and the control of the synthesis of other macromolecules. Three-hour lecture/discussion.

611 Microbial Physiology and Diversity 3 cr
Prereq: BIOS 303 or consent of instructor. Freq: Alternate years.
Explores diverse molecular mechanisms of microbial physiology. Topics include microbial regulation of gene expression, metabolism, behavior, symbiosis, and applications to biotechnology. Three-hour lecture/discussion.

614 Molecular Evolution 3 cr
Prereq: BIOS 309 or 314, or consent of instructor. Freq: Occasionally.
Examines the evolution of nucleic acids and proteins. Considers five major topics: genetic variability; the causes of molecular evolution and the neutral theory; methods of detecting genetic variability; the use of molecular markers for estimating phylogeny and the evolution of genome structure. Three-hour lecture/discussion. Cross-listed with BIOS 414.

653 Molecular Biology and Bioinformatics of Nucleic Acids 4 cr
Prereq: BIOS 260, 309, and consent of instructor. Freq: Fall.
Covers techniques and theory of nucleic acid isolation (DNA and RNA) and analysis including laboratory and computational methods. Includes common laboratory methods for isolating and characterizing nucleic acids. Eight-hour lecture/lab.

655 Protein Biochemistry and Bioinformatics 4 cr
Prereq: BIOS 260, 309, and consent of instructor. Freq: Spring.
Practical experience in protein expression, purification, and characterization with emphasis on enzymology and use of computer programming for development of relevant bioinformatics applications. Eight-hour lecture/lab.

675 Advanced Molecular Biology 3 cr
Prereq: BIOS 260, 309 or 509; and consent of instructor. Freq: Alternate year.
In-depth coverage of selected research topics in molecular biology including DNA replication, transcription, translation, and other current topics. Three-hour lecture.

680 Bioinformatics Programming 4 cr
Prereq: BIOS 260, 309 (or 509), and consent of instructor. Freq: Occasionally.
This course focuses on implementation of programming languages, data structures, and data management strategies for bioinformatics applications. Lectures and computer-based exercises emphasize both theory and analysis of genomic and proteomic data. Three-hour lecture; three-hour lab.

690 Advanced Topics in Molecular Biology 1-4 cr
Prereq: BIOS 260, 309 or 509; and consent of instructor. Freq: Occasionally.
Selected advanced topics in molecular biology.

699 Independent Study 1-3 cr
Prereq: Consent of instructor. Freq: Fall, Spring.
Advanced study performed under the supervision of a regular faculty member. Suitability as an elective for the master’s of applied molecular biology is determined on a case-by-case basis by the MAMB program committee.

711 Thesis 1-9 cr
Prereq: Consent of instructor. Freq: Fall, Spring.
Dissertation for master of science in applied molecular biology. Graded on a credit/no-credit basis.

731 Seminar in Molecular Biology 1 cr
Prereq: BIOS 309 (or 509) and consent of instructor. Freq: Fall, Spring.
Research reports, special topics, and reports from recent literature in molecular biology or biotechnology. Graded on a credit/no-credit basis.

Chemistry (CHEM) Courses in Applied Molecular Biology

620 Advanced Biochemistry 3 cr
Prereq: BIOS 240 or CHEM/BIOS 307 or CHEM 324 or consent of instructor. Freq: Spring (even years).
Advanced topics in biochemistry including thermodynamics, protein structure, and enzyme kinetics and mechanisms. Not open to students with credit in CHEM 410.