Molecular Biology and Biochemistry Major

Admission to the Major

Students are encouraged to begin course work toward the MB&B major in the first year so that they can take maximum advantage of upper-level MB&B courses, research, and study-abroad opportunities in later years. However, the major can certainly be completed successfully if initiated during sophomore year.

A prospective MB&B major can begin with the core introductory biology series (MB&B181/Biol181 and MB&B182/Biol182; associated laboratory MB&B191/Biol191 and MB&B192/Biol192) and/or the core general chemistry series (CHEM141/Chem143 and CHEM142/Chem144; associated laboratory, CHEM152). MB&B181 is offered in small sections rather than a single, large lecture class. These small sections allow for problem-based learning at a more individualized pace as students master the first semester of university-level biology.

Major Requirements

The molecular biology and biochemistry major requires the following course work:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MB&amp;B181 &amp; MB&amp;B191</td>
<td>Principles of Biology I: Cell Biology and Molecular Basis of Heredity</td>
<td>1.5</td>
</tr>
<tr>
<td>MB&amp;B182 &amp; MB&amp;B192</td>
<td>Principles of Biology II and Principles of Biology II-Laboratory</td>
<td>1.5</td>
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<tr>
<td>CHEM141/143 or CHEM142/144</td>
<td>Introductory Chemistry I or Introductory Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>CHEM152</td>
<td>Introductory Chemistry Laboratory</td>
<td>0.25</td>
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<tr>
<td>MB&amp;B208</td>
<td>Molecular Biology</td>
<td>1</td>
</tr>
<tr>
<td>CHEM251/252</td>
<td>Principles of Organic Chemistry I or Principles of Organic Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>Mathematics</td>
<td>Select one course (calculus or statistics recommended)</td>
<td>1</td>
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<tr>
<td>MB&amp;B381</td>
<td>Physical Chemistry for the Life Sciences</td>
<td>1</td>
</tr>
<tr>
<td>MB&amp;B383</td>
<td>Biochemistry</td>
<td>1</td>
</tr>
<tr>
<td>MB&amp;B394 or MB&amp;B395</td>
<td>Advanced Laboratory in Molecular Biology and Genetics or Structural Biology Laboratory</td>
<td>1</td>
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Electives

Select two elective courses, at least one of which must be a 300-level MB&B course

Students are encouraged to take a seminar course, MB&B209, in the spring of the first or sophomore year.

Two consecutive semesters of research for credit (in the same laboratory) (MB&B421, MB&B422) with an MB&B faculty member (or a preapproved faculty member in another department conducting research in molecular biology/biochemistry/biophysics) can be substituted for the 200-level elective. Honors thesis (MB&B409 and MB&B410) does not count as an elective.

MB&B381 may be replaced by two semesters of introductory or general physics (PHYS111/PHYS113 and PHYS112/PHYS116) or physical chemistry (CHEM337 and CHEM338). In this case MB&B381 may count as the required 300-level elective.

For potential elective courses outside of MB&B, including study-abroad courses, students must consult with their faculty advisor and the MB&B chair in a timely manner.

Majors interested in a concentration in molecular biology should take MB&B394, which is offered every spring semester and generally taken in the junior or senior year. Students interested in the molecular biophysics certificate should take MB&B395, which is offered every other year in fall semester.

MB&B majors are also encouraged to attend the MB&B/biology seminars (Thursdays at noon), the chemistry colloquium (Fridays at 3:30 p.m.), and/or the biological chemistry seminars (Mondays at 4 p.m.), wherein distinguished scientists from other institutions are invited to present their research to our community.

Note: Many MB&B majors take 200- and 300-level courses over the curriculum requirement to better prepare for graduate or medical school.

Courses for Non-Majors

Non-life-science majors are encouraged to consider MB&B111, MB&B119, MB&B181, or MB&B182 as part of their program to meet NSM requirements. See WesMaps (https://www.wesleyan.edu/wesmaps) for current course offerings.

MB&B228 is an introductory biochemistry course for non-majors intending to pursue a medical degree.

Student Learning Goals

- Acquire mastery of core foundational knowledge of molecular biology and biochemistry
- Acquire selective familiarity with our primary literature and bioinformatic databases
- Achieve familiarity with major questions at the forefront of our field
- Acquire mastery of analytical, quantitative, and creative approaches to analyze problems in our field and to synthesize them in order to create logical hypotheses and experimental plans
- Acquire ability to use multidisciplinary approaches to synthesize a cogent experimental plan
- Acquire mastery of important methodologies in our field
- Acquire mastery of a subset of hands-on methodologies in our field
- Acquire proficiency in oral, written, and visual modes of effective scientific communication
ADVANCED PLACEMENT

Prospective MB&B majors who have achieved a score of 4 or 5 in AP Biology may consider replacing one of the introductory biology courses (MB&B181 or MB&B182) with an upper-level course. Students must consult with an MB&B faculty member if they wish to try to place out of an introductory course. Permission to place out of MB&B181 is based on a short interview with one of the MB&B faculty instructors and a short placement test.

Prospective MB&B majors who have achieved a score of 4 or 5 in AP Chemistry must meet the Chemistry Department requirements for advanced placement credit.

PRIZES

Hawk Prize: The gift of Philip B. Hawk, Class of 1898, as a memorial to his wife, Gladys, to the students who have done the most effective work in biochemistry.

William Firshein Prize: In honor of founding faculty member William Firshein, awarded to the graduating MB&B student who has contributed the most to the interests and character of the Molecular Biology and Biochemistry Department.

Scott Biomedical Prize: Awarded to a member or members of the molecular biology and biochemistry senior class who have demonstrated excellence and interest in commencing a career in academic or applied medicine.

Dr. Neil Clendeninn Prize: Established in 1991 by George Thornton, Class of 1991, and David Derryck, Class of 1993, for the African American student who has achieved academic excellence in biology and/or molecular biology and biochemistry. This student must have completed his or her sophomore year and in that time have exemplified those qualities of character, leadership, and concern for the Wesleyan community as shown by Dr. Neil Clendeninn, Class of 1971.

RELATED PROGRAMS OR CERTIFICATES

Certificate program in molecular biophysics (catalog.wesleyan.edu/certificates/molecular-biophysics). An interdisciplinary program with faculty in the MB&B, chemistry, physics, and biology departments. To receive a certificate in molecular biophysics, a student should major in either the chemistry or MB&B department. Interested students must take MB&B395, MB&B383, MB&B381 or CHEM337 and CHEM338, two upper-level elective courses in molecular biophysics, and two semesters of Molecular Biophysics Journal Club (MB&B307 and MB&B308). Students are strongly encouraged to conduct independent research in the laboratory of a molecular biophysics program faculty member. Students interested in the molecular biophysics certificate should contact Professor I. Mukerji.

Certificate program in integrative genomic sciences (IGS). An integrative program of course work and research in the areas of bioinformatics, genomics, computational biology, and bioethics. IGS involves faculty and students in the life sciences, physical sciences, information sciences, and philosophy. Please see the website for current information on courses. Students interested in the IGS certificate should contact Professor R. Lane.

BA/MA PROGRAM

This program provides an attractive option for life science majors to enrich their course and research background. Students are advised to begin research by their junior year if they intend to pursue the BA/MA. Admission is competitive and based on GPA, faculty recommendations, and research experience. For more information, please visit the BA/MA Program (http://wesleyan.edu/grad/degree-programs/ba-ma.html) page.

ADDITIONAL INFORMATION

Undergraduate research is an important part of the program for many MB&B majors. Wesleyan’s small but excellent graduate program makes it possible for majors to work at the cutting edge of discovery in molecular biology and biochemistry. MB&B majors not interested in laboratory work are encouraged to gain exposure to current research through journal clubs and seminars.

HONORS

To be considered for departmental honors, a student must

- be an MB&B major and be recommended to the department by a faculty member. The student is expected to have a B average (grade point average 85) in courses credited to the major.
- submit a thesis based on laboratory research or library research, performed under the supervision of an MB&B faculty member.