

ADVISING GUIDE FOR BIOLOGY MAJORS

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Also see 2024-2025 Undergraduate Catalog:

https://catalog.umb.edu/preview_program.php?catoid=54&poid=13837&returnto=9273

BIOLOGY MAJOR CURRICULUM:

Introductory Biology and Chemistry Courses

Students must complete all 18 credits of the following introductory courses.

- BIOL 111 – General Biology I (4 credits)
- BIOL 112 – General Biology II (4 credits)
 - Prerequisite: BIOL 111
- CHEM 115 – Chemical Principles I Lecture (3 credits)
 - Corequisites: CHEM 117 and MATH 130 or placement into MATH 140
- CHEM 117 – Chemical Principles I Lab (2 credits)
 - Corequisite: CHEM 115
- CHEM 116 – Chemical Principles II Lecture (3 credits)
 - Prerequisite: CHEM 115 with a grade of C- or better
 - Corequisite: CHEM 118
- CHEM 118 – Chemical Principles II Lab (2 credits)
 - Prerequisite: CHEM 117
 - Corequisite: CHEM 116

Mathematics Requirement

Biology majors start at a level in mathematics based on their ALEKS Math Placement results, then progress to the level of calculus. Biology majors must complete 1 calculus course from the list below:

- MATH 135 – Survey of Calculus (3 credits)
 - Prerequisite: Appropriate recent ALEKS score or MATH 130. (Note that Math 135R does not fulfill this requirement.)
- MATH 140 – Calculus I (4 credits)
 - Prerequisites: Appropriate recent ALEKS score or completion of MATH 130 with a grade of B or better
- MATH 145 – Calculus I for Life Sciences (4 credits)
 - Prerequisites: Appropriate recent ALEKS score or MATH 130 with a grade of B or better

Note: MATH 141 – Calculus II (4 credits) is not required for the biology major but is sometimes recommended based on a student's post-graduate plans. Prerequisite for Math 141 is MATH 140 or MATH 145 with a grade of C- or better.

Physics Requirement

Biology majors must complete two semesters of physics courses with labs. Students have the option to take either the algebra-based or the calculus-based physics sequence.

- PHYSIC 107 – College Physics I (algebra-based) (3 credits)
 - Prerequisite: MATH 130 or equivalent recent ALEKS score or instructor permission
- PHYSIC 171 – Introductory Physics Lab for Life Sciences I (algebra-based) (1 credit)
 - Corequisite: PHYSIC 107
- PHYSIC 108 – College Physics II (algebra-based) (3 credits)
 - Prerequisite: PHYSIC 107 with a grade of C- or better.
 - Prerequisite or Corequisite: MATH 130

- PHYSIC 172 – Introductory Physics Lab for Life Sciences II (algebra-based) (1 credit)
 - Prerequisite: PHYSIC 171 with a grade of C- or better
 - Corequisite: PHYSIC 108

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- PHYSIC 113 – Fundamentals of Physics I (calculus-based) (4 credits)
 - Prerequisite or Corequisite: MATH 140
- PHYSIC 181 – Physics Laboratory I (calculus-based) (2 credits)
 - Corequisite: PHYSIC 107 or PHYSIC 113
- PHYSIC 114 – Fundamentals of Physics II (calculus-based) (4 credits)
 - Prerequisite: PHYSIC 113 with a grade of C- or better
 - Prerequisite or Corequisite: MATH 141
- PHYSIC 182 – Physics Laboratory II (calculus-based) (2 credits)
 - Prerequisite: PHYSIC 181 with a grade of C- or better
 - Prerequisite or Corequisite: PHYSIC 108 or PHYSIC 114

Note: Students can progress from calculus-based Fundamentals of Physics I to algebra-based College Physics II but cannot move from algebra-based College Physics I to calculus-based Fundamentals of Physics II.

Intermediate Biology Requirement

Students must complete the following 3 intermediate biology courses:

- BIOL 210 – Cell Biology (with lab) (4 credits)
 - Prerequisites: BIOL 111 and 112 and CHEM 115 and 117 (or CHEM 103)
 - Prerequisite or Corequisite: MATH 130 or placement into MATH 140
- BIOL 252 – Genetics (with lab) (4 credits)
 - Prerequisites: BIOL 111 and 112 and CHEM 115 and 117 (or CHEM 103)
 - Prerequisite or Corequisite: MATH 130 or placement into MATH 140
- BIOL 290 – Population Biology (lecture only) (3 credits)
 - Prerequisites: BIOL 111 and 112 and any one of these: MATH 130, 135, 140, 145, or placement into MATH 140

Advanced Biology Requirement

Students need to take 20 credits of the Advanced Biology Curriculum. Students can pick any combination of courses between BIOL 304 and BIOL 395. Within those 20 credits, students must take 4 different lab courses to satisfy the Lab Course Requirement (see below for details).

Organic Chemistry

Many biology majors elect to take organic chemistry (CHEM 251/255 and 252/256), although it is not required for the major. If a student elects to take these courses, they will count towards the 20-credit Advanced Biology Requirement. **However, only 1 lab credit for each of the 2-credit organic chemistry labs counts toward the Advanced Biology Requirement and the Lab Course Requirement.** Thus, if the student takes two semesters of organic chemistry with lab, then 8 of those credits can be applied to the Advanced Biology Requirements. Note: Students must earn a grade of C- or better in CHEM 116/118 to enroll in CHEM 251/255 and must then receive a grade of C- or better in CHEM 251/255 to enroll in CHEM 252/256.

Lab Course Requirement

Students must take a minimum of 4 advanced lab courses, which are included in the 20-credit Advanced Biology Requirement. Of the 4 required lab courses, a **minimum of 2** must be taken **within** the Biology Department at UMass Boston. Courses considered to be outside the Biology Department include Organic Chemistry, Biochemistry II, and transferred courses. As stated above, only 1 credit from each 2-credit Organic

Chemistry lab can be applied toward the Advanced Biology or Lab Course Requirement.

One semester of Biol 478 or 479 for 3 credits (Independent Study) can be used as 1 of the 4 required lab courses. However, this does not count toward the 12-credit residency requirement (see below).

These courses each satisfy 1 course toward the Lab Course Requirement:

BIOL 306, 309, 310, 312, 313, 316, 317, 321, 328, 330, 332, 334, 337, 338, 341, 343, 345, 347, 353, 356, 358, 361, 362, 364, 365, 370, 378, 382, 391, 478 or 479; **BIOCHM** 385; **CHEM** 255, **CHEM** 256.

Note that multi-credit labs count for just 1 credit toward the Advanced Lab Requirement.

ADDITIONAL BIOLOGY REQUIREMENTS AND POLICIES:

Grade Point Average in the Major

To graduate with a biology major, students must have a minimum cumulative grade point average (GPA) of 2.0 or above in the major. This biology major GPA is calculated from the following courses provided they have been completed at UMass Boston: all biology courses at the 200 and 300 levels, some 600-level courses, and Biochemistry I if taken.

Biology Residency Requirement

All biology majors, including transfer students, must take at least 12 credit hours at the 300 level or above within the Biology Department at UMass Boston. This includes at least 2 credits from 2 different lab courses. Biochemistry 383 and 385 may count toward this requirement.

Note: The following courses do not count toward the Residency Requirement: **BIOL** 444, 478, 479, 653, 672, 673; **BIOCHM** 384, 386, 471, 472, 491, 492; **CHEM** 251, 252, 255, 256; as well as all other courses from other programs and departments.

Biology Transfer Course Policy:

Fully matriculated students cannot take courses at other institutions and transfer them to UMass Boston to be applied to the biology major. That said, students who have a particularly pressing reason to take a course at another institution may appeal this regulation. The appeal must be approved by the Department Chair or the Biology Director of Undergraduate Advising. Students may obtain the prior approval form for this purpose from the Admissions Office.

Pass/Fail Policy:

Students may take only 1 course pass/fail among all courses that count toward the biology major requirements. This includes all required biology, chemistry, math, and physics courses.

HONORS IN BIOLOGY:

To recognize achievement in research and coursework, the Biology Department confers honors to some of its graduating seniors. The Department may award honors to students who have completed the following requirements:

- Minimum cumulative Grade Point Average (GPA) of 3.0 for all courses and 3.0 for biology courses, as calculated on the Degree Audit. The biology GPA is calculated from all biology courses at the 200 and 300 levels, some 600-level courses, and Biochemistry I if taken. These GPAs must be current during the middle of the student's final semester, which is when GPA eligibility for honors is determined.
- Successful engagement in supervised research while enrolled in at least 1 semester (3 credits) of

Independent Study (BIOL 478/479) or Cooperative Education (BIOL 444). The mentor supervising the undergraduate research may be either a UMass Boston faculty member in biology, chemistry, the School for the Environment, or another related discipline, or an off-campus scientist with a faculty liaison in the Biology Department at UMass Boston.

- Public presentation of their research, which in the view of the of the biology faculty, merits the awarding of honors. Shortly before graduation (spring or fall), the biology honors candidate presents their research at a public poster or talk session organized by the Biology Department.
- Submission of a written honors thesis describing their research to the Biology Department. This is typically due one month following the oral presentation.

Honors in biology differs from honors in other majors and from the Honors College. Biology majors are eligible for honors in biology if they have met the requirements above. Students in other majors or programs, such as biochemistry, must meet the requirements of their program/department to earn honors in that department/program. It is the major of the student, not the program/department affiliation of the research mentor, that dictates the requirements for earning honors.

ADDITIONAL INFORMATION FOR BIOLOGY MAJORS:

- **Cell Biology and Genetics Labs:** Any biology major, including transfer students, who has not completed the lab portions of Cell Biology (BIOL 210) and/or Genetics (BIOL 252), must take an extra 300-level lab course in lieu of each missed lab experience to satisfy the requirements of the major.
- **Anatomy and Physiology:** Biology Majors who are interested in taking anatomy and physiology should take BIOL 307/309 and BIOL 308/310, which count toward the Advanced Biology Requirement. Biology majors should **not** take BIOL 207 and 208 as they do not count toward the major. If a student takes BIOL 207 and/or 208, they cannot later take BIOL 307/309 or BIOL 308/310.
- **Course Repeats:**
 - Students may not take a lecture-only version of a course as a repeat if the original course taken included the lab component or vice versa. Since students cannot receive credit for both versions, the second course would be an illegal repeat.
 - After passing a course, no student can repeat a course for a better grade outside of the university and then transfer that grade in to be counted toward their degree program.
- **Exemption from General Biology—Minimum CLEP/AP Scores:**
 - CLEP: The Biology Department accepts the CLEP exam with a score of 50 or above. Students meeting this requirement are exempt from BIOL 111 and 112 and can receive 6 credits toward graduation.
 - Advanced Placement (AP): Students with a score of 3 on the AP Biology exam are exempt from BIOL 111 and 112. Those with an AP score of 4 or higher are exempt from BIOL 111 and 112 and receive 8 credits.
 - Once the CLEP/AP waivers have been applied, students cannot later take BIOL 111/112. If these courses are taken, the CLEP/AP credits are forfeited.