The Major

 Certain changes to the Biology Major listed in this online version are still pending CAP approval.

The major in biological sciences provides a strong basis for understanding the breadth of disciplines in biology while enabling depth of study in one or more specialized fields. Within this general framework, students construct a course program that matches their interests by choosing among the following five tracks.

Track 1: Integrative Biology
Track 2: Cells, Physiology and Development
Track 3: Genetics, Evolution and Molecular Biosciences
Track 4: Biodiversity, Ecology and Conservation
Track 5: Biology and Education

In their first semesters, students are encouraged to enroll in an appropriate core course (130/131 or 132/133 (formerly 150/151 or 154/155)) as well as chemistry (CHM 111 or 118).

Basic Requirements for Tracks 1–4
12 courses are required, plus laboratories. These include:

- Core courses: BIO 130 (formerly 154), BIO 132 (formerly 150), as well as either BIO 230 or BIO 232.
- CHM 111 or 118.
- A course in statistics (MTH 220 recommended)
- Five additional upper-level BIO courses (lectures, seminars or colloquia) as specified for each track, at least two at the 300 level.
- Two electives chosen in consultation with the student’s adviser. One 100-level biology course (100–149) can be counted as an elective.
- Five laboratory courses: BIO 131 (formerly 155) and BIO 133 (formerly 151) and at least one at the 300 level. Laboratories do not fulfill the upper-level or elective course requirements. One-credit or two-credit laboratories do not count as separate courses toward the minimum 12 required courses.

Independent research is strongly encouraged but not required for the major. With the approval of the student’s adviser, one semester of Special Studies (400) or Honors (430, 431 or 432), of 3 credits or more, can substitute for an elective or a 200/300-level laboratory.

With the approval of the student’s adviser, one course in the major may be graded S/U.

Note: Students receiving advanced placement on their Smith College transcript for biology (e.g., AP, International Baccalaureate, A Levels) may, in consultation with the Departmental advisor, substitute either Bio 130 or 132 with a 200 or 300-level course in the same subfield of biology as the course they are bypassing (e.g. a course in cell biology, physiology and development in lieu of bio 132, or a course in biodiversity, ecology or conservation in lieu of Bio 130).

Track 1: Integrative Biology

Students must complete a minimum of five 200- or 300-level courses as well as three laboratories from tracks 2–4. At least 1 course from each of Tracks 2, 3 and 4 must be included in the program of study. Courses cross-listed in different tracks can only be counted once.
Track 2: Cells, Physiology and Development

Students must complete a minimum of five 200- or 300-level courses as well as three laboratories from the following list.

**200 level:** BIO 200 Animal Physiology, BIO 202 Cell Biology, BIO 204 Microbiology, BIO 206 Plant Physiology, BIO 230 Genomes and Genetic Analysis, BIO 232 Evolution, BCH 252 Biochemistry I

**300 level:** BIO 300 Neurophysiology, BIO 302 Developmental Biology, BIO 306 Immunology, BIO 308 Introduction to Biological Microscopy, BIO 310 Cellular and Molecular Bases of Learning and Memory, BIO 320 Colloquium on Molecular Medicine, BIO 321 Topics in Microbiology, BIO 322 Topics in Cell Biology, BIO 323 Topics in Developmental Biology, NSC 318 Systems Neurobiology

Track 3: Genetics, Evolution and Molecular Biosciences

Students must complete minimum of five 200- or 300-level courses as well as three laboratories from the following list:

**200 level:** BIO 230 Genomes and Genetic Analysis, BIO 232 Evolutionary, BIO 264 Plant Diversity and Evolution, BCH 252 Biochemistry I, GEO 231 Invertebrate Paleontology and the History of Life

**300 level:** BIO 302 Developmental Biology, BIO 306 Immunology, BIO 310 Cellular and Molecular Bases of Learning and Memory, BIO 321 Topics in Microbiology, BIO 332 Molecular Biology of Eukaryotes, BIO 334 Bioinformatics and Comparative Molecular Biology, BIO 350 Topics in Molecular Biology, BIO 351 Topics in Evolutionary Biology, BIO 366 Biogeography, BIO 370 Microbial Diversity, BCH 390 Biochemical Research Using Advanced Techniques, NSC 312 Neuroethology

Track 4: Biodiversity, Ecology and Conservation

Students must complete minimum of five 200- or 300-level courses as well as three laboratories from the following list:

**200 level:** BIO 200 Animal Physiology, BIO 206 Plant Physiology, BIO 232 Evolution, BIO 260 Invertebrate Diversity, BIO 264 Plant Diversity and Evolution, BIO 268 Marine Ecology, BIO 272 Vertebrate Biology, GEO 231 Invertebrate Paleontology and Paleocology

**300 level:** BIO 302 Developmental Biology, BIO 355 Ecophysiology, BIO 362 Animal Behavior, BIO 363 Animal Behavior Methods, BIO 364 Plant Ecology, BIO 366 Biogeography, BIO 370 Microbial Diversity, BIO 390 Topics in Environmental Biology, EGR 315 Ecohydrology, NSC 312 Neuroethology

Track 5: Biology and Education

Graduates receive a degree in biological sciences and may be able to complete the requirements for a Massachusetts teaching license for high school and middle school biology. While this track still requires the same total number of 12 courses to satisfy a Biology major, careful selection of additional courses outside the major will be required to prepare you for completion of a MA state teaching licensure. This track is designed for the student who plans to become a secondary education teacher in biology. Students interested in this track should contact the coordinator of teacher education as soon as possible.

A minimum of eight courses and four labs that count toward biological sciences are required, including:
• All three core courses (BIO 130 (formerly 154), 132 (formerly 150), and either 230 or 232).
• Three additional courses: one each from tracks 2, 3 and 4, at least one of which is at the 300 level
• Four laboratories: two affiliated with the core courses and at least one at the 300 level.
• A course in statistics (MTH 220 recommended)
• Chemistry 111 or 118.

A total of four education-related courses are required to complete an emphasis in the learning sciences to satisfy this biology-education track:

Each of the following courses is required:

EDC 238 Introduction to the Learning Sciences

EDC 342 Growing Up American: Adolescents and Their Educational Institutions

EDC 347 Individual Differences Among Learners

EDC 390 The Teaching of Science, Engineering and Technology

An important note: To satisfy the requirements of MA state licensure in the teaching of biology (5th–8th grades or 8th–12th grades), the following additional courses should be taken as “outside major course credit”:

EDC 211 Rethinking Equity and Teaching for English Language Learners

EDC 346 Clinical Internship in Teaching

EDC 352 Methods of Instruction

Consult closely with your advisor in biology to plan the inclusion of these license-required courses, as well as with your Education advisor to stay abreast of any State regulatory changes that may impact the required curriculum.