**Biology**

The **MAJOR** in Biology has six components:

* **Three introductory biology courses** (Biology 219 [Marine Biology] OR 220 [Organismal Biology]; Biology 221 [Genetics and Molecular Biology]; and FS BIO 201).
* **Three 300-level biology courses**, one in each of three main areas of biology (Cellular/Molecular Biology, Organismal Biology/Physiology, and Population Biology/Ecology/Evolution).
* A **Junior Seminar** (Biology 580).
* A two-semester, six-credit **Senior Project and Seminar** (Biology 600 and 610).
* **Required foundation courses in Mathematics and Chemistry:** Mathematics 151 (or 140 and 141), Chemistry 120 & 122, and one semester of Organic Chemistry (Chemistry 231).
* **Two additional four-credit courses** chosen from: **Biostatistics (**BIO 385), **Chemistry** (Chem 200 or higher, except 231), **Computer Science** (100-level or higher), **Geology** (100-level or higher, excluding GEO 331), **Mathematics** (Math 152 or higher), **and/or Physics** (Physics 101 or higher). These courses should be chosen to complement career goals or specific curricular interests. Courses numbered 190 do not qualify. Any course cross-listed as Biology does not qualify.

The **MINOR** in Biology has three components:

* **Three introductory biology courses** (BIO 219/220, 221, and FSBIO 201)
* **Two 300-level biology courses,** at least **one** of which must be a laboratory course
* **Required foundation courses in Chemistry:** CHEM 120 & 122

**CHANGES FOR FALL 2022 ADVISING**

As of Fall 2022, the introductory Biology sequence no longer requires Chemistry 120 as a prerequisite. However, completion of the major and minor **do** still require successful completion of some chemistry and math courses. The most significant aspect of this change is that students may start Biology coursework prior to or concurrent with the chemistry or math courses.

In addition, starting in Fall 2022, students may complete Biology 220 and Biology 221 in any order. Biology 219 (Marine Biology) also may substitute for Biology 220 for interested students. However, Biology 219 is only offered in spring semester AND is not appropriate for students interested in post-graduate health professions.

As a result of the changes, introductory students interested in majoring in Biology now have (at least) four potential paths in the first semester:

1. **Chemistry and Math**
2. **Biology and Math**
3. **Biology and Chemistry**
4. **Biology, Chemistry, and Math**

The example pathways shown below have significant flexibility, within these general guidelines:

* FS BIO 201 can be taken either semester in the second year
* Students who enroll in MATH 140 or CHEM 120 in their first semester and have difficulty in those courses should consider taking an ‘X’ and enrolling in the CHEM 119 (Module B) course in the 2nd half of the semester
* The Math Department recommends that students are more likely to succeed the closer the student is in time to their high school math experiences
* **Chemistry 231 is offered ONLY in fall semester**
* Biology 3XX upper-level courses can be distributed across semesters in any fashion once the introductory series (BIO 219/220, 221, FSBIO 201) has been completed. Some Biology 3XX courses require completion of Chemistry prerequisites.

**Notes for students interested in health professions**

* These students should complete BIO 220, not BIO 219.
* Although placement in Mathematics 152 or higher satisfies the Mathematics 151 requirement for the Biology major, health professions students may need to take additional courses in Mathematics. See the Health Professions Advising Guidelines for further details.
* The three introductory Biology courses, Mathematics 151 (or 140 and 141), Chemistry 120 & 122, and Chemistry 231, should be completed by the end of the sophomore year, if mathematics and chemistry placement permits. **Students and their advisors should also be aware that Chemistry 231 is only offered in the fall semester.**
* Students should complete Chemistry 332 and 234 (Organic Chemistry II and lab), Chemistry 253 (Biochemistry), and Physics 101 and 102 (or Physics 110 and 120).
	+ Physics 101: fall semesters only, starting fall 2022
	+ Physics 102: fall 2022, then spring semesters only starting spring 2023
	+ Physics 110: fall semester only
	+ Physics 120: spring semester only
	+ Chemistry 332 & 234: spring semester only

**Prerequisites for the Biology Major and Minor:**

1. Placement into MATH 151, transfer or AP credit for MATH 151, completion of MATH 140 with a C or better, or completion of CHEM 119 with a C or better are required to enroll in CHEM 120.
2. Biology 219/220 OR Biology 221 are prerequisites for FS BIO 201.
3. Biology 219/220, 221, **and** FS BIO 201 are prerequisites for Biology 300-level courses**.**
4. Biology 219/220, 221, **and** *a grade of C or higher in FS BIO 201* are prerequisites for BIO 580**.**
5. Biology 580 is a prerequisite for Biology 600. Biology 600 is a prerequisite for Biology 610.

**Pathway 1. Chemistry and Math**

This pathway is closest to the recommended steps prior to Fall 2022. It allows completion of CHEM 231 (Organic Chemistry) by the end of sophomore year, and is recommended for students that place into MATH 151. Students that place into MATH 140 probably should opt for pathway 2 (Biology and Math) instead.

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|  | **placed into MATH 140** | **placed into MATH 151** |
| **year** | Fall | Spring | Fall | Spring |
| **1** | FS 101MATH 140-CHEM 119 (session B)- | FS102MATH 141CHEM 120- | FS 101MATH 151CHEM 120 (**1**)- | FS 102BIO 219, 220 or 221CHEM 122 (**2**)- |
| **2** | CHEM 122 (**2)**BIO 220 or 221-- | BIO 219, 220, or 221FS BIO 201Cognate- | BIO 220 or 221 or FS BIO 201CHEM 231 (**3**)- | BIO 219, 220, 221 or FS BIO 201Cognate-- |
| **3** | CHEM 231 (**3**)BIO 3XX CognateBIO 580(**4**) | BIO 580(**4**)BIO 3XX- | BIO 580 (**4**) BIO 3XXCognate- | BIO 580 (**4**) BIO 3XX-- |
| **4** | BIO 600BIO 3XX-- | BIO 610--- | BIO 600BIO 3XX-- | BIO 610- -- |

**Pathway 2. Biology and Math**

This pathway is most applicable for students with biology interests but a MATH 140 placement (as they cannot immediately start with Chemistry 120 in the first semester, but can begin with biology coursework). Students who place into MATH 151 also can proceed via this pathway, but will not complete CHEM 231 until their junior year.

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|  | **placed into MATH 140** | **placed into MATH 151** |
| **year** | Fall | Spring | Fall | Spring |
| **1** | FS 101MATH 140BIO 220 or 221- | FS102MATH 141CHEM 120BIO 219, 220, or 221 | FS 101MATH 151BIO 220 or 221- | FS 102BIO 219, 220 or 221CHEM 120 (**1**)- |
| **2** | CHEM 122 (**2)**FS BIO 201-- | BIO 3XXCognate-- | FS BIO 201CHEM 122 (**2**)- | BIO 3XXCognate-- |
| **3** | CHEM 231 (**3**)BIO 3XXBIO 580(**4**)- | BIO 580(**4**)BIO 3XXCognate- | CHEM 231(**3**)BIO 580 (**4**) BIO 3XX- | BIO 580 (**4**) BIO 3XXCognate- |
| **4** | BIO 600--- | BIO 610--- | BIO 600--- | BIO 610- -- |

**Pathway 3. Biology and Chemistry**

This new pathway is realistically only available to students placing into MATH 151 (as students with a MATH 140 placement cannot immediately start Chemistry 120 in the first semester), but delays completion of MATH courses. Students placing into MATH 140 *could* take Chemistry 119, but are better served via pathway 2 (Biology and Math).

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|  | **placed into MATH 140** | **placed into MATH 151** |
| **year** | Fall | Spring | Fall | Spring |
| **1** | FS 101BIO 220 or 221CHEM 119 (session B)- | FS102BIO 219, 220, or 221CHEM 120MATH 140 | FS 101BIO 220 or 221CHEM 120 (**1**)- | FS 102BIO 219, 220 or 221CHEM 122 (**2**)MATH 151 |
| **2** | CHEM 122 (**2)**MATH 141FS BIO 201 | Cognate-- | FS BIO 201CHEM 231 (**3**)- | CognateBIO 3XX- |
| **3** | CHEM 231 (**3**)BIO 3XX CognateBIO 580(**4**) | BIO 580(**4**)BIO 3XX- | BIO 580 (**4**) BIO 3XXCognate- | BIO 580 (**4**) BIO 3XX-- |
| **4** | BIO 600BIO 3XX-- | BIO 610--- | BIO 600--- | BIO 610- -- |

**Pathway 4. Biology, Chemistry, and Math**

This pathway is most appropriate for students with a very strong interest and demonstrated record of achievement in science and math courses (*e.g.,* placement into MATH 151 and/or transfer credit for two or more of the required courses)

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| **year** | Fall | Spring |
| **1** | FS 101MATH 151CHEM 120 (**1**)BIO 220 or 221 | FS 102BIO 219, 220 or 221CHEM 122 (**2**)- |
| **2** | FS BIO 201CHEM 231 (**3**)-- | BIO 3XXCognate-- |
| **3** | BIO 580 (**4**) BIO 3XXCognate- | BIO 580 (**4**) BIO 3XX-- |
| **4** | BIO 600--- | BIO 610- -- |

1. Placement into MATH 151, transfer or AP credit for MATH 151, completion of MATH 140 with a C or better, or completion of CHEM 119 with a C or better is required to enroll in CHEM 120.
2. Prerequisite for CHEM 231, which is only offered in Fall.
3. Only offered in Fall. Required for Biology major
4. Can be taken either semester of junior year.

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