

# ACCELERATED DUAL-DEGREE BS IN BIOLOGY/MS IN MOLECULAR & CELL BIOLOGY (3+1)

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For highly qualified students, the Accelerated Dual-Degree BS in Biology/MS in Molecular and Cell Biology (3+1) provides an opportunity for students to achieve both a Bachelor of Science in Biology and a Master of Science within the field of Molecular and Cell Biology within a 4-year time frame typically associated with only an undergraduate education. The 3+1 program provides an excellent foundation for students intending to pursue studies in professional healthcare fields and doctoral programs. It also offers a competitive edge for students wishing to pursue a career in biotechnology and biopharmaceutical industries.

The requirements and policies for the undergraduate degree are the same as described on the Bachelor of Science in Biology (<https://catalog.qu.edu/arts-sciences/biological-sciences/biology-bs/>) page, except that students in the 3+1 combined BS/MS program are expected to maintain a GPA of at least 3.00 at the end of each school year for continued participation in the program. The requirements and policies for the graduate degree are the same as described on the Master of Science in Molecular and Cell Biology (<https://catalog.qu.edu/graduate-studies/arts-sciences/molecular-cell-biology-ms/>) page.

**Students** in the 3+1 accelerated dual-degree program in biology/MCB must meet the following requirements. The minimum number of credits required for a Bachelor of Science degree is 120. The minimum number of credits required for a Master of Science in molecular and cell biology is 34.

Code	Title	Credits
<b>University Curriculum (<a href="https://catalog.qu.edu/academics/university-curriculum/">https://catalog.qu.edu/academics/university-curriculum/</a>)<sup>1</sup></b>		<b>46</b>
<b>Modern Language Requirement<sup>2</sup></b>		<b>3-6</b>
<b>Biological Science Core Requirements</b>		
BIO 150 & 150L	General Biology for Majors and General Biology for Majors Laboratory	4
BIO 151 & 151L	Molecular and Cell Biology and Genetics and Molecular and Cell Biology and Genetics Lab	4
BIO 252 & 252L	Ecology and Biodiversity and Ecology and Biodiversity Laboratory	4
BIO 298	Research Methods in Biology	3
<b>Biology Electives<sup>3</sup></b>		
Select a minimum of one course from each of the following categories:		10-16
<b>Molecular and Cellular Electives (3-4 credits):<sup>3</sup></b>		
BIO 240	Cellular Communication	
BIO 282 & 282L	Genetics and Genetics Lab	

BIO 317 & 317L	Developmental Biology and Developmental Biology Lab	
BIO 346 & 346L	Cell Physiology and Cell Physiology Lab	
BIO 365	Cancer Biology	
BIO 382 & 382L	Human Genetics and Human Genetics Lab	
BIO 471 & 471L	Molecular Genetics and Molecular Genetics Lab	
<b>Organismal Electives (3-4 credits):<sup>3</sup></b>		
BIO 215	Environmental Biotechnology	
BIO 300	Special Topics	
BIO 323 & 323L	Invertebrate Zoology and Invertebrate Zoology Lab	
BIO 324 & 324L	Vertebrate Zoology and Vertebrate Zoology Lab	
BIO 328 & 328L	Human Clinical Parasitology and Human Clinical Parasitology Lab	
BIO 352 & 352L	Botany and Botany Lab	
BIO 358 & 358L	Conservation Biology and Conservation Biology Lab	
BIO 375 & 375L	Physiological Models for Human Disease and Physiological Models for Human Disease Lab	
BIO 383	Evolution	
<b>Physiology Electives (3-4 credits):<sup>3</sup></b>		
BIO 211 & 211L	Human Anatomy and Physiology I and Human Anatomy and Physiology Lab I	
BIO 212 & 212L	Human Anatomy and Physiology II and Human Anatomy and Physiology II Lab	
BIO 225 & 225L	Physiological Diversity and Physiological Diversity Lab	
BIO 325	Environmental Toxicology	
BIO 329	Neurobiology	
BIO 350	Cardiovascular Physiology	
<b>Experiential Learning (1-4 credits):</b>		
BIO 385	Explorations in Biology	
BIO 386	Environmental Studies Practicum	
BIO 491	Independent Research in Biological Science	
BIO 492	Independent Research in Biological Sciences	
BIO 493	Independent Research in Biological Sciences	
BIO 494	Independent Research in Biological Sciences	
<b>Physical Science Core Requirements</b>		
CHE 110 & 110L	General Chemistry I and General Chemistry I Lab	4
CHE 111 & 111L	General Chemistry II and General Chemistry II Lab	4

CHE 210 & 210L	Organic Chemistry I and Organic Chemistry I Lab	4
CHE 211 & 211L	Organic Chemistry II and Organic Chemistry II Lab	4
PHY 110 & 110L	General Physics I and General Physics I Lab	4
PHY 111 & 111L	General Physics II and General Physics II Lab	4
<b>Open Undergraduate Electives</b> <sup>4</sup>		<b>9</b>
<b>Graduate Courses</b> <sup>5</sup>		
BIO 515	Advanced Biochemistry	4
BIO 568	Molecular and Cell Biology	4
BIO 571	Molecular Genetics	4
BIO 605	DNA Methods Laboratory	4
BIO 606	Protein Methods Laboratory	4
BIO 675	Comp Exam in Molecular and Cell Biology	2
Open Graduate Electives		12
<b>Total Credits</b>		<b>141-150</b>

<sup>1</sup> **University Curriculum Requirement:** All students must complete the 46 credits of the University Curriculum (<https://catalog.qu.edu/academics/university-curriculum/>). Completion of MA 140 (Pre-Calculus) with a minimum grade of C- and either MA 141 (Calculus of a Single Variable) or MA 275 (Biostatistics) is required for the Bachelor of Science degree in Biology. The following courses taken for the Biology major double count as UC requirements: BIO 150& 150L, BIO 151 and 151L, CHE 110& 110L, CHE 111& 111L, and PHY 110& 110L.

<sup>2</sup> **College of Arts & Sciences Modern Language Requirement:** All CAS students (both bachelor of science and bachelor of arts) must complete one modern language through the 102 level. Modern language courses may also count toward the UC Personal Inquiry II requirement. Students who have taken a language in high school should take the modern language placement test for that language. Students with placement scores at the 201 level or higher have demonstrated language competency and thus have passed out of the language requirement.

<sup>3</sup> **Biology Electives:** Some biology courses have no laboratory component and are 3-credit rather than 4-credit courses. Co-requisite courses must be taken simultaneously.

<sup>4</sup> **Open Undergraduate Electives:** Students take open electives for a total of 120 credits required for the Bachelor of Science degree in Biology. Many students pursue other interests by selecting electives in fulfillment of a minor.

<sup>5</sup> **Graduate Courses:** Students take a total of 34 graduate credits required for the Master of Science degree in Molecular and Cell Biology.

The accelerated dual-degree (3+) program is designed for outstanding students. First-year applicants will be considered for an accelerated dual-degree program based on demonstrated academic achievement to complete the bachelor's degree at an accelerated pace.

While scores are not required, if a student wants to submit, they should have at least a 1200 SAT or 25 ACT to be considered.

For detailed admission requirements, including required documents, please visit the Admissions page (<https://catalog.qu.edu/general-information/admissions/>) of this catalog. You can also learn more

about accelerated dual-degrees (<https://www.qu.edu/academics/about-our-programs/accelerated-dual-degree/>) on qu.edu

## Accelerated Dual-Degree BS in Biology/MS in Molecular and Cell Biology (3+1)

Shown below is one of several possible paths through the curriculum. Students choose courses and follow a curriculum in consultation with their academic adviser; individual planning will vary based on a number of factors, including, for instance, Advanced Placement and/or transfer credits.

The minimum number of credits required for the undergraduate degree is 120, and the minimum number of credits required for the graduate degree is 34. At least 18 credits must be completed after conferral of the bachelor's degree and cannot be double counted.

Courses taken to fulfill the undergraduate Bachelor of Science in Biology are identical to those listed in the BS in Biology curriculum (<https://catalog.qu.edu/arts-sciences/biological-sciences/biology-bs/#curriculumtext>).

Courses taken to fulfill the graduate Master of Science in Molecular and Cell Biology are identical to those listed in the MS in Molecular and Cell Biology curriculum (<https://catalog.qu.edu/graduate-studies/arts-sciences/molecular-cell-biology-ms/#curriculumtext>).

Code	Title	Credits
<b>Fall Semester</b>		
Milestones: Earn 40 credits, meet with your advisor at least once a semester, a GPA of 3.0 or higher and a science GPA of 2.25 or higher.		
BIO 150 & 150L	General Biology for Majors and General Biology for Majors Laboratory	4
CHE 110 & 110L	General Chemistry I and General Chemistry I Lab	4
MA 140	Pre-Calculus <sup>1</sup>	3
EN 101	Introduction to Academic Reading and Writing <sup>1</sup>	3
FYS 101	First-Year Seminar	3
<b>Spring Semester</b>		
BIO 151 & 151L	Molecular and Cell Biology and Genetics and Molecular and Cell Biology and Genetics Lab	4
CHE 111 & 111L	General Chemistry II and General Chemistry II Lab	4
MA 141	Calculus of a Single Variable <sup>1</sup>	3
EN 102	Academic Writing and Research	3
University Curriculum (UC) Course		3
<b>Summer Session</b>		
University Curriculum (UC) Course		3
Open Elective		3
<b>Second Year</b>		

Milestones: Earn 84 credits, a GPA of 3.0 or higher and a science GPA of 2.25 or higher. Meet with your advisor at least once per semester to discuss academic, experiential learning, career, and co-curricular opportunities.

#### Fall Semester

BIO 252 & 252L	Ecology and Biodiversity and Ecology and Biodiversity Laboratory <sup>2</sup>	4
or BIO 298	Research Methods in Biology	

CHE 210 & 210L	Organic Chemistry I and Organic Chemistry I Lab	4
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Language at the 101 level		3
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University Curriculum (UC) Course		3
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#### J-Term

Open Elective		3
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#### Spring Semester

BIO 298	Research Methods in Biology <sup>2</sup>	3-4
or BIO 252 & 252L	Ecology and Biodiversity and Ecology and Biodiversity Laboratory	

Biology Elective		4
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CHE 211 & 211L	Organic Chemistry II and Organic Chemistry II Lab	4
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Language at the 102 level (Satisfies CAS Language Requirement)		3
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University Curriculum (UC) Course		3
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#### Summer Session

University Curriculum (UC) Course		3
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Open Elective		3
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#### Third Year

Milestones: Earn 120 UG credits, a GPA of 3.0 or higher and a science GPA of 2.25 or higher. Meet with your advisor at least once per semester. Participate in study abroad, complete internship or research opportunities.

#### Fall Semester

Biology Elective		3
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BIO 571	Molecular Genetics	4
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PHY 110 & 110L	General Physics I and General Physics I Lab	4
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CAS 420	CAS Integrative Capstone	3
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Open Electives		3
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#### J-Term

Open Elective		3
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#### Spring Semester

Biology Elective		4
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BIO 515	Advanced Biochemistry	4
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BIO 605	DNA Methods Laboratory	4
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PHY 111 & 111L	General Physics II and General Physics II Lab	4
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#### Summer Session

Graduate Elective		3
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#### Fourth Year

Milestones: Earn 35 Graduate credits and a GPA of 3.0 or higher with a minimum grade of C in all graduate courses. Prepare for graduation.

#### Fall Semester

BIO 568	Molecular and Cell Biology	4
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BIO 606	Protein Methods Laboratory	4
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Graduate Elective		3
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#### Spring Semester

BIO 675	Comp Exam in Molecular and Cell Biology	2
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Graduate Elective		4
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Graduate Elective		3
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<b>Total combined credits</b>		<b>143</b>
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<sup>1</sup> Initial placement in the English and mathematics courses is determined by placement exam and an evaluation of high school units presented. Completion of MA 140 (Pre-Calculus) with a minimum grade of C- and either MA 141 (Calculus of a Single Variable) or MA 275 (Biostatistics) is required for the Bachelor of Science degree in Biology. Students intending to pursue graduate or professional studies (medicine, dentistry, osteopathy or veterinary medicine) are advised to complete at least one semester of calculus.

<sup>2</sup> Students may take either BIO 252 and 252L or BIO 298 in either order or concurrently.