

# MOLECULAR AND CELLULAR BIOLOGY, BACHELOR OF SCIENCE

## Molecular and Cellular Biology Major Requirements (B.S.)

(Also see Requirements for a Bachelor's Degree. (<https://e-catalogue.jhu.edu/ksas-wse/undergraduate-policies/academic-policies/requirements-bachelors-degree/>))

The Biology Department offers a B.S. degree in molecular and cellular biology. The B.S. program is designed to provide a rigorous preparation for advanced study in the biomedical sciences. The program is tailored not only to students planning to enter Ph.D. programs or obtain employment in the biotechnology industry but also for premedical students.

All courses required for the molecular and cellular biology major must be taken for a letter grade (not S/U) and be passed with a grade of C- or better with one exception. The department will accept one passing grade below C- in senior year provided that the average for all formal lecture and laboratory courses is at least 2.0.

Code	Title	Credits
<b>Mathematics**</b>		
AS.110.106	Calculus I (Biology and Social Sciences)	4
or AS.110.108	Calculus I (Physical Sciences & Engineering)	
AS.110.107	Calculus II (For Biological and Social Science)	4
or AS.110.109	Calculus II (For Physical Sciences and Engineering)	
<b>Physics</b>		
AS.171.101	General Physics: Physical Science Major I	4
or AS.171.103	General Physics I for Biological Science Majors	
or AS.171.107	General Physics for Physical Sciences Majors (AL)	
AS.171.102	General Physics: Physical Science Major II	4
or AS.171.104	General Physics/Biology Majors II	
or AS.171.108	General Physics for Physical Science Majors (AL)	
AS.173.111	General Physics Laboratory I	1
AS.173.112	General Physics Laboratory II	1
<b>Chemistry</b>		
AS.030.101	Introductory Chemistry I	4
& AS.030.105	and Introductory Chemistry Laboratory I	
AS.030.102	Introductory Chemistry II	4
& AS.030.106	and Introductory Chemistry Laboratory II	
or AS.030.103	Applied Chemical Equilibrium and Reactivity w/lab	
AS.030.205	Introductory Organic Chemistry I	4
AS.030.206	Organic Chemistry II	4
or AS.030.212	Honors Organic Chemistry II	
AS.030.225	Introductory Organic Chemistry Laboratory	3
or AS.030.227	Chemical Chirality: An Introduction in Organic Chem. Lab, Techniques	
<b>Biology</b>		
AS.020.303	Genetics	3
AS.020.304	Molecular Biology	3

AS.020.306	Cell Biology	3
AS.020.305	Biochemistry	3
AS.020.363	Developmental Biology	3
AS.020.315	Biochemistry Project lab	2-3
or AS.250.253	Protein Engineering and Biochemistry Lab	
or AS.250.254	Protein Biochemistry and Engineering Laboratory	
AS.020.340	Developmental Genetics Lab	3
AS.020.316	Cell Biology Lab	1
<b>Electives</b>		
At least four courses totaling at least 12 credits (see POS-Tag BIOL-UL in the Schedule of Classes) from the courses approved by the Director of Undergraduate Studies. At least one course must be taught by the Biology Department (AS.020.xxx) and be a 2 or 3 credit course.		
<b>Research</b>		
Research (totaling at least 6 credits) *		6
<b>Total Credits</b>		<b>76-77</b>

\* The supervised research will include participation in group meetings and writing a summary of accomplished work at the end of the year.

\*\* 01/29/2024 CORRECTION: MATH Requirement should read AS.110.107 Calculus II (For Biological and Social Science) or AS.110.109 Calculus II (For Physical Sciences and Engineering) or AS.110.113 Honors Single Variable Calculus. AS.110.113 was inadvertently omitted at time of publication.

## Sample Program of Study

First Year			
First Semester	Credits	Second Semester	Credits
AS.030.101	3	AS.030.102	3
AS.030.105	1	AS.030.106	1
AS.110.106	4	AS.110.107	4
		AS.020.303	3
		AS.020.340	3
		<b>8</b>	<b>14</b>
Second Year			
First Semester	Credits	Second Semester	Credits
AS.030.205	4	AS.020.306	3
AS.030.225 or 227	3	AS.020.316	1
AS.020.304	3	AS.030.206	4
		<b>10</b>	<b>8</b>
Third Year			
First Semester	Credits	Second Semester	Credits
AS.020.305	3	AS.020.363	3
AS.020.315 or AS.250.253	1	AS.171.104 or 102	4
AS.171.103 or 101	4	AS.173.112	1
Upper Level Biology Elective	2-3	Upper Level Biology Elective	2-3
AS.173.111	1		
		<b>11-12</b>	<b>10-11</b>
Fourth Year			
First Semester	Credits	Second Semester	Credits
Upper Level Biology Elective	2-3	Upper Level Biology Elective (if needed)	2-3
Upper Level Biology Elective	2-3	Research	3

Research	3	
	<b>7-9</b>	<b>5-6</b>

**Total Credits 73-78**

### **Honors in Molecular and Cellular Biology**

Students completing the B.S. in molecular and cellular biology major are eligible to receive their degree with honors.

The B.S. in molecular and cellular biology with honors requires, in addition to the regular requirements for the major, a 3.5 GPA for natural sciences and quantitative studies courses, a presentation of a poster describing the independent research, and a recommendation from the research sponsor.

The research requirement must be completed under the direction of a faculty member in a department associated with the Johns Hopkins University or the Johns Hopkins Medical Institutions. If the student's research director for independent research is not a member of the Department of Biology, a Biology faculty member must serve as a sponsor and approve the recommendation from the research director.