

# BIOCHEMISTRY AND MOLECULAR BIOLOGY UNDERGRADUATE MAJOR (BS, HBS)

## This major offers the following option(s):

- Advanced Molecular Biology (<http://catalog.oregonstate.edu/college-departments/science/school-life-sciences/biochemistry-biophysics/biochemistry-molecular-biology-bs-hbs/advanced-molecular-biology-option/>)
- Computational Molecular Biology (<http://catalog.oregonstate.edu/college-departments/science/school-life-sciences/biochemistry-biophysics/biochemistry-molecular-biology-bs-hbs/computational-molecular-biology-option/>)
- Pre-Medicine/Biochemistry and Molecular Biology (<http://catalog.oregonstate.edu/college-departments/science/school-life-sciences/biochemistry-biophysics/biochemistry-molecular-biology-bs-hbs/pre-medicinbiochemistry-molecular-biology-option/>)

Administered by the Department of Biochemistry and Biophysics under the School of Life Sciences.

The BS degree in Biochemistry and Molecular Biology provides a degree path centered on the molecular basis of living systems with training in molecular genetics, biochemistry, and cell biology, as well as in rapidly developing areas such as bioinformatics. Majors must select an option either in Advanced Molecular Biology (<http://catalog.oregonstate.edu/college-departments/science/school-life-sciences/biochemistry-biophysics/biochemistry-molecular-biology-bs-hbs/advanced-molecular-biology-option/>), Computational Molecular Biology (<http://catalog.oregonstate.edu/college-departments/science/school-life-sciences/biochemistry-biophysics/biochemistry-molecular-biology-bs-hbs/computational-molecular-biology-option/>), or Pre-Medicine/Biochemistry and Molecular Biology (<http://catalog.oregonstate.edu/college-departments/science/school-life-sciences/biochemistry-biophysics/biochemistry-molecular-biology-bs-hbs/pre-medicinbiochemistry-molecular-biology-option/>). The first two options are designed for students interested in careers in the biotechnology and pharmaceutical industries or graduate work in the molecular life sciences, with the second especially well-suited for students interested in computational aspects of molecular biology. The third option is ideal for students interested in careers in medicine and related health professions.

## Major Code: 971

- Demonstrate a core knowledge base in the theory and practice of modern Biochemistry and Molecular Biology (BMB).
- Function successfully in the laboratory and use safe laboratory practices.
- Critically evaluate data and design experiments to test hypotheses relevant to the practice of Biochemistry and Molecular Biology.
- Read and evaluate primary literature in the discipline.
- Effectively communicate scientific data and ideas, using various formats appropriate for different target audiences.

- Use databases, computational tools and other online resources effectively.
- Demonstrate awareness of ethical issues in the practice of science.

Students majoring in Biochemistry and Molecular Biology cannot seek a double major in Biochemistry and Biophysics, Biology, Biohealth Sciences, Botany, Microbiology or Zoology.

Completion of one of the following options is required to earn a degree in Biochemistry and Molecular Biology: Advanced Molecular Biology (<http://catalog.oregonstate.edu/college-departments/science/school-life-sciences/biochemistry-biophysics/biochemistry-molecular-biology-bs-hbs/advanced-molecular-biology-option/>), Computational Molecular Biology (<http://catalog.oregonstate.edu/college-departments/science/school-life-sciences/biochemistry-biophysics/biochemistry-molecular-biology-bs-hbs/computational-molecular-biology-option/>), or Pre-Medicine/Biochemistry and Molecular Biology (<http://catalog.oregonstate.edu/college-departments/science/school-life-sciences/biochemistry-biophysics/biochemistry-molecular-biology-bs-hbs/pre-medicinbiochemistry-molecular-biology-option/>). For further information, see MyDegrees or the Department of Biochemistry and Biophysics website (<https://biochem.science.oregonstate.edu/>).

Code	Title	Credits
Students are required to achieve a C- or better in the following courses (or their honors counterparts) required for the Biochemistry and Molecular Biology major:		
BI 221 & BI 222 & BI 223	*PRINCIPLES OF BIOLOGY: CELLS and *PRINCIPLES OF BIOLOGY: ORGANISMS and *PRINCIPLES OF BIOLOGY: POPULATIONS	12
CH 231 & CH 261	GENERAL CHEMISTRY and *LABORATORY FOR CHEMISTRY 231	5
CH 232 & CH 262	GENERAL CHEMISTRY and *LABORATORY FOR CHEMISTRY 232	5
CH 233 & CH 263	GENERAL CHEMISTRY and *LABORATORY FOR CHEMISTRY 233	5
MTH 251	*DIFFERENTIAL CALCULUS	4
MTH 252	INTEGRAL CALCULUS	4
Code	Title	Credits
<b>Baccalaureate Core</b>		
Select 51 credits		
<b>Core</b>		
BB 111	INTRODUCTION TO BIOCHEMISTRY AND BIOPHYSICS RESEARCH	1
BB 314	CELL AND MOLECULAR BIOLOGY	4
BB 315	MOLECULAR BIOLOGY LABORATORY	3
BB 317	*SCIENTIFIC THEORY AND PRACTICE	3
BB 481	MACROMOLECULAR STRUCTURE	3
BB 486	ADVANCED MOLECULAR GENETICS	3
BB 490	BIOCHEMISTRY 1: STRUCTURE AND FUNCTION	3
BB 491	BIOCHEMISTRY 2: METABOLISM	3
BB 492	BIOCHEMISTRY 3: GENETIC BIOCHEMISTRY	3
BB 494	BIOCHEMISTRY LABORATORY MOLECULAR TECHNIQUES 2	3
BB 498	ASBMB CERTIFICATION EXAM	0
BI 221 & BI 222 & BI 223	*PRINCIPLES OF BIOLOGY: CELLS and *PRINCIPLES OF BIOLOGY: ORGANISMS and *PRINCIPLES OF BIOLOGY: POPULATIONS	12
CH 231 & CH 261	GENERAL CHEMISTRY and *LABORATORY FOR CHEMISTRY 231	5
CH 232 & CH 262	GENERAL CHEMISTRY and *LABORATORY FOR CHEMISTRY 232	5
CH 233 & CH 263	GENERAL CHEMISTRY and *LABORATORY FOR CHEMISTRY 233	5

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CH 334 & CH 335 & CH 336	ORGANIC CHEMISTRY and ORGANIC CHEMISTRY and ORGANIC CHEMISTRY	9
CH 337 or CH 324	ORGANIC CHEMISTRY LABORATORY QUANTITATIVE ANALYSIS	4
MTH 251	*DIFFERENTIAL CALCULUS	4
MTH 252	INTEGRAL CALCULUS	4
PH 201 & PH 202 & PH 203	*GENERAL PHYSICS and *GENERAL PHYSICS and *GENERAL PHYSICS	15
ST 351	INTRODUCTION TO STATISTICAL METHODS	4
<b>Required Option</b>		
Credits vary by option		minimum 21
<b>Total credits required for graduation is 180</b>		
Total Credits		117

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Baccalaureate Core Course (BCC)

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Writing Intensive Course (WIC)

**Major Code: 971**

<b>First Year</b>		
<b>Fall</b>		
BI 221	*PRINCIPLES OF BIOLOGY: CELLS	4
BB 111	INTRODUCTION TO BIOCHEMISTRY AND BIOPHYSICS RESEARCH	1
CH 231	GENERAL CHEMISTRY	4
CH 261	*LABORATORY FOR CHEMISTRY 231	1
WR 121	*ENGLISH COMPOSITION	3
Credits		13
<b>Winter</b>		
BI 222	*PRINCIPLES OF BIOLOGY: ORGANISMS	4
CH 232	GENERAL CHEMISTRY	4
CH 262	*LABORATORY FOR CHEMISTRY 232	1
HHS 231	*LIFETIME FITNESS FOR HEALTH	2
MTH 251	*DIFFERENTIAL CALCULUS	4
Credits		15
<b>Spring</b>		
BI 223	*PRINCIPLES OF BIOLOGY: POPULATIONS	4
CH 233	GENERAL CHEMISTRY	4
CH 263	*LABORATORY FOR CHEMISTRY 233	1
Select one of the following:		3
COMM 111	*PUBLIC SPEAKING	
COMM 114	*ARGUMENT AND CRITICAL DISCOURSE	
COMM 218	*INTERPERSONAL COMMUNICATION	
MTH 252	INTEGRAL CALCULUS	4
Credits		16
<b>Second Year</b>		
<b>Fall</b>		
BB 314	CELL AND MOLECULAR BIOLOGY	4
CH 334	ORGANIC CHEMISTRY	3
PH 201	*GENERAL PHYSICS	5
Bacc Core Course		3
Credits		15
<b>Winter</b>		
CH 335	ORGANIC CHEMISTRY	3
PH 202	*GENERAL PHYSICS	5
ST 351	INTRODUCTION TO STATISTICAL METHODS	4
Bacc Core Course		3
Credits		15

<b>Spring</b>		
BB 317	*SCIENTIFIC THEORY AND PRACTICE	3
CH 336	ORGANIC CHEMISTRY	3
PH 203	*GENERAL PHYSICS	5
BB 315	MOLECULAR BIOLOGY LABORATORY	3
Credits		14
<b>Third Year</b>		
<b>Fall</b>		
BB 490	BIOCHEMISTRY 1: STRUCTURE AND FUNCTION	3
CH 337	ORGANIC CHEMISTRY LABORATORY	4
Bacc Core Course		3
Option Course		3
Elective		3
Credits		16
<b>Winter</b>		
BB 491	BIOCHEMISTRY 2: METABOLISM	3
CH 324	QUANTITATIVE ANALYSIS	4
Bacc Core Course		3
Option Course		3
Elective		3
Credits		16
<b>Spring</b>		
BB 492	BIOCHEMISTRY 3: GENETIC BIOCHEMISTRY	3
Bacc Core Course		6
Option Course		3
Elective		3
Credits		15
<b>Fourth Year</b>		
<b>Fall</b>		
BB 481	MACROMOLECULAR STRUCTURE	3
Bacc Core Course		3
Option Course		6
Elective		3
Credits		15
<b>Winter</b>		
BB 494	BIOCHEMISTRY LABORATORY MOLECULAR TECHNIQUES 2	3
BB 486	ADVANCED MOLECULAR GENETICS	3
BB 498	ASBMB CERTIFICATION EXAM	0
Bacc Core Course		3
Option Course		3
Electives		3
Credits		15
<b>Spring</b>		
Option Course		6
Electives		9
Credits		15
Total Credits		180

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Baccalaureate Core Course (BCC)

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Writing Intensive Course (WIC)