

# COMPUTATIONAL BIOLOGY OPTION

This option is available within the Biological Data Sciences (<https://catalog.oregonstate.edu/college-departments/agricultural-sciences/botany-plant-pathology/biological-data-sciences-bs-hbs/>) major at the following location:

- Corvallis

Students in the Computational Biology Option take courses in computer science, bioinformatics, and statistics.

**Option Code: 918**

Upon successful completion of the program, students will meet the following learning outcomes:

- Proficiently apply biological data sciences to scientific investigation.
- Critically evaluate data and design experiments to test hypotheses relevant to biological data sciences.
- Effectively communicate scientific data, methods, and ideas.
- Demonstrate awareness of professional and ethical practices of science.

Code	Title	Credits
<b>Genome Biology</b>		
BDS 474	INTRODUCTION TO GENOME BIOLOGY	3
<b>Mathematics</b>		
MTH 231	ELEMENTS OF DISCRETE MATHEMATICS	4
<b>Computer Science</b>		
CS 162	INTRODUCTION TO COMPUTER SCIENCE II <sup>1</sup>	4
CS 261	DATA STRUCTURES	4
<b>Tracks</b>		
Select one of the following tracks:		19-30
Track 1 - General Computational Biology (19-24 credits)		
Track 2 - Advanced Computational Biology (27-30 credits)		
<b>Total Credits</b>		<b>34-45</b>

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CS 162 has prerequisites that are not part of the option requirements

## Track 1

Code	Title	Credits
<b>General Computational Biology</b>		
<i>Biology/Biocomputing and Statistics</i>		
<i>Group A</i>		
Select one course from the following:		3-4
BB 485	APPLIED BIOINFORMATICS	
BDS 446/CS 446	NETWORKS IN COMPUTATIONAL BIOLOGY	
BDS 472	ADVANCED COMPUTING FOR BIOLOGICAL DATA ANALYSIS	
BDS 475	COMPARATIVE GENOMICS	
BDS 477	POPULATION GENOMICS	
BDS 478	FUNCTIONAL GENOMICS	
BI 456	PHYLOGENETICS	
MB 420	MICROBIAL GENOME EVOLUTION AND BIODIVERSITY	
<i>Group B</i>		
Select one course from the following:		3-4
ST 413	METHODS OF DATA ANALYSIS	
ST 415	DESIGN AND ANALYSIS OF PLANNED EXPERIMENTS	

ST 431	SAMPLING METHODS	
ST 437	DATA VISUALIZATION	
Select one course from either Group A or B above		3-4
<i>Advanced Computer Science</i>		
Select three courses from the following:		10-12
CS 325	ANALYSIS OF ALGORITHMS	
CS 331	INTRODUCTION TO ARTIFICIAL INTELLIGENCE	
CS 361	SOFTWARE ENGINEERING I	
CS 362	SOFTWARE ENGINEERING II	
CS 420	GRAPH THEORY WITH APPLICATIONS TO COMPUTER SCIENCE	
CS 434	MACHINE LEARNING AND DATA MINING	
CS 458	INTRODUCTION TO INFORMATION VISUALIZATION	
CS 475	INTRODUCTION TO PARALLEL PROGRAMMING	
<b>Total Credits</b>		<b>19-24</b>

## Track 2

Code	Title	Credits
<b>Advanced Computational Biology</b>		
<i>Mathematics</i>		
MTH 254	VECTOR CALCULUS I	4
MTH 341	LINEAR ALGEBRA I	3
<i>Machine Learning</i>		
CS 331	INTRODUCTION TO ARTIFICIAL INTELLIGENCE	4
BDS 472	ADVANCED COMPUTING FOR BIOLOGICAL DATA ANALYSIS	3
<i>Biology/Biocomputing and Statistics</i>		
Select one course from the following:		3-4
BB 485	APPLIED BIOINFORMATICS	
BDS 446/CS 446	NETWORKS IN COMPUTATIONAL BIOLOGY	
BDS 475	COMPARATIVE GENOMICS	
BDS 477	POPULATION GENOMICS	
BDS 478	FUNCTIONAL GENOMICS	
BI 456	PHYLOGENETICS	
MB 420	MICROBIAL GENOME EVOLUTION AND BIODIVERSITY	
ST 413	METHODS OF DATA ANALYSIS	
ST 415	DESIGN AND ANALYSIS OF PLANNED EXPERIMENTS	
ST 421	INTRODUCTION TO MATHEMATICAL STATISTICS	
ST 422	INTRODUCTION TO MATHEMATICAL STATISTICS	
ST 431	SAMPLING METHODS	
ST 437	DATA VISUALIZATION	
<i>Advanced Computer Science</i>		
Select at least three courses from the following:		10-12
CS 325	ANALYSIS OF ALGORITHMS	
CS 361	SOFTWARE ENGINEERING I	
CS 362	SOFTWARE ENGINEERING II	
CS 420	GRAPH THEORY WITH APPLICATIONS TO COMPUTER SCIENCE	
CS 434	MACHINE LEARNING AND DATA MINING	
CS 458	INTRODUCTION TO INFORMATION VISUALIZATION	
CS 475	INTRODUCTION TO PARALLEL PROGRAMMING	
<b>Total Credits</b>		<b>27-30</b>

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