

# MICROBIOLOGY UNDERGRADUATE MAJOR (BS, HBS)

This major offers the following option(s):

- Aquatic Microbiology (<http://catalog.oregonstate.edu/college-departments/science/school-life-sciences/microbiology/microbiology-bs-hbs/aquatic-microbiology-option/>)
- Pre-Medicine/Microbiology (<http://catalog.oregonstate.edu/college-departments/science/school-life-sciences/microbiology/microbiology-bs-hbs/pre-medicinemicrobiology-option/>)

Administered by the Department of Microbiology under the School of Life Sciences.

The undergraduate BS degree in Microbiology (MB) is designed for students seeking a focused education in the field of microbiology. The major consists of a comprehensive core with a strong biological and physical science foundation combined with select fundamental courses in microbiology, followed by the completion of a number of upper division microbiology courses selected by each student based on their specific interests. The Microbiology major integrates a number of laboratory classes, providing students with a wide variety of hands-on experiences. Students can also choose to do microbiology research in a number of laboratories on campus. Microbiology majors receive excellent training for a variety of professional programs, such as medical, dental, and pharmacy programs, as well as graduate school.

The Microbiology major has a built-in Chemistry minor. Students may also elect to complete one transcript-visible option in Pre-Medicine or Aquatic Microbiology. An option is not required. Options in the MB major require additional credits beyond the basic MB major, although most students can complete the MB degree requirements plus the additional course work for either option in four years. The Pre-Medicine option will help prepare a student for taking the standardized test required for medical school application (MCAT), as well as provide an additional perspective in the humanities that is valued by medical programs. The Aquatic Microbiology option takes advantage of an area of expertise by various researchers at OSU, exposing students to both fundamental concepts as well as unique perspectives related to microbiology in both freshwater and ocean systems.

For more information, write to the Head of the Department of Microbiology, 226 Nash Hall, Oregon State University, Corvallis, OR 97331-3804 or visit the departmental website (<https://microbiology.science.oregonstate.edu>) for specific contact information.

## Major Code: 570

- Apply specialized microbiology knowledge from multiple fields to critically analyze and evaluate microbiological, environmental, and health-related problems.
- Demonstrate competency in routine and specialized microbiological laboratory skills applicable to microbiological research or clinical methods, including laboratory safety and accurately reporting observations and analysis.
- Communicate scientific concepts, experimental results and analytical arguments clearly and concisely, both verbally and in writing.

- Practice flexible professional skills needed for careers in microbiology and related scientific and professional fields.

To receive the BS degree in Microbiology, a student must complete all university baccalaureate core requirements plus departmental requirements listed below. All departmental requirements must be taken for a grade, with the exception of CH 324, which may be taken S/U; however, if taken S/U the student will not receive the chemistry minor.

Microbiology majors planning advanced professional training in medicine, dentistry, pharmacy, etc should consult an appropriate advisor.

Code	Title	Credits
<b>Mathematics and Statistics Core (12 credits)</b>		
MTH 227 & MTH 228	*CALCULUS AND PROBABILITY FOR THE LIFE SCIENCES I and CALCULUS AND PROBABILITY FOR THE LIFE SCIENCES II <sup>+</sup>	8
or MTH 251 & MTH 252	*DIFFERENTIAL CALCULUS and INTEGRAL CALCULUS	
ST 351	INTRODUCTION TO STATISTICAL METHODS	4
<b>Chemistry and Physics Core (46 credits)</b>		
CH 231 & CH 261	GENERAL CHEMISTRY and *LABORATORY FOR CHEMISTRY 231 <sup>+</sup>	5
CH 232 & CH 262	GENERAL CHEMISTRY and *LABORATORY FOR CHEMISTRY 232 <sup>+</sup>	5
CH 233 & CH 263	GENERAL CHEMISTRY and *LABORATORY FOR CHEMISTRY 233 <sup>+</sup>	5
CH 324	QUANTITATIVE ANALYSIS	4
CH 331 & CH 332	ORGANIC CHEMISTRY and ORGANIC CHEMISTRY <sup>+</sup>	8
CH 337	ORGANIC CHEMISTRY LABORATORY	4
PH 201 & PH 202 & PH 203	*GENERAL PHYSICS and *GENERAL PHYSICS and *GENERAL PHYSICS	15
<b>Biological Sciences Core (23 credits)</b>		
BB 314	CELL AND MOLECULAR BIOLOGY	4
BB 450 & BB 451	GENERAL BIOCHEMISTRY and GENERAL BIOCHEMISTRY	7
BI 221 & BI 222 & BI 223	*PRINCIPLES OF BIOLOGY: CELLS and *PRINCIPLES OF BIOLOGY: ORGANISMS and *PRINCIPLES OF BIOLOGY: POPULATIONS	12
<b>Microbiological Sciences Core (18 credits) <sup>++</sup></b>		
MB 110	ORIENTATION TO MICROBIOLOGY	1
MB 290	SUCCESS IN MICROBIOLOGY	1
MB 302	GENERAL MICROBIOLOGY	3
MB 303	GENERAL MICROBIOLOGY LABORATORY	2
MB 310	BACTERIAL MOLECULAR GENETICS	3
MB 311	*MOLECULAR MICROBIOLOGY LAB: A WRITING INTENSIVE COURSE	3
MB 312	BACTERIAL PHYSIOLOGY AND METABOLISM	3
MB 490	MICROBIOLOGY CAPSTONE EXPERIENCE	2
<b>Upper-division Microbiology Laboratory (2 credits) <sup>++</sup></b>		
Select one of the upper division MB labs from the following: <sup>1</sup>		2
MB 417	IMMUNOLOGY LABORATORY	
MB 422	AQUATIC MICROBIOLOGY LABORATORY	
MB 435	PATHOGENIC MICROBES LABORATORY	
MB 441	FOOD MICROBIOLOGY LABORATORY	
MB 496	FISH DISEASES IN CONSERVATION BIOLOGY AND AQUACULTURE LAB	
<b>Upper-division Microbiology Electives (18 credits) <sup>++</sup></b>		
Select 18 credits from the following courses: <sup>2</sup>		18
BOT 350	INTRODUCTORY PLANT PATHOLOGY	
BOT 461	MYCOLOGY	
MB 401	RESEARCH	
MB 403	THESIS	

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MB 405	READING AND CONFERENCE	
MB 406	SPECIAL PROJECTS	
MB 410	OCCUPATIONAL INTERNSHIP	
MB 416	IMMUNOLOGY	
MB 417	IMMUNOLOGY LABORATORY	
MB 420	MICROBIAL GENOMES, BIOGEOCHEMISTRY, AND DIVERSITY	
MB 422	AQUATIC MICROBIOLOGY LABORATORY	
MB 430	BACTERIAL PATHOGENESIS	
MB 434	VIROLOGY	
MB 435	PATHOGENIC MICROBES LABORATORY	
MB 436	THE HUMAN MICROBIOME	
MB 440	FOOD MICROBIOLOGY	
MB 441	FOOD MICROBIOLOGY LABORATORY	
MB 448	MICROBIAL ECOLOGY	
MB 456	MICROBIAL GENETICS AND BIOTECHNOLOGY	
MB 479/FST 479	FERMENTATION MICROBIOLOGY	
MB 480	GENERAL PARASITOLOGY	
MB 491/FST 491	FISH DISEASES IN CONSERVATION BIOLOGY AND AQUACULTURE	
MB 496	FISH DISEASES IN CONSERVATION BIOLOGY AND AQUACULTURE LAB	
MB 499	SPECIAL TOPICS	
Remaining Bacc Core and/or electives to reach the 180 credit requirement		61
Total Credits		180

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Baccalaureate Core Course (BCC)

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Writing Intensive Course (WIC)

+  
MB majors must complete the following courses with a grade of C- or better: MTH 227 (or MTH 251), CH 231, CH 232, CH 233, CH 261, CH 262, CH 263 and CH 331

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MB majors must have a minimum 2.0 GPA in microbiology classes. This includes courses in the Microbiology Sciences Core, Microbiology Laboratory, and Microbiology Electives

1  
Additional upper division MB lab credits may count towards the Upper-division Microbiology Electives credits

2  
No more than 3 credits may come from the following courses: MB 401, MB 403, MB 405, MB 410. No more than 3 credits may come from MB 406

**Major Code: 570**

First Year		Credits
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
MB 110	ORIENTATION TO MICROBIOLOGY	1
MTH 251 or MTH 227	*DIFFERENTIAL CALCULUS or *CALCULUS AND PROBABILITY FOR THE LIFE SCIENCES I	4

MTH 252 or MTH 228	INTEGRAL CALCULUS or CALCULUS AND PROBABILITY FOR THE LIFE SCIENCES II	4
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Fitness	3	
Speech	3	
Writing I	3	
Credits		45

Second Year		
BB 314	CELL AND MOLECULAR BIOLOGY	4
CH 331 & CH 332	ORGANIC CHEMISTRY and ORGANIC CHEMISTRY	8
CH 337	ORGANIC CHEMISTRY LABORATORY	4
MB 302	GENERAL MICROBIOLOGY	3
MB 303	GENERAL MICROBIOLOGY LABORATORY	2
PH 201 & PH 202 & PH 203	*GENERAL PHYSICS and *GENERAL PHYSICS and *GENERAL PHYSICS	15
ST 351	INTRODUCTION TO STATISTICAL METHODS	4
Electives		3
Writing II		3
Credits		46

Third Year		
BB 450	GENERAL BIOCHEMISTRY	4
BB 451	GENERAL BIOCHEMISTRY	3
CH 324	QUANTITATIVE ANALYSIS	4
MB 310	BACTERIAL MOLECULAR GENETICS	3
MB 311	*MOLECULAR MICROBIOLOGY LAB: A WRITING INTENSIVE COURSE	3
MB 312	BACTERIAL PHYSIOLOGY AND METABOLISM	3
Perspectives		15
Synthesis		6
Elective		3
Credits		44

Fourth Year		
MB 490	MICROBIOLOGY CAPSTONE EXPERIENCE	2
Select 20 credits from the approved 400-level microbiology courses below <sup>2 credits</sup> of which must come from 400-level laboratory courses.		20

BOT 350	INTRODUCTORY PLANT PATHOLOGY
BOT 461	MYCOLOGY
MB 401	RESEARCH
MB 405	READING AND CONFERENCE
MB 406	SPECIAL PROJECTS
MB 410	OCCUPATIONAL INTERNSHIP
MB 416	IMMUNOLOGY
MB 417	IMMUNOLOGY LABORATORY
MB 420	MICROBIAL GENOMES, BIOGEOCHEMISTRY, AND DIVERSITY
MB 422	AQUATIC MICROBIOLOGY LABORATORY
MB 430	BACTERIAL PATHOGENESIS
MB 434	VIROLOGY
MB 435	PATHOGENIC MICROBES LABORATORY
MB 436	THE HUMAN MICROBIOME
MB 440	FOOD MICROBIOLOGY
MB 441	FOOD MICROBIOLOGY LABORATORY
MB 448	MICROBIAL ECOLOGY
MB 456	MICROBIAL GENETICS AND BIOTECHNOLOGY
MB 479/FST 479	FERMENTATION MICROBIOLOGY
MB 480	GENERAL PARASITOLOGY
MB 491/FW 491	FISH DISEASES IN CONSERVATION BIOLOGY AND AQUACULTURE
MB 496	FISH DISEASES IN CONSERVATION BIOLOGY AND AQUACULTURE LAB

MB 499	SPECIAL TOPICS	
	Credits	22
	Total Credits	157

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Baccalaureate Core Course (BCC)

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Writing Intensive Course (WIC)