

BACHELOR OF SCIENCE IN MICROBIOLOGY

A. THE GENERAL EDUCATION AND TOTAL UNIVERSITY CREDIT REQUIREMENTS MUST BE MET. NOTE: See General Education Goals for a B.S. degree (ISU catalog). A minimum of 128 credits are required for graduation. 36 of these must be upper division credits.

			CREDITS
B. COURSES IN BIOLOGICAL SCIENCES			
EITHER THESE TWO COURSES			
BIOL	101	Biology I	4
BIOL	102	Biology II	4
OR THESE TWO COURSES			
BIOL	202	General Zoology	3
BIOL	203	General Botany	3
AND THESE COURSES			
BIOS	235	General Microbiology (includes laboratory)	4
BIOS	236	Advanced General Microbiology (includes laboratory)	3
BIOS	332*	Biochemistry	3
BIOS	334	Experimental Biochemistry	1
BIOS	351/353	Immunology/Laboratory	3/1
BIOS	355/357	Pathogenic Microbiology/Laboratory	3/2
BIOS	433	Microbial Physiology	4
BIOS	465/467	Microbial Genetics/Laboratory	3/1
BIOS	475	General Virology	3
BIOS	477	Bacterial Virology Lab	1
OR			
BIOS	478	Animal Virology Lab	1
BIOS	491	Senior Seminar	1
OR			
BIOS	492	Senior Seminar	1
BIOS	494	Senior Seminar	1
(For Senior Seminar a minimum of one credit must be in BIOS 494).			
C. COURSES IN MATH			
MATH	147	Precalculus	5
MATH	160**	Brief Calculus	4
D. COURSES IN CHEMISTRY			
CHEM	111	General Chemistry I	5
CHEM	112	General Chemistry II	4
CHEM	301/303	Organic Chemistry I/Laboratory	3/1
CHEM	302/304	Organic Chemistry II/Laboratory	3/1
CHEM	232/234	Quantitative Analysis/Laboratory	2/2
E. COURSES IN PHYSICS			
PHYS	111/113	General Physics I/Laboratory	3/1
PHYS	112/114	General Physics II/Laboratory	3/1
F. COURSES IN FOREIGN LANGUAGE			
LANG	XXX	FOREIGN LANGUAGE	8
(Any of the foreign languages offered at ISU. This requirement is waived for those who have taken 2 or more years of high school foreign language with a grade of "C" or above. A high school transcript must be delivered to the Department of Biological Sciences).			

*Students electing to take BIOS 447 (Biochemistry II) are advised to take BIOS 445 as the first biochemistry course.

**Students electing to take Math 175 are advised to take Math 170 rather than Math 160 as the first calculus course.

RECOMMENDED COURSE SELECTION - MICROBIOLOGY MAJOR

Bachelor of Science

<u>FRESHMAN YEAR</u>			<u>CREDITS</u>
CHEM	111	General Chemistry I	5
CHEM	112	General Chemistry II	4
EITHER THESE TWO COURSES			
BIOL	101	Biology I	4
BIOL	102	Biology II	4
OR THESE TWO COURSES			
BIOL	202	General Zoology	3
BIOL	203	General Botany	3
AND THESE COURSES			
ENGL	101	Composition	3
MATH	147	Precalculus	5
MATH	160*	Brief Calculus	4
COMM	101	Principles of Speech	2
IN ADDITION:		One of Goals 6, 7, or 8	3
TOTAL			32
 <u>SOPHOMORE YEAR</u>			
ENGL	201	Critical Reading and Writing	3
CHEM	301/303	Organic Chemistry I/Laboratory	3/1
CHEM	302/304	Organic Chemistry II/Laboratory	3/1
BIOS	235	General Microbiology (includes laboratory)	4
BIOS	236	Advanced General Microbiology (includes laboratory)	3
PHYS	111/113	General Physics I/Laboratory	3/1
PHYS	112/114	General Physics II/Laboratory	3/1
IN ADDITION:		Two of Goals 9, 11, and 12	6
TOTAL			32
 <u>JUNIOR YEAR</u>			
CHEM	232/234	Quantitative Analysis/Laboratory	2/2
BIOS	332**/334	Biochemistry/Experimental Biochemistry	3/1
BIOS	351/353	Immunology/Laboratory	3/1
BIOS	355/357	Pathogenic Microbiology/Laboratory	3/2
IN ADDITION:		Foreign Language (2 semesters, Goal 10B)	8
		One of Goals 6, 7, or 8	3
		Electives***	4
TOTAL			32
 <u>SENIOR YEAR</u>			
BIOS	433	Microbial Physiology	4
BIOS	465/467	Microbial Genetics/Laboratory	3/1
BIOS	475	General Virology	3
BIOS	477	Bacterial Virology Laboratory	1
		OR	
BIOS	478	Animal Virology Laboratory	1
BIOS	491 OR 492	Senior Seminar	1
BIOS	494	Senior Seminar	1
		(For Senior Seminar a minimum of one credit must be in BIOS 494)	
IN ADDITION:		Electives***	18
TOTAL			32

*Students electing to take Math 175 are advised to take Math 170 rather than Math 160 as the first calculus course.

**Students electing to take BIOS 447 (Biochemistry II) are advised to take BIOS 445 as the first biochemistry course.

***Recommended electives: BIOS 303, BIOS 447, CHEM 351-352, MATH 175*

Microbiology, like most scientific disciplines, combines elements from many areas of science. Basic principles of chemistry, mathematics, cell biology, etc., are continually applied, and successful progression through the microbiology degree program requires that students understand and retain those principles and be able to use them where appropriate. Likewise, progression through successive microbiology courses requires that students apply principles learned in, and retained from, previous microbiology courses. It is extremely important that students wishing to major in microbiology understand this progressive aggregation of information and accept that they will be expected to utilize basic principles that underlie various aspects of microbiology although those principles are not necessarily described or directly discussed in the courses where they must be applied. Finally, because this aggregation of information is progressive, it is important for students to take courses in the appropriate order, as indicated in the suggested yearly curriculum; without the appropriate background, as developed in prerequisite courses, it will be difficult for the student to successfully progress through courses built on that background.

Recommended Elective Courses:

A. GENERAL COURSES

Both Microbiology majors and Medical Technology majors should consider courses in the Humanities and Social Sciences, in addition to those needed to fulfill University requirements for the degree. Recommended courses would include:

- (1) Literature courses - Such as ENGL 251 through 254 or specialty courses.
- (2) Writing courses - Such as ENGL 307. Additionally, specific non-credit help for communication problems is available in the Language Laboratory on a personalized basis.

B. MICROBIOLOGY MAJORS

In addition to the courses listed in sections A and C, the Microbiology major who is considering graduate work should consider such courses as Physical Chemistry (CHEM 351-352), Instrumental Analysis & Lab (CHEM 313 & 334), Biochemistry II (BIOS 447) and additional Calculus courses (MATH 175-275), as well as courses in specialty areas, such as Statistics (MATH 253) and Electron Microscopy (BIOS 479).

C. MEDICAL TECHNOLOGY MAJORS

Areas of specific interest are:

- (1) Pharmacy and Pharmacology - Such as PHAR 205, 316, & 317.
- (2) Computer Science - Such as CIS 120. Free computer workshops are available from the computer center for non-credit.
- (3) Medical Electronics (PHYS 300).
- (4) Business - Such as MGT 312 or MGT 373.
- (5) Statistics - Math 253 or BIOS 315.

Additional courses in Biological Sciences such as Anatomy & Physiology (BIOS 301-302), Radiobiology (BIOS 307), Parasitology (BIOS 423), Veterinary & Medical Entomology (BIOS 438), Mammalian Histology (BIOS 419), General Pathology (BIOS 444), General Genetics (BIOS 358) and Cell Biology (BIOS 206-207 for non-Microbiology majors), or in Chemistry, such as Principles of Nuclear Science (CHEM 317), should also be considered.

MEDICAL TECHNOLOGY

The Medical Technology program at Idaho State University is offered within the Department of Biological Sciences. There are several options available which make the student eligible for certification as a Medical Technologist (ASCP) or Clinical Laboratory Scientist (NCA).

1) The curriculum leading to the B.S. degree in Medical Technology consists of the first three years of the Microbiology program (either basic Microbiology or Microbiology/Medical Technology emphasis) followed by a 12 month medical technology internship. The internship is offered through ISU by registering for BIOS 411 (Clinical Diagnosis - 32 credits). Students may elect to complete the internship at another location such as a hospital program. For this option, all general education courses must be completed prior to the internship and the student must still register for BIOS 411.

2) Because few hospital internship programs in the west will accept students for internships unless they already have a B.S. degree, we recommend that each student first earn a B.S. degree. This degree is then followed by a year in BIOS 411 at ISU or in a hospital internship. If the original degree was in Microbiology or Microbiology with a Medical technology emphasis, a second B.S. degree will be awarded in Medical Technology upon completion of BIOS 411.

3) Students may be admitted into BIOS 411 with related degrees such as Biochemistry, Biology, or Zoology. They must have completed 16 hours of Chemistry, including organic or biochemistry; 16 hours of Biology and 3 hours of Microbiology. Completion of the BIOS 411 establishes eligibility for the ASCP and NCA registries, but does not result in the award of a second B.S. degree.

This program is particularly attractive to students who want to be prepared academically for a wide variety of possible career choices or graduate opportunities.

Students should consult with the director of the Medical Technology program or the department chair regarding the timetable and procedures for making application to the medical technology internship programs. Most application deadlines for non-ISU programs are about December 1 of the year preceding entry into the internship. The ISU deadline is April 1 of the academic year preceding internship. Registration in BIOS 411 is restricted. Entry into BIOS 411 is limited to 10-12 students per year and is highly competitive. Early application is recommended. A copy of the evaluation criteria with relative values is available from the Biological Sciences office.

Further information about this program may be obtained from:

Chair
Department of Biological Sciences
Campus Box 8007
Idaho State University
Pocatello, ID 83209