

## DEPARTMENT OF BIOLOGICAL SCIENCES COLLEGE OF ARTS AND SCIENCES

### FACULTY

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### DEPARTMENTAL MISSION AND GOALS

The mission of the Department of Biological Sciences is to provide educational opportunities in biological science that meet the needs of students and citizens of Oklahoma and surrounding states; to support faculty and student research in the biological sciences; and to contribute to the educational, economic, and cultural environment of the university, the community, and the region.

The Department of Biological Sciences accomplishes its mission and that of the university through the following:

- Ensuring quality education by recruiting the most qualified faculty without regard to national origin, race, gender, disability, age, or religion, who are committed to undergraduate teaching, involving undergraduates in research, and providing service to the university and the region.
- Providing courses of study that establish a foundation for life-long learning in biological science and that prepare graduates to successfully pursue professional and graduate education, to become effective teachers, and to begin fulfilling careers in biology and related fields.
- Establishing an environment of academic freedom, intellectual inquiry, and governance that encourages collaborative interactions among faculty and students and that values analytical and critical thinking, diversity of ideas, effective communication, innovation, and intellectual honesty.
- Extending learning opportunities outside of the classroom through field experiences, student research, regional and national professional meeting attendance and participation, service-learning experiences, and seminar series featuring local and invited speakers.
- Supporting faculty and student research with internal and extramural funding, dedicated space, equipment, and time and recognizing the scholarly achievements of faculty and students.

- Maintaining a curriculum that meets the constantly changing needs of modern biology through ongoing assessment by faculty, students, alumni, and external review.

### PROGRAMS OF STUDY

- Majors:**
- B.S. Biological Sciences
    - Biomedical Sciences Option
    - Environmental & Organismal Science Option
  - B.S. Microbiology
    - Medical Laboratory Science Option (3+1)
  - B.S. Medical Lab. Science Option (Dual Degree)
  - B.S.Ed. Natural Science Education (Biology)  
(Listed in Dept. of Education)
- Minor:** Biological Sciences
- Pre-Professional:\*** Communication Sciences & Disorders  
Dentistry and Dental Hygiene  
Medical Imaging & Radiation Sciences  
Medicine/Osteopathic Medicine  
Nutritional Sciences/Clinical Dietetics  
Optometry  
Physical and Occupational Therapy  
Physician Associate/Assistant  
Veterinary Medicine
- Master:** M.Ed. Natural Sciences  
M.Ed. Biomedical Sciences and Microbiology  
(See Graduate Catalog for more information.)

\* Students pursuing professional degrees should schedule an appointment with a pre-professional advisor during their first semester on campus to identify requirements specific to their particular program.

### GENERAL INFORMATION

The course offerings in the Department of Biological Sciences span the sub-disciplines within the life sciences. Students may choose to pursue a generalized degree in biological sciences, focus their program in one of three program options, pursue professional programs in medical laboratory sciences and education, or pursue a course of study that prepares students for admission to professional programs in health and medical sciences. This diversity prepares students for professional schools as well as a

variety of options for graduate study and careers in professional biology.

### **SPECIAL OPPORTUNITIES**

SWOSU is an affiliate member of the Gulf Coast Research Laboratory, a Mississippi State Institute of Higher Learning. Coursework in marine biology completed at this facility may be applied toward degree requirements in the biological sciences major. Classes are offered during two six-week summer sessions at the marine laboratory at Ocean Springs, Mississippi. Students may also enroll in courses at other field stations and request that credit earned apply to their degree programs.

Students are encouraged to pursue opportunities for research by contacting individual faculty members or applying for numerous off-campus summer research experiences and internships. Students may receive independent study course credit for participation in approved research projects. Paid positions as research and teaching assistants and departmental tutors are available for qualified students. Speak to your advisor or one of your instructors about opportunities for research in Biological Sciences.

### **STUDENT ORGANIZATIONS**

Membership in the Biology Club can further enhance the training received by biology majors. This student organization, established in 1930 and open to all students, assists the department in such areas as display preparation, arrangement for seminar speakers and scheduling of tours of research laboratories and wildlife refuges. Multi-disciplinary organizations such as the Medical Professions Club and the Pre-veterinary Medicine Club provide additional opportunities to serve and experience the opportunities a Biological Sciences degree can provide.

Beta Beta Beta, a national biological science honor fraternity, recognizes the achievements of outstanding biology students. Students have the opportunity to present their research with posters and oral presentations and compete for regional and national recognition for research excellence.

### **GENERAL INFORMATION**

(Programs and Advisors)

New students are assigned to the biological sciences faculty advisor with whom they consulted during initial enrollment. Students should select an advisor from one of the biological sciences degrees and options no later than the last semester of their sophomore year (transfer students entering after their sophomore year should select an advisor before enrolling for their second semester.)

#### **B.S. Biological Sciences**

Any biological science faculty member

#### **B.S. Biological Sciences, Biomedical Sciences Option**

Aracena, McGrane, Paul, Sharma, Ubeidat

#### **B.S. Biological Sciences, Environmental and Organismal Biology Option**

Aracena, Boggs, Castle, Cothran, Klingler

#### **B.S. Microbiology**

McGrane, Paul, Somalinga

#### **B.S. Microbiology, Medical Laboratory Sciences Option**

Paul

#### **B.S. Ed. Natural Sciences Education**

McGrane

#### **Transfer Students**

Any biological sciences faculty member

**Professional Programs** (Consult advisor in one of the following areas concerning requirements and application information.)

#### **Pre-Medicine, Pre-Osteopathic Medicine**

Aracena, McGrane, Sharma, Ubeidat

#### **Pre-Physical Therapy, Pre-Occupational Therapy**

Sharma

#### **Pre-Dentistry, Pre-Dental Hygiene**

Paul

#### **Pre-Veterinary Medicine**

Castle, Cothran, Klingler

#### **Pre-Optometry**

Klingler

#### **Pre-Physician Associate, Pre-Medical Imaging and Radiation Sciences, Pre-Communication Sciences Disorders, Pre-Nutritional Sciences**

Sharma

**Graduate Programs:** Students must apply for graduate programs through the College of Professional and Graduate Studies. Following acceptance into the graduate program, each student will be assigned to an advisor from the Biological Sciences graduate faculty.

#### **Department of Biological Sciences Statement on Evolution**

Biology is a natural science that accumulates knowledge through empirical observation and rigorously tested hypotheses. Evolution by natural selection, a foundational principle of modern biology, is supported by overwhelming scientific evidence and is accepted by a vast majority of scientists. Because understanding evolution is fundamental to the understanding and practice of modern biology, Southwestern Oklahoma State University biology faculty teach evolution throughout the biology curriculum. This practice is in accordance with policy statements from the National Academies of Science, the American Association for the Advancement of Science, the American Institute of Biological Sciences, the National Science Teachers Association, the American Biology Teachers Association, the Oklahoma Academy of Sciences, and the Oklahoma Science Teachers Association and is supported by numerous religious denominations and organizations. Because we are a science department, we do not teach philosophically deduced theories or alternative hypotheses that cannot be rigorously tested.

For more information visit our web site at:

<https://www.swosu.edu/academics/academic-departments/biological-sciences/index.php>

#### **Medical Laboratory Sciences**

Students interested in working in medical laboratories may pursue an Associate degree as a medical laboratory technician (Sayre Campus) or a bachelor's degree in microbiology-medical laboratory sciences option (Weatherford Campus and clinical study at an accredited affiliated hospital).

Prior to admission to a clinical program, students complete 90 hours of general education and pre-medical laboratory sciences course work. This is the 3+1 program and after completion of the program, the student is awarded a B.S. in Microbiology, Medical Laboratory Sciences Option. Students may opt to complete an undergraduate degree before applying for one of the clinical

programs. This is the dual degree program and students complete an undergraduate degree in Biology before applying to the clinical program. Upon completion of the clinical program, students receive a B.S. in Biological Sciences and a B.S. in Microbiology, Medical Laboratory Sciences Option. Students do not have to be admitted to a Pre-Medical Laboratory Science program but should regularly seek advisement from the advisor of Medical Laboratory Sciences in the Department of Biological Sciences in the College of Arts and Sciences.

The clinical training portion of the Medical Laboratory Science option, which involves 30 credit hours, can only be achieved at an accredited hospital in affiliation with Southwestern Oklahoma State University.

Acceptance into the hospital-based clinical training program is the option of the hospital program. Student applications are required and must follow specified guidelines. Minimum requirements for application require an overall grade point average (OGPA) of 2.5. The students must have a personal interview with hospital program officials. After all applications and interviews have been completed, the students will be “matched” to a training hospital for their professional clinical training.

The Professional Medical Training program at the hospital is 12 months. The students will enroll in clinical courses each semester

of the year – 12 hours in the fall and spring semesters and six hours for the summer semester. Final letter grades for all 30 hours will not be posted until the total clinical program has been completed.

For additional information contact:

Dr. Eric Paul  
Department of Biological Sciences  
SCI 325  
(580) 774-3228  
eric.paul@swosu.edu

### **Natural Sciences Education**

Students interested in teaching middle school or high school biological sciences and other science disciplines should refer to the secondary education programs offered by the Department of Education within the School of Behavioral Sciences and Education in the College of Professional and Graduate Studies. For further information contact:

Dr. Gina McGrane  
Department of Biological Sciences  
SCI 110A  
(580) 774-3046  
regina.mcgrane@swosu.edu

## BACHELOR OF SCIENCE BIOLOGICAL SCIENCES (BIOSC.BS)

### GENERAL EDUCATION (Min. 40 hours)

**Bolded courses are required. Italicized courses are recommended.**

**Communication**..... 9

**ENGL 1113 English Composition I**  
**ENGL 1213 English Composition II**  
**COMM 1313 Introduction to Public Speaking OR**  
**TECH 3143 Technical Presentations (if permitted by degree program)**

**Quantitative Reasoning** ..... 3

*Select one course.*

MATH 1143 Mathematical Concepts  
MATH 1153 Mathematical Applications  
MATH 1193 Elementary Statistics  
MATH 1313 Functions and Modeling  
**MATH 1513 College Algebra**  
or a higher numbered math course

**U. S. History** ..... 3

*Select one course.*

HIST 1043 U.S. History to 1877  
HIST 1053 U.S. History since 1877

**American Government**..... 3

**POLSC 1103 American Government & Politics**

**Science**..... 7-8

*Select one course from Life Science and one course from Physical Science. One Science course must be a lab science.*

**Life Science**.....3-4

BIOL 1004 Biological Concepts w/Lab  
BIOL 1013 Current Issues in Biology  
**BIOL 1054 Principles of Biology I w/Lab**

**Physical Science**.....3-4

ASTRO 1904 Astronomy  
CHEM 1004 General Chemistry w/Lab  
GEOL 1934 Physical Geology w/Lab  
PHY 1044 Basic Physics I w/Lab  
PHY 1063 General Physics (or a higher numbered chemistry or physics course)  
SCI 1501 Concepts of Physical Science Lab  
SCI 1513 Conc of Phy Science (can be taken w/wo lab)

**Humanities and Social Science** .....12

*Select one course from each sub-category and one additional course from any subcategory below.*

**Humanities** ..... 3

GEOG 1103 World Cultural Geography  
HIST 1033 World History  
HUM 1103 Introduction to Humanities

**Fine Arts** ..... 3

ART 1223 Art Survey  
COMM 1263 Introduction to Theatre  
LIT 2333 Introduction to Film  
LIT 2413 Introduction to Literature  
MUSIC 1013 Introduction to Music I  
MUSIC 1103 Music and Culture (Music majors only)  
MUSIC 1123 History of Rock-n-Roll  
PHILO 1453 Introduction to Philosophy

**Social and Human Sciences**..... 3

ASL 2163 American Sign Language I  
ECONO 2263 Intro to Macroeconomics  
ECONO 2363 Intro to Microeconomics  
ENTRP 1123 Intro to Business  
FINAN 2113 Personal Financial Planning  
ITAL 1004 Elementary Italian I  
KINES 1133 Wellness Conc & Exercise Applications  
LATIN 1054 Elementary Latin I (or higher number)  
PSYCH 1003 General Psychology  
SOCIO 1003 Introduction to Sociology  
SPAN 1054 Elementary Spanish I (or higher number)  
TECH 1223 Technology and Society

**Computer Proficiency**..... 0-3

COMSC 1023 Computers and Info Access, or a department-assigned course which satisfies the Computer Proficiency in the major, or the

SWOSU Proficiency Exam, or HS course clearly defined to meet our goals.

**GE Elective**.....0-3

Students who meet the computer proficiency by exam or HS course must choose an additional GE course from any category.

### BIOLOGICAL SCIENCES MAJOR

**Required Courses**..... 16

BIOL 1254 Principles of Biology II  
BIOL 3053 Cell Biology  
BIOL 3152 Genetics and Cell Biology Lab  
BIOL 3253 Genetics  
BIOL 3283 Ecology  
BIOL 4901 Biological Sciences Capstone

**Major Electives** ..... 24

(Electives must include one Field Course [F] or a field course with lab from the Gulf Coast Research Lab or other field station or lab and one Plant Course [P].)

BIOL 3012 Biological Terminology  
BIOL 3304 Aquatic Ecology [F]  
BIOL 3604 Biology of Insects [F]  
BIOL 3704 Human Anatomy  
BIOL 3814 Biology of Plants [P]  
BIOL 3904 Human Physiology  
BIOL 4001-4 Independent Studies  
BIOL 4010-4 Seminar in Biology  
*(A maximum of 4 hours total of Independent Studies and Seminar may be counted toward the major.)*  
BIOL 3355 General Microbiology  
BIOL 3363 Invertebrate Biology  
BIOL 4021-4 Special Topics in Biomedical Sciences  
BIOL 4031-4 Special Topics in Microbiology  
BIOL 4041-4 Special Topics Environ & Organismal Biology  
BIOL 4154 Developmental Biology  
BIOL 4204 Vertebrate Biology [F]  
BIOL 4213 Immunology  
BIOL 4284 Parasitology  
BIOL 4314 Environmental Biology  
BIOL 4343 Applied Microbiology  
BIOL 4355 Microbiology  
BIOL 4404 Pathogenic Microbiology  
BIOL 4454 Plant Taxonomy [P]  
BIOL 4463 Virology  
BIOL 4503 Microbial Physiology  
BIOL 4524 Environmental Microbiology [F]  
BIOL 4604 Terrestrial Ecology [P]  
BIOL 4622 Economically Important Plants [P]  
BIOL 4703 Infectious Disease Epidemiology  
BIOL 4853 Evolution  
BIOL 4864 Human Genetics  
BIOL 4914 General and Comparative Physiology  
BIOL 4935 Cell and Molecular Biology  
BIOL 4944 Neuroscience

**Other Requirements** ..... 18-20

MATH 2823 Applied Calculus (OR MATH 1613 Trigonometry OR MATH 1834 Calculus I)  
MATH 3413 Statistical Methods I OR 3433 Statistics I OR PSYCH 2433 Psychological Statistics  
CHEM 1303 & 1332 General Chemistry II (Lecture and Lab)  
CHEM 3013 & 3111 Organic Chemistry I (Lecture and Lab)  
PHY 1063 General Physics OR one higher numbered Physics course with lab

**Minor Requirements (see Minor Programs of Study)** .....18-22

**Free Electives to total 120 hours**.....0-4

**TOTAL HOURS**..... 120

#### REGULATIONS PERTAINING TO GRADUATION

Minimum credit hours for graduation .....120  
Minimum credit hours in the liberal arts & sciences ..... 55  
Minimum credit hours in upper-division (3000/4000 courses)..... 40  
Minimum credit hours (3000/4000 courses) in major completed at SWOSU..... 8  
Minimum credit hours at SWOSU (15 of the last 30)..... 30  
Minimum Grade Point Average in all coursework.....2.00  
Minimum Grade Point Average in major. ....2.00

## BIOLOGICAL SCIENCES (BIOSC.BS) Suggested Course Sequence

### FIRST YEAR

FIRST SEMESTER	SECOND SEMESTER
1051 SWOSUConnect* (1) 1054 Principles of Biology I (4) 1113 English Composition I (3) 1513 College Algebra (3) 1313 Intro to Public Speaking or 3433 Technical Presentations (3)	1254 Principles of Biology II (4) 1213 English Composition II (3) 2823 Applied Calculus (3) General Education (2-5)
Total (14)	Total (12-15)

### SECOND YEAR

FIRST SEMESTER	SECOND SEMESTER
3253 Genetics (3) 3152 Genetics and Cell Biology Lab (2) 1203 General Chemistry I (3) 1252 General Chemistry I Lab (2) Major electives, Minor courses, or General Education (3-7)	3053 Cell Biology (3) 3283 Ecology (3) 1303 General Chemistry II (3) 1352 General Chemistry II Lab (2) General Education (1-3) Statistics course (3)
Total (13-17)	Total (15-17)

### THIRD YEAR

FIRST SEMESTER	SECOND SEMESTER
Field/Plant course elective (4) Chemistry requirements (4)* Major electives, Minor courses, or General Education (3-7) Physics requirements (3-4)*	Chemistry requirements (4)* Field/Plant course elective (4) Major electives, Minor courses, or General Education (3-7) Physics requirements (4)*
Total (14-19)	Total (15-19)

### FOURTH YEAR

FIRST SEMESTER	SECOND SEMESTER
Major electives, Minor courses, General Education or Free electives (15)	4901 Biological Sciences Capstone (1) Major electives, Minor courses General Education or Free electives (14)
Total (15)	Total (15)

\*First time entering SWOSU students need to take 1051 SWOSUConnect.

\*Physics requirement may be filled by 1063 General Physics or Basic Physics I and Basic Physics II. Students planning to apply to graduate or professional schools should take Organic Chemistry I and II and Basic Physics I and II.

#Students pursuing Biological Sciences Degree Options should enroll in specified electives during the third and fourth years.

Students applying to professional schools should regularly consult with a pre-professional advisor and the pre-medical committee to be aware of changes in admissions policies and deadlines.

NOTE: Students entering SWOSU with concurrent credits, Advanced Placement or CLEP credits may need to adjust the course sequences accordingly. Likewise, students entering with deficiencies may not be able to complete a degree in four years or may have to attend summer school.

## BACHELOR OF SCIENCE-BIOLOGICAL SCIENCES BIOMEDICAL SCIENCES OPTION (BIOMS.BS)

### GENERAL EDUCATION (Min. 40 hours)

**Bolded courses are required. Italicized courses are recommended.**

**Communication** ..... 9

**ENGL 1113 English Composition I**  
**ENGL 1213 English Composition II**  
**COMM 1313 Introduction to Public Speaking OR**  
**TECH 3143 Technical Presentations (if permitted by degree program)**

**Quantitative Reasoning** ..... 3

*Select one course.*

**MATH 1143 Mathematical Concepts**  
**MATH 1153 Mathematical Applications**  
**MATH 1193 Elementary Statistics**  
**MATH 1313 Functions and Modeling**  
**MATH 1513 College Algebra**  
 or a higher numbered math course

**U. S. History** ..... 3

*Select one course.*

**HIST 1043 U.S. History to 1877**  
**HIST 1053 U.S. History since 1877**

American Government..... 3

**POLSC 1103 American Government & Politics**

**Science** ..... 7-8

*Select one course from Life Science and one course from Physical Science. One Science course must be a lab science.*

**Life Science**.....3-4

**BIOL 1004 Biological Concepts w/Lab**  
**BIOL 1013 Current Issues in Biology**  
**BIOL 1054 Principles of Biology I w/Lab**

**Physical Science**.....3-4

**ASTRO 1904 Astronomy**  
**CHEM 1004 General Chemistry w/Lab**  
**GEOL 1934 Physical Geology w/Lab**  
**PHY 1044 Basic Physics I w/Lab**  
**PHY 1063 General Physics (or a higher numbered chemistry or physics course)**  
**SCI 1501 Concepts of Physical Science Lab**  
**SCI 1513 Conc of Phy Science (can be taken w/wo lab)**

**Humanities and Social Science** .....12

*Select one course from each sub-category and one additional course from any subcategory below.*

**Humanities** ..... 3

**GEOG 1103 World Cultural Geography**  
**HIST 1033 World History**  
**HUM 1103 Introduction to Humanities**

**Fine Arts** ..... 3

**ART 1223 Art Survey**  
**COMM 1263 Introduction to Theatre**  
**LIT 2333 Introduction to Film**  
**LIT 2413 Introduction to Literature**  
**MUSIC 1013 Introduction to Music I**  
**MUSIC 1103 Music and Culture (Music majors only)**  
**MUSIC 1123 History of Rock-n-Roll**  
**PHILO 1453 Introduction to Philosophy**

**Social and Human Sciences** ..... 3

**ASL 2163 American Sign Language I**  
**ECONO 2263 Intro to Macroeconomics**  
**ECONO 2363 Intro to Microeconomics**  
**ENTRP 1123 Intro to Business**  
**FINAN 2113 Personal Financial Planning**  
**ITAL 1004 Elementary Italian I**  
**KINES 1133 Wellness Conc & Exercise Applications**  
**LATIN 1054 Elementary Latin I (or higher number)**  
**PSYCH 1003 General Psychology**  
**SOCIO 1003 Introduction to Sociology**  
**SPAN 1054 Elementary Spanish I (or higher number)**  
**TECH 1223 Technology and Society**

**Computer Proficiency**..... 0-3

**COMSC 1023 Computers and Info Access**, or a department-assigned course which satisfies the Computer Proficiency in the major, or the

SWOSU Proficiency Exam, or HS course clearly defined to meet our goals.

**GE Elective**.....0-3

Students who meet the computer proficiency by exam or HS course must choose an additional GE course from any category.

### BIOMEDICAL SCIENCE OPTION

**Biological Sciences Core Courses (Required)** .....16

**BIOL 1254 Principles of Biology II**  
**BIOL 3053 Cell Biology**  
**BIOL 3152 Genetics and Cell Biology Lab**  
**BIOL 3253 Genetics**  
**BIOL 3283 Ecology**  
**BIOL 4901 Biological Sciences Capstone**

**Major Electives (include one Field Course [F] and one Plant Course [P])** .....24

**BIOL 3304 Aquatic Ecology [F]**  
**BIOL 3604 Biology of Insects [F]**  
**BIOL 3704 Human Anatomy**  
**BIOL 3814 Biology of Plants [P]**  
**BIOL 4001-4 Independent Studies in Biological Sciences**  
*(A maximum of 4 hours total of Independent Studies may be counted toward the major.)*

**BIOL 3355 General Microbiology**  
**BIOL 3363 Invertebrate Biology**  
**BIOL 4021-4 Special Topics in Biomedical Sciences**  
**BIOL 4154 Developmental Biology**  
**BIOL 4204 Vertebrate Biology [F]**  
**BIOL 4213 Immunology**  
**BIOL 4284 Parasitology**  
**BIOL 4314 Environmental Biology**  
**BIOL 4355 Microbiology**  
**BIOL 4404 Pathogenic Microbiology**  
**BIOL 4454 Plant Taxonomy [P]**  
**BIOL 4463 Virology**  
**BIOL 4524 Environmental Microbiology [F]**  
**BIOL 4604 Terrestrial Ecology [P]**  
**BIOL 4622 Economically Important Plants [P]**  
**BIOL 4703 Infectious Disease Epidemiology**  
**BIOL 4853 Evolution**  
**BIOL 4864 Human Genetics**  
**BIOL 4914 General and Comparative Physiology**  
**BIOL 4935 Cell and Molecular Biology**  
**BIOL 4944 Neuroscience**

**Other Requirements** ..... 18-20

**MATH 2823 Applied Calculus (OR MATH 1613 Trigonometry OR MATH 1834 Calculus I)**  
**MATH 3413 Statistical Methods I OR 3433 Statistics I OR PSYCH 2433 Psychological Statistics**  
**CHEM 1303 & 1352 General Chemistry II (Lecture and Lab)**  
**CHEM 3013 & 3111 Organic Chemistry I (Lecture and Lab)**

*(Students planning to attend most professional or graduate schools should take CHEM 3013 and 3111 and CHEM 4113 and 4021)*

**PHY 1063 General Physics OR one higher numbered Physics course with lab**

*(Students planning to attend most professional or graduate schools should take PHYS 1044 and 1054)*

**Minor Requirements (see Minor Programs of Study)** ..... 18-22  
*(Chemistry Minor is recommended for the Biomedical Sciences option)*

**Free Electives to total 120 hours**..... 0-4

**TOTAL HOURS**..... 120

### REGULATIONS PERTAINING TO GRADUATION

Minimum credit hours for graduation.....120  
 Minimum credit hours in the liberal arts & sciences.....55  
 Minimum credit hours in upper-division (3000/4000 courses).....40  
 Minimum credit hours (3000/4000 courses) in major completed at SWOSU ..... 8  
 Minimum credit hours at SWOSU (15 of the last 30).....30  
 Minimum Grade Point Average in all coursework..... 2.00  
 Minimum Grade Point Average in major.....2.00

## BACHELOR OF SCIENCE - BIOLOGICAL SCIENCES ENVIRONMENTAL AND ORGANISMAL BIOLOGY OPTION (EVOGS.BS)

### GENERAL EDUCATION (Min. 40 hours)

**Bolded courses are required. Italicized courses are recommended.**

**Communication**..... 9

<b>ENGL</b>	<b>1113</b>	<b>English Composition I</b>	
<b>ENGL</b>	<b>1213</b>	<b>English Composition II</b>	
<b>COMM</b>	<b>1313</b>	<b>Introduction to Public Speaking OR</b>	
<b>TECH</b>	<b>3143</b>	<b>Technical Presentations (if permitted by degree program)</b>	

**Quantitative Reasoning**..... 3

*Select one course.*

MATH	1143	Mathematical Concepts
MATH	1153	Mathematical Applications
MATH	1193	Elementary Statistics
MATH	1313	Functions and Modeling
<b>MATH</b>	<b>1513</b>	<b>College Algebra</b>

or a higher numbered math course

**U. S. History**..... 3

*Select one course.*

HIST	1043	U.S. History to 1877
HIST	1053	U.S. History since 1877

**American Government**..... 3

<b>POLSC</b>	<b>1103</b>	<b>American Government &amp; Politics</b>
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**Science**..... 7-8

*Select one course from Life Science and one course from Physical Science. One Science course must be a lab science.*

**Life Science**..... 3-4

BIOL	1004	Biological Concepts w/Lab
BIOL	1013	Current Issues in Biology
<b>BIOL</b>	<b>1054</b>	<b>Principles of Biology I w/Lab</b>

**Physical Science**..... 3-4

ASTRO	1904	Astronomy
CHEM	1004	General Chemistry w/Lab
GEOL	1934	Physical Geology w/Lab
PHY	1044	Basic Physics I w/Lab
PHY	1063	General Physics (or a higher numbered chemistry or physics course)
SCI	1501	Concepts of Physical Science Lab
SCI	1513	Conc of Phy Science (can be taken w/wo lab)

**Humanities and Social Science**..... 12

*Select one course from each sub-category and one additional course from any subcategory below.*

**Humanities**..... 3

GEOG	1103	World Cultural Geography
HIST	1033	World History
HUM	1103	Introduction to Humanities

**Fine Arts**..... 3

ART	1223	Art Survey
COMM	1263	Introduction to Theatre
LIT	2333	Introduction to Film
LIT	2413	Introduction to Literature
MUSIC	1013	Introduction to Music I
MUSIC	1103	Music and Culture (Music majors only)
MUSIC	1123	History of Rock-n-Roll
PHILO	1453	Introduction to Philosophy

**Social and Human Sciences**..... 3

ASL	2163	American Sign Language I
ECONO	2263	Intro to Macroeconomics
ECONO	2363	Intro to Microeconomics
ENTRP	1123	Intro to Business
FINAN	2113	Personal Financial Planning
ITAL	1004	Elementary Italian I
KINES	1133	Wellness Conc & Exercise Applications
LATIN	1054	Elementary Latin I (or higher number)
PSYCH	1003	General Psychology
SOCIO	1003	Introduction to Sociology
SPAN	1054	Elementary Spanish I (or higher number)
TECH	1223	Technology and Society

**Computer Proficiency**..... 0-3

COMSC 1023 Computers and Info Access, or a department-assigned course which satisfies the Computer Proficiency in the major, or the SWOSU Proficiency Exam, or HS course clearly defined to meet our goals.

**GE Elective**..... 0-3

Students who meet the computer proficiency by exam or HS course must choose an additional GE course from any category.

### ENVIRONMENTAL AND ORGANISMAL BIOLOGY OPTION

**Biological Sciences Core Courses (Required)**..... 16

BIOL	1254	Principles of Biology II
BIOL	3053	Cell Biology
BIOL	3152	Genetics and Cell Biology Lab
BIOL	3253	Genetics
BIOL	3283	Ecology
BIOL	4901	Biological Sciences Capstone

**Major Electives** (include one Field Course [F] and one Plant Course [P]) .. 24

BIOL	3304	Aquatic Ecology [F]
BIOL	3604	Biology of Insects [F]
BIOL	3704	Human Anatomy
BIOL	3814	Biology of Plants [P]
BIOL	4001-4	Independent Studies in Biological Sciences

*(A maximum of 4 hours total of Independent Studies may be counted toward the major.)*

BIOL	3355	General Microbiology
BIOL	3363	Invertebrate Biology
BIOL	4041-4	Special Topics in Environ & Organismal Biology
BIOL	4154	Developmental Biology
BIOL	4204	Vertebrate Biology [F]
BIOL	4284	Parasitology
BIOL	4314	Environmental Biology
BIOL	4343	Applied Microbiology
BIOL	4355	Microbiology
BIOL	4454	Plant Taxonomy [P]
BIOL	4463	Virology
BIOL	4524	Environmental Microbiology [F]
BIOL	4604	Terrestrial Ecology [P]
BIOL	4622	Economically Important Plants [P]
BIOL	4853	Evolution
BIOL	4914	General and Comparative Physiology

**Other Requirements**..... 18-20

MATH	2823	Applied Calculus (OR MATH 1613 Trigonometry OR MATH 1834 Calculus I)
MATH	3413	Statistical Methods I OR 3433 Statistics I OR PSYCH 2433 Psychological Statistics
CHEM	1303 & 1352	General Chemistry II (Lecture and Lab)
CHEM	3013 & 3111	Organic Chemistry I (Lecture and Lab)
PHY	1063	General Physics OR one higher numbered Physics course with lab

**Minor Requirements** (see Minor Programs of Study) ..... 18-22

**Free Electives to total 120 hours**..... 0-4

**TOTAL HOURS**..... 120

#### REGULATIONS PERTAINING TO GRADUATION

Minimum credit hours for graduation	120
Minimum credit hours in the liberal arts & sciences	55
Minimum credit hours in upper-division (3000/4000 courses)	40
Minimum credit hours (3000/4000 courses) in major completed at SWOSU	8
Minimum credit hours at SWOSU (15 of the last 30)	30
Minimum Grade Point Average in all coursework	2.00
Minimum Grade Point Average in major	2.00

## PRE-PROFESSIONAL PROGRAMS (BIOMS.BS & EVOGS.BS)

### Suggested Course Sequence

#### FIRST YEAR

FIRST SEMESTER	SECOND SEMESTER
1051 SWOSUConnect (1) <sup>+</sup> 1054 Principles of Biology I (4) 1113 English Composition I (3) 1203 General Chemistry I(3) 1252 General Chemistry I Lab (2) 1513 College Algebra (3)	1254 Principles of Biology II (4) 1213 English Composition II (3) 1303 General Chemistry II (3) 1352 General Chemistry II Lab (2) 2823 Applied Calculus (3)
Total (16)	Total (15)

#### SECOND YEAR

FIRST SEMESTER	SECOND SEMESTER
3152 Genetics and Cell Biology Lab (2) 3253 Genetics (3) Chemistry requirements (4)* 1313 Intro to Public Speaking or 3433 Technical Presentations (3) General Education (0-3) Statistics course (3)	3053 Cell Biology (3) 3283 Ecology (3) Chemistry requirements (4)* General Education (4-6)
Total (15-18)	Total (14-16)

#### THIRD YEAR

FIRST SEMESTER	SECOND SEMESTER
Field/Plant course elective (4) Option electives, Minor courses, or General Education (7-11) Physics requirements (3-4)*  MCAT, DAT, or other admissions tests should be taken in the junior year.	Field/Plant course elective (4) Option electives, Minor courses, or General Education (7-11) Physics requirements (4)*  MCAT, DAT, or other admissions tests should be taken in the junior year.
Total (14-19)	Total (15-19)

#### FOURTH YEAR

FIRST SEMESTER	SECOND SEMESTER
Option electives, Minor courses, or General Education (15)	4901 Biological Sciences Capstone (1) Option electives, Minor courses, or General Education (14)
Total (15)	Total (15)

<sup>+</sup>First time entering SWOSU students need to take 1051 SWOSUConnect.

\*Physics requirement may be filled by 1063 General Physics or Basic Physics I and Basic Physics II. Students planning to apply to graduate or professional schools should take Organic Chemistry I and II and Basic Physics I and II.



## BACHELOR OF SCIENCE - MICROBIOLOGY (MICRO.BS)

### GENERAL EDUCATION (Min. 40 hours)

**Bolded courses are required. Italicized courses are recommended.**

#### Communication..... 9

<b>ENGL</b>	<b>1113</b>	<b>English Composition I</b>
<b>ENGL</b>	<b>1213</b>	<b>English Composition II</b>
<b>COMM</b>	<b>1313</b>	<b>Introduction to Public Speaking OR</b>
<b>TECH</b>	<b>3143</b>	<b>Technical Presentations (if permitted by degree program)</b>

#### Quantitative Reasoning ..... 3

Select one course.

MATH	1143	Mathematical Concepts
MATH	1153	Mathematical Applications
MATH	1193	Elementary Statistics
MATH	1313	Functions and Modeling
<b>MATH</b>	<b>1513</b>	<b>College Algebra</b>

or a higher numbered math course

#### U. S. History ..... 3

Select one course.

HIST	1043	U.S. History to 1877
HIST	1053	U.S. History since 1877

#### American Government..... 3

<b>POLSC</b>	<b>1103</b>	<b>American Government &amp; Politics</b>
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#### Science..... 7-8

Select one course from Life Science and one course from Physical Science. One Science course must be a lab science.

##### Life Science.....3-4

BIOL	1004	Biological Concepts w/Lab
BIOL	1013	Current Issues in Biology
<b>BIOL</b>	<b>1054</b>	<b>Principles of Biology I w/Lab</b>

##### Physical Science.....3-4

ASTRO	1904	Astronomy
CHEM	1004	General Chemistry w/Lab
GEOL	1934	Physical Geology w/Lab
PHY	1044	Basic Physics I w/Lab
PHY	1063	General Physics (or a higher numbered chemistry or physics course)
SCI	1501	Concepts of Physical Science Lab
SCI	1513	Conc of Phy Science (can be taken w/wo lab)

#### Humanities and Social Science .....12

Select one course from each sub-category and one additional course from any subcategory below.

##### Humanities ..... 3

GEOG	1103	World Cultural Geography
HIST	1033	World History
HUM	1103	Introduction to Humanities

##### Fine Arts ..... 3

ART	1223	Art Survey
COMM	1263	Introduction to Theatre
LIT	2333	Introduction to Film
LIT	2413	Introduction to Literature
MUSIC	1013	Introduction to Music I
MUSIC	1103	Music and Culture (Music majors only)
MUSIC	1123	History of Rock-n-Roll
PHILO	1453	Introduction to Philosophy

##### Social and Human Sciences ..... 3

ASL	2163	American Sign Language I
ECONO	2263	Intro to Macroeconomics
ECONO	2363	Intro to Microeconomics
ENTRP	1123	Intro to Business
FINAN	2113	Personal Financial Planning
ITAL	1004	Elementary Italian I
KINES	1133	Wellness Conc & Exercise Applications
LATIN	1054	Elementary Latin I (or higher number)
PSYCH	1003	General Psychology
SOCIO	1003	Introduction to Sociology
SPAN	1054	Elementary Spanish I (or higher number)
TECH	1223	Technology and Society

#### Computer Proficiency .....0-3

COMSC 1023 Computers and Info Access, or a department-assigned course which satisfies the Computer Proficiency in the major, or the SWOSU Proficiency Exam, or HS course clearly defined to meet our goals.

#### GE Elective.....0-3

Students who meet the computer proficiency by exam or HS course must choose an additional GE course from any category.

### MICROBIOLOGY MAJOR

#### Core Courses (Required)..... 28

BIOL	1254	Principles of Biology II
BIOL	3053	Cell Biology
BIOL	3152	Genetics and Cell Biology Lab
BIOL	3253	Genetics
BIOL	3283	Ecology
BIOL	3355	General Microbiology
BIOL	3704	Human Anatomy
BIOL	4213	Immunology
BIOL	4355	Microbiology
BIOL	4901	Biological Sciences Capstone

#### Major Electives..... 21

Choose one of the following courses:

BIOL	3304	Aquatic Ecology
BIOL	4524	Environmental Microbiology
BIOL	4604	Terrestrial Ecology

Choose the remaining 17 credit hours from the following list:

BIOL	4001-4	Independent Studies in Biological Sciences
<i>(A maximum of 4 hours total of Independent Studies may be counted toward the major.)</i>		
BIOL	4031-4	Special Topics in Microbiology
BIOL	4284	Parasitology
BIOL	4343	Applied Microbiology
BIOL	4404	Pathogenic Microbiology
BIOL	4503	Microbial Physiology
BIOL	4463	Virology
BIOL	4703	Infectious Disease Epidemiology
BIOL	4853	Evolution
BIOL	4864	Human Genetics
BIOL	4914	General and Comparative Physiology
BIOL	4935	Cell and Molecular Biology
BIOL	4944	Neuroscience

#### Other Requirements.....9

MATH	2823	Applied Calculus (OR MATH 1613 Trigonometry OR MATH 1834 Calculus I)
MATH	3413	Statistical Methods I OR 3433 Statistics I OR PSYCH 2433 Psychological Statistics
PHY	1063	General Physics OR one higher numbered Physics course with lab

#### Chemistry (Minor) ..... 22

CHEM	1203 & 1252	General Chemistry I and lab
CHEM	1303 & 1352	General Chemistry II and lab
CHEM	3013 & 3111	Organic Chemistry I and lab
CHEM	4113 & 4021	Organic Chemistry II and lab
CHEM	4124	Biochemistry (w/lab)

#### Free Electives to total 120 hours .....0-4

#### TOTAL HOURS.....120

#### REGULATIONS PERTAINING TO GRADUATION

Minimum credit hours for graduation.....	120
Minimum credit hours in the liberal arts & sciences.....	55
Minimum credit hours in upper-division (3000/4000 courses).....	40
Minimum credit hours (3000/4000 courses) in major completed at SWOSU.....	8
Minimum credit hours at SWOSU (15 of the last 30).....	30
Minimum Grade Point Average in all coursework.....	2.00
Minimum Grade Point Average in major.....	2.00

## PRE-PROFESSIONAL PROGRAMS (MICRO.BS)

### Suggested Course Sequence

#### FIRST YEAR

FIRST SEMESTER	SECOND SEMESTER
1051 SWOSUConnect (1) <sup>+</sup> 1054 Principles of Biology I (4) 1113 English Composition I (3) 1203 General Chemistry I (3) 1252 General Chemistry I Lab (2) 1513 College Algebra (3)	1213 English Composition II (3) 1254 Principles of Biology II (4) 1303 General Chemistry II (3) 1352 General Chemistry II Lab (2) 2823 Applied Calculus (3)
Total (16)	Total (15)

#### SECOND YEAR

FIRST SEMESTER	SECOND SEMESTER
3152 Genetics and Cell Biology Lab (2) 3253 Genetics (3) 3355 General Microbiology (5) Chemistry requirements (4)* 1313 Introduction to Public Speaking or 3433 Technical Presentations (3)	3053 Cell Biology (3) 3283 Ecology (3) Chemistry requirements (4)* General Education (4-6)
Total (17)	Total (14-16)

#### THIRD YEAR

FIRST SEMESTER	SECOND SEMESTER
3704 Human Anatomy (4) Option electives, Minor courses, or General Education (7-11) Physics requirements (3-4)*  MCAT, DAT, or other admissions tests should be taken in the junior year.	Option electives, Minor courses, or General Education (7-11) Physics requirements (4)* Statistics course (3)  MCAT, DAT, or other admissions tests should be taken in the junior year.
Total (14-19)	Total (14-18)

#### FOURTH YEAR

FIRST SEMESTER	SECOND SEMESTER
4213 Immunology (3) Option electives, Minor courses, or General Education (12)	4901 Biological Sciences Capstone (1) Option electives, Minor courses, or General Education (14)
Total (15)	Total (15)

<sup>+</sup>First time entering SWOSU students need to take 1051 SWOSUConnect.

\*Physics requirement may be filled by 1063 General Physics or Basic Physics I and Basic Physics II. Students planning to apply to graduate or professional schools should take Organic Chemistry I and II and Basic Physics I and II.

## BACHELOR OF SCIENCE – MICROBIOLOGY MEDICAL LABORATORY SCIENCE OPTION (3+1) (MLSCI.BS)

### GENERAL EDUCATION (Min. 40 hours)

**Bolded courses are required. Italicized courses are recommended.**

**Communication**..... 9

<b>ENGL</b>	<b>1113</b>	<b>English Composition I</b>	
<b>ENGL</b>	<b>1213</b>	<b>English Composition II</b>	
<b>COMM</b>	<b>1313</b>	<b>Introduction to Public Speaking OR</b>	
<b>TECH</b>	<b>3143</b>	<b>Technical Presentations (if permitted by degree program)</b>	

**Quantitative Reasoning**..... 3

*Select one course.*

MATH	1143	Mathematical Concepts
MATH	1153	Mathematical Applications
MATH	1193	Elementary Statistics
MATH	1313	Functions and Modeling
<b>MATH</b>	<b>1513</b>	<b>College Algebra</b>

or a higher numbered math course

**U. S. History**..... 3

*Select one course.*

HIST	1043	U.S. History to 1877
HIST	1053	U.S. History since 1877

**American Government**..... 3

<b>POLSC</b>	<b>1103</b>	<b>American Government &amp; Politics</b>
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**Science**..... 7-8

*Select one course from Life Science and one course from Physical Science. One Science course must be a lab science.*

**Life Science**..... 3-4

BIOL	1004	Biological Concepts w/Lab
BIOL	1013	Current Issues in Biology
<b>BIOL</b>	<b>1054</b>	<b>Principles of Biology I w/Lab</b>

**Physical Science**..... 3-4

ASTRO	1904	Astronomy
CHEM	1004	General Chemistry w/Lab
GEOL	1934	Physical Geology w/Lab
PHY	1044	Basic Physics I w/Lab
PHY	1063	General Physics (or a higher numbered chemistry or physics course)
SCI	1501	Concepts of Physical Science Lab
SCI	1513	Conc of Phy Science (can be taken w/wo lab)

**Humanities and Social Science**..... 12

*Select one course from each sub-category and one additional course from any subcategory below.*

**Humanities**..... 3

GEOG	1103	World Cultural Geography
HIST	1033	World History
HUM	1103	Introduction to Humanities

**Fine Arts**..... 3

ART	1223	Art Survey
COMM	1263	Introduction to Theatre
LIT	2333	Introduction to Film
LIT	2413	Introduction to Literature
MUSIC	1013	Introduction to Music I
MUSIC	1103	Music and Culture (Music majors only)
MUSIC	1123	History of Rock-n-Roll
PHILO	1453	Introduction to Philosophy

**Social and Human Sciences**..... 3

ASL	2163	American Sign Language I
ECONO	2263	Intro to Macroeconomics
ECONO	2363	Intro to Microeconomics
ENTRP	1123	Intro to Business
FINAN	2113	Personal Financial Planning
ITAL	1004	Elementary Italian I
KINES	1133	Wellness Conc & Exercise Applications
LATIN	1054	Elementary Latin I (or higher number)
PSYCH	1003	General Psychology
SOCIO	1003	Introduction to Sociology
SPAN	1054	Elementary Spanish I (or higher number)
TECH	1223	Technology and Society

**Computer Proficiency**..... 0-3

COMSC 1023 Computers and Info Access, or a department-assigned course which satisfies the Computer Proficiency in the major, or the SWOSU Proficiency Exam, or HS course clearly defined to meet our goals.

**GE Elective**..... 0-3

Students who meet the computer proficiency by exam or HS course must choose an additional GE course from any category.

### MEDICAL LABORATORY SCIENCE OPTION

*Courses marked with ‡ must be completed with a grade of C or better in order to apply for admission to clinical coursework.*

**Required Courses**..... 16

BIOL	1254	Principles of Biology II
BIOL	3355	General Microbiology ‡
BIOL	3704	Human Anatomy ‡
BIOL	4213	Immunology ‡

**Electives**..... 14

BIOL	3053	Cell Biology
BIOL	3152	Genetics and Cell Biology Lab
BIOL	3253	Genetics
BIOL	3904	Human Physiology ‡
BIOL	4031-4	Special Topics in Microbiology
BIOL	4284	Parasitology
BIOL	4343	Applied Microbiology
BIOL	4404	Pathogenic Microbiology
BIOL	4463	Virology
BIOL	4503	Microbial Physiology
BIOL	4524	Environmental Microbiology
BIOL	4703	Infectious Disease Epidemiology
BIOL	4853	Evolution
BIOL	4914	General and Comparative Physiology
BIOL	4935	Cell and Molecular Biology

**Chemistry Minor (plus Gen Chem I in GE requirement)**..... 22

CHEM	1203 & 1252	General Chemistry I and lab ‡
CHEM	1303 & 1352	General Chemistry II and lab ‡
CHEM	3013 & 3111	Organic Chemistry I and lab ‡
CHEM	4113 & 4021	Organic Chemistry II and lab ‡
CHEM	4124	Biochemistry (w/lab) ‡

**Clinical (performed at an accredited hospital affiliate)**..... 30

*Admission through a competitive statewide process is required to enter clinical coursework. The required clinical hours are awarded only after successful completion of clinical training.*

MLS	4117	Clinical Microbiology
MLS	4125	Clinical Chemistry I
MLS	4236	Clinical Hematology
MLS	4246	Clinical Immunology/Immunohematology
MLS	4325	Clinical Chemistry II
MLS	4351	Topics in Medical Laboratory Science

**TOTAL HOURS**..... 122

#### REGULATIONS PERTAINING TO GRADUATION

Minimum credit hours for graduation.....	122
Minimum credit hours in the liberal arts & sciences.....	55
Minimum credit hours in upper-division (3000/4000 courses).....	40
Minimum credit hours (3000/4000 courses) in major completed at SWOSU.....	8
Minimum credit hours at SWOSU (15 of the last 30).....	30
Minimum Grade Point Average in all coursework.....	2.00
Minimum Grade Point Average in major.....	2.00

## B.S. Microbiology - Medical Laboratory Science Option (3+1) (MLSCI.BS) Suggested Course Sequence

### FIRST YEAR

FIRST SEMESTER	SECOND SEMESTER
1051 SWOSUConnect (1) <sup>+</sup> 1054 Principles of Biology I (4) 1113 English Composition I(3) 1203 General Chemistry I (3) 1252 General Chemistry I Lab (2) 1513 College Algebra (3)	1213 English Composition II (3) 1254 Principles of Biology II (4) 1303 General Chemistry II (3) 1352 General Chemistry II Lab (2) 1313 Introduction to Public Speaking or 3433 Technical Presentations (3)
Total (16)	Total (15)

### SECOND YEAR

FIRST SEMESTER	SECOND SEMESTER
1043 US History to 1877 <b>OR</b> 1053 US History since 1877 (3) 3013 Organic Chemistry I (3) 3111 Organic Chemistry I Lab (1) 3355 General Microbiology (5) General Education (3)	1003 General Psychology (3) 1033 World History (3) 4021 Organic Chemistry II Lab (1) 4113 Organic Chemistry II (3) 4213 Immunology (3) General Education (3)
Total (15)	Total (16)

### THIRD YEAR

FIRST SEMESTER	SECOND SEMESTER
3704 Human Anatomy (4) 4124 Biochemistry (4) Biology Electives (4) General Education (3)	Biology Electives (12) General Education (4)
Total (15)	Total (16)

### FOURTH YEAR

FIRST SEMESTER	SECOND SEMESTER
Clinical course taken at an accredited hospital affiliate (15)	Clinical course taken at an accredited hospital affiliate (15)
Total (15)	Total (15)

<sup>+</sup>First time entering SWOSU students need to take 1051 SWOSUConnect

## BACHELOR OF SCIENCE – BIOLOGY & MICROBIOLOGY MEDICAL LABORATORY SCIENCE OPTION Dual Degree (BIOSC.BS & MLSCI.BS)

### GENERAL EDUCATION (Min. 40 hours)

**Bolded courses are required.** *Italicized courses are recommended.*

#### Communication..... 9

<b>ENGL</b>	<b>1113</b>	<b>English Composition I</b>
<b>ENGL</b>	<b>1213</b>	<b>English Composition II</b>
<b>COMM</b>	<b>1313</b>	<b>Introduction to Public Speaking OR</b>
<b>TECH</b>	<b>3143</b>	<b>Technical Presentations (if permitted by degree program)</b>

#### Quantitative Reasoning ..... 3

*Select one course.*

MATH	1143	Mathematical Concepts
MATH	1153	Mathematical Applications
MATH	1193	Elementary Statistics
MATH	1313	Functions and Modeling
<b>MATH</b>	<b>1513</b>	<b>College Algebra</b> or a higher numbered math course

#### U. S. History ..... 3

*Select one course.*

HIST	1043	U.S. History to 1877
HIST	1053	U.S. History since 1877

#### American Government..... 3

<b>POLSC</b>	<b>1103</b>	<b>American Government &amp; Politics</b>
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#### Science..... 7-8

*Select one course from Life Science and one course from Physical Science. One Science course must be a lab science.*

#### Life Science.....3-4

BIOL	1004	Biological Concepts w/Lab
BIOL	1013	Current Issues in Biology
<b>BIOL</b>	<b>1054</b>	<b>Principles of Biology I w/Lab</b>

#### Physical Science.....3-4

ASTRO	1904	Astronomy
CHEM	1004	General Chemistry w/Lab
GEOL	1934	Physical Geology w/Lab
PHY	1044	Basic Physics I w/Lab
PHY	1063	General Physics (or a higher numbered chemistry or physics course)
SCI	1501	Concepts of Physical Science Lab
SCI	1513	Conc of Phy Science (can be taken w/wo lab)

#### Humanities and Social Science .....12

*Select one course from each sub-category and one additional course from any subcategory below.*

#### Humanities ..... 3

GEOG	1103	World Cultural Geography
HIST	1033	World History
HUM	1103	Introduction to Humanities

#### Fine Arts ..... 3

ART	1223	Art Survey
COMM	1263	Introduction to Theatre
LIT	2333	Introduction to Film
LIT	2413	Introduction to Literature
MUSIC	1013	Introduction to Music I
MUSIC	1103	Music and Culture (Music majors only)
MUSIC	1123	History of Rock-n-Roll
PHILO	1453	Introduction to Philosophy

#### Social and Human Sciences..... 3

ASL	2163	American Sign Language I
ECONO	2263	Intro to Macroeconomics
ECONO	2363	Intro to Microeconomics
ENTRP	1123	Intro to Business
FINAN	2113	Personal Financial Planning
ITAL	1004	Elementary Italian I
KINES	1133	Wellness Conc & Exercise Applications
LATIN	1054	Elementary Latin I (or higher number)
PSYCH	1003	General Psychology
SOCIO	1003	Introduction to Sociology
SPAN	1054	Elementary Spanish I (or higher number)
TECH	1223	Technology and Society

#### Computer Proficiency .....0-3

COMSC 1023 Computers and Info Access, or a department-assigned course which satisfies the Computer Proficiency in the major, or the SWOSU Proficiency Exam, or HS course clearly defined to meet our goals.

#### GE Elective.....0-3

Students who meet the computer proficiency by exam or HS course must choose an additional GE course from any category.

### DUAL DEGREE PROGRAM

#### B.S. Biological Sciences – BIOSC.BS

#### B.S. Microbiology, Med Lab Sci Option MLSCI.BS

*Courses marked with ‡ must be completed with a grade of C or better in order to apply for admission to clinical coursework.*

#### Biological Sciences Core Courses (Required) ..... 28

BIOL	1254	Principles of Biology II
BIOL	3053	Cell Biology
BIOL	3152	Genetics and Cell Biology Lab
BIOL	3253	Genetics
BIOL	3283	Ecology
BIOL	3355	General Microbiology ‡
BIOL	3704	Human Anatomy ‡
BIOL	4213	Immunology ‡
BIOL	4901	Biological Sciences Capstone

#### Major Electives ..... 28

BIOL	3904	Human Physiology ‡
<b>OR</b>	<b>BIOL 4914</b>	<b>Gen &amp; Comp Physiology ‡</b>
BIOL	4031-4	Special Topics in Microbiology
BIOL	4284	Parasitology
BIOL	4343	Applied Microbiology
BIOL	4404	Pathogenic Microbiology
BIOL	4463	Virology
BIOL	4503	Microbial Physiology
BIOL	4524	Environmental Microbiology
BIOL	4703	Infectious Disease Epidemiology
BIOL	4853	Evolution
BIOL	4914	General and Comparative Physiology

#### Recommend the following for Plant/Field Biol Requirement:

BIOL	4454	Plant Taxonomy
<b>OR</b>	<b>BIOL 4604</b>	<b>Terrestrial Ecology</b>

#### Other Requirements ..... 9-15

MATH	2823	Applied Calculus ( <b>OR</b> MATH 1613 Trigonometry <b>OR</b> MATH 1834 Calculus I)
MATH	3413	Statistical Methods I <b>OR</b> 3433 Statistics I <b>OR</b> PSYCH 2433 Psychological Statistics
PHY	1063	Gen Physics <b>OR</b> higher numbered Physics crs with lab

#### Chemistry (Minor)..... 22

CHEM	1203 & 1252	General Chemistry I and lab ‡
CHEM	1303 & 1352	General Chemistry II and lab ‡
CHEM	3013 & 3111	Organic Chemistry I and lab ‡
CHEM	4113 & 4021	Organic Chemistry II and lab ‡
CHEM	4124	Biochemistry (w/lab) ‡

#### Clinical (performed at an accredited hospital affiliate)..... 30

*Admission through a competitive statewide process is required to enter clinical coursework. The required clinical hours are awarded only after successful completion of clinical training.*

MLS	4117	Clinical Microbiology
MLS	4125	Clinical Chemistry I
MLS	4236	Clinical Hematology
MLS	4246	Clinical Immunology/Immunoematology
MLS	4325	Clinical Chemistry II
MLS	4351	Topics in Medical Laboratory Science

#### TOTAL HOURS..... 157

#### REGULATIONS PERTAINING TO GRADUATION

Minimum credit hours for graduation.....	157
Minimum credit hours in the liberal arts & sciences.....	55
Min credit hours in upper-division (3000/4000 courses).....	40
Min credit hours (3000/4000 courses) in major completed at SWOSU.....	8
Minimum credit hours at SWOSU (15 of the last 30).....	30
Minimum Grade Point Average in all coursework.....	2.00
Minimum Grade Point Average in major.....	2.00

Upon completion of Clinical Program, will earn B.S. Biological Sciences and B.S. Medical Laboratory Sciences.

**B.S. Biology & Microbiology - Medical Laboratory Science Option (Dual Degree)  
(BIOSC.BS & MLSCI.BS)  
Suggested Course Sequence**

**FIRST YEAR**

FIRST SEMESTER	SECOND SEMESTER
1051 SWOSUConnect (1) <sup>+</sup> 1054 Principles of Biology I (4) 1113 English Composition I (3) 1513 College Algebra (3) 1313 Introduction to Public Speaking or 3433 Technical Presentations (3)	1203 General Chemistry I (3) 1252 General Chemistry I Lab (2) 1213 English Composition II (3) 1254 Principles of Biology II (4) 2823 Applied Calculus (3) General Education (4)
Total (14)	Total (19)

**SECOND YEAR**

FIRST SEMESTER	SECOND SEMESTER
3152 Genetics and Cell Biology Lab (2) 3253 Genetics (3) 3355 General Microbiology (5) Major electives, Minor courses, or General Education (4-6) Statistics course (3)	1303 General Chemistry II (3) 1352 General Chemistry II Lab (2) 3053 Cell Biology (3) 3283 Ecology (3) General Education (6)
Total (17-19)	Total (17)

**THIRD YEAR**

FIRST SEMESTER	SECOND SEMESTER
Chemistry requirements (4)* Field/Plant course elective (4) Option electives, Minor courses, or General Education (4-7) Physics requirements (3-4)	Chemistry requirements (4)* Field/Plant course elective (4) Option electives, Minor courses, or General Education (4-7) Physics requirements (3-4)
Total (15-19)	Total (15-19)

**FOURTH YEAR**

FIRST SEMESTER	SECOND SEMESTER
Major electives, Minor courses, or General Education (15)	4901 Biological Sciences Capstone (1) Major electives, Minor courses, or General Education (14)
Total (15)	Total (15)

**FIFTH YEAR**

FIRST SEMESTER	SECOND SEMESTER
Clinical course taken at an accredited hospital affiliate (15)	Clinical course taken at an accredited hospital affiliate (15)
Total (15)	Total (15)

<sup>+</sup>First time entering SWOSU students need to take 1051 SWOSUConnect.

\*Physics requirement may be filled by 1063 General Physics or Basic Physics I and Basic Physics II. Students planning to apply to graduate or professional schools should take Organic Chemistry I and II and Basic Physics I and II.

## **SCHOOLS OF MEDICAL LABORATORY SCIENCE**

**(12-Month Clinical Programs)**

**Adjunct Instructors, Department of Biological Sciences**

Program Directors and Medical Directors

Stacey Paryag; MPA, AHI (AMT), MLS (ASCP) CM,

Program Director

Carol Dittman, M.D., Medical Director

Comanche County Memorial Hospital

Lawton, OK

Leah Babcock; MSHR, MT (ASCP),

Program Director

Dr. L. W. Cartmell, Medical Director

Mercy Hospital Ada

Ada, OK

Nathan Harden; MS, MLS (ASCP),

Program Director

Sigrid Wayne, M.D., Medical Director

Tulsa, OK

Karen Ford; MBA, MT (ASCP) BB,

Program Director

Kari Butler; MLS, AMT, Program Educator

Mercy Hospital Ardmore