

# Department of BIOLOGY AND CHEMISTRY

## Faculty:

Vicki S. DeBolt, D.O.  
Brian L. Ellis, Ph.D.  
Bryan J. Isaac, Ph.D.

Beth A. Kroa, Ph.D.  
Cassandra J. May, Ph.D.  
Joanna R. McLean, Ph.D.

## Majors:

Biochemistry & Molecular Biology  
Biology  
Chemistry  
International Health  
Science Education/Biology  
Science Education/Chemistry

## Programs of Study:

Pre-Medicine  
Other Pre-Professional such as  
pre-dental, pre-vet, pre-physical therapy,  
pre-physician assistant, pre-pharmacy

## Department Mission

The mission of the Department of Biology & Chemistry is to educate and train students for positions of influence and leadership in the scientific community. We seek to offer programs that provide diverse learning and research experiences to students who desire work in the biological and chemical sciences in its variety of expressions.

As Christians embracing the truth of God revealed in both His scriptures and His creation, we desire to disciple students into active followers of Christ who apply the biblical worldview and principles to the pursuit of Him. We strive to instill in our students that as humans we are uniquely called to be stewards of His creation and to glorify him through the demonstration of excellence and the highest ethical standards in our current and future careers. The skills and knowledge we obtain have the highest goal of advancing His kingdom purposes through our service and professional work.

## Biochemistry & Molecular Biology Major - Bachelor of Science

A degree in biochemistry is excellent preparation for those interested in immediate employment or additional training in the health professions and their related industries such as clinical or pharmaceutical laboratory settings. Food industries, biotechnology, toxicology, forensics, community health, and many other careers begin with the training in genetics, biochemistry, cellular biology, and molecular biology techniques offered by this Bethel College degree. This degree typically includes the completion of a minor in chemistry, which further strengthens the versatility of this degree in the quickly changing fields utilizing biotechnology.

Bethel Core			HOURS
BIBL	215	Old Testament Literature	3
BIBL	216	New Testament Literature	3
CHEM	163	General Chemistry I	4
COMM	171	Speech Communication	3
ENGL	101	Written Communication II	3
ENGL	102	Written Communication III	3
		Art/Drama/Music	3
		Foreign Language 2 semesters, or	6
		1 semester at 200 (Intermediate) level	(3)
		History elective	3
KINE	252	Fitness/Wellness	1

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			<b>HOURS</b>
KINE	117	On the Ball Training, or	1
KINE	124	Aerobics, or	(1)
KINE	128	Physical Fitness, or	(1)
KINE	135	Weight Training	(1)
		Literature	3
MATH	131	Calculus I	4
PHIL	250	Introduction to Philosophy	3
PHIL	452	Senior Experience	1
PSYC	182	General Psychology	3
SOC	151	Principles of Sociology	3
THEO	110	Exploring the Christian Faith	<u>3</u>
			<b>50-53</b>

## **Major Courses**

BIOL	125	General Biology: Cell and Molecular	4
BIOL	126	General Biology: Botany and Zoology	4
BIOL	308	Molecular Cell Biology	3
BIOL	309	Genetics	4
BIOL	312	Microbiology	4
BIOL/CHEM	460	Biochemistry	4
CHEM	164	General Chemistry II	4
CHEM	261	Organic Chemistry I	4
CHEM	262	Organic Chemistry II	4
PHYS	121	General Physics I, or	4
PHYS	122	General Physics II	(4)
NS	200	Science & Faith Seminar	1
NS	333	Scientific Research Methods	<u>2</u>
			<b>42</b>

## **Choose at least 6 hours from the following:**

BIOL	205	Biostatistics and Epidemiology	(3)
BIOL	337	Vertebrate Physiology, or	(4)
BIOL	215	Anatomy & Physiology II, or	(4)
BIOL	313	Ecology	(4)
BIOL	399 *	Internship	(1-3)
BIOL	413 *	Independent Study in Biology	(0-3)
CHEM	461	Physical Chemistry I: Thermodynamics	<u>(3)</u>
			<b>6</b>

\*BIOL 399/413 \*May be repeated for a total of 3 hours

## **Option for a Chemistry minor:**

CHEM	280	Analytical Chemistry	4
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Elective hours needed to complete degree

**15-22**

**Total credits**

**120**

## **Biology Major - Bachelor of Science**

Students with biology training proceed to a variety of fields depending on their interests and opportunities. The degree prepares students well for further education in master's, doctoral, and professional programs. Post-secondary goals should be discussed during advising to ensure the best selection of electives to meet possible requirements. Those entering the biology field directly may work in public health, natural resources, pharmaceutical industries, environmental testing and management, clinical laboratories, animal care and research, and many others.

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**BIOLOGY AND CHEMISTRY**

<b>Bethel Core</b>			<b>HOURS</b>
BIBL	215	Old Testament Literature	3
BIBL	216	New Testament Literature	3
CHEM	163	General Chemistry I	4
COMM	171	Speech Communication	3
ENGL	101	Written Communication II	3
ENGL	102	Written Communication III	3
		Art/Drama/Music	3
		Foreign Language 2 semesters or 1 semester at 200 (Intermediate) level	6 (3)
		History elective	3
KINE	252	Fitness/Wellness	1
KINE	117	On the Ball Training, or	1
KINE	124	Aerobics, or	(1)
KINE	128	Physical Fitness or	(1)
KINE	135	Weight Training	(1)
		Literature	3
MATH	124	Applied Calculus, or	3
MATH	131	Calculus I	(4)
PHIL	250	Introduction to Philosophy	3
PHIL	452	Senior Experience	1
PSYC	182	General Psychology	3
SOC	151	Principles of Sociology	3
THEO	110	Exploring the Christian Faith	3

**49-53****Major Requirements**

BIOL	125	General Biology: Cell and Molecular	4
BIOL	126	General Biology: Botany and Zoology	4
BIOL	309	Genetics	4
BIOL	312	Microbiology	4
BIOL	313	Ecology	4
BIOL	337	Vertebrate Physiology, or	4
BIOL	214	Human Anatomy & Physiology I, and	(4)
BIOL	215	Human Anatomy & Physiology II	(4)
CHEM	164	General Chemistry II	4
CHEM	261	Organic Chemistry I	4
NS	200	Science & Faith Seminar	1
NS	333	Scientific Research Methods	2
PHYS	121	General Physics I, or	4
PHYS	122	General Physics II	(4)

**39-43****Choose at least 7 hours from the following:**

BIOL	205	Biostatistics and Epidemiology	3
BIOL	308	Molecular Cell Biology	3
BIOL	399 *	Internship in Biology, or	0-3
BIOL	413 *	Independent Study in Biology	0-3
BIOL	460	Biochemistry	4
CHEM	262	Organic Chemistry II	4
		Au Sable Course	4
			7

\*BIOL 399/413 May be repeated for a total of 3 hours

# ***BIOLOGY AND CHEMISTRY***

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			<b>HOURS</b>
Option to include a Chemistry minor:			
CHEM	280	Analytical Chemistry	4
CHEM	262	Organic Chemistry II (in electives)	(4)
CHEM	460	Biochemistry (in electives)	(4)
Elective hours needed to complete degree			<b>13-25</b>
<b>Total credits</b>			<b>120</b>

## **Biology Minor**

### **Minor Requirements**

BIOL	125	General Biology: Cell and Molecular	4
BIOL	126	General Biology: Botany and Zoology	4

### **Choose at least 9 hours from the following:**

BIOL	205	Biostatistics and Epidemiology	3
BIOL	337*	Vertebrate Physiology, or	4
BIOL	214*	Human Anatomy & Physiology I, and/or	4
BIOL	215*	Human Anatomy & Physiology II	(4)
BIOL	308	Molecular Cell Biology	(3)
BIOL	309	Genetics	(4)
BIOL	312	Microbiology	(4)
BIOL	313	Ecology	(4)
BIOL/CHEM	460	Biochemistry	(4)
BIOL	399**	Internship in Biology, and/or	(1-4)
BIOL	413**	Independent Study in Biology	<u>(0-3)</u>
<b>Total credits</b>			<b>17</b>

\*BIOL 337/214/215

Limited to 8 hours from these courses

\*\*BIOL 399/413

May be repeated for a total of 3 hours

## **Chemistry Major - Bachelor of Science**

A chemistry degree is highly regarded among technical degrees offered nationwide and is strong preparation for immediate careers in industry, government, education. Graduate and professional schools are also options considered by most chemistry majors. Types of future study or employment could include regulatory affairs, quality control, forensic science, environmental compliance, chemical information, materials science, personal care products, oil and petroleum industries, and medicinal chemistry.

### **Bethel Core**

BIBL	215	Old Testament Literature	3
BIBL	216	New Testament Literature	3
CHEM	163	General Chemistry I	4
COMM	171	Speech Communication	3
ENGL	101	Written Communication II	3
ENGL	102	Written Communication III	3
		Art/Drama/Music	3
		Foreign Language 2 semesters, or	6
		1 semester at 200 (Intermediate) level	(3)
		History elective	3
KINE	252	Fitness/Wellness	1
KINE	117	On the Ball Training, or	1
KINE	124	Aerobics, or	(1)
KINE	128	Physical Fitness, or	(1)

			HOURS
KINE	135	Weight Training	(1)
		Literature	3
MATH	131	Calculus I	4
PHIL	250	Introduction to Philosophy	3
PHIL	452	Senior Experience	1
PSYC	182	General Psychology	3
SOC	151	Principles of Sociology	3
THEO	110	Exploring the Christian Faith	3
			<b>50-53</b>

### Content Courses

CHEM	164	General Chemistry II	4
CHEM	261	Organic Chemistry I	4
CHEM	262	Organic Chemistry II	4
CHEM	280	Analytical Chemistry	4
CHEM	460	Biochemistry	4
CHEM	461	Physical Chemistry I: Thermodynamics	3
PHYS	301	Quantum Physics	4
NS	200	Science & Faith Seminar	1
NS	333	Scientific Research Methods	2
			<b>30</b>

### Cognates and Prerequisites

MATH	132	Calculus II	4
PHYS	121	General Physics I	4
PHYS	122	General Physics II	4
BIOL	125	General Biology: Cell and Molecular	4
			<b>16</b>

### Select 2 hours from the following:

CHEM	399*	Internship in Chemistry	1-3
CHEM	465*	Independent Study in Chemistry	0-3
MATH	231	Calculus III	4
BIOL	308	Molecular Cell Biology	3
BIOL	309	Genetics	4
			<b>2-4</b>

\*CHEM 399/465 May be repeated for a total of 3 hours

Elective hours needed to complete degree	<b>17-22</b>
<b>Total credits</b>	<b>120</b>

## Chemistry Minor

CHEM	163	General Chemistry I	4
CHEM	164	General Chemistry II	4
CHEM	261	Organic Chemistry I	4
CHEM	280	Analytical Chemistry	4
			<b>16</b>

### Choose four hours from the following:

CHEM	262	Organic Chemistry II	4
CHEM	399*	Internship in Chemistry	(1-4)
CHEM	460	Biochemistry	(4)
CHEM	461	Physical Chemistry I: Thermochemistry	(3)
CHEM	465*	Independent Study in Chemistry	(0-3)

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PHYS	301	Quantum Physics	(4)
			4
<b>Total credits</b>			<b>20</b>

\*CHEM 399/465 May be repeated for a total of 3 hours

## International Health Major – Bachelor of Science

The International Health major is designed to prepare and equip leaders who will engage the multifaceted challenges and opportunities encountered in International Health and to do so from a biblical worldview. This degree offers various tracks including a pre-medicine option with clinical field experience or the option to double major in a field of interest such as business, ministry, etc. A minimum of six weeks of international/intercultural field experience is required for degree completion; extended internships are available to gain skills and competitive edge for employment or graduate school entrance. International health majors are highly sought by government agencies and non-profit organizations as they seek to improve health at the individual, community and national levels through various avenues including safe water, food security, environmental sustainability, economic development and education.

### Bethel Core

BIBL	215	Old Testament Literature	3
BIBL	216	New Testament Literature	3
CHEM	150	Intro to Gen/Org/Biochemistry, or	4
CHEM	163	General Chemistry I	(4)
COMM	171	Speech Communication	3
ENGL	101	Written Communication II	3
ENGL	102	Written Communication III	3
		Art/Drama/Music	3
		Foreign Language 2 semesters or	6
		1 semester at 200 (Intermediate) level	(3)
HIST	246	Introduction to World Civilization	3
KINE	252	Fitness/Wellness	1
KINE	117	On the Ball Training, or	1
KINE	124	Aerobics, or	(1)
KINE	128	Physical Fitness, or	(1)
KINE	135	Weight Training	(1)
		Literature	3
		College Level Mathematics	3
PHIL	250	Introduction to Philosophy	3
PHIL	452	Senior Experience	1
PSYC	182	General Psychology	3
SOC	151	Principles of Sociology	3
THEO	110	Exploring the Christian Faith	3
			<b>49-52</b>

### Major Requirements

BIOL	125	General Biology: Cell and Molecular	4
BIOL	205	Biostatistics and Epidemiology	3
BIOL	225	Perspectives in International Health	3
BIOL	220	Clinical Microbiology, or	4
BIOL	312	Microbiology	(4)
BIOL	313	Ecology	4
NS	211	Nutrition ADN & BSN, or	3
KINE	282	Applied Nutrition	(3)

			<b>HOURS</b>
NS	333	Scientific Research Methods, or	2
SS	376	Research Methods	(3)
			<b>23-24</b>
<b>Choose one of the following two-course sequences:</b>			
BIOL	126	General Biology: Botany and Zoology, and	4
BIOL	337	Vertebrate Physiology, or	4
BIOL	214	Human Anatomy & Physiology I, and	(4)
BIOL	215	Human Anatomy & Physiology II	(4)
			<b>8</b>
<b>International Core</b>			
IS	350	International & Community Development	3
IS	460	Independent Study in International Studies	3
SOC	356	Cultural Anthropology	3
SS	277	World Regional Geography	3
			<b>12</b>
Elective hours needed to complete degree			<b>24-28</b>
<b>Total credits</b>			<b>120</b>

\*International Learning Experience may be met by any combination of:

Credit earned through a semester abroad approved by the Dean of the School and registered as IS 460 - Independent Study in International Studies, or through shorter trips with an international experience. These might include Bethel Task Force trips, summer missions trips, business tours, Au Sable international courses, and/or study tours, etc. One hour of credit is generally awarded for two weeks of international experience (thus, students must complete 6 weeks of international study to earn the degree).

Bethel College offers a cooperative 4+1 Masters in Public Health program with Indiana Wesleyan University for students majoring in International Health. Students can apply in their junior year to Indiana Wesleyan University's Masters in Public Health program following IWU's application process. The student applying to the MPH degree must have satisfied Bethel's academic guidelines, as well as the following criteria:

- 1) Cumulative GPA of at least 3.0 on a 4.0 scale.
- 2) A grade of "B-" or better in BIOL 205, BIOL 225, IS 350, SOC 356 and SS 277.
- 3) Recommendation for admission by the International Health Coordinator and/or the Biology & Chemistry Department faculty.
- 4) Essay of 500 to 750 words explaining the student's interest in the MPH program.
- 5) Interview: Applicants to the MPH degree program must pass a formal interview with the program faculty.

**Fall Term**

IPE	545	Biostatistics	3
MPH	530	Introduction to Epidemiology	3

**Spring Term**

MPH	510	Social and Behavioral Aspects of Health	3
MPH	620	Health Systems Administration and Mgmt.	3

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<b>Summer Term</b>			<b>HOURS</b>
MPH	570	Environmental Health	3
IPE	565	Research Methods I	3

Since these courses will also count towards their International Health major, students will not be eligible to graduate until August following their senior year. Students will then complete the remaining 22 credits required for the MPH directly from Indiana Wesleyan University through the online course delivery format.

### **International Health Minor**

BIOL	205	Biostatistics and Epidemiology	3
BIOL	225	Perspectives in International Health or	3
NUR	487	Global Health	(3)
			6

#### **Choose 7-8 hours from the following:**

BIOL	125	General Biology: Cell and Molecular	4
BIOL	126	General Biology: Botany and Zoology	4
BIOL	214	Human Anatomy & Physiology I	(4)
BIOL	215	Human Anatomy & Physiology II	(4)
BIOL	220	Clinical Microbiology or	(4)
BIOL	312	Microbiology	(4)
NS	110	Environmental Science or	(4)
BIOL	313	Ecology	(4)
BIOL	337	Vertebrate Physiology	(4)
CHEM	150	Intro. to General, Organic, & Biochemistry or	(4)
CHEM	163	General Chemistry I	(4)
NS	211	Nutrition ADN & BSN or	(3)
KINE	282	Applied Nutrition	(3)
			<b>7-8</b>

#### **Choose 6 hours from the International Core:**

IS	350	International & Community Development	3
IS	460	Independent Study in International Studies	3
SOC	356	Cultural Anthropology	(3)
SS	277	World Regional Geography	(3)
			6

**Total credits** **19-20**

### **Science Education/Biology and Science Education/Chemistry – Bachelor of Science**

The science education degree prepares students to become certified in science content areas and meet the Indiana Department of Education teacher certification requirements. Students are assigned an advisor in the science area and another advisor in the teacher education program to ensure that teacher certification milestones are met in addition to the normal Bethel College degree requirements. Graduates are prepared to work at the secondary level in either private or public school settings, but the degree is rigorous enough in the science content to allow students the flexibility to obtain many of the positions mentioned in earlier major descriptions.

Students selecting the Science Education/Biology Major will be prepared to take the Indiana CORE Assessment in Life Science, and with wise elective selection, could add the CORE Assessment in Chemistry or Physical Science.



Students selecting the Science Education/Chemistry Major will be prepared to take the Indiana CORE Assessment in Chemistry or Physical Science. With additional coursework in electives, it is reasonable to envision adding the CORE Assessment in Physics and/or Life Science.

**Science Education Major - Biology**

<b>Bethel Core</b>			<b>HOURS</b>
BIBL	215	Old Testament Literature	3
BIBL	216	New Testament Literature	3
CHEM	163	General Chemistry I	4
COMM	171	Speech Communication	3
ENGL	101	Written Communication II	3
ENGL	102	Written Communication III	3
		Art/Drama/Music	3
		Foreign Language 2 semesters, or 1 semester at 200 (Intermediate) level	6 (3)
		History Elective	3
KINE	252	Fitness/Wellness	1
KINE	117	On the Ball Training, or	1
KINE	124	Aerobics, or	(1)
KINE	128	Physical Fitness, or	(1)
KINE	135	Weight Training	(1)
		Literature	3
MATH	124	Applied Calculus, or	3
MATH	131	Calculus I	(4)
PHIL	250	Introduction to Philosophy	3
PHIL	452	Senior Experience	1
PSYC	182	General Psychology	3
SOC	151	Principles of Sociology	3
THEO	110	Exploring the Christian Faith	3
			<b>49-53</b>
<b>Content Courses</b>			
BIOL	125	General Biology: Cell and Molecular	4
BIOL	126	General Biology: Botany and Zoology	4
BIOL	214	Human Anatomy & Physiology I	4
BIOL	215	Human Anatomy & Physiology II	4
BIOL	309	Genetics	4
BIOL	313	Ecology	4
NS	200	Science & Faith Seminar	1
			<b>25</b>
<b>Cognates and Prerequisites</b>			
CHEM	164	General Chemistry II	4
CHEM	261	Organic Chemistry I	4
PHYS	121	General Physics I, or	4
PHYS	122	General Physics II	(4)
			<b>12</b>
<b>Choose at least three hours from the following:</b>			
BIOL	205	Biostatistics and Epidemiology	3
BIOL	337	Vertebrate Physiology	(4)
BIOL	308	Molecular Cell Biology	(3)
BIOL	220	Clinical Microbiology, or	(4)
BIOL	312	Microbiology	(4)
BIOL	460	Biochemistry	(4)
BIOL	399*	Internship in Biology, or	(1-3)

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			<b>HOURS</b>
BIOL	413*	Independent Study in Biology	(0-3)
CHEM	262	Organic Chemistry II	<u>(4)</u>
			<b>3</b>
<b>Professional Education</b>			
EDUC	102	Foundations of Education	2
EDUC	204	Diversity in the Classroom	2
EDUC	205	Educational Pedagogy I	3
EDUC	305	Educational Pedagogy II	3
EDUC	308	Teaching Exceptional Learners	2
PSYC	285	Adolescent Growth & Development	2
SCED	443	Specific Methods in Science	2
SCED	448	Content-Specific Literacy	3
EDUC	455	Student Teaching I	8
EDUC	441	Professional Education Seminar	<u>0-2</u>
			<b>27-29</b>
Electives needed to complete degree			<b>0-4</b>
<b>Total credits</b>			<b>120-122</b>

See *TEACHER EDUCATION* (page 95) for program admission and other information.

## **Science Education Major - Chemistry**

### **Bethel Core**

BIBL	215	Old Testament Literature	3
BIBL	216	New Testament Literature	3
CHEM	163	General Chemistry I	4
COMM	171	Speech Communication	3
ENGL	101	Written Communication II	3
ENGL	102	Written Communication III	3
		Art/Drama/Music	3
		Foreign Language 2 semesters, or 1 semester at 200 (Intermediate) level	6 (3)
		History Elective	3
KINE	252	Fitness/Wellness	1
KINE	117	On the Ball Training, or	1
KINE	124	Aerobics, or	(1)
KINE	128	Physical Fitness, or	(1)
KINE	135	Weight Training	(1)
		Literature	3
MATH	131	Calculus I	4
PHIL	250	Introduction to Philosophy	3
PHIL	452	Senior Experience	1
PSYC	182	General Psychology	3
SOC	151	Principles of Sociology	3
THEO	110	Exploring the Christian Faith	<u>3</u>
			<b>50-53</b>

### **Content Courses**

CHEM	164	General Chemistry II	4
CHEM	261	Organic Chemistry I	4
CHEM	280	Analytical Chemistry	4
NS	200	Science & Faith Seminar	1
CHEM	461	Physical Chemistry I: Thermodynamics, or	3
PHYS	301	Quantum Physics	<u>(4)</u>
			<b>16-17</b>

## Cognates and Prerequisites

			HOURS
MATH	132	Calculus II	4
PHYS	121	General Physics I	4
PHYS	122	General Physics II	4
BIOL	125	General Biology: Cell and Molecular	4
			<b>16</b>

### Select at least six hours from the following:

BIOL/CHEM	460	Biochemistry	(4)
BIOL413/CHEM	465*	Independent Study in Biology/Chemistry	(0-3)
BIOL/CHEM	399*	Internship in Biology/Chemistry	(1-4)
CHEM	262	Organic Chemistry II	(4)
CHEM	461	Physical Chemistry I: Thermodynamics	(3)
PHYS	301	Quantum Physics	(4)
PHYS	222	General Physics III	<u>(4)</u>
			<b>6</b>

\*May be repeated for a total of 3 hours

### Professional Education

EDUC	102	Foundations of Education	2
EDUC	204	Diversity in the Classroom	2
EDUC	205	Educational Pedagogy I	3
EDUC	305	Educational Pedagogy II	3
EDUC	308	Teaching Exceptional Learners	2
PSYC	285	Adolescent Growth & Development	2
SCED	443	Specific Methods in Science	2
SCED	448	Content-Specific Literacy	3
EDUC	455	Student Teaching I	8
EDUC	441	Professional Education Seminar	<u>0-2</u>
			<b>27-29</b>
Electives needed to complete degree			<b>0-5</b>
<b>Total credits</b>			<b>120-121</b>

See *TEACHER EDUCATION* (page 95) for program admission and other information.

## Suggested Curriculum for Pre-Med Interest

If the student's goal is to obtain admission to professional school after completion of the bachelor's degree, the advisor will work with the student to optimize the program of study so that both the bachelor's degree is completed as well as the needed coursework for admission to the student's program(s) of interest. Four year plans will consider what courses should be prioritized before national standardized admissions exams are taken after the junior year. Depending on career goals, exams may include the MCAT, DAT, GRE, LSAT, or others.

### Program Suggestions

BIOL	125	General Biology I	4
BIOL	126	General Biology II	4
BIOL	337	Vertebrate Physiology	4
BIOL/CHEM	460	Biochemistry	4
CHEM	163	General Chemistry I	4
CHEM	164	General Chemistry II	4
CHEM	261	Organic Chemistry I	4
CHEM	262	Organic Chemistry II	4
PHYS	121	General Physics I	4
PHYS	122	General Physics II	<u>4</u>
			<b>40</b>

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<b>Suggested electives for medical school preparation:</b>			<b>HOURS</b>
BIOL	205	Biostatistics and Epidemiology	(3)
BIOL	308	Genetics	(4)
BIOL/CHEM	399	Internship in Biology/Chemistry	(1-4)
BIOL	312	Microbiology	(4)
BIOL	413	Independent Study in Biology	(0-3)
CHEM	280	Analytical Chemistry	(4)
CHEM	465	Independent Study in Chemistry	(0-3)
NS	333	Scientific Research Methods	(3)
Pre-Med Courses			<b>40</b>
General Education Courses			<b>50-53</b>
Major Hours (Students' choice)			<b>30</b>
<b>Total Credits</b>			<b>120-123</b>

## **Additional Recommendations for Pre-Professional and Graduate School Students:**

These are general recommendations based on typical professional and graduate school requirements. It is the student's responsibility to research the particular schools of interest and work with the advisor to individualize their preparation.

### **Pre-Medicine:**

**Electives:** PHYS121 or PHYS122, BIOL205

**Suggested Electives:** NUR121 Medical Terminology or NUR 127 Spanish Medical Terminology, PSYC391 Biological Psychology, NS211 Nutrition ADN and BSN or KINE282 Applied Nutrition, NUR121 Medical Terminology or NUR127 Spanish Medical Terminology, Internship or Independent Study

### **Pre-Veterinary**

**Electives:** PHYS121 or PHYS122, BIOL205, BIOL337

**Suggested Electives:** A course in animal nutrition, Internship or Independent Study

### **Pre-Dentistry**

**Electives:** PHYS121 or PHYS122, BIOL214 & BIOL215, Internship or Independent Study

### **Pre-Physician Assistant**

**Electives:** BIOL/CHEM 399, BIOL214 & BIOL 215, BIOL205, two additional courses in Psychology

**Suggested Electives:** NS211 Nutrition ADN and BSN or KINE282 Applied Nutrition, NUR121 Medical Terminology or NUR127 Spanish Medical Terminology, Internship or Independent Study

### **Pre-Physical Therapy**

**Electives:** BIOL214 & BIOL215, BIOL205, and one additional course in Psychology

**Suggested Electives:** KINE463 Kinesiology, NUR121 Medical Terminology or NUR127 Spanish Medical Terminology, NS211 Nutrition ADN and BSN or KINE282 Applied Nutrition

### **Pre-MS or Pre-PhD Students**

**Electives:** BIOL/CHEM 399 Internship in Biology/Chemistry, BIOL413/CHEM465 Independent Study in Biology/Chemistry

**Suggested Electives:** When given options in the program, select the more rigorous of the choices.

All majors in this division receive the Bachelor of Science (B.S.) degree.

The **Au Sable Institute of Environmental Studies** offers over 23 field-based courses through a network of over 50 Christian colleges in North America. Students may take these courses as general electives, as electives in some majors, and even possibly as course substitutions for certain Bethel College courses in consultation with their advisor, department chair, and the Dean of Arts and Sciences.

The list of current courses can be found at [www.ausable.org/courses](http://www.ausable.org/courses) and includes the following:

<b>Au Sable Institute of Environmental Studies Courses:</b>			<b>HOURS</b>
BIOL	301	Land Resources	4
BIOL	302	Lake Ecology and Management	4
BIOL	303	Ecological Agriculture	4
BIOL	304	International Development & Environmental Sustainability	4
BIOL	305	Field Ecology of Birds	4
BIOL	311	Field Botany	4
BIOL	312	Insect Biology & Ecology	4
BIOL	318	Marine Biology	4
BIOL	321	Animal Ecology	4
BIOL	322	Aquatic Biology	4
BIOL	343	Tropical Agriculture & Missions	4
BIOL	345	Wildlife Ecology	4
BIOL	355	Watersheds in Global Development	4
BIOL	359	Marine Mammals	4
BIOL	360	Applied Biodiversity Genetics	4
BIOL	361	Field Biology in Spring	4
BIOL	427	Conservation and Development in Indian Tropics	4
BIOL	452	Environmental Health	4
BIOL	471	Conservation Biology	4
BIOL	478	Alpine Ecology	4
BIOL	482	Restoration Ecology	4
BIOL/CHEM	490	Research Methods	1
BIOL/CHEM	491	Research Methods II	1
BIOL/CHEM	499	Research	1-6
CHEM	332	Environmental Chemistry	4
CHEM	390	Directed Individual Study	1-4
BIOL	362	Environmental Applications for Geographic Information Systems	4
BIOL	365	Insect Ecology of Streams, Forreests, and Fields	4
BIOL	368	Plant Ecology	4
BIOL	390	Directed Individual Study	1-4
ENVR	310	Environmental Law and Policy	4