

## DEPARTMENT OF PHYSICAL SCIENCES

The Department of Physical Sciences offers majors and minors in chemistry, engineering physics, geology, and physical science. Students interested in teaching science in secondary schools should follow the curriculum in science set forth in this catalog under the teacher licensure curricula, College of Education.

The description and curricula for each of the various degree programs in the physical sciences are listed below. Note that for every degree program in this department, there is a non-course requirement involving an exit interview with the Department Head as part of the formal process for graduation.

### Chemistry

The primary purpose of the chemistry program is to educate students in an area of science which is rapidly expanding. The chemists of today are involved in the development of a multitude of new materials such as plastics, drugs, and agricultural products. Research chemists are conducting studies of the fundamental nature of matter which lead to expanded knowledge in medicine and biology. Each course in chemistry stresses laws, theories, and applications in the lecture portion and offers students the opportunity to have "hands-on" experience in well equipped laboratories.

Chemistry is one of the highly recommended courses of study for students interested in pursuing careers in a variety of professional endeavors such as the health sciences: medicine, pharmacy, dentistry, and para-medical fields.

The program and degrees are certified by the American Chemical Society. This professional option is especially recommended for students who plan to pursue graduate studies in chemically related fields or those persons wishing to seek employment as industrial chemists.

The "Biochemistry Option" is primarily designed to provide the background needed for students seeking entrance into professional medical or dental schools. It will also greatly benefit students seeking technical jobs that require multidisciplinary training in biology and chemistry as well as an abundance of science laboratory skills.

The "General Option" is specifically designed with a minimum of required courses so that students, in cooperation with their faculty academic advisors, can exercise a maximum degree of flexibility in tailoring programs to meet their individual aspirations. By judiciously choosing electives, individuals can enrich these minimum requirements to prepare for futures in law, technical marketing, environmental science, computer science, technical writing, toxicology, education, technical illustration, engineering, health sciences, and biochemistry.

Chemistry also offers an environmental option. The objective of this curriculum is to bring together the disciplines of chemistry, biology, and geology as applied to the environment. Emphasis will be on interdisciplinary approaches to environmental studies.

Chemistry majors must earn a grade of "C" or better in all chemistry courses (including transfer credits) in order to satisfy graduation requirements.

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Gann, G. Jones, Musser, Patton  
Instructor:  
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**Curriculum in Chemistry (General Option)**  
**Degree Completion Plan Beginning in Fall Semester**

Freshman				Sophomore			
Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring
ENGL 1013 <sup>1, T</sup>	3	ENGL 1023 <sup>1, T</sup>	3	Social Sciences <sup>1, T</sup>	3	Social Sciences <sup>1, T</sup>	3
MATH 2914 <sup>T</sup>	4	MATH 2924 <sup>T</sup>	4	PHYS 2014 or 2114 <sup>T</sup>	4	PHYS 2024 or 2124 <sup>T</sup>	4
CHEM 2124 <sup>T</sup>	4	CHEM 2134 <sup>T</sup>	4	CHEM 3254	4	CHEM 3264	4
Social Sciences <sup>1, T</sup>	3	BIOL 1114 <sup>T</sup>	4	COMS 2003 or 2803 <sup>T</sup>	3	CHEM 3245	5
PHSC 1001	1	PHSC 1011	1	Physical Activity <sup>1, T</sup>	1		
<b>Total Hours</b>	<b>15</b>	<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>15</b>	<b>Total Hours</b>	<b>16</b>

Junior				Senior			
Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring
Fine Arts <sup>1, T</sup>	3	Humanities <sup>1, T</sup>	3	Elective <sup>4</sup>	9	Elective <sup>4</sup>	9
Science Elective <sup>2</sup>	3	Elective <sup>4, T</sup>	5	CHEM 4414	4	CHEM 4401	1
CHEM 3301	1	CHEM 3423	3	CHEM Elective <sup>3</sup>	3	CHEM Elective <sup>3</sup>	3
CHEM 3324	4	CHEM 3344	4			Social Sciences <sup>1</sup>	3
Elective <sup>4, T</sup>	3	Physical Activity <sup>1, T</sup>	1				
<b>Total Hours</b>	<b>14</b>	<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>16</b>

**Degree Completion Plan Beginning in Spring Semester**

Freshman				Sophomore			
Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
ENGL 1013 <sup>1, T</sup>	3	ENGL 1023 <sup>1, T</sup>	3	Social Sciences <sup>1, T</sup>	3	Social Sciences <sup>1, T</sup>	3
MATH 2914 <sup>T</sup>	4	MATH 2924 <sup>T</sup>	4	PHYS 2024 or 2124 <sup>T</sup>	4	PHYS 2014 or 2114 <sup>T</sup>	4
CHEM 2124 <sup>T</sup>	4	CHEM 2134 <sup>T</sup>	4	CHEM 3254	4	CHEM 3264 <sup>T</sup>	4
Social Sciences <sup>1, T</sup>	3	PHSC 1001	1	CHEM 3245	5	COMS 2003 or 2803 <sup>T</sup>	3
PHSC 1011	1	BIOL 1114 <sup>T</sup>	4			Physical Activity <sup>1, T</sup>	1
<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>15</b>

Junior				Senior			
Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
Humanities <sup>1, T</sup>	3	Fine Arts <sup>1, T</sup>	3	CHEM 4401	1	CHEM 4414	4
Elective <sup>4, T</sup>	5	Science Elective <sup>2</sup>	3	CHEM Elective <sup>3</sup>	3	CHEM Elective <sup>3</sup>	3
CHEM 3344	4	CHEM 3301	1	Social Sciences <sup>1</sup>	3	Elective <sup>4</sup>	9
CHEM 3423	3	Elective <sup>4, T</sup>	3	Elective <sup>4</sup>	9		
Physical Activity <sup>1, T</sup>	1	CHEM 3324	4				
<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>14</b>	<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>16</b>

<sup>1</sup>See appropriate alternatives or substitutions in "General Education Requirements" on page 88.

<sup>2</sup>Science electives from BIOL, GEOL, PHYS, PHSC (excluding PHSC 1013 and PHSC 1021), and excluding CHEM.

<sup>3</sup>Excluding CHEM 1114.

<sup>4</sup>German, Statistics, and Technical Communications are encouraged. (Electives must include sufficient upper-division courses to result in 40 upper division hours)

(upper division = 3000-4000 level).

<sup>T</sup> Designates a block of courses that would provide for a seamless transfer into this program if equivalent courses are taken at another college or university

### Curriculum in Chemistry (Environmental Option)

#### Degree Completion Plan Beginning in Fall Semester

Freshman		Sophomore				
Fall	Spring	Fall	Spring	Fall	Spring	
PHSC 1001	1 Social Sciences <sup>1, T</sup>	3	Social Sciences <sup>1, T</sup>	3	Physical Activity <sup>1, T</sup>	1
ENGL 1013 <sup>1, T</sup>	3 ENGL 1023 <sup>1, T</sup>	3	MATH 2163 or PSY 2053	3	CHEM 3245	5
MATH 2243	3 CHEM 2143	3	(COMS 2003 or 2803) or PHSC 1004 <sup>T</sup>	3-4	CHEM 3264	4
CHEM 2124 <sup>T</sup>	4 CHEM 2134 <sup>T</sup>	4	CHEM 3254	4	PHYS 2024 <sup>T</sup>	4
PHSC 1004 or (COMS 2003 or 2803) <sup>T</sup>	4-3 ECON 2003 <sup>T</sup>	3	PHYS 2014 <sup>T</sup>	4	CHEM 2111	1
Physical Activity <sup>1, T</sup>	1 PHSC 1011	1				
<b>Total Hours</b>	<b>16-15</b>	<b>Total Hours 17</b>	<b>Total Hours</b>	<b>17-18</b>	<b>Total Hours</b>	<b>15</b>
Junior		Senior				
Fall	Spring	Fall	Spring	Fall	Spring	
Humanities <sup>1, T</sup>	3 CHEM 3111	1	CHEM 4414	4	CHEM 4111	1
ENGL 2053	3 Fine Arts <sup>1, T</sup>	3	BIOL 3054	4	POLS 4103	3
BIOL 2124	4 BIOL 2134	4	BIOL 3114	4	CHEM 4991-4	1-4
CHEM 3353	3 Social Sciences <sup>1, T</sup>	3	GEOL 3083	3	Elective <sup>T</sup>	8-5
GEOL 1014 <sup>T</sup>	4 BIOL 3043	3				
<b>Total Hours</b>	<b>17</b>	<b>Total Hours 14</b>	<b>Total Hours</b>	<b>15</b>	<b>Total Hours</b>	<b>13</b>
Degree Completion Plan Beginning in Spring Semester						
Freshman		Sophomore				
Spring	Fall	Spring	Fall	Spring	Fall	
ENGL 1013 <sup>1, T</sup>	3 ENGL 1023 <sup>1, T</sup>	3	CHEM 2111	1	PHYS 2014 <sup>T</sup>	4
MATH 2243	3 PHSC 1004 or (COMS 2003 or 2803) <sup>T</sup>	4-3	CHEM 2143	3	CHEM 3254	4
Social Sciences <sup>1, T</sup>	6 CHEM 2134 <sup>T</sup>	4	CHEM 3245	5	(COMS 2003 or 2803) or PHSC 1004 <sup>T</sup>	3-4
CHEM 2124 <sup>T</sup>	4 PHSC 1001	1	MATH 2163 or PSY 2053	3	BIOL 2124	4
PHSC 1011	1 Physical Activity <sup>1, T</sup>	1	Fine Arts <sup>1, T</sup>	3	Physical Activity <sup>1, T</sup>	1
	Social Sciences <sup>1, T</sup>	3				
<b>Total Hours</b>	<b>17</b>	<b>Total Hours 16-15</b>	<b>Total Hours</b>	<b>15</b>	<b>Total Hours</b>	<b>16-17</b>
Junior		Senior				
Spring	Fall	Spring	Fall	Spring	Fall	
PHYS 2024 <sup>T</sup>	4 BIOL 3043	3	CHEM 4111	1	Humanities <sup>1, T</sup>	3
CHEM 3264	4 CHEM 3353	3	BIOL 3054	4	GEOL 3083	3
CHEM 3111	1 GEOL 1014 <sup>T</sup>	4	CHEM 4991-4	1-4	CHEM 4414	4
BIOL 2134	4 BIOL 3114	4	Elective <sup>T</sup>	8-5	POLS 4103	3
ENGL 2053	3 ECON 2003 <sup>T</sup>	3				
<b>Total Hours</b>	<b>16</b>	<b>Total Hours 17</b>	<b>Total Hours</b>	<b>14</b>	<b>Total Hours</b>	<b>13</b>

<sup>1</sup>See appropriate choices, alternatives or substitutions in "General Education Requirements" on page 88.

<sup>T</sup> Designates a block of courses that would provide for a seamless transfer into this program if equivalent courses are taken at another college or university

### Curriculum in Chemistry (Professional Option)

#### Degree Completion Plan Beginning in Fall Semester

Freshman				Sophomore			
Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring
ENGL 1013 <sup>1, T</sup>	3	ENGL 1023 <sup>1, T</sup>	3	Social Sciences <sup>1, T</sup>	3	Social Sciences <sup>1, T</sup>	3
MATH 2914 <sup>T</sup>	4	MATH 2924 <sup>T</sup>	4	PHYS 2114 <sup>T</sup>	4	PHYS 2124 <sup>T</sup>	4
CHEM 2124 <sup>T</sup>	4	CHEM 2134 <sup>T</sup>	4	CHEM 3254	4	CHEM 3264	4
Social Sciences <sup>1, T</sup>	3	BIOL 1114 <sup>T</sup>	4	COMS 2003 or 2803 <sup>T</sup>	3	CHEM 3245	5
PHSC 1001	1	PHSC 1011	1	MATH 2934	4		
Physical Activity <sup>1, T</sup>	1						
<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>18</b>	<b>Total Hours</b>	<b>16</b>
Junior				Senior			
Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring
Fine Arts <sup>1, T</sup>	3	Humanities <sup>1, T</sup>	3	CHEM 3344	4	CHEM 4424	4
CHEM Elective <sup>2</sup>	3	Social Sciences <sup>1, T</sup>	3	CHEM 4414	4	CHEM 4992-4	2-4
CHEM 3301	1	Elective <sup>3</sup>	6	CHEM 4401	1	Elective <sup>3</sup>	7-5
CHEM 3324	4	CHEM 3334	4	CHEM 4433	3		
Elective <sup>3, T</sup>	3			Elective <sup>3</sup>	2		
Physical Activity <sup>1, T</sup>	1						
<b>Total Hours</b>	<b>15</b>	<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>14</b>	<b>Total Hours</b>	<b>13</b>

#### Degree Completion Plan Beginning in Spring Semester

Freshman				Sophomore			
Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
ENGL 1013 <sup>1, T</sup>	3	ENGL 1023 <sup>1, T</sup>	3	Social Sciences <sup>1, T</sup>	3	COMS 2003 or 2803 <sup>T</sup>	3
MATH 2914 <sup>T</sup>	4	MATH 2924 <sup>T</sup>	4	CHEM 3245	5	MATH 2934	4
CHEM 2124 <sup>T</sup>	4	CHEM 2134 <sup>T</sup>	4	CHEM 3254	4	Social Sciences <sup>1, T</sup>	3
Social Sciences <sup>1, T</sup>	3	BIOL 1114 <sup>T</sup>	4	PHYS 2124 <sup>T</sup>	4	PHYS 2114 <sup>T</sup>	4
Physical Activity <sup>1, T</sup>	1	PHSC 1001	1			CHEM 3264	4
PHSC 1011	1						
<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>18</b>
Junior				Senior			
Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
CHEM 3334	4	Fine Arts <sup>1, T</sup>	3	CHEM 4424	4	CHEM 3344	4
Humanities <sup>1, T</sup>	3	CHEM Elective <sup>2</sup>	3	CHEM 4992-4	2-4	CHEM 4414	4
Social Sciences <sup>1, T</sup>	3	CHEM 3301	1	Elective <sup>3</sup>	7-5	CHEM 4401	1
Elective <sup>3</sup>	6	CHEM 3324	4			CHEM 4433	3
		Elective <sup>3, T</sup>	3			Elective <sup>3</sup>	2
		Physical Activity <sup>1, T</sup>	1				
<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>15</b>	<b>Total Hours</b>	<b>13</b>	<b>Total Hours</b>	<b>14</b>

<sup>1</sup>See appropriate alternatives or substitutions in "General Education Requirements" on page 88.

<sup>2</sup>Excluding CHEM 1114 and CHEM 2204.

<sup>3</sup>German, Statistics, and Technical Communications are encouraged. (Electives must include sufficient upper division courses to result in 40 upper division hours)

(upper division = 3000-4000 level)

<sup>T</sup> Designates a block of courses that would provide for a seamless transfer into this program if equivalent courses are taken at another college or university

**Curriculum in Chemistry (Biochemistry Option)**  
**Degree Completion Plan Beginning in Fall Semester**

Freshman				Sophomore			
Fall	Spring		Fall	Spring		Fall	Spring
ENGL 1013 <sup>1, T</sup>	3	ENGL 1023 <sup>1, T</sup>	3	Social Sciences <sup>1, T</sup>	3	Social Sciences <sup>1, T</sup>	3
MATH 2914 <sup>T</sup>	4	MATH 2924 <sup>T</sup>	4	PHYS 2014 or 2114 <sup>T</sup>	4	PHYS 2024 or 2124 <sup>T</sup>	4
CHEM 2124 <sup>T</sup>	4	CHEM 2134 <sup>T</sup>	4	CHEM 3254	4	CHEM 3264	4
Social Sciences <sup>1, T</sup>	3	BIOL 1114 <sup>T</sup>	4	COMS 2003 or 2803 <sup>T</sup>	3	CHEM 3245	5
PHSC 1001	1	PHSC 1011	1	Physical Activity <sup>1, T</sup>	1		
<b>Total Hours</b>	<b>15</b>	<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>15</b>	<b>Total Hours</b>	<b>16</b>
Junior				Senior			
Fall	Spring		Fall	Spring		Fall	Spring
Fine Arts <sup>1, T</sup>	3	CHEM 3363	3	CHEM 3324	4	Elective <sup>4</sup>	5
BIOL 2124	4	BIOL 2134	4	CHEM 4414	4	Humanities <sup>T</sup>	3
CHEM 3301	1	BIOL 3034	4	Elective <sup>4</sup>	4	BIOL 4033	3
CHEM 3344	4	CHEM 3423	3	BIOL 3124 or 3174	4	Social Sciences <sup>1, T</sup>	3
Elective <sup>4, T</sup>	4	Physical Activity <sup>1, T</sup>	1			CHEM 4401	1
<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>15</b>	<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>15</b>
Degree Completion Plan Beginning in Spring Semester							
Freshman				Sophomore			
Spring	Fall		Spring	Fall		Spring	Fall
ENGL 1013 <sup>1, T</sup>	3	ENGL 1023 <sup>1, T</sup>	3	Social Sciences <sup>1, T</sup>	3	Social Sciences <sup>1, T</sup>	3
MATH 2914 <sup>T</sup>	4	MATH 2924 <sup>T</sup>	4	PHYS 2024 or 2124 <sup>T</sup>	4	PHYS 2014 or 2114 <sup>T</sup>	4
CHEM 2124 <sup>T</sup>	4	CHEM 2134 <sup>T</sup>	4	CHEM 3254	4	CHEM 3264	4
Social Sciences <sup>1, T</sup>	3	PHSC 1001	1	CHEM 3245	5	COMS 2003 or 2803 <sup>T</sup>	3
Physical Activity <sup>1, T</sup>	1	BIOL 1114 <sup>T</sup>	4			Physical Activity <sup>1, T</sup>	1
PHSC 1011	1						
<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>15</b>
Junior				Senior			
Spring	Fall		Spring	Fall		Spring	Fall
Humanities <sup>1, T</sup>	3	Fine Arts <sup>1, T</sup>	3	CHEM 3363	3	BIOL 3124 or 3174	4
Elective <sup>4, T</sup>	4	CHEM 3344	4	BIOL 4033	3	CHEM 4414	4
BIOL 2124	4	BIOL 2134	4	Elective <sup>4</sup>	3	CHEM 4401	1
BIOL 3034	4	CHEM 3324	4	Social Sciences <sup>1, T</sup>	3	Elective <sup>4</sup>	6
		CHEM 3301	1	CHEM 3423	3		
<b>Total Hours</b>	<b>15</b>	<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>15</b>	<b>Total Hours</b>	<b>15</b>

<sup>1</sup>See appropriate alternatives or substitutions in "General Education Requirements" on page 88.  
<sup>2</sup>Science electives from BIOL, GEOL, PHYS, PHSC (excluding PHSC 1013 and PHSC 1021), and excluding CHEM.  
<sup>3</sup>Excluding CHEM 1114 and CHEM 2204.  
<sup>4</sup>German, Statistics, and Technical Communications are encouraged. (Electives must include sufficient upper-division courses to result in 40 upper division hours)  
 (upper division = 3000-4000 level).  
<sup>T</sup> Designates a block of courses that would provide for a seamless transfer into this program if equivalent courses are taken at another college or university

The minor in chemistry is designed for science majors who would like to further their studies in chemistry and for students who cannot complete a major in chemistry, but for employment opportunities, would like to gain basic knowledge and competencies in chemistry. The minor in chemistry requires the core chemistry courses:

- \*General Chemistry      CHEM 2124, 2134
- \*Organic Chemistry      CHEM 3254, 3264
- \*Quantitative Analysis    CHEM 3245

**Minor  
Chemistry**

## Geology

The science of geology seeks to develop an understanding of the Earth's physical and chemical processes, environmental systems, and natural resources. Geologists work in a variety of areas, discovering new sources of fossil fuels, minerals, and economically important rocks. Volcanoes, earthquakes, landforms, surface and subsurface water, earth history, and fossils are all subjects for study. Also, geologists may work as members of an interdisciplinary team in planning construction projects, sanitary landfills, mine land reclamation, and other environmentally-oriented projects. Employment opportunities for geologists exist in private industry, state and federal government agencies, and teaching at all levels.

Geology students may follow programs designed to prepare them for entry into graduate school, employment in the geotechnical field, or secondary school earth science teaching. The best opportunities exist for students who continue their education and complete the master's or doctor's degree in geology. Major oil and gas companies generally require the master's degree for an entry-level position. Also, excellent employment opportunities are available in the environmental geotechnical field.

The geology major will study for a bachelor of science degree. This degree requires a minimum of 124 semester hours with a minimum of 43 semester hours in geology (professional option), or a minimum of 36 semester hours in geology (environmental option). Students interested in teaching as a profession should follow the Physical Science and Earth Science curriculum listed under teacher licensure curricula, College of Education. Additional departmental courses and related courses may be specified for geology majors following particular emphasis programs, and for some emphasis programs, substitutions of the above list may be required. Strongly recommended are calculus and/or statistics.

The geology program is fully interdisciplinary, and the student and his/her advisor can "build" an academic program through selection of appropriate electives to suit the special needs and interests of the student.

### Curriculum in Geology (Professional Option)

Suggested Sequence of Courses							
Freshman			Sophomore				
Fall	Spring		Fall	Spring			
ENGL 1013 <sup>1, T</sup>	3	ENGL 1023 <sup>1, T</sup>	3	POLS 2003 <sup>T</sup>	3	Social Sciences <sup>1, T</sup>	3
PHSC 1001	1	Social Sciences <sup>1, T</sup>	3	CHEM 2124 <sup>T</sup>	4	CHEM 2134 <sup>T</sup>	4
Biological Science <sup>1, T</sup>	4	GEOG 2013 <sup>T</sup>	3	GEOL 2001	1	GEOL 3124 or Elective <sup>4</sup>	4
MATH 1113 <sup>T</sup>	3	MATH 1203 <sup>T</sup>	3	GEOL 3014	4	GEOL 3164	4
GEOL 1014 <sup>T</sup>	4	GEOL 2024	4	Elective	3		
Physical Activity <sup>1, T</sup>	1	PHSC 1011	1				
<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>17</b>	<b>Total Hours</b>	<b>15</b>	<b>Total Hours</b>	<b>15</b>
Junior			Senior				
Fall	Spring		Fall	Spring			
PHYS 2014 <sup>T</sup>	4	PHYS 2024 <sup>T</sup>	4	Fine Arts <sup>1, T</sup>	3	Humanities <sup>1, T</sup>	3
GEOL 3001	1	Elective or GEOL 3124 <sup>4</sup>	4	GEOL 4001	1	Elective or GEOL 4023 <sup>4</sup>	3
GEOL 3004	4	GEOL 4023 or Elective <sup>4</sup>	3	Elective(3000- 4000 level)	3	Elective(3000- 4000 level)	3
GEOL 3023	3	MATH/COMS Elective <sup>2</sup>	4-3	Elective or GEOL 3044 <sup>4</sup>	4		
GEOL 3044 or Elective <sup>4</sup>	4	Elective <sup>T</sup>	3-4	Physical Activity <sup>1, T</sup>	1		
<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>18</b>	<b>Total Hours</b>	<b>12</b>	<b>Total Hours</b>	<b>9</b>

## Curriculum in Geology (Professional Option)

Ninth Semester	
<b>Summer (after Junior or Senior year)</b>	
GEOL 4006 <sup>3</sup>	6
<b>Total Hours</b>	<b>6</b>

<sup>1</sup>See appropriate choices, alternatives or substitutions in "General Education Requirements" on page 88.  
<sup>2</sup>COMS 1003, COMS 1103, MATH 2914, or math 2163.  
<sup>3</sup>GEOL 4006 (6 credit hours of field geology) must be completed during the summer after Junior or Senior year.  
<sup>4</sup>Must complete both the GEOL class and one elective (GEOL course offered in alternating years).  
<sup>T</sup> Designates a block of courses that would provide for a seamless transfer into this program if equivalent courses are taken at another college or university

## Curriculum in Geology (Environmental Option)

Degree Completion Plan Beginning in Fall Semester							
Freshman			Sophomore				
Fall	Spring		Fall	Spring			
ENGL 1013 <sup>1, T</sup>	3	ENGL 1023 <sup>1, T</sup>	3	GEOG 2013 <sup>T</sup>	3	POLS 2003 <sup>T</sup>	3
PHSC 1001	1	COMS 1003 <sup>T</sup>	3	ENGL 2053	3	CHEM 2143	3
PHSC 1004 or CHEM 1114 <sup>T</sup>	4	MATH 2163 or PSY 2053 <sup>T</sup>	3	CHEM 1114 or PHSC 1004 <sup>T</sup>	4	BIOL 1014 <sup>T</sup>	4
MATH 1113 <sup>T</sup>	3	ECON 2003 <sup>T</sup>	3	GEOL 3014	4	GEOL 3164	4
GEOL 1014 <sup>T</sup>	4	GEOL 2024	4	Physical Activity <sup>1, T</sup>	1	GEOL 2111	1
Physical Activity <sup>1, T</sup>	1	PHSC 1011	1				
<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>17</b>	<b>Total Hours</b>	<b>15</b>	<b>Total Hours</b>	<b>15</b>
Junior			Senior				
Fall	Spring		Fall	Spring			
BIOL3043 or Elective 3 (3000-4000 level) <sup>2</sup>	3	Humanities <sup>1, T</sup>	3	BIOL 3043 or Elective 3 (3000-4000 level) <sup>2</sup>	3	FW 4034	4
GEOL 3004	4	GEOL 3111	1	GEOL 3083	3	GEOL 4111	1
GEOL 3023	3	Fine Arts <sup>1, T</sup>	3	CHEM 3254	4	Science Elective <sup>2</sup>	8
GEOL 3044 or 3153	4-3	Science Elective <sup>2, T</sup>	3	GEOL 3153 or 3044	3-4		
PHYS 2014 <sup>T</sup>	4	PHYS 2024 <sup>T</sup>	4	Social Sciences <sup>1, T</sup>	3		
<b>Total Hours</b>	<b>18-17</b>	<b>Total Hours</b>	<b>14</b>	<b>Total Hours</b>	<b>16-17</b>	<b>Total Hours</b>	<b>13</b>
Degree Completion Plan Beginning in Spring Semester							
Freshman			Sophomore				
Spring	Fall		Spring	Fall			
ENGL 1013 <sup>1, T</sup>	3	ENGL 1023 <sup>1, T</sup>	3	ENGL 2053	3	MATH 2163 or PSY 2053 <sup>1</sup>	3
COMS 1003 <sup>T</sup>	3	PHSC 1001	1	CHEM 2143	3	POLS 2003 <sup>T</sup>	3
MATH 1113 <sup>T</sup>	3	PHSC 1004 <sup>T</sup>	4	GEOL 2111	1	GEOL 3014	4
CHEM 1114 <sup>T</sup>	4	BIOL 1014 <sup>T</sup>	4	ECON 2003 <sup>T</sup>	3	PHYS 2014 <sup>T</sup>	4
GEOG 2013 <sup>T</sup>	3	GEOL 1014 <sup>T</sup>	4	GEOL 2024	4	Physical Activity <sup>1, T</sup>	1
PHSC 1011	1			Physical Activity <sup>1, T</sup>	1		
<b>Total Hours</b>	<b>17</b>	<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>15</b>	<b>Total Hours</b>	<b>15</b>
Junior			Senior				
Spring	Fall		Spring	Fall			
Fine Arts <sup>1, T</sup>	3	Humanities <sup>1, T</sup>	3	FW 4034	4	GEOL 3083	3
GEOL 3111	1	GEOL 3004	4	GEOL 4111	1	GEOL 3153 or 3044	3-4
GEOL 3164	4	GEOL 3023	3	Science Elective <sup>2, T</sup> (3 hrs)	5	Science Elective <sup>2</sup>	6
PHYS 2024 <sup>T</sup>	4	BIOL 3043 or Elective 3 (3000-4000 level) <sup>2</sup>	3	CHEM 3254	4	BIOL 3043 or Elective 3 (3000-4000 level) <sup>2</sup>	3
Social Sciences <sup>1, T</sup>	3	GEOL 3044 or 3153	4-3				
<b>Total Hours</b>	<b>15</b>	<b>Total Hours</b>	<b>17-16</b>	<b>Total Hours</b>	<b>14</b>	<b>Total Hours</b>	<b>15-16</b>

<sup>1</sup>See appropriate alternatives or substitutions in "General Education Requirements" on page 88.  
<sup>2</sup>Electives in Physical or Life Sciences and Mathematics (Geology, Biology, Chemistry, and Math).  
<sup>T</sup> Designates a block of courses that would provide for a seamless transfer into this program if equivalent courses are taken at another college or university

## Minor Geology

The minor in geology is primarily designed for students who are majoring in disciplines where a broader background in geology can aid in recognizing and addressing geological hazards, natural disasters, environmental issues, natural resource management, conservation, and land use planning. The minor in geology requires 20 hours of courses:

\*GEOL Electives (11 hours)

\*GEOL Electives (9 hours of 3000 or 4000 level)

\*no more than one credit hour can be a seminar course or special problem

## Physical Science - General Option

The baccalaureate degree in physical science offers a program of study in which the student can elect a major emphasis in the physical sciences department. The curriculum is designed with enough flexibility so that students may prepare for a number of professions. Additionally, a broad scientific background can be provided in this curriculum for students anticipating the teaching of science in the secondary schools. The physical science degree curriculum is ideally suited for students planning a military career as it affords a desirable general scientific background.

To qualify for a baccalaureate degree in physical science (general option), the student must complete the following minimum number of semester hours: eight hours in biology, eight hours in chemistry, eleven hours in physics, four hours in geology, and eleven hours in mathematics. The student must also complete an additional 29 semester hours in four of the following subject areas: chemistry, engineering, geology, mathematics, physics, and physical science (PHSC 1004, 1013, 1021, GEOL 1004 may not be counted in these hours).

### Curriculum in Physical Science (General Option) Degree Completion Plan Beginning in Fall Semester

Freshman		Sophomore					
Fall	Spring	Fall	Spring	Fall	Spring		
ENGL 1013 <sup>1, T</sup>	3	ENGL 1023 <sup>1, T</sup>	3	Social Sciences <sup>1, T</sup>	3	Social Sciences <sup>1, T</sup>	3
PHSC 1001	1	Social Sciences <sup>1, T</sup>	3	PHYS 2014 or 2114 <sup>T</sup>	4	PHYS 2024 or 2124 <sup>T</sup>	4
Biological Science <sup>1, T</sup>	4	MATH 2914 <sup>T</sup>	4	MATH 2924 <sup>T</sup>	4	BIOL Elective	4
CHEM 2124 <sup>T</sup>	4	CHEM 2134 <sup>T</sup>	4	Fine Arts <sup>1, T</sup>	3	Humanities <sup>T</sup>	3
MATH 1113 <sup>T</sup>	3	PHSC 1011	1	GEOL 1014 <sup>T</sup>	4	Physical Activity <sup>1, T</sup>	1
<b>Total Hours</b>	<b>15</b>	<b>Total Hour</b>	<b>15</b>	<b>Total Hours</b>	<b>18</b>	<b>Total Hours</b>	<b>15</b>
Junior		Senior					
Fall	Spring	Fall	Spring	Fall	Spring		
PHSC/MATH/ ENGR Elective <sup>2</sup>	3	PHSC/MATH/ ENGR Elective <sup>2</sup>	3	Elective(3000- 4000 level)	11	PHSC 3033	3
PHSC 3053	3	PHYS/MATH/ENGR Elective(3000- 4000 level) <sup>2</sup>	3	PHYS 3213 or Elective(3000- 4000level) <sup>3</sup>	4	PHSC/MATH Elective (3000- 4000 level) <sup>2</sup>	3
PHYS 3213 or Elective (3000- 4000 level) <sup>3</sup>	6	PHSC/MATH Elective (3000- 4000 level) <sup>2</sup>	3	Physical Activity <sup>1, T</sup>	1	PHSC/MATH Elective (3000- 4000 level) <sup>2</sup>	4
COMS 2803	3	Elective	4			Elective	4
		Social Sciences <sup>1, T</sup>	3				
<b>Total Hours</b>	<b>15</b>	<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>14</b>

### Curriculum in Physical Science (General Option)

#### Degree Completion Plan Beginning in Spring Semester

Freshman				Sophomore			
Spring	Fall		Spring	Fall			
ENGL 1013 <sup>1, T</sup>	3	PHSC 1001	1	Social Sciences <sup>1, T</sup>	3	Social Sciences <sup>1, T</sup>	3
MATH 1113 <sup>T</sup>	3	ENGL 1023 <sup>1, T</sup>	3	PHYS 2024 or 2124 <sup>T</sup>	4	PHYS 2014 or 2114 <sup>T</sup>	4
Biological Science <sup>1, T</sup>	4	Social Sciences <sup>1, T</sup>	3	MATH 2924 <sup>T</sup>	4	BIOL Elective	4
CHEM 2124 <sup>T</sup>	4	MATH 2914 <sup>T</sup>	4	Fine Arts <sup>1, T</sup>	3	Humanities <sup>1, T</sup>	3
Physical Activity <sup>1, T</sup>	1	CHEM 2134 <sup>T</sup>	4	Physical Activity <sup>1, T</sup>	1	GEOL 1014 <sup>T</sup>	4
PHSC 1011	1						
<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>15</b>	<b>Total Hours</b>	<b>15</b>	<b>Total Hours</b>	<b>18</b>
Junior				Senior			
Spring	Fall		Spring	Fall			
PHSC/MATH/ ENGR Elective <sup>2</sup>	3	PHSC/MATH/ ENGR Elective <sup>2</sup>	3	PHSC 3033	3	Elective(3000- 4000 level)	8
PHSC/MATH Elective (3000- 4000 level) <sup>2</sup>	3	PHYS 3213 or Elective (3000- 4000 level) <sup>3</sup>	3	Elective (3000- 4000 level) <sup>3</sup>	3	PHSC/MATH Elective (3000- 4000 level) <sup>2</sup>	4
Elective	6	PHSC/MATH Elective (3000- 4000 level) <sup>2</sup>	6	PHSC/MATH Elective (3000- 4000 level) <sup>2</sup>	4	PHYS 3213 or Elective (3000- 4000 level) <sup>3</sup>	3
COMS 2803	3	Elective	2	Social Sciences <sup>1, T</sup>	3		
		PHSC 3053	3				
<b>Total Hours</b>	<b>15</b>	<b>Total Hours</b>	<b>17</b>	<b>Total Hours</b>	<b>13</b>	<b>Total Hours</b>	<b>15</b>

<sup>1</sup>See appropriate alternatives or substitutions in "General Education Requirements" on page 88.

<sup>2</sup>Excluding MATH 3003, MATH 3033, MATH 4113, PHSC 1013, and PHSC 1021.

<sup>3</sup>Must complete both the PHYS class and one upper division elective (PHYS course offered in alternating years).  
(upper division = 3000-4000 level)

<sup>T</sup> Designates a block of courses that would provide for a seamless transfer into this program if equivalent courses are taken at another college or university

It is the physicist's task to relate the abstract domain of mathematics to the real world. The ability to apply the laws of logic to the reasoning process is the physicist's prime mental asset. Imagination and vision are also important to the physicist. Vast amounts of information are assimilated into a few fundamental laws or theories in such diversified fields as optics, mechanics, thermodynamics, electricity and magnetism, quantum mechanics, and nuclear physics.

The physics curriculum is designed to serve the needs of students in the fields of engineering, medicine, and other sciences. The junior and senior courses are tailored for students who desire a concentration in physics for a bachelor of science degree in physical science and/or wish to pursue graduate study in areas such as physics, meteorology, and astronomy.

To qualify for a bachelor of science degree in physical science, the student must take eight hours in chemistry, three hours in computer and information science, 27 hours in mathematics, and a minimum of 30 hours in physics. Twenty-two semester hours in these courses must be at the 3000 or 4000 level. A minimum of 38 hours must be taken in the Department of Physical Science.

## Physical Science - Physics Option

### Curriculum in Physical Science (Physics Option)

#### Degree Completion Plan Beginning in Fall Semester

Freshman				Sophomore			
Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring
Physical Activity <sup>1, T</sup>	1	Physical Activity <sup>1, T</sup>	1	COMS 2803	3	Biological Science <sup>1, T</sup>	4
ENGL 1013 <sup>1, T</sup>	3	ENGL 1023 <sup>1, T</sup>	3	PHYS 2114 <sup>T</sup>	4	PHYS 2124 <sup>T</sup>	4
MATH 1914 <sup>T</sup>	4	MATH 2914 <sup>T</sup>	4	MATH 2924 <sup>T</sup>	4	MATH 2934	4
Social Sciences <sup>1, T</sup>	3	Social Sciences <sup>1, T</sup>	3	Social Sciences <sup>1, T</sup>	3	Social Sciences <sup>1, T</sup>	3
CHEM 2124 <sup>T</sup>	4	CHEM 2134 <sup>T</sup>	4	Elective <sup>3</sup>	3	Elective <sup>3, T</sup>	2
PHSC 1001	1	PHSC 1011	1				
<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>17</b>	<b>Total Hours</b>	<b>17</b>
Junior				Senior			
Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring
Humanities <sup>1, T</sup>	3	Fine Arts <sup>1, T</sup>	3	Elective <sup>3</sup>	3	PHYS 4991-4	1-4
MATH 3243	3	PHYS Elective (3000-4000 level)	3	MATH Elective (3000-4000 level) <sup>2</sup>	3	MATH Elective (3000-4000 level) <sup>2</sup>	3
PHYS 3023 or 3213	3	PHYS 3133 or 4013	3	PHYS 3213 or 3023	3	PHYS 4013 or 3133	3
PHYS Elective (3000-4000) or PHYS 4113 <sup>4</sup>	3	ELEG 2113	3	PHYS Elective (3000-4000) or PHYS 4113 <sup>4</sup>	3	Elective(3000-4000 level) <sup>2,3</sup>	6-3
ELEG 2103	3	ELEG 2111	1	Elective (3000-4000 level) <sup>2,3</sup>	3		
		Elective <sup>3</sup>	2				
<b>Total Hours</b>	<b>15</b>	<b>Total Hours</b>	<b>15</b>	<b>Total Hours</b>	<b>15</b>	<b>Total Hours</b>	<b>13</b>
Degree Completion Plan Beginning in Spring Semester							
Freshman				Sophomore			
Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
Physical Activity <sup>1, T</sup>	1	Physical Activity <sup>1, T</sup>	1	COMS 2803	3	Biological Science <sup>1, T</sup>	4
ENGL 1013 <sup>1, T</sup>	3	ENGL 1023 <sup>1, T</sup>	3	PHYS 2124 <sup>T</sup>	4	PHYS 2114 <sup>T</sup>	4
MATH 1914 <sup>T</sup>	4	MATH 2914 <sup>T</sup>	4	MATH 2924 <sup>T</sup>	4	MATH 2934	4
Social Sciences <sup>1, T</sup>	3	Social Sciences <sup>1, T</sup>	3	Social Sciences <sup>1, T</sup>	3	Social Sciences <sup>1, T</sup>	3
CHEM 2124 <sup>T</sup>	4	CHEM 2134 <sup>T</sup>	4	Elective <sup>3</sup>	3	Elective <sup>3, T</sup>	2
PHSC 1011	1	PHSC 1001	1				
<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>17</b>	<b>Total Hours</b>	<b>17</b>
Junior				Senior			
Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
Humanities <sup>1, T</sup>	3	Fine Arts <sup>1, T</sup>	3	Elective <sup>3</sup>	3	PHYS 4991-4	1-4
MATH 3243	3	Elective <sup>3</sup>	2	MATH Elective (3000-4000 level) <sup>2</sup>	3	MATH Elective (3000-4000 level) <sup>2</sup>	3
PHYS 3133 or 4013	3	PHYS 3023 or 3213	3	PHYS 4013 or 3133	3	PHYS 3213 or 3023	3
ELEG 2103	3	PHYS 4113 or PHYS Elective (3000-4000) <sup>4</sup>	3	Elective(3000-4000 level) <sup>2,3</sup>	3	PHYS 4113 or PHYS Elective (3000-4000) <sup>4</sup>	3
PHYS Elective (3000-4000 level)	3	ELEG 2113	3			Elective(3000-4000 level) <sup>2,3</sup>	6-3
		ELEG 2111	1				
<b>Total Hours</b>	<b>15</b>	<b>Total Hours</b>	<b>15</b>	<b>Total Hours</b>	<b>12</b>	<b>Total Hours</b>	<b>16</b>

<sup>1</sup>See appropriate alternatives or substitutions in "General Education Requirements" on page 88.

<sup>2</sup>Excluding MATH 3003, MATH 3033, and MATH 4113.

<sup>3</sup>Seven hours of electives must be from physical sciences, biology, engineering, computer science.

<sup>4</sup>Must complete both the PHYS 4113 and 3 hours PHYS electives (PHYS course offered in alternating years).

<sup>T</sup> Designates a block of courses that would provide for a seamless transfer into this program if equivalent courses are taken at another college or university

## Physical Science - Nuclear Physics Option

The nuclear physics curriculum is designed to provide a baccalaureate degree program for persons employed or those interested in employment in the nuclear power industry. The program provides a combination of courses which form a firm theoretical foundation for those presently employed as nuclear power plant operators. Students without nuclear power industry experience or training will, in addition to the theoretical education provided through the program, receive sufficient training to enter nuclear power plant specific training. Graduates will also be prepared to enter a graduate school in nuclear physics or nuclear engineering.

Specific course requirements for the degree are listed in the curriculum which follows.

### Curriculum in Physical Science (Nuclear Physics Option)

Degree Completion Plan Beginning in Fall Semester							
Freshman			Sophomore				
Fall	Spring		Fall	Spring			
PHSC 1001	1	MCEG 2023	3	COMS 2803 <sup>T</sup>	3	Physical Activity <sup>1, T</sup>	1
ENGL 1013 <sup>1, T</sup>	3	ENGL 1023 <sup>1, T</sup>	3	PHYS 2114 <sup>T</sup>	4	PHYS 2124 <sup>T</sup>	4
MATH 2914 <sup>T</sup>	4	MATH 2924 <sup>T</sup>	4	MATH 2934	4	MATH 3243	3
Social Sciences <sup>1, T</sup>	3	CHEM 2134 <sup>T</sup>	4	Social Sciences <sup>1, T</sup>	6	Social Sciences <sup>1, T</sup>	3
CHEM 2124 <sup>T</sup>	4	PHSC 1011	1			Biological Science <sup>1, T</sup>	4
<b>Total Hours</b>	<b>15</b>	<b>Total Hours</b>	<b>15</b>	<b>Total Hours</b>	<b>17</b>	<b>Total Hours</b>	<b>15</b>
Junior			Senior				
Fall	Spring		Fall	Spring			
PHYS 4113 or PHYS Elective <sup>3</sup>	3	MCEG 3523 or PHYS 3033	3	PHYS 3213 or PHYS elective <sup>3</sup>	3	PHYS 4991-4	1-4
ELEG 2103	3	Fine Arts <sup>1, T</sup>	3	Elective	2	Engineering Elective	3
MCEG 3503	3	MCEG 4403	3	MCEG 4323	3	MCEG 4443	3
MCEG 3313	3	Business Admin. Elective <sup>1</sup>	3	PHYS 4113 <sup>3</sup> or PHYS Elective (3000-4000)	3	Humanities <sup>1, T</sup>	3
PHYS 3213 or PHYS elective <sup>3</sup>	3	ELEG 2111 and ELEG 2113	4	PHYS 3143 or ELEG 3103	3	PHYS Elective (3000-4000 level)	6-3
Physical Activity <sup>1, T</sup>	1						
<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>14</b>	<b>Total Hours</b>	<b>16</b>
Degree Completion Plan Beginning in Spring Semester							
Freshman			Sophomore				
Spring	Fall	Spring	Fall	Spring	Fall	Spring	
PHSC 1011	1	MCEG 2023	3	COMS 2803 <sup>T</sup>	3	Physical Activity <sup>1, T</sup>	1
ENGL 1013 <sup>1, T</sup>	3	ENGL 1023 <sup>1, T</sup>	3	PHYS 2124 <sup>T</sup>	4	PHYS 2114 <sup>T</sup>	4
MATH 2914 <sup>T</sup>	4	MATH 2924 <sup>T</sup>	4	MATH 2934	4	MATH 3243	3
Social Sciences <sup>1, T</sup>	3	PHSC 1001	1	Social Sciences <sup>1, T</sup>	6	Social Sciences <sup>1, T</sup>	3
CHEM 2124 <sup>T</sup>	4	CHEM 2134 <sup>T</sup>	4			Biological Science <sup>1, T</sup>	4
<b>Total Hours</b>	<b>15</b>	<b>Total Hours</b>	<b>15</b>	<b>Total Hours</b>	<b>17</b>	<b>Total Hours</b>	<b>15</b>

### Curriculum in Physical Science (Nuclear Physics Option)

Junior		Senior					
Spring	Fall	Spring	Fall				
Fine Arts <sup>1, T</sup>	3	MCEG 4403	3	Humanities <sup>1, T</sup>	3	MCEG 4323	3
MCEG 3313	3	MCEG 3503	3	MCEG 4443	3	ELEG 3103 or PHYS 3143	3
ELEG 2103	3	PHYS Elective (3000-4000) or PHYS 4113 <sup>3</sup>	3	Elective	2	PHYS Elective (3000-4000) or PHYS 4113 <sup>3</sup>	3
MCEG 3523 or PHYS 3033	3	ELEG 2111 and ELEG 2113	4	Engineering Elective	3	PHYS Elective (3000-4000 level)	6-3
Business Admin. Elective <sup>T</sup>	3	PHYS 3213 or PHYS Elective <sup>3</sup>	3	PHYS 4991-4	1-4	PHYS Elective or PHYS 3213 <sup>3</sup>	3
Physical Activity <sup>1, T</sup>	1						
<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>12-15</b>	<b>Total Hours</b>	<b>18-15</b>

<sup>1</sup>See appropriate alternatives or substitutions in "General Education Requirements" on page 88.  
<sup>2</sup>Excluding MATH 3003, MATH 3033, and MATH 4113.  
<sup>3</sup>Must complete both the PHYS class and one PHYS upper division elective (PHYS course offered in alternating years).  
 (upper division = 3000-4000 level courses).  
<sup>T</sup> Designates a block of courses that would provide for a seamless transfer into this program if equivalent courses are taken at another college or university

#### Minor Physical Science

The minor in physical science is for science students wishing to obtain additional background to support their science degree and enhance their employment opportunities. The minor in physical science requires 20 hours of courses:

- \*Electives (11 hours of CHEM, GEOL, PHSC, or PHYS)
- \*Electives (9 hours of 3000 or 4000 level - CHEM, GEOL, PHSC, or PHYS)
- \*No more than one credit hour can be a seminar course or special problem

#### Engineering Physics

Students graduating with an engineering physics degree will be well qualified for jobs requiring highly technical skills and theoretical knowledge. Also, the degree program will prepare students for graduate studies in the fields of physics and engineering. However, those interested in employment immediately after graduation will have numerous alternatives for career choices. Job opportunities for an engineering physics graduate could include employment in industries such as: McDonnell Douglas/Boeing, Texas Instruments, Honeywell, Microsoft, Polaroid, Union Carbide, National Institute of Standards & Technology, Entergy, Tennessee Valley Authority, and Dow Chemical. Also, government agencies such as NASA, National Bureau of Standards, Office of Naval Research, Department of Energy, etc., provide additional employment opportunities for engineering physics graduates.

To qualify for a baccalaureate degree in engineering physics, the student must complete eight hours in chemistry, three hours in computer and information science, 18 hours in mathematics, 33 hours in physics (including the core physics courses), and 26 hours in engineering. Specific course requirements for the degree are listed in the curriculum which follows.

**Curriculum in Engineering Physics**  
**Degree Completion Plan Beginning in Fall Semester**

Freshman		Sophomore					
Fall	Spring	Fall	Spring	Fall	Spring		
PHSC 1001	1	PHSC 1011	1	Social Sciences <sup>1, T</sup>	3	Social Sciences <sup>1, T</sup>	6
ENGL 1013 <sup>1, T</sup>	3	ENGL 1023 <sup>1, T</sup>	3	PHYS 2114 <sup>T</sup>	4	PHYS 2124 <sup>T</sup>	4
MATH 2914 <sup>T</sup>	4	MATH 2924 <sup>T</sup>	4	MATH 2934	4	MATH 3243	3
COMS 2803 <sup>T</sup>	3	MCEG 2023	3	Biological Science <sup>1, T</sup>	4	Elective	1
CHEM 2124 <sup>T</sup>	4	CHEM 2134 <sup>T</sup>	4			Physical Activity <sup>1, T</sup>	1
Physical Activity <sup>1, T</sup>	1						
<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>15</b>	<b>Total Hours</b>	<b>15</b>	<b>Total Hours</b>	<b>15</b>
Junior		Senior					
Fall	Spring	Fall	Spring	Fall	Spring		
PHYS 3023 or 3213	3	PHYS 4013 or 3133	3	PHYS 3213 or 3023	3	PHYS 3133 or 4013	3
Humanities <sup>1, T</sup>	3	PHYS 4003 or 3003	3	PHYS 4991	1	PHYS 3003 or 4003	3
ELEG 2103	3	ELEG 2113	3	ELEG/MCEG Elective (3000- 4000 level)	3	ELEG/MCEG Elective (3000- 4000 level)	3
PHYS 4113 <sup>4</sup> or MATH (3000- 4000 level) <sup>2</sup>	3	ELEG 2111	1	MATH (3000- 4000 level) <sup>2</sup> or PHYS 4113 <sup>4</sup>	3	ELEG/MCEG 4991	1
PHYS 4213 or MCEG 3013 <sup>3</sup>	3	Business Admin. Elective <sup>T</sup>	3	MCEG 3013 <sup>3</sup> or PHYS 4213	3	MCEG 4403 <sup>3</sup>	3
		Fine Arts <sup>1, T</sup>	3	Social Sciences <sup>1</sup>	3	MCEG 4443	3
<b>Total Hours</b>	<b>15</b>	<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>16</b>
Degree Completion Plan Beginning in Spring Semester							
Freshman		Sophomore					
Spring	Fall	Spring	Fall	Spring	Fall		
ENGL 1013 <sup>1, T</sup>	3	ENGL 1023 <sup>1, T</sup>	3	Social Sciences <sup>1, T</sup>	6	Social Sciences <sup>1, T</sup>	6
MATH 2914 <sup>T</sup>	4	MATH 2924 <sup>T</sup>	4	PHYS 2124 <sup>T</sup>	4	PHYS 2114 <sup>T</sup>	4
COMS 2803 <sup>T</sup>	3	MCEG 2023	3	MATH 2934	4	MATH 3243	3
CHEM 2124 <sup>T</sup>	4	CHEM 2134 <sup>T</sup>	4	Biological Science <sup>1, T</sup>	4	Elective	1
Physical Activity <sup>1, T</sup>	1	PHSC 1001	1			Physical Activity <sup>1, T</sup>	1
PHSC 1011	1						
<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>15</b>	<b>Total Hours</b>	<b>18</b>	<b>Total Hours</b>	<b>15</b>
Junior		Senior					
Spring	Fall	Spring	Fall	Spring	Fall		
PHYS 4013 or 3133	3	PHYS 3133 or 4013	3	PHYS 3133 or 3213	3	PHYS 4013 or 3023	3
PHYS 4003 or 3003	3	ELEG 2113	3	PHYS 3003 or 4003	3	ELEG/MCEG Elective (3000- 4000 level)	6
ELEG 2103	3	ELEG 2111	1	PHYS 4991	1	ELEG/MCEG 4991	1
Humanities <sup>1, T</sup>	3	PHYS 4113 <sup>4</sup> or MATH (3000- 4000 level) <sup>2</sup>	3	MCEG 4403 <sup>3</sup>	3	MATH (3000- 4000 level) <sup>2</sup> or PHYS 4113 <sup>4</sup>	3
Business Admin. Elective <sup>T</sup>	3	PHYS 4213 or MCEG 3013 <sup>3</sup>	3	MCEG 4443	3	MCEG 3013 <sup>3</sup> or PHYS 4213	3
		Fine Arts <sup>1, T</sup>	3				
<b>Total Hours</b>	<b>15</b>	<b>Total Hours</b>	<b>16</b>	<b>Total Hours</b>	<b>13</b>	<b>Total Hours</b>	<b>16</b>

<sup>1</sup>See appropriate alternatives or substitutions in "General Education Requirements" on page 88.  
<sup>2</sup>Excluding Math 3003, MATH 3033, and MATH 4113.  
<sup>3</sup>PHYS 3023 and 4003 will satisfy the prerequisites for MCEG 3013 and 4403 for engineering physics majors.  
<sup>4</sup>Must complete both the PHYS class and one MATH upper division elective (PHYS course offered in alternating years).  
<sup>T</sup> Designates a block of courses that would provide for a seamless transfer into this program if equivalent courses are taken at another college or university

## Minor Engineering Physics

The minor in engineering physics is for engineering students or physical science students wishing to obtain additional background to support their major degree and enhance their employment opportunities. The minor in engineering physics requires 20 hours of courses:

\*PHYS Electives (11 hours)

\*PHYS Electives (9 hours of 3000 or 4000 level)

\*No more than one credit hour can be a seminar course or special problem

## Pre-Professional Programs

Dr. Robert Allen  
Dr. Scott Kirkconnell,  
Coordinators  
McEver Hall,  
Room 20C & 13A

Arkansas Tech University offers complete pre-professional training programs in medicine, dentistry, and pharmacy. The pre-professional curriculum is not a major. The major will be selected from the following list of majors that have been approved for the pre-professional curriculum: biology or chemistry. Statements and curricula for these programs are listed below.

## Pre-Medical or Pre-Dental

Students who plan to complete a bachelor of science degree before entering professional school may take their major in another area but must include as electives the specific courses required by the school of their choice.

It is recommended that students pursuing this course of study plan to graduate with a major in biology, chemistry, or physical science even though the professional field requires only two or three years of college work for admission. Requirements are subject to change, and most professional schools are already admitting only students with baccalaureate degrees. Students should contact the school they wish to enter for specific course requirements.

## Pre-Dental Hygiene

The dental hygienist is a valuable member of the dental health team whose major responsibilities involve preventing oral disease through patient education, removing deposits from the teeth, exposing radiographs (x-rays), applying fluoride and sealants to the teeth, administering local anesthesia, and nutritional counseling. Opportunities for employment include working in a private dental office, state or federal government agencies, public and private schools, industry, dental product sales, and dental hygiene education. The future may bring employment opportunities in hospitals, nursing homes, and other treatment sites not now available.

Students pursuing a career in dental hygiene can attend Arkansas Tech for two years to complete general education requirements and then transfer to a dental hygiene department for two years to complete the professional curriculum. Students should contact the dental hygiene program they plan to attend for specific information about degree requirements.

#### **Recommended Courses for Pre-Dental Hygiene<sup>4</sup>**

English Composition I, II (ENGL 1013, 1023)  
Principles of Biology (BIOL 1114)  
College Algebra (MATH 1113)  
Introductory Sociology (SOC 1003)  
Survey of Chemistry (CHEM 1114)  
United States History II (HIST 2013)<sup>1</sup>  
Microbiology (BIOL 3054)  
Introduction to Computer Based Systems (COMS 1003)  
World Civilization I, II (HIST 1503, 1513)  
General Psychology (PSY 2003)  
Introduction to Speech-Communication (SPH 1003)  
Fine Arts<sup>2</sup> (3 hours)  
Humanities<sup>3</sup> (3 hours)

<sup>1</sup>United States History I (HIST 2003) or American Government (POLS 2003) can substitute

<sup>2</sup>MUS 2003 or ART 2123 or TH 2273 or ENGL 2173 or JOUR 2173

<sup>3</sup>ENGL 2003 or ENGL 2013 or PHIL 2003

<sup>4</sup>With 14 additional credit hours, the student could obtain an associate degree (Associate of Arts in General Studies) before transferring to a professional program.

#### **Recommended Courses for Pre-Medical or Pre Dental**

English Composition I, II (ENGL 1013, 1023)<sup>1</sup>  
Social Sciences<sup>1</sup> (12 hours)  
Principles of Biology (BIOL 1114)  
General Chemistry I, II (CHEM 2124, 2134)  
College Algebra (MATH 1113)  
Plane Trigonometry (MATH 1203)  
Physical Activity<sup>1</sup> (2 hours)  
Principles of Zoology (BIOL 2124)  
Organic Chemistry (CHEM 3254, 3264)  
Physical Principles (PHYS 2014, 2024)  
Principles of Botany (BIOL 2134)  
English Elective (3 hours)  
Calculus I (MATH 2914) or other MATH above MATH 1113 (3-4 hours)

<sup>1</sup>See appropriate alternatives or substitutions in "General Education Requirements" on page 88.

The curriculum for the last two years will depend upon the major area of study chosen by each individual student. Most students choose to major either in biology or chemistry but any field is acceptable. Students pursuing admission to a professional school should seek the advice of a member of the faculty pre-professional committee appropriate to his/her major.

## Pre-Pharmacy

Few professions can surpass pharmacy in abundance of opportunities. In addition to the very large demand for pharmacists to work in the local pharmacies, many professional pharmacists are medical-service representatives, drug salesmen, executive officers of industry and government, and teachers and researchers in medical fields. Students should contact the pharmacy school of their choice for specific course requirements.

### Recommended Courses for Pre-Pharmacy

English Composition I, II (ENGL 1013, 1023)<sup>1</sup>

Principles of (BIOL1114)<sup>2</sup>

Human Anatomy (BIOL 2014)<sup>2</sup>

General Chemistry I, II (CHEM 2124, 2134)

Calculus (MATH 2914)

Physical Principles I (PHYS 2014)

English/Communications Electives<sup>4</sup> (3 hours)

Organic Chemistry (CHEM 3254, 3264)

Principles of Economics (ECON 2003)

Critical Thinking Electives<sup>5</sup> (6 hours)

Humanities Electives<sup>3</sup> (15 hours)

<sup>1</sup>See appropriate alternatives or substitutions in "General Education Requirements" on page 88.

<sup>2</sup>BIOL 2014, BIOL 2124, BIOL 3054, or BIOL 3074 can substitute.

<sup>3</sup>Choose from survey courses in art, music, theater, literature, philosophy, religion, foreign language, sign language, psychology, sociology, anthropology, US or world history, political science, ethics, geography.

<sup>4</sup>Choose from SPH 1003, SPH 2003, ENGL 2043, ENGL 2053, or any survey of literature course.

<sup>5</sup>Choose from ACCT 2003, CHEM 3245, MATH 2163, MATH 2924, PHYS 2024, PHIL 3103, BIOL 3034, BIOL 4033, or CHEM 3344.

## Pre-Physical Therapy

At the earliest convenience after the decision to study in the field, students should contact an institution of their choice and inquire about the prerequisite study program and other requirements for admission into the professional curriculum. Due to the rapidly changing availability of Physical Therapy degree programs and due to changes in entrance requirements, students should seek the most current information available. Searches on the World Wide Web are the best way to get the most current information. An advisor from the biology department can guide the student's registration at Tech when the student has secured a curriculum and entrance requirements for a Physical Therapy school that can meet his or her needs.