# **Natural Science Program**

# **Purpose Statement**

The Department of Natural Science provides:

- a career-oriented approach to pre-professional preparation in the health sciences
- a liberal arts and sciences approach to environmental health and sustainability
- a hands-on approach to education in the laboratory and through student research
- preparation to meet the Kansas State Department of Education standards for licensure in biology and chemistry

# **Biochemistry Major (Recommended for Pre-Medical Students)**

#### Requirements

G-CH 111 College Chemistry I (5 hours)
CH 112 College Chemistry II (5 hours)
CH 251 Organic Chemistry II (5 hours)
CH 252 Organic Chemistry II (5 hours)
CH 201 Quantitative Analysis (4 hours)
CH 370 Biochemistry (4 hours)
G-BI 111 College Biology I (4 hours)
BI 112 College Biology II (4 hours)
BI 112 College Biology II (4 hours)
BI/CH 310 Statistical Data Analysis (4 hours)
BI/CH 360 Cell Physiology/Biochemistry II (4 hours)

Select one from the following:

BI 283Genetics (4 hours)BI 334Microbial Ecophysiology (5 hours)BI 364Cell and Molecular Biology (4 hours)BI 384Molecular Genetics (4 hours)CH 390Instrumental Analysis (3 hours)

#### **Required Supporting Courses**

G-PH 215 General Physics I (4 hours)
PH 216 General Physics II (4 hours)
\*NS 300 Research Methods (1 hour)
NS 375 Junior Seminar (1 hour)
\*NS 475 Senior Research (2 hours)

# **Biology Major**

#### Requirements

A minimum of 32 semester hours of biological science coursework, including

G-BI 111 College Biology I (4 hours)
BI 112 College Biology II (4 hours)
BI 283 Genetics (4 hours)
BI 310 Statistical Data Analysis (4 hours)

8 credit hours chosen from among the 300 Level BI Courses

#### **Required Supporting courses**

G-CH 111 College Chemistry I (5 hours) CH 112 College Chemistry II (5 hours) CH 251 Organic Chemistry I (5 hours) CH 252 Organic Chemistry II (5 hours) G-PH 215 General Physics I (4 hours) \*NS 300 Research Methods (1 hour) NS 375 Junior Seminar (1 hour) \*NS 475 Senior Research (2 hours)

# Biology Major - Teaching Licensure in Biology (6-12)

#### **Biology Major for Teacher Licensure**

A minimum of 32 semester hours, including:

G-BI 111 College Biology I (4 hours) BI 112 College Biology II (4 hours) G-BI 201 Biodiversity (4 hours) BI 283 Genetics (4 hours) \*NS 300 Research Methods (1 hour) NS 375 Junior Seminar (1 hour)

12 credit hours chosen from among the remaining BI or NS courses numbered 200 of higher, including at least one organismal course and one population course.

#### **Required Supporting Courses**

G-CH 111 College Chemistry I (5 hours)
CH 112 College Chemistry II (5 hours)
CH 251 Organic Chemistry I (5 hours)
CI 232 Educational Technology (2 hours)
G-MA 221 Elementary Applied Statistics (4 hours)
G-PE 170 Personal and Community Health (2 hours)
G-PH 215 General Physics I (4 hours)
G-PY 101 Introduction to Psychology (3 hours)

Students pursuing this major must also meet all professional requirements for teacher licensure in the Curriculum and Instruction Department.

# **Biology Minor**

#### Requirements

A minimum of 20 semester hours, including

G-BI 111 College Biology I (4 hours)BI 112 College Biology II (4 hours)BI 283 Genetics (4 hours)

At least eight hours of additional biology courses

#### **Required supporting courses**

G-CH 111 College Chemistry I (5 hours) CH 251 Organic Chemistry I (5 hours)

# **Health Science Interdisciplinary Major**

#### **Required Courses**

G-BI 111 College Biology I (4 hours) BI 112 College Biology II (4 hours) G-CH 111 College Chemistry I (5 hours) CH 112 College Chemistry II (5 hours) G-PH 215 General Physics I (4 hours) PH 216 General Physics II (4 hours) G-BI 210 Principles of Nutrition (3 hours) BI 225 Human Anatomy (4 hours) BI 315 Human Physiology (4 hours) PE 180 First Aid and Personal Safety (2 hours) PE 280 Care and Treatment of Athletic Injuries (3 hours) PE 288 Psychology and Sociology of Sport (2 hours) PE 330 Physiology of Exercise (3 hours) PE 411 Kinesiology (3 hours) PE/BI 445 Readings and Research: Research Methods in Health Science (1 hour) PE 475 Senior Seminar - Kinesiology Internship (2 hours) G-MA 221 Elementary Applied Statistics (4 hours)

G-PY 101 Introduction to Psychology

#### **Recommended Supporting Courses**

G-PE 150 Concepts in Holistic Health (2 hours) G-PE 170 Personal and Community Health

#### Additional Requirements for Some Pre-professional Programs

PY 204 Child and Adolescent Development (3 hours) OR
PY 305 Abnormal Psychology (3 hours)
BI 207 Medical Terminology (2 hours)
BI 404 Biomedical Ethics (2 hours)
G-MA 105 College Algebra
Trigonometry (or above)
Communication course
Sociology course
Business course

### **Chemistry Major**

#### Requirements

A minimum of 36 semester hours including

- G-CH 111 Chemistry I (5 hours)
- CH 112 Chemistry II (5 hours)
- CH 251 Organic Chemistry I (5 hours)
- CH 252 Organic Chemistry II (5 hours)
- CH 201 Quantitative Analysis (4 hours) CH 390 Instrumental Analysis (3 hours)
- **CH 385** Advanced Inorganic Chemistry (4 hours)
- **CH 400** General Physical Chemistry (5 hours)

### Required supporting courses

PH 205 College Physics I (5 hour)
PH 206 College Physics II (5 hour)
\*NS 300 Research Methods (1 hour)
NS 375 Junior Seminar (1 hour)
\*NS 475 Senior Research (2 hours)
G-MA 111 Calculus I (4 hours)
MA 112 Calculus II (4 hours)

#### **Recommended supporting courses**

**G-BI 111** College Biology I (4 hours) **BI 112** College Biology II (4 hours)

### Chemistry Major - Teaching Licensure in Chemistry (6-12)

#### **Chemistry Major for Teacher Licensure:**

A minimum of 32 hours including:

G- CH 111 College Chemistry I (5 hours)
G- CH 112 College Chemistry II (5 hours)
CH 251 Organic Chemistry I (5 hours)
CH 201 Quantitative Analysis (4 hours)

CH 310 Statistical Data Analysis (4 hours)

CH 385 Advanced Inorganic (4 hours)

CH 388 Lab Assisting Internship (2 hours)

Remaining hours must come from CH 252 Organic Chemistry II or CH courses 300 level or above.

#### **Required courses:**

G-BI 111 College Biology I (4 hours)

BI 112 College Biology II (4 hours)
PH 215 General Physics I (4 hours)
PH 216 General Physics II (4 hours)
NS 375 Junior Seminar (1 hours)

#### Suggested Courses:

G-NS 141 Environmental Science (4 hours)
G-PC 251 Geology (4 hours)
G-PC 275 Astronomy (4 hours)
CH 252 Organic Chemistry II (5 hours)
G-MA 111 Calculus I (4 hours)
MA 112 Calculus II (4 hours)
PH 205 College Physics I (replace G-PH 215) (5 hours)
PH 206 College Physics II (replace G-PH 216) (5 hours)
\*NS 475 Senior Research (2 hours)

Students pursuing this major must also meet all professional requirements for teacher licensure in the curriculum and instruction department.

# **Chemistry Minor**

#### Requirements

A minimum of 24 hours including

G-CH 111 College Chemistry I (5 hours)
CH 112 College Chemistry II (5 hours)
CH 251 Organic Chemistry I (5 hours)
CH 252 Organic Chemistry II (5 hours)
CH 201 Quantitative Analysis (4 hours)

### **Environmental Stewardship Major**

This program achieves its purposes when its graduates:

- demonstrate knowledge of contemporary theories in the natural sciences
- demonstrate skill in the application of laboratory and field experimental techniques
- demonstrate knowledge of contemporary theories of human social systems and behavior
- demonstrate a critical understanding of their personal rôles in history, culture, and community
- evaluate the impacts of human society and Earth's natural systems on one another
- differentiate between their personal belief system and societal belief systems
- express a personal environmental ethic

#### **Required Natural Science Courses:**

G-BI 106 Environmental Biology or
G-BI 201 Biodiversity (4 hours)
G-CH 106 Environmental Chemistry (4 hours)
G-NS 141 Environmental Science (4 hours)
G-PH 215 General Physics I (4 hours)
G-PC 251 Geology (4 hours)
G-NS 245 Climatology (4 hours)
BI 316 Ecology (4 hours) or
BI 325 Human Ecology, Epidemiology and Public Health (4 hours)
BI 334 Microbial Ecophysiology (5 hours) or
BI 345 Plant Ecophysiology (4 hours)
NS 404 Environmental Ethics (2 hours)
BI/EC 416 Ecological Economics (2 hours)
NS 495 Field Experience (4 hours)

#### **Electives from Humanities, Social Science, and Technology:**

Select at least 24 hours from the following:

**CM 325** Conflict Communication (3 hours) **EC 202** Survey of Economics (3 hours) Up to 2 courses (G-HI or HI200+) (6 hours) G-PE 170 Personal/Community Health (2 hours)
G-PS 125 International Relations (3 hours)
G-PS 130 Principles of Geography (3 hours)
G-PS 215 Global Peace Studies (3 hours)
PY/SO 303 Social Psychology (3-4 hours)
G-SO 101 Introduction to Sociology (3 hours)
SO 206 Social Problems (3-4 hours)
SO 320 Urban Sociology (3 hours)
\*G-TE 333 Technology and Society (3-4 hours)

Other courses as approved by both the advisor and co-advisor.

#### **Other Course Requirements:**

NS 350 Stewardship Seminar1/semester (4 required)
\*NS 300 Research Methods (1 hour)
NS 375 Junior Seminar (1 hour)
\*NS 475 Senior Research (2 hours)

### **Environmental Science Minor**

#### Requirements

G-BI 106 Environmental Biology or
G-CH106 Environmental Chemistry (4 hours)
G-NS 141 Environmental Science (4 hours)
G-PC251 Geology (4 hours)
G-NS 245 Climatology (4 hours)
NS 493 Field Experience (4 hours)

### **Environmental Stewardship Minor**

#### Requirements

G-NS 141 Environmental Science (4 hours)
G-PC 251 Geology or
G-PC245 Climatology (4 hours)
NS495 Field Experience (4 hours)
NS350 Stewardship Seminar (2 hours)

Electives from Environmental Stewardship Major Electives list (6 hours)