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

General Education Student Learning Outcome: Students should be able to demonstrate an understanding of how the natural sciences construct knowledge of the world.

General Education Performance Indicators

Students should be able to:

1. Summarize the current consensus of the scientific community with regards to the structure and function of some aspect of the physical or biological world.
2. Illustrate their knowledge of the changing nature of the consensus of the scientific community with regards to the structure and function of some aspect of the physical or biological world, by outlining the historical changes in that consensus.
3. Report on their experiences with those methods and processes of the natural sciences which they conducted in the laboratory.

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 I (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/CH 310 Statistical Data Analysis (4 hours)
BI/CH 373 Cell Physiology/Biochemistry II (4 hours)

Select one from the following:

BI 283 Genetics (4 hours)
BI 384 Advanced Genetics (4 hours)
CH 390 Instrumental 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

This interdisciplinary major is being phased out. Entering students planning to graduate in spring 2023 or later should enroll in the new Health Science major in the Health/P.E./Recreation department. Students transferring in 60 hours or more—including equivalents of College Biology I & II, College Chemistry I & II, Elementary Applied Statistics, and Human Anatomy and Human Physiology—may enroll in this major in academic year 2020-21 with prospects to graduate in spring 2022.

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

G-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)
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)
CI 406 (ED 406) Methods for Teaching Natural Science in the Secondary School (3 hours)
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 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 roles 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 101 Principles of Biology (4 hours) or **G-BI 111** College Biology I (4 hours)

G-BI 201 Biodiversity (4 hours)
G-CH 101 Principles of 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 325 Human Ecology, Epidemiology and Public Health (4 hours)
NS 404 Environmental Ethics (2 hours)
NS 495 Field Experience (4 hours)

Electives from Humanities, Social Science, and Technology

Select at least 27 hours from the following:

CM 325 Conflict Communication (3 hours)
EC 202 Survey of Economics (3 hours)
G-ET 201 Social Entrepreneurship (3 hours)
Up to 2 courses (G-HI or HI200+) (6 hours)
G-PE 170 Personal/Community Health (2 hours)
G-PR 104 Ethics (3 hours)
G-PR 107 Critical Thinking (3 hours)
G-PR 203 Science and Religion (3 hours)
G-PR 206 Religion and Environmental Stewardship (3 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 101 Principles of Biology or **G-BI 111** College Biology I or **G-CH 101** Principles of Chemistry (4 hours)
G-NS 141 Environmental Science (4 hours)
G-PC 251 Geology (4 hours)
G-NS 245 Climatology (4 hours)
NS 495 Field Experience (4 hours)

Environmental Stewardship Minor

Requirements

G-NS 141 Environmental Science (4 hours)
G-PC 251 Geology or
G-PC 245 Climatology (4 hours)
NS 495 Field Experience (4 hours)
NS 350 Stewardship Seminar (2 hours)

Electives from Environmental Stewardship Major Electives list (6 hours)