

### ADVISING NOTES

For all courses listed under Physical Sciences, a student must have satisfied at minimum the UNI entrance requirements in English and Mathematics. Some courses require a minimum ALEKS score.

Students are required to take a course with a scheduled laboratory from either LAC Category 4A: Life Sciences or 4B: Physical Sciences. Only 6 hours are required for students who meet the LAC laboratory requirement with a course other than the one listed in Life or Physical Sciences.

All LAC related student requests should be signed by the student's advisor and sent directly to the Provost's Office.

### AS A RESULT OF THIS CATEGORY STUDENTS WILL ...

Know the processes and dynamic nature of science.

Apply scientific reasoning skills to investigate natural phenomena.

Be able to articulate why science is important.

### IT TAKES MORE THAN A MAJOR

Employers believe that college graduates need **hands-on experience with the methods of science** to succeed in the workplace.

Source: Hart Research Association, *It Takes More than a Major: Employer Priorities for College Learning and Student Success*, (Washington D.C.: Association of American Colleges and Universities, 2013).

### REQUIREMENT: 3 OR 4 CREDIT HOURS

CHEM 1010*	Principles of Chemistry	4 Hours
CHEM 1011	Molecules and Life	3 Hours
CHEM 1020*	Chemical Technology	4 Hours
CHEM 1030*	Applied General Chemistry	4 Hours
CHEM 1110*	General Chemistry I	4 Hours
CHEM 1130*	General Chemistry I-II	5 Hours
EARTHSCI 1100**	Astronomy	3-4 Hours
EARTHSCI 1110*	Astronomy Laboratory	1 Hour
EARTHSCI 1200	Elements of Weather	3 Hours
EARTHSCI 1210*	Elements of Weather - Lab	1 Hour
EARTHSCI 1300*	Introduction to Geology	4 Hours
EARTHSCI 2320*	Fossils and Evolution	4 Hours
GEOG 1210	Physical Geography	3 Hours
GEOG 1211*	Physical Geography Laboratory	1 Hour
PHYSICS 1000	Physics in Everyday Life	3 Hours
PHYSICS 1400*	Conceptual Physics	4 Hours
PHYSICS 1511*	General Physics I	4 Hours
PHYSICS 1701*	Physics I for Science and Engineering	4 Hours
SCI ED 1300*	Inquiry into Physical Science	4 Hours
SCI ED 1100*	Inquiry into Earth and Space Science	4 Hours
TECH 1015	Introduction to Sustainability	3 Hours

\*Lab Course

\*\*Lab Course if 4-hour option elected

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## COURSE DESCRIPTIONS

**CHEM 1010 Principles of Chemistry—4 hrs.** Basic concepts of chemistry, the periodic table and its relation to atomic structure and chemical properties. How the understanding of changes in matter and energy is important in both living and non-living systems. Work of the chemist and the interactions of chemistry with other activities of humankind.

- Discussion, 3 periods; lab, 2 periods.
- No credit for student with credit in any college chemistry course.
- Prerequisite(s): student must have satisfied university entrance requirements in English and Mathematics.

**CHEM 1011 Molecules and Life—3 hrs.** Basic concepts of chemistry, with an emphasis on the structure and function of molecules in living systems.

- Discussion, 3 periods.
- No credit for student with credit in any college chemistry course.
- Prerequisite(s): student must have satisfied university entrance requirements in English and Mathematics.

**CHEM 1020 Chemical Technology—4 hrs.** Basic concepts of inorganic and organic chemistry and their applications to industrial processes. Emphasis on application of chemical principles in materials, energy production and use, and environmental problems.

- Discussion, 3 periods; lab, 2 periods.
- No credit for student with credit in any college chemistry course.

**CHEM 1030 Applied General Chemistry—4 hrs**

Basic concepts of chemistry, with particular attention to allied health and nutrition applications.

- Discussion, 3 periods; lab, 3 periods.
- No credit for students with credit in CHEM 1110 General Chemistry I or CHEM 1130 General Chemistry I-II.

**CHEM 1110 General Chemistry I—4 hrs.** Structure of matter, its physical properties and laws describing them, the periodic table and its relation to atomic structure and chemical properties, and non-metallic elements and their compounds.

- Students with extensive background in high school chemistry and mathematics may enter CHEM 1130 General Chemistry I-II following departmental advisement.
- Discussion, 3 periods; lab, 3 periods.
- Prerequisite(s): student must have satisfied university entrance requirements in English and Mathematics.

**CHEM 1130 General Chemistry I-II—5 hrs.** Accelerated course for well-prepared students. Content similar to **CHEM 1110 General Chemistry I** and **CHEM 1120 General Chemistry II** but covered in one semester. Completion satisfies General Chemistry requirement of any chemistry major.

- Discussion, 4 periods; lab, 3 periods.
- Prerequisite(s): consent of department head.

**EARTHSCI 1100 Astronomy—3-4 hrs.** Introduction to the Universe, solar system, stars, and galaxies, including apparent motions of bodies in the sky; development of astronomy and its impact on humankind.

- Discussion, 3 periods; lab, 2 periods.
- Also offered as a 3-hour course without lab.
- Prerequisite(s): student must have satisfied university entrance requirements in English and Mathematics.

**EARTHSCI 1110 Astronomy Laboratory—1 hr.**

Exploration of astronomical phenomena through the use of telescopes, charts, almanacs, computer simulations, and other laboratory equipment. Students will gain experience in methods of observing the night sky and become familiar with celestial objects.

- Lab, 2 periods.
- Prerequisite(s): consent of instructor.
- Corequisite(s): EARTHSCI 1100 Astronomy.

**EARTHSCI 1200 Elements of Weather—3 hrs.**

Meteorological elements and their applications to environment; interpretation of weather maps and weather data; forecasting and briefing on daily weather.

- Discussion, 3 periods.
- No credit for those who have completed EARTHSCI 3210/5210 Meteorology.
- Prerequisite(s): student must have satisfied university entrance requirements in English and Mathematics.

**EARTHSCI 1210 Elements of Weather Laboratory—1 hr.**

Fundamentals of meteorological observation, use of basic meteorological instruments, and applications of maps and charts to understanding forecasts.

- Intended for science teaching majors and minors.
- Lab, 2 periods.
- Prerequisite(s) or corequisite(s): EARTHSCI 1200 Elements of Weather.

**EARTHSCI 1300 Introduction to Geology—4 hrs.**

Introduction to the physical environment, emphasizing materials of the Earth and processes that lead to changes within and on the Earth. Lab emphasis includes rocks and minerals, geologic processes, and landscape development.

- Discussion, 3 periods; lab, 2 periods.
- Prerequisite(s): student must have satisfied university entrance requirements in English and Mathematics.

# Category 4B: Physical Sciences (cont.)

## COURSE DESCRIPTIONS

**EARTHSCI 2320 Fossils and Evolution—4 hrs.** Topics in paleontology, including fossil preservation, systematics, functional morphology, paleoecology, paleobiogeography, and biostratigraphy, with special emphasis on mass extinctions and the role of paleontology in reconstructing evolutionary history. Laboratory studies of major groups of fossil invertebrates.

- Discussion, 3 periods; lab, 3 periods.

**GEOG 1210 Physical Geography—3 hrs.** Explanation of patterns of solar energy receipt, atmospheric pressure, winds, and precipitation around the Earth. Emphasis on how solar energy, water, and crustal movements interact to determine characteristics of natural environments on Earth.

- Prerequisite(s): student must have satisfied university entrance requirements in English and Mathematics.

**GEOG 1211 Physical Geography Laboratory—1 hr.** Explanation of patterns of solar energy receipt, atmospheric pressure, winds, and precipitation around the Earth. Emphasis on how solar energy, water, and crustal movements interact to determine characteristics of natural environments on Earth.

- Prerequisite(s): student must have satisfied university entrance requirements in English and Mathematics.
- Prerequisite(s) or corequisite: GEOG 1210 Physical Geography.

**PHYSICS 1000 Physics in Everyday Life—3 hrs.** Basic laws and concepts of physics introduced and demonstrated through operation of everyday devices and systems. Emphasis on understanding physical principles behind working of modern technologies and interplay between science and technology.

- Students may not earn credit in both PHYSICS 1400 Conceptual Physics and PHYSICS 1000 Physics in Everyday Life.
- Prerequisite(s): student must have satisfied university entrance requirements in English and Mathematics.

**PHYSICS 1400 Conceptual Physics—4 hrs.** Energy; temperature and heat; waves and sound; electricity and magnetism; light and color; and atomic and nuclear structure of matter. Emphasis on observation, interpretation, and conceptual understanding of physical phenomena.

- Discussion, 3 periods; lab, 2 periods.
- Students may not earn credit in both PHYSICS 1400 Conceptual Physics and PHYSICS 1000 Physics in Everyday Life.
- Prerequisite(s): student must have satisfied university entrance requirements in English and Mathematics.

**PHYSICS 1511 General Physics I—4 hrs.** Algebra-based introductory course covering Newtonian mechanics, gravitation, and thermal physics. Emphasis on conceptual understanding of physical principles through group investigations and lab activities.

- Discussion/lab, 5 periods.
- Prerequisite(s): high school algebra and trigonometry or equivalent.
- Prerequisite: ALEKS score of  $\geq 40\%$ .

**PHYSICS 1701 Physics I for Science and Engineering—4 hrs.** Calculus-based introductory course covering Newtonian mechanics, gravitation, and thermal physics.

- Lab activities.
- Discussion/lab, 5 periods.
- Prerequisite(s): one year of high school physics or equivalent.
- Prerequisite(s) or corequisite(s): MATH 1420 Calculus I.
- Prerequisite(s): student must have satisfied university entrance requirements in English and Mathematics.

**SCI ED 1100 Inquiry into Earth and Space Science—4 hrs.** Inquiry-oriented introduction to fundamental concepts and processes in meteorology, astronomy, and geology using active investigation.

- Integrated lecture/lab for 5 periods.
- For Elementary Education and Early Childhood majors only.
- Prerequisite(s): student must have satisfied university entrance requirements in English and Mathematics.

**SCI ED 1300 Inquiry into Physical Science—4 hrs.** Inquiry-oriented introduction to fundamental concepts and processes in physics and chemistry that includes energy, force and motion, and the nature of matter.

- Integrated lecture/lab for 5 periods.
- For Elementary Education and Early Childhood majors only.
- Prerequisite(s): student must have satisfied university entrance requirements in English and Mathematics.

**TECH 1015 Introduction to Sustainability—3 hrs.** Students will gain a basic understanding of sustainability, with focus on possibilities for harmonizing economic, ecological, and social goals for current and future generations. They will conduct practical exercises to enhance personal sustainability.