

General Education Goals and Course Learning Objectives For Block VII Natural Sciences Courses

1. All Block VII natural sciences (NS) courses are expected to include a section on the course syllabus entitled “General Education Goals and the Course” beginning Fall 2006. This requirement applies to all sections of all Block VII NS courses. NS courses address goals two, five, seven, and eight.
 - a. The course syllabi for all NS courses should have the following statement: Students will be able to:
 - Use appropriate methods of critical thinking and quantitative reasoning to examine issues and to identify solutions. (Goal two)
 - Analyze the fundamental natural processes of the world and the interactions of humans and their environment. (Goal five)
 - Distinguish the methods that underlie the search for knowledge in the arts, humanities, natural sciences, history, and social and behavioral sciences. (Goal seven)
 - Integrate knowledge that will deepen their understanding of, and will inform their own choices about, issues of personal and public importance. (Goal eight)

2. When the General Education Committee approved courses for Block VII (NS), they approved course-specific learning objectives for each course. All sections of each approved course are expected to use the approved learning objectives, but individual faculty members may supplement the approved the learning objectives.
 - a. If the department wishes to revise course-specific learning objectives, the department should provide the revised course-specific learning objectives for approval by the General Education Committee prior to implementation.

3. As part of the assessment of General Education, the General Education Committee will be conducting a content analysis of course syllabi each semester. Department Chairs should collect an electronic copy of the course syllabus from all sections of approved courses in Block VII (NS) by the end of the third week of the semester and send those syllabi to the Chair of the University General Education Committee.

Course-Specific Learning Objectives

ANT 201

By the end of the course, the student will correctly:

1. Define standard genetic terms.
2. Solve standard Mendelian genetics problems.
3. Describe the process of normal cell division with regard to genes and some errors that occur in this process.
4. Evaluate an issue in genetics: stem cell research.
5. Describe bone growth and the cells involved in remodeling bone.
6. Identify human bones and their structures and describe the functions of these structures.
7. Describe in general terms how muscles work and identify attachments and actions of selected muscles.
8. Describe the types of joints in the body and give examples of each.
9. Analyze a movement, such as a pullup, deducing what the primary muscles performing the movement are, which bones move and how, and which synovial joints are involved in the movement.
10. Describe the general characteristics of Primate suborders, Anthroidea superfamilies, and Hominoidea families.
11. Describe the general requisites for evolution to occur.
12. Evaluate an issue in primatology: bushmeat and ebola.
13. Use standard anthropometric techniques to measure classmates and compare male and female measurements.

AST 130

Students will demonstrate ability to:

1. describe basic astronomical observations and explain how those observations are made.
2. explain and apply basic laws of physics that are crucial to understanding astronomical behavior including Newton's law of universal gravitation, the nature of light and telescopes.
3. describe and explain the structure and patterns in the solar system.
4. use scientific method and explain how it is used to gain insight into astronomy.

AST 330

Students will demonstrate ability to:

1. Describe basic astronomical observations and explain how those observations are made, including the role of spacecraft and telescopes.
2. Explain and apply basic laws of physics that are crucial to understanding astronomical behavior, including gravitation, the nature of light and the operation of optical instruments.
3. Describe and explain the structure and patterns in the universe, in galaxies and the attributes of stars as well as to explain the processes that govern the evolution of stars, galaxies and the universe.

4. Describe the nature of scientific theories and to apply scientific method to astronomical phenomena and explain how this is used to gain insight into the structure and evolution of the universe.

BIO 171

In this course students will demonstrate the ability to:

1. Apply proper use and applications of anatomical terminology.
2. Analyze the components of the cell and the organizational hierarchy of life.
3. Apply of the concept of anatomical position to comprehension of various organ systems of the body and identification of the structures thereof.
4. Apply the concept of planes to the body and organs.
5. Demonstrate comprehension of regions of the body.
6. Evaluate methods of studying anatomy (gross anatomy, histology, embryology etc).
7. Demonstrate knowledge of surface anatomy via practical laboratory exams.
8. Synthesize knowledge and of the gross anatomy of each of body's organ systems into comprehension of proper functioning of the complete body.

BIO 273

This course will introduce students to the terminology and the fundamental concepts and processes of basic clinical microbiology, and teach students how to apply these basic principles to their lives and those of others around them. Through utilization of these instructional methods the student will achieve the following objectives: (1) display an understanding of the basic principles of clinical microbiology; (2) be able to discuss current topics of infectious disease worldwide; (3) comprehend the possible outcomes of risky behaviors in the spread of disease (i.e., engaging in unprotected sex or the use of injected drugs) and its potential effect on others as well as themselves; (4) understand and outline the basic functions of the immune system and its components; and (5) demonstrate a basic understanding of how chemotherapeutic drugs work to kill or inhibit infectious agents in the human host.

Critical thinking skills are essential in this course and are needed to

1. apply general principles to specific problems;
2. analyze case studies and determine causative agents of disease and suitable treatments;
3. discuss and comprehend the mechanisms by which infectious disease is spread in the general population.
4. Finally, students will gain an appreciation of the many ways in which a basic understanding of clinical microbiology can aid them in decision making in their everyday lives.

BIO 301

1. Students will demonstrate their breadth of knowledge of how the human body works by explaining the basic chemical, physical, and biological concepts, laws and facts within the framework needed to understand physiological principles—how the human body works.

2. Students will generalize and distinguish the fact that the cell is the basic unit of life in all multicellular organisms, such as the human body, and be able to understand how the cell functions, grows, reproduces and interacts with other cells and the environment—both inside and outside the body.
3. Students will be able to define, explain and identify the fundamental factual knowledge needed to understand how the body works or functions-- its physiology-- from cell to tissue, tissue to organ, organ to system, and how the whole body interacts with its environment in order to maintain constant conditions called homeostasis.
4. Students will develop a basic understanding of physiological mechanisms that operate via negative feedback by using the methods physiologist use to obtain and search for new knowledge and draw valid conclusions in physiology.
5. Students will be able to comprehend the importance of obtaining an understanding of the scientific method and its quantitative and qualitative application in human physiology.
6. Students will demonstrate the ability to breakdown material, integrate, correlate, and analyze related physiological concepts and knowledge in order to understand the relationships between anatomical structures and their physiological functions in both health and disease.

BIO 303

Upon completion of the course students will be able to:

1. identify and apply the principles of genetics;
2. develop a working knowledge of genetic concepts as they relate to humans;
3. demonstrate an understanding of genetic diversity in human populations;
4. understand how selection and evolution have influenced human genetics;
5. assess how scientists think and approach problems;
6. analyze social, ethical, legal and cultural implications of genetic principles and advances (biotechnology) as they apply to individuals and society.

BIO 317

It is expected that at the end of this course, the student will be able to:

1. explain the methods of scientific inquiry,
2. demonstrate a knowledge of ecological concepts and connections as they apply to terrestrial and aquatic ecosystems.
3. demonstrate an understanding of how human activities can impact terrestrial and aquatic ecosystems.

CHE 102

By the completion of this course each student should have developed a working set of capabilities:

1. Students will be able to identify and name carbon containing compounds.
2. Students will be able to analyze reactions and predict products from common organic reactions including:
 - a. Acid and base reactions.
 - b. Substitution reactions.

- c. Elimination reactions.
- d. Addition reactions.
- e. Radical reactions.
3. Students will be able to analyze spectra and determine structure for carbon containing compounds.
4. Students will be able to analyze carbon containing compounds to determine physical properties.

GLY 302

Students will be able to:

1. Recognize the features that characterize the various types of tectonic, physical, and climatic environments that exist on the Earth in order to classify the environment of any given place on the Earth's surface either now or in the past.
2. Compare and contrast different environments and their characteristic features in order to evaluate hypotheses for the origins of these environments.
3. Evaluate the risk of natural disasters for an area given its tectonic, physical, and climatic environment.

GLY 303

1. Students will be able to explain geologic processes to infer and predict geologic events and their consequences to the Earth and its life over the course of geologic time.
2. Students will be able to explain and infer the behavior of interconnected Earth systems in order to understand and appreciate their effects on Earth systems and inhabitants of the Earth.
3. Students will be able to ascertain and differentiate rates of geologic processes in the context of geologic time in order to understand and appreciate their effects on Earth systems and inhabitants of the Earth.
4. Students will be able to evaluate the impact of the human population on the resources and environment of the Earth in order to explore possible solutions for human-induced problems.

NAT 305

Students successfully completing this course will be able to:

1. use knowledge of dinosaur anatomy, taxonomy, and biology to place newly encountered dinosaurs in appropriate phylogenetic groupings and make appropriate inferences about their biology,
2. use geologic data to make appropriate inferences (age of fossils, circumstances of fossil formation, circumstances of organisms in life, temporal and geographic distribution of organisms on earth, etc.) about dinosaurs, other life forms, and environmental conditions during the Mesozoic Era, and

3. critically examine data to evaluate, and resolve or clarify, current conflicts (e.g., extinction, relationship of dinosaurs and modern birds, dinosaur physiology) concerning dinosaurs and other Mesozoic organisms.

NAT 380

After completing this course, students will be able to:

1. Evaluate scientific information presented in media and journals for a lay audience to determine its reliability and credibility;
2. Understand the role that science plays in today's society, from individual quality of life to the effect of a scientifically educated public on politics and government;
3. Use scientific and non-scientific information to make personal and community-based decisions about issues of societal importance that include scientific factors.