



**COWLEY COLLEGE
& Area Vocational Technical School**

COURSE PROCEDURE FOR

GENERAL BIOLOGY II
BIO4135 5 Credit Hours

Student Level:

This course is open to students on the college level in either the freshman or sophomore year.

Catalog Description of the Course:

BIO 4135 - GENERAL BIOLOGY II (N) (5 hrs)

A study of the fundamental concepts of biology as they apply to levels of organization, from the bacteria through the vertebrates, and ecosystems. Lecture emphasis is on the organization, physiology, and diversity of life as studied through the kingdoms. Laboratory work emphasizes the structural comparison of major kingdoms and phyla.

Prerequisite: Advanced high school Biology class, BIO4111 Principles of Biology, or a science ACT score of 21.

Controlling Purpose: This course is designed for science majors as an introduction to life from the organism level to the study of ecosystems. Non-science majors will find the course helpful in the overall course content, and in gaining a further understanding of the diversity of life.

Learner Outcomes: Upon completion of this course students will have an understanding of the diversity of life through the study of Kingdoms, major phyla and their unique characteristics, and the importance of these phyla to man.

The learning outcomes and competencies detailed in this course meet, or exceed the learning outcomes and competencies specified by the Kansas Core Outcomes Project for this course, as sanctioned by the Kansas Board of Regents.

Units Outcomes and Criterion Based Evaluation Key for Core Content:

The following defines the minimum core content not including the final examination period. Instructors may add other content as time allows.

Evaluation KEY:

- A = All major and minor goals have been achieved and the achievement level is considerably above the minimum required for doing more advanced work in the same field

- B = All major goals have been achieved, but the student has failed to achieve some of the less important goals. However, the student has progressed to the point where the goals of work at the next level can be easily achieved.
- C = All major goals have been achieved, but many of the minor goals have not been achieved. In this grade range, the minimum level of proficiency represents a person who has achieved the major goals to the minimum amount of preparation necessary for taking more advanced work in the same field, but without any major handicap of inadequacy in his background.
- D = A few of the major goals have been achieved, but the student's achievement is so limited that he is not well prepared to work at a more advanced level in the same field.
- F = Failing, will be computed in GPA and hours attempted.
- N = No instruction or training in this area.

| UNIT I: PHYLOGENY AND THE SYSTEMS OF CLASSIFICATION | | | | | | |
|---|---|---|---|---|---|---|
| Outcomes: Upon completion of this unit the student will be able to give reasons as to the importance of classification. | | | | | | |
| A | B | C | D | F | N | Specific Competencies |
| | | | | | | Demonstrate the ability to: |
| | | | | | | Explain several problems associated with the application of common names to organisms. |
| | | | | | | Discuss what the Binomial System of nomenclature is, how it developed, and how it is currently used. |
| | | | | | | Explain the basis for Whittaker's five-kingdom system |
| | | | | | | Describe the basis for the current domains and which kingdoms they include. |
| | | | | | | Explain the concept of hierarchical categories by placing the major taxa in order. |
| | | | | | | Construct a dichotomous key and be able to read a key to classify an organism. |
| | | | | | | Discuss the various types of symmetry in terms of evolutionary adaptations of each pattern of organization. |
| | | | | | | Describe unicellular, diploblastic, and triploblastic levels of organization. |
| | | | | | | Distinguish among acoelomate, pseudocoelomate, and coelomate patterns of organization. |

UNIT II: PROKARYOTES AND VIRUSES

Outcomes: Upon completion of this unit, the student will be able to identify and explain the diversity and classification of the prokaryotes and viruses.

| A | B | C | D | F | N | Specific Competencies |
|---|---|---|---|---|---|---|
| | | | | | | Demonstrate the ability to: |
| | | | | | | Describe the structure of a virus and it's action as an infectious agent. |
| | | | | | | Identify the basic forms of bacteria and discuss why prokaryotic organisms are difficult to classify. |
| | | | | | | Explain how a prokaryotic cell differs from a eukaryotic cell. |
| | | | | | | List at least 10 ways bacteria are useful to humans and understand how they are useful. |

UNIT III: PROTISTS

Outcomes: Upon completion of this unit, the student will be able to identify and explain the diversity and classification of the Protista.

| A | B | C | D | F | N | Specific Competencies |
|---|---|---|---|---|---|--|
| | | | | | | Demonstrate the ability to: |
| | | | | | | Discuss the structure and function of the water molds, chytrids, and slime molds. |
| | | | | | | Describe the major groups of the animal-like protists, giving examples of each group. |
| | | | | | | Describe the major groups of the plant-like protists (algae), giving examples of each group. |
| | | | | | | Diagram the life cycles of <i>Chlamydomonas</i> , <i>Ulothrix</i> , <i>Spirogyra</i> , and <i>Oedogonium</i> ; indicate where meiosis and fertilization occur in each. |
| | | | | | | Explain four kinds of reproduction in protozoans (binary fission, budding, multiple fission/schizogony, conjugation). |
| | | | | | | Outline protozoan classification and list major morphological characteristics of each phylum of protozoa. |
| | | | | | | Discuss the medical and/or economic importance of the protozoans. |

UNIT IV: FUNGI

Outcomes: Upon completion of this unit will identify and explain the diversity that exists among the fungi.

| A | B | C | D | F | N | Specific Competencies |
|---|---|---|---|---|---|--|
| | | | | | | Demonstrate the ability to: |
| | | | | | | Give the general features that distinguish Kingdom Fungi from the other kingdoms. |
| | | | | | | Distinguish the division and classes of fungi from one another on the basis of their cells or hyphae and their reproduction. |
| | | | | | | Identify and describe sporangium, conidium, coenocytic, mycelium, dikaryotic, zygosporangium, ascus, and basidium. |
| | | | | | | Explain how lichens are classified and identified. |
| | | | | | | Discuss the ecological importance of Lichens. |
| | | | | | | Discuss the medical and/or economic importance of fungi. |

UNIT V: PLANT KINGDOM

Outcomes: Upon completion of this unit, the student will be able to identify and explain the Plant Kingdom, Bryophytes, Vascular Plants, Seed Plants and flowering Plants.

| A | B | C | D | F | N | Specific Competencies |
|---|---|---|---|---|---|---|
| | | | | | | Demonstrate the ability to: |
| | | | | | | Identify the tissues of plants and the function of each tissue type. |
| | | | | | | Explain the features that distinguish the Plant Kingdom from other Kingdoms. |
| | | | | | | Explain how bryophytes as a group differ from other plants. |
| | | | | | | Show the basic differences between thalloid liverworts and "leafy" liverworts. |
| | | | | | | Explain the structures involved in the life cycle of a moss and in which structures meiosis and fertilization occur. |
| | | | | | | Explain which features liverworts, hornworts, and mosses have in common, and understand how their sporophytes differ. |
| | | | | | | Distinguish the four divisions of seedless vascular plants from one another. |
| | | | | | | Know how to recognize and explain the functions of all the structures involved in alternation of generations in a fern. |
| | | | | | | List 10 important uses of vascular plants that do not produce seeds. |
| | | | | | | Name the features common to typical male and female conifer strobili and how they differ. |
| | | | | | | Explain the modifications of pine leaves that adapt them to a harsh environment. |
| | | | | | | Indicate where the following structures occur in the life cycle of a pine tree: archegonia, eggs, sperms with integument, vessels, spore mother cells, embryo, and pollen grains. |
| | | | | | | Describe at least 10 different uses for conifers. |
| | | | | | | Understand the basic difference between angiosperms and gymnosperms. |
| | | | | | | Contrast two principle schools of thought concerning the origin of the flowering plants and the nature of the first flowers. |
| | | | | | | Compare the characteristics of flowers associated with specific types of pollinators. |
| | | | | | | Describe characteristics of 10 flowering plant families. |

UNIT VI: KINGDOM ANIMALIA

Outcomes: Upon completion of the unit the student will be able to give examples of organisms and explain the diversity that exists in the Animal Kingdom.

| A | B | C | D | F | N | Specific Competencies |
|---|---|---|---|---|---|---|
| | | | | | | Demonstrate the ability to: |
| | | | | | | List the major morphological characteristics, feeding habits, and economic importance of 10 major Phyla. |
| | | | | | | Characterize the three classes of sponges according to their type of skeleton, habitat and give examples of each class. |
| | | | | | | Characterize the four major classes of cnidarians according to habitat, body plan and reproduction. |
| | | | | | | List six characteristics of the Phylum Platyhelminthes. |
| | | | | | | Explain the mode of infection of important human parasites in the classes Trematoda and Cestoidea. |
| | | | | | | List nine pseudocoelomate phyla and the major distinguishing characteristics, habitats, and feeding habits. |
| | | | | | | Contrast protostome and deuterostome embryology. |
| | | | | | | Define metamerism and tagmatization and discuss their advantages. |
| | | | | | | Classify Phylum Annelida according to major characteristics for each class. |
| | | | | | | Discuss the importance of earthworms in soil conditioning and leeches in medicine. |
| | | | | | | List nine characteristics of arthropods. |
| | | | | | | Classify Phylum Arthropoda to subphylum and give the basis for separation into these four subphyla. |
| | | | | | | Explain the phylogenetic placement of the Echinoderms. |
| | | | | | | List five characteristics of the Phylum Hemichordata. |
| | | | | | | Describe four characteristics present in all members of Phylum Chordata during some stage of their life cycle. |
| | | | | | | Classify each subphylum of chordates to class and give the major characteristics of each. |
| | | | | | | Describe the external and internal features of the urochordates and cephalochordata. |
| | | | | | | Discuss the life cycle of lampreys and their history and importance in the Great Lakes. |
| | | | | | | Describe the habitat and feeding habits of hagfishes. |
| | | | | | | State two major developments in the evolution of vertebrates (jaws and paired appendages). |
| | | | | | | Discuss the diversity of bony fishes and some of the distinctive characteristics of each group. |

UNIT VI: KINGDOM ANIMALIA

Outcomes: Upon completion of the unit the student will be able to give examples of organisms and explain the diversity that exists in the Animal Kingdom.

| A | B | C | D | F | N | Specific Competencies |
|---|---|---|---|---|---|--|
| | | | | | | Demonstrate the ability to: |
| | | | | | | Compare the elasmobranchs and bony fishes as to their major characteristics. |
| | | | | | | Describe an amphibian, then name three orders of amphibians, their distinctive characteristics, and examples. |
| | | | | | | List the characteristics of Class Reptilia; name four orders and list distinctive characteristics and examples of each order. |
| | | | | | | List the major adaptations of Class Aves for flight. |
| | | | | | | List characteristics of modern mammals; classify mammals to subclass and infraclass and list characteristics and examples of each group. |

UNIT VII: ECOSYSTEMS AND HOMEOSTASIS

Outcomes: Upon completion of the unit the student will be able to describe the interactions and flow of energy that occur within an ecosystem.

| A | B | C | D | F | N | Specific Competencies |
|---|---|---|---|---|---|--|
| | | | | | | Demonstrate the ability to: |
| | | | | | | Discuss at least 10 ways in which humans have disrupted ecosystems. |
| | | | | | | Explain the functions of producers, primary consumers, secondary consumers, and decomposers in an ecosystem. |
| | | | | | | Diagram the flow of energy in an ecosystem. |
| | | | | | | Explain the cycling of matter that exists in an ecosystem. |
| | | | | | | Define succession and give examples of primary and secondary succession. |
| | | | | | | Discuss how the Laws of Thermodynamics apply to an ecosystem. |

Projects Required: Laboratory reports in a lab book are required. Reports are to include drawings, graphs, results, and other data where indicated. Two special projects will be assigned as determined by the instructor. They may include, but are not limited to, specimen collections, research papers, current events folders, and class presentations Each project is worth 50 points.

Text Book:

Contact the Bookstore for current textbook.

Materials/Equipment Required:

None

Major Pieces of Equipment:

Compound and dissecting microscopes
Miscellaneous prepared slides
Collecting equipment
Model/dissecting specimens
Computers and CD ROMs

Attendance Policy:

Students should adhere to the attendance policy outlined by the instructor in the course syllabus.

Grading Policy:

The grading policy will be outlined by the instructor in the course syllabus.

Maximum class size:

Based on classroom occupancy

Course Timeframe:

The U.S. Department of Education, Higher Learning Commission and the Kansas Board of Regents define credit hour and have specific regulations that the college must follow when developing, teaching and assessing the educational aspects of the college. A credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally-established equivalency that reasonably approximates not less than one hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work for approximately fifteen weeks for one semester hour of credit or an equivalent amount of work over a different amount of time. The number of semester hours of credit allowed for each distance education or blended hybrid courses shall be assigned by the college based on the amount of time needed to achieve the same course outcomes in a purely face-to-face format.

Refer to the following policies:

[402.00 Academic Code of Conduct](#)

[263.00 Student Appeal of Course Grades](#)

[403.00 Student Code of Conduct](#)

Disability Services Program:

Cowley College, in recognition of state and federal laws, will accommodate a student with a documented disability. If a student has a disability which may impact work in this class which requires accommodations, contact the Disability Services Coordinator.