##### PRINCIPLES OF BIOLOGY

**COURSE SYLLABUS**

**Fall 2014 and Spring 2015**

**LACROSSE HIGH SCHOOL**

##### BARTON COUNTY COMMUNITY COLLEGE

##### GREAT BEND, KS

#### **LIBERAL ARTS AND SCIENCES**

**Rob Holopirek**

**Instructor**

**Any Students with Special Needs Must See Me Immediately**

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BARTON COMMUNITY COLLEGE

**COURSE SYLLABUS**

# **GENERAL COURSE INFORMATION**

Course Number: LIFE 1402

Course Title: Principles of Biology

Credit Hours: 5

Prerequisite: None

Division/Discipline: Academics Division-Liberal Arts and Sciences/Biology

Course Description: The course introduces the student to the unifying principles common to all levels of biological organization. Emphasis is at the cellular, organismic and population levels with inquiry into the nature of scientific investigation. This course is designed to provide students with a biological frame of reference in a liberal education as well as for students selecting additional courses in the department of biology.

# **CLASSROOM POLICY**

Students and faculty of Barton Community College constitute a special community engaged in the process of education. The College assumes that its students and faculty will demonstrate a code of personal honor that is based upon courtesy, integrity, common sense, and respect for others both within and outside the classroom.

The College reserves the right to suspend a student for conduct that is detrimental to the College's educational endeavors as outlined in the College catalog.

Plagiarism on any academic endeavors at Barton Community College will not be tolerated. Learn the rules of, and avoid instances of, intentional or unintentional plagiarism.

Anyone seeking an accommodation under provisions of the Americans with Disabilities Act should notify Student Support Services.

# **COURSE AS VIEWED IN THE TOTAL CURRICULUM**

Principles of Biology is an approved general education course at BCC, which can be used to fulfill degree requirements as a breadth laboratory science course in the natural/physical sciences. In addition, it is required (or recommended) to be taken by students enrolled in life science programs and certain allied health programs at the College, including Biological Sciences, Medical Lab Technician, and certain pre-professional programs (e.g., Pre-dentistry, Pre-forestry, Pre-medical technology, Pre-medicine, Pre-pharmacy, Pre-wildlife Science).

This course transfers well and may be used to help fulfill credit and course requirements for general education at most if not all Kansas Regents’ institutions (in some cases, it may have to be taken in combination with another biology course). However, general education requirements vary among institutions, and perhaps even among departments, colleges, or programs within an institution. Also, these requirements may change from time to time and without notification. Therefore, it shall be the student’s responsibility to obtain relevant information from intended transfer institutions during his (her) tenure at Barton County Community College to insure that he (she) enrolls in the most appropriate set of courses for the transfer program.

# **ASSESSMENT OF STUDENT LEARNING / COURSE OUTCOMES**

Barton Community College assesses student learning at several levels:  institutional, program, degree and classroom.  The goal of these assessment activities is to improve student learning.  As a student in this course, you will participate in various assessment activities.  Results of these activities will be used to improve the content and delivery of Barton’s instructional program.

## Course Outcomes

This course is intended to:

1. Develop a greater appreciation for and understanding of the fundamental characteristics of life.
2. Interrelate the structure and function of living systems at various levels of biological organization, and to relate the activity and adaptation of organisms to variation in environmental conditions and constraints.
3. Provide opportunities for the student to use the scientific method to seek answers to biological questions using experimentation, observation, and discovery.
4. Relate biological concepts and processes to the student’s individual life and to other fields of knowledge, so that the student may live a healthier, happier, and more meaningful life.

# **COURSE COMPETENCIES**

The learning outcomes and competencies detailed in this syllabus 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.

1. Understand the nature of science through the study and use of the scientific method
2. Understand the levels of organization; i.e., chemical, cellular, organismal and ecological, and understand properties of life
3. Understand bioenergetics through the study of enzyme activity, metabolism, cellular respiration and photosynthesis
4. Understand the importance of reproduction in maintaining the continuity of life through the study of mitosis, meiosis, differentiation/development, and diversity of reproductive strategies
5. Apply principles of genetics to unity and diversity of life through the study of classical and molecular genetics
6. Discuss evolutionary theory as a mechanism of change through the study of natural selection, speciation, and diversity of life
7. Understand principles of ecology through the study of ecosystem organization, ecological interactions, and environmental issues

VI. INSTRUCTOR'S EXPECTATIONS OF STUDENTS IN CLASS

Students are expected to come to class prepared and on time. Students should play an active role in the learning process by participating in discussions, laboratory assignments, and other activities. It is the students’ responsibility to study and learn the material, and seek help when needed. Any behavior that compromises the integrity of this course may result in the student’s dismissal from class.

**Study tips**: As a five credit hour course, students should expect to spend a minimum of ten hours studying outside of the classroom each week. Students should study and come to class prepared to ask questions and participate in discussions. The textbook should be used as a reference to supplement the information given in the lectures. It is beneficial to divide the material into small sections and then thoroughly study one section each night. The days leading up to the exam should be used for review.

**Academic Integrity**: Honesty is a trait highly desired among people from all walks of life. It is assumed that students will do their own work, and will not cheat on exams. If a student is caught in a dishonest act, the instructor will take appropriate action as outlined by the Academic Integrity Policy, which may include, but is not limited to, a failing grade in the course.

**Honor Code**: On all course work, assignments, or examinations undertaken by students at Barton County Community College, the following pledge is implied by virtue of enrollment:

*On my honor as a student, I have neither given nor received unauthorized aid on this assignment.*

VII. TEXTBOOKS AND OTHER REQUIRED MATERIALS

Text: Campbell, N.A., L.G. Mitchell, and J.B. Reece. Biology: Concepts and Connections. (6th ed). Addison Wesley Longman. 2007.

Lab: Lab Experiences in Biology

VIII. REFERENCES

Any of the following materials may be used to supplement classroom activities: textbook, other reference materials in lab or in the BCCC library, laboratory facilities (models, specimens, equipment, etc.), audio-visual materials, and educational software. Your textbook should come with a CD study partner, which is extremely helpful in learning the material. The instructor maintains regular, posted office hours, and students are encouraged to consult the instructor at those times. Student-instructor consultations may require advanced, scheduled appointments. Students are encouraged to schedule appointments, especially if they are unable to meet with the instructor during his regular office hours.

IX. METHODS OF INSTRUCTION AND EVALUATION

The lecture material will be presented principally using a standard lecture format, with the use of the chalkboard, overhead projector, and computer-generated graphics being the predominant means of delivery. Labs will involve inquiry-based learning models with small-group participation and cooperative learning. Students will do two laboratory projects and present their findings among their peers in poster sessions. Students will be evaluated based on their performance on the lecture exams, laboratory projects, laboratory quizzes, lecture quizzes, and a comprehensive final exam.. Students should expect a quiz at the beginning of each lecture covering material from the previous lecture. The following is a break down of the points available in lecture and laboratory. Final grades will be determined using the following percentage scale: < 60% = F; 60-69.9% = D; 70-79.9% = C; 80-89.9% = B; 90-100% = A. The instructor reserves the right to consider each grade on an individual basis.

20 chapter quizzes 20-30 pts each ~500 pts

7 unit exams 100 pts each ~700 pts

2 lab projects 50pts ~100 pts

4 Lab Tests 50 pts ~200 pts

10 Abstracts 10 pts ~100 pts

Final exam 200 pts (% of grade) ~200 pts

**Total ~1800 pts**

**Bonus Points:**

Lecture Quizzes will be 5 questions each. Students will receive 1 bonus point for each perfect quiz, and ½ point for each quiz when missing only one question. With approximately 100 lecture quizzes throughout the year, this could be a bonus of about 5% of the overall grade. These quizzes cannot be made up for any reason.

###### **X. ATTENDANCE REQUIREMENTS**

**all students are expected to attend all classes and labs!** When a student is absent, that student is responsible for all assignments missed and information covered. According to the college attendance policy, students who miss ten ‘10’ lecture and/or laboratory sessions (13% of course) may be dropped from the course without their consent. Students will be reminded of this policy if necessary. If a student wishes to have an absence excused for the purposes of the attendance policy only, the student must complete a **Student Absentee Form** (available through the department secretary) and have the instructor sign the form. The student must then return the signed absentee form to the departmental secretary to put on record.

If extenuating circumstances exist for a *missed exam*, the instructor reserves the right to grant a ‘make-up’ opportunity. **The Science Department Make-Up Test Policy** is outlined below.

1. Students can make arrangements to make up an exam prior to the announced test date without penalty. The student must make appropriate arrangements with the instructor.

2. In the case of excused unplanned absences, students will be allowed to make up exams after the announced date. The exam must be made up within two working days (M through F) of returning from absence. It is the responsibility of the student to make arrangements with the instructor to take a make-up exam at an appropriate time. Students must complete a Student Absentee Form with the departmental secretary prior to taking the make up exam. Make-up tests will be given at 3:00 pm on Tuesday and Thursday in S126. Unless otherwise specified by the instructor, students will be given 50 minutes to complete the exam. Exams will be collected at 3:50 pm. Students will not be able to leave the room during the exam. All exams made up after the announced date will be marked to a maximum of 90% of the possible points.

3. Instructors reserve the right to change the nature of the make-up exam.

1. COURSE OUTLINE

### **Date Chapter Topic**

Course Syllabus

1 Introduction: The Scientific Study of Life

34 Ecology

1. Population Dynamics
2. Communities and Ecosystems

**Exam I**

2 Chemical Basis of Life

3 Molecules of Cells

4 Tour of the Cell

5 The Working Cell: Energy and Enzymes

5 The Working Cell: Membrane Structure and Function

1. How Cells Harvest Chemical Energy
2. Photosynthesis: Using Light to Make Food

**Exam II**

8 Cellular Basis of Inheritance: The Cell Cycle

8 Cellular Basis of Inheritance: Mitosis

8 Cellular Basis of Inheritance: Reproductive Strategies and Meiosis

9 Patterns of Inheritance: Mendelian Genetics

9 Patterns of Inheritance: Exdending Mendelian Genetics

**Exam III**

10 Molecular Biology of the Gene: Replication

10 Molecular Biology of the Gene: Protein Synthesis

10 Molecular Biology of the Gene: Protein Synthesis

11 The Control of Gene Expression

12 DNA Technology

**Exam IV**

13,14 Evolutionary Theory

13,14 Evolutionary Theory

16 Origin’s of the Diversity of Life

17 Plant Diversity

18 Animal Diversity

**Exam V**

20 Animal Form and Function

21 Nutrition and Digestion

22 Respiration

22 Respiration

23 Circulation

**Exam VI**

24 Immune System

25 Control of Internal Environment

26 Chemical Regulation

27 Reproduction

**Exam VII**

**Laboratory Outline**

**Date Exercise**

Scientific Method

Microscopes

Aquatic Ecology

Biodiversity of Macroinvertebrates as an Indicator of Water Quality

## Lab Quiz I

Diffusion / Osmosis

Effects of Temp, pH, and substrate concentration on Enzyme Activity

Production of CO2 during Cell Respiration

CO2 Uptake during Photosynthesis

## Lab Quiz II

Division of Cell Nucleus

Heredity

# Gene Expression

## Lab Quiz III

Evolution and Population Dynamics

Genetic Drift

Gene Flow

Natural Selection

Diversity of Life

Plant Anatomy

Developing a Dichotomous Key

Using a Dichotomous Key

## Lab Quiz IV

Human Anatomy

# Digestion

Respiration

Circulation (Sheep Heart Dissection)

Nervous System (Sheep Brain Dissection)

Senses (Sheep Eye Dissection)

Immune System

Control of Internal Environment

Chemical Regulation

Cadaver Lab Tour (FHSU)

## Lab Quiz V

Barton County Community College Course Attendance Policy

*As a part of its mission to improve your social, economic, and personal life,* Barton County Community College acknowledges its responsibility to prepare you for future academic and professional endeavors. Therefore, you are encouraged to develop a professional ethic that reflects personal responsibility, personal initiative, and teamwork. In context to that commitment, you are required to attend all classes. When you are absent from class, you not only miss a part of the subject matter of the course but also diminish the opportunities for contributing to the learning environment. Poor attendance in class may cause you to lose your financial aid according to federal guidelines and irresponsibility will diminish your professional and academic progress.

# GUIDELINES

1. Barton County Community College requires you to attend all classes.

2. If enrolling late, you must complete a Learning Contract with your instructor(s) according to the Late Registration Policy.

3. Instructors will state the attendance policy in their course syllabus and review it with you at the first class meeting. Instructors are encouraged to exercise good judgment, and may develop a more stringent attendance policy with the approval of the appropriate Associate Dean as courses or programs warrant.

4. Instructors will keep a weekly record of your attendance to comply with federal financial aid guidelines.

5. If your absences become excessive, your instructor(s) will notify you of your status and, if you do not respond, will use the Early Alert Form to contact the appropriate Student Support Services personnel to assist you.

6. When an absence is unavoidable (i.e., due to extended illness), you should initiate contact with your instructor(s) who may, in some instances, require verification. Documented absences do not remove your responsibility to complete the class work missed. Instructors will make reasonable accommodations for you in the event of your absence.

7. When an absence is related to a planned extracurricular activity (such as a field trip, fine arts production, conference, or intercollegiate event), you and/or the assigned sponsors are responsible for one week’s prior notification to your instructor(s). However, in unique situations when an absence is related to an urgent, yet unforeseen, need (i.e., “make up” practice sessions called due to weather), you and/or the assigned sponsors are responsible for the immediate notification of your instructor(s.) Further, if you are absent from class because of a college-related activity, you are required to complete missed class work. If you fail to complete missed class work, your absence may be counted against your attendance leading to involuntary withdrawal for excessive absence.

8. Whenever the number of your absences exceeds 2 weeks of the total course meeting hours (or 13%), your instructor(s) may drop you from the course for excessive absences. No drops will be allowed after the published final drop date. In shorter sessions (or courses less than a semester in length), the number of absences required to warrant withdrawal from a course shall be equivalent to 13% of a “normal” semester.

9. The instructor will receive prior approval from the appropriate Associate Dean before you are involuntarily dropped for excessive absences.

10. Arriving late to class may cause you to be counted absent by your instructor.

(7.28.00)

**SYLLABUS ADDENDUM**

Course Number: LIFE 1402

Course Title: Principles of Biology

Instructor: Rob Holopirek

Academic Term: Fall Semester 2014 and Spring Semester 2015

**ADDENDUM TO SECTION III**

##### Course Transferability to Regent’s Institution

**Principles of Biology (LIFE 1402)** at BCCC is equivalent to:

|  |  |  |
| --- | --- | --- |
| INSTITUTION | EQUIVALENT COURSE(s) a | SOURCE(s) OF INFORMATION b |
| Emporia State University | Principles of Biology (GB 100; 3 cr.) and Principles of Biology Lab (GB 101; 1 cr.) | BCCC – ESU Transfer Guide (1995-96) |
| Fort Hays State University | One (1) credit of biology elective, plus **Human Biology (BIOL 121, 3 cr.)** and  **Laboratory Experiences in Biology (BIOL 223, 1 cr.)**, | BCCC – FHSU Course Equivalency List (4/20/98) |
| Kansas State University | Principles of Biology (BIOL 198, 4 cr.)  Also transfers as **Organismic Biology (BIOL 201, 5 cr.)**, if LIFE 1402 is combined with BCCC Principles of Zoology (LIFE 1410) or Principles of Botany (LIFE 1406) | KSU website (4/29/97 update) and KSU Undergraduate Catalog (1996-98) |
| Pittsburg State University | **Environmental Life Science (BIOL 113, 3 cr.)** and **Environmental Life Science Lab (BIOL 114, 2 cr.)** | PSU General Education Degree Requirements and BCCC Course Equivalencies attached to letter from PSU Registrar (17 July 1998) |
| University of Kansas | **Principles of Biology (BIOL 100, 3 cr.)** and **Principles of Biology Laboratory (BIOL 102, 2 cr.)** | KU website (10/30/97 update) and KU Undergraduate Catalog (1998-2000) |
| Wichita State University | **Introduction to Organismal Biology (BIOL 203Q, 5 cr.)**, when taken in combination with BCCC Principles of Zoology (LIFE 1410) or Principles of Botany (LIFE 1406) | WSU – BCCC Transfer Course Equivalencies (9/12/96) and WSU Undergraduate Catalog (1997-98) |

a Highlighted (**boldface** font) courses may be used at the institution to fulfill general education requirements.

b Include both the name (location) and date of the source of information.