Course: BIOL 1030/1031 – Concepts of Biology with Laboratory
Semester: 2012-2013
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Required Textbook:

Catalog Course Description:
A course designed for non-science majors based on the Tennessee Science Curriculum (TSC) Standards for K-8 and TBR GenEd learning outcomes for Natural Science. Topics include cell structure and functions, energy production, ecology, biological diversity, adaptation, genetics, reproduction, and the human organ systems covered in a constructivism learning environment. Student will design, develop and implement hands-on science activities for K-8 students.
4 credit hours

Prerequisites: None

Course Outcomes:
Upon completion of this course student will:
1. Recognize and understand cell structure, growth, development and reproduction.
2. Understand the unifying principles of gene inheritance.
3. Differentiate forms of energy, energy production and utilization in cells.
4. Have Knowledge of the basic concepts of ecology.
5. Appreciate the diversity of life forms on Earth.
6. Recognize and describe the functions of human systems.

The subject content for the core is shown as chapter learning outcomes which are available on the Biology Home Page at www.ws.edu (See Attachment A)

Common Core:
1. The Cell
2. Cellular Energy Production
3. Organisms and Their Interactions with the Environment
4. Biological Diversity and the Adaptations of Living Organisms
5. Reproduction and DNA
6. Genetics
7. Human Biology
General Education Course Designation: Natural Science: (4 semester hours)

Instructional Methods:
Lectures and discussion: you are expected to attend class, pay attention and participate actively in discussions by answering questions, asking questions and making comments. You will get more out of the lecture if you have read the material in the textbook ahead of time. Always bring your book with you to lecture. Learning Outcomes for students can be found in the Walters State eLearn page for this course and the biology section of the Natural Science homepage. Outlines and PowerPoint presentations used in lecture may be available for your review on the Walters State eLearn page for this course.

Reading: The textbook provides a good general introduction to the field of biology. Most of the topics that are approached in the class are covered by the book. Thus, it will serve to augment lecture and to provide material for discussion. In addition, readings in the book will support the material that you will be studying in labs. The book includes many things that will help you understand the material and study for the tests, including a chapter outline, review questions, quizzes and a list of key terms.

Expectations:
Satisfactory performance in college courses generally asks for two hours of study outside of class for each hour in class. This estimate applies to an “average” student expecting an “adequate” (= C) grade. Students aiming higher or those with academic problems should expect to spend more effort than the minimum. Should you procrastinate, not read ahead of time or expect to cram everything on last days before exams this course may not be for you.

The Student Can Expect from the Instructor:
1. Email response within 24 hours during the normal work week. Holidays and vacations excluded.
2. Email during the weekend will be answered on Monday.
3. Exams to be graded and returned in a timely manner.
4. Enthusiasm for the subject and encouragement to help you when you need it.
5. A fair grading system with feedback.
6. Learning that ties concepts into the real world around us.
7. Respect for you as a learner.

Grading Method:
Exams 3@100 pts = 300 pts
Comprehensive Final Exam 1@200 pts = 200 pts
Course Project 1@100 pts = 100 pts
Portfolio 1@270 pts = 270 pts
Integration Assignments 1@130 pts = 130 pts

90 -100% A
80 – 89% B
70 – 79% C
60 – 69% D
Below 60% F

Exam Policy:
1. **ALL** exams are to be taken at times scheduled by the instructor.
2. **All** exams scheduled in the course by the instructor must be taken in order for the student to receive a passing grade.

3. Make-up exams will be given totally at the discretion of the instructor for excused absences only (excused absences include illness, death in family, and military or jury duty). Make-up exams may be different from exams taken at scheduled times. (discussion test are possible)

4. Make-up exams must be taken before the next scheduled exam or a grade of zero will be recorded.

**Course Ground Rules:**
Students should attend the first day of class or contact the instructor prior to the first class. Failure to do this may result in being dropped from the class.

Plagiarism, cheating, and other forms of academic dishonesty are prohibited.

Students with disabilities must register with Student Support Services in the Student Services Building, Room U134 (phone 423-585-6892) if they need any special facilities, services, or consideration.

Students in need of tutoring assistance are encouraged to contact the Office of Student Tutoring located in the Student Services Building, Room L107 at phone number 423-585-6920 or 423-798-7982 for the Greeneville Campus, 865-908-5494 for the Sevierville Campus, 423-851-4762 for the Claiborne Campus.

Students receiving any type of financial aid or scholarship should contact the Financial Aid Office before making any changes to their schedule. Schedule changes without prior approval may result in loss of award for the current term and future terms.

Students who have not paid fees on time and/or are not correctly registered for this class and whose names do not appear on official class rolls generated by the Admissions and Records Office will not be allowed to remain in class or receive credit for this course.

Cellular phone use during classroom interaction is prohibited. Cellular phones must be turned to the non-audible mode until after class, at which time calls can be received or checked. (See the Walters State Catalog/Handbook)

For information related to the cancellation of classes due to inclement weather, please check the college’s Web site at [www.ws.edu](http://www.ws.edu) or call the college’s student information line, 1-800-225-4770, option 1; InfoConnect, (423) 581-1233, option 1045; the Sevier County Campus, (865) 774-5800, option 7; or the Greeneville/Greene County Center for Higher Education, (423) 798-7940, option 4. Also, please monitor local TV and radio stations for weather-related announcements. For additional information on this policy see the college catalog.

In the event of a pandemic or other college declared critical event that impacts the college’s ability to proceed with academic course activities as planned, the college reserves the right to alter this course plan. In the event of a pandemic or other event, please refer to the college’s home web page, [www.ws.edu](http://www.ws.edu) or call InfoConnect, (423) 581-1233 for further information.

Regular class attendance is a student’s obligation. (See the Walters State Catalog/Student Handbook) If for some reason a student misses class, it is his or her responsibility to see the instructor regarding missed assignments and/or activities and to be prepared for the next class.
Excessive absences may **substantially** lower the semester grade. The college requires the instructor to keep accurate records and to report when students are not attending class.

Students are required to supply a #2 pencil for each lecture exam. The wearing of hats and caps in class is not allowed! Students will be asked to remove their hats and caps.

**STAY AWAKE IN CLASS.** Your mere presence in class is not sufficient—you must be able to actively process the information presented! Sleeping in class is disruptive in two ways: the student who is snoozing is not interested and not participating in the classroom discussion; secondly, sleeping in class is considered to be disrespectful to the teacher and other students. The penalty for sleeping in class may range from the student being requested to leave the class with a following conference with the instructor, to notification of the Vice-President of Academic Affairs (in the cases of habitual sleepers). If you have a medical condition that prevents you from staying awake in class, please discuss this with the instructor.

**WSCC Catalog Notification Statement:**
All students attending Walters State Community College, regardless of the time and location of the class, must abide by the rules and regulations outlined in the current *Walters State Catalog/Student Handbook* and the current “Walters State Timetable of Classes.” A copy of the *Catalog/Handbook* and the “Timetable of Classes” may be obtained from the Admissions Office on the Main campus or at any of our off-campus sites. You may also access the Catalog/Handbook on-line at the following web address: [http://www.ws.edu/catalog](http://www.ws.edu/catalog).

**Alternative Teaching Plan**
In the event of a pandemic or other college declared critical event, the lead faculty member for this course will use eLearn to communicate with the students. If the lead faculty member is affected by this event, another member from the teaching team will assume instruction for the course. The course will continue utilizing an online format of instruction and testing.

General Education Core Competency (CC) courses – ENGL 1010, SPCH 2010, MATH 1530 or 1630 or 1710, and CPSC 1100 or MGMT 1100 – must be completed by the time the student completes 30 hours of college credit towards a degree at Walters State Community College. Completion of the courses with a passing grade is the primary form of documentation of competency. Alternate methods of documentation are described in the College Catalog (“General Education Competency Requirements”).

**ATTENTION:** The Natural Science faculty members are concerned with proper academic advising of students in **ALL** Pre-Professional programs. It is our explicit desire to help you with any advising problems you may encounter.
Learning Outcomes
Attachment A

Topic 1  The Cell
15.1 Characteristics of Life
15.2 Cell Types: Prokaryotic and Eukaryotic
15.3 Tour of a Eukaryotic Cell
15.4 Cell Membrane: Structure and Function
15.5 Transport Mechanisms
15.6 Cellular Communication
15.7 How Cells Reproduce

Learning Outcomes:
A. Understand the basic characteristics of life and the macromolecules essential for living.
B. List and differentiate the levels of organization in a multicellular organism and identify examples of careers within the levels.
C. Distinguish differences between prokaryotic and eukaryotic cells.
D. Recognize and describe the general structure and function of common organelles found in animal and plant cells.
E. Be able to use a compound microscope to examine various cell types including wet mounts.
F. Understand the importance of the plasma membrane in maintaining boundaries, cellular communication and recognition, and effective cellular transport.
G. List and differentiate between the various types of transport mechanisms and give applicable examples.
H. List and differentiate between the stages of cell cycle with an emphasis on chromosomal movement.

TSC Standards: 1.1, 1.2, 1.3, 1.4, 4.1

Topic 2  Cellular Energy Production
15.8 How Cells Use Energy
15.9 Photosynthesis
15.10 Cellular Respiration (Aerobic and Anaerobic)
21.3 Energy Flows in Ecosystems

Learning Outcomes:
A. Differentiate the types and forms of energy and their transformation capabilities.
B. Understand the importance of adenosine triphosphate as a main energy source for cells.
C. Understand the importance of enzymes as metabolic catalysts, where they are generated, and types of enzymatic inhibitions.
D. Describe the parts of a chemical reaction.
E. Differentiate between organisms that use photosynthesis or cellular respiration and the organelles used by these organisms for energy production.
F. Be able to identify and explain the stages of photosynthesis involved in energy and food production including all initial substrates and end products.

G. Be able to identify and explain the stages of aerobic and anaerobic cellular respiration involved in energy production including all initial substrates and end products.

H. Identify the different trophic levels in a typical energy pyramid or food chain and types of organisms that populate each trophic level.

I. Be able to describe a typical food chain using organisms found within a local ecosystem.

TSC Standards: 3.1, 3.2, 3.3, 13.3, 14.4

**Topic 3**

**Organisms and Their Interactions with the Environment**

21.1 Organisms and their Environment
21.2 Species Interactions
21.4 Kinds of Ecosystems
21.5 Change in an Ecosystem
21.6 Population Studies
21.7 Human Population Growth

Learning Outcomes:

A. Understand the typical biotic and abiotic components of an organism’s environment.

B. Differentiate between an ecosystem, population, and community by giving applicable examples.

C. Support trophic level knowledge by describing applicable competitive interaction and symbiotic relationships involving organisms within and between trophic levels.

D. List and differentiate the types of terrestrial and aquatic biomes.

E. Differentiate between various biogeochemical cycles and be able to describe indigenous examples for each local cycle.

F. Be able to conceptualize an indigenous ecological succession pathway including typical plant and animal populations.

G. Typical methods used to study population growth with an emphasis on human population.

H. Pollution and its impact on ecosystems.

TSC Standards: 2.1, 2.2, 2.3, 2.4, 8.1
Topic 4  
**Biological Diversity and the Adaptations of Living Organisms**

18.1 Classifying Living Things
18.2 The Three Domains of Life
18.3 Bacteria
18.4 Archaea
18.5 Protists
18.6 Plants
18.7 Fungi
18.8 Animals
18.9 Viruses and Infectious Molecules

Learning Outcomes:
A. List and be able to give examples of the levels in the Linnaean system of classification.
B. Be able to draw a typical cladogram.
C. List and describe the types of organisms found in each of the three domains of life.
D. Within each domain, identify adaptations that allow organisms to survive in diverse environments.
E. Be able to develop dichotomous keys to identify organisms within and between domain levels based on unique survival adaptations.
F. Differentiate between the types of prokaryotes, the types of plants and the types of animals based on unique characteristics.
G. Understand the types of viruses and infectious molecules and how they potentially compromise host organisms.
H. Identify an example of how an environmental change has altered the existence of an indigenous species.

TSC Standards: 5.1, 5.2, 4.1, 6.2, 6.3

Topic 5  
**Reproduction and DNA**

19.8 Reproduction and Development
18.6 Plants
16.1 What is a Gene?
16.2 Chromosomes: Packages of Genetic Information
16.3 DNA Replication
16.4 Transcription and Translation
16.5 Meiosis: Genetic Diversity

Learning Outcomes:
A. Differentiate between asexual and sexual reproduction and give examples of organisms that utilize each to generate gametes.
B. Understand the relationship between a DNA, genes, chromosomes, and the genetic code of life.
C. Understand the research basis for DNA as the genetic blueprint for protein production including key studies and scientists.
D. Identify the steps in DNA replication and the enzymes essential for the process.
E. Be able to diagram the steps in transcription and translation including the enzymes required for the process.
F. Differentiate between introns, exons, mRNA, tRNA, and rRNA
molecules.

G. Be able to use a genetic code chart to build a polypeptide from a given mRNA molecule.

H. Differentiate the stages of meiosis from the stages of mitosis using terms such as diploid, haploid, synapsis, crossover, recombination, and gamete.

TSC Standards: 4.1, 4.3

**Topic 6**

**Genetics**

16.6 Mendelian Genetics
16.7 Inheritance: Beyond Mendelian Genetics
16.8 The Human Genome
16.9 Genetic Mutations
16.10 Cancer: Genes Gone Awry

**Learning Outcomes:**

A. Understand the research of Gregor Mendel and how it relates to the dominant and recessive trait associated with complete dominant inheritance.

B. Compare complete dominant inheritance to incomplete dominant inheritance using terms like codominance, incomplete dominance, multiple alleles, polygenic traits, pleiotropy, linked genes and sex-linked genes.

C. Be able to use a Punnett Square to establish probabilities for monohybrid and dihybrid crosses.

D. Effectively describe the importance of karyotyping and the human genome project.

E. Describe genetic mutations by using terms like point, nonsense and frameshift mutations.

F. Describe how cancer can be caused by genetic mutations.

TSC Standards: 4.2, 4.3, 4.4

**Topic 7**

**Human Biology**

19.1 Organization of the Human Body
19.2 Homeostasis
19.3 The Brain
19.4 The Nervous System
19.5 How Neurons Work
19.6 The Senses
19.7 Hormones
19.9 The Skeleton and Muscles
20.1 Integrations of Body Systems
20.2 The Circulatory System
20.3 Respiration
20.4 Digestion
20.5 Nutrition, Exercise, and Health
20.6 Excretion and Water Balance
20.7 Keeping the body Safe: Defense Systems
Learning Outcomes:
A. Be able to recognize the general organs and organ systems that make up the human body.
B. Be able to describe the normal functions of the organs and organ systems that make up the human body.
C. Research common homeostatic imbalances associated with the human body.
D. Discuss the importance of nutrition and exercise in a healthy lifestyle.

TSC Standards: 1.2, 2.2, 4.1, 4.3