CONCEPTS OF BIOLOGY
BIOL 1310

Class Hours: 2.0
Lab Hours: 3.0
Credit Hours: 3.0
Revised: Fall 2015

Catalog Course Description:
A survey of biology concepts and content as applicable to the Tennessee K-8 curriculum standards and the National Science Foundation Standards. Instructional topics include scientific method, cell structure and function, food production and energy for life, heredity and reproduction, diversity and adaptation among living things, interactions between living things and their environment, and biological change. Students will design, develop, and implement hands-on science activities for K-8 students; create and develop a course portfolio; and collect and evaluate biologically related resources. Course includes two hours of lecture and three hours of laboratory applications each week. A course designed for students seeking the Associate of Science in Teaching degree; course focuses on the elementary education science concepts via the Next Generation of Science Standards.

Entry Level Standards:
Students must be eligible for enrollment in English 1010 and college-level Math.

Prerequisites:
None

Textbook(s) and Other Course Materials:
Enger, Eldon D. and Frederick C. Ross. (2012) Concepts in Biology Lab Manual, 14th Ed. New York: The McGraw-Hill Companies, Inc. This is a custom publication only available from the PSCC Bookstore. Students must purchase this book from the PSCC Bookstore. A used version will not have the papers you will need to turn in to the Instructor.

Hoefnagels, Marielle. (2013) Biology: The Essentials. New York: The McGraw-Hill Companies, Inc. This is a custom publication only available from the PSCC Bookstore.

The textbooks are required, and the student should bring the texts to each lecture and laboratory session. You will need the laboratory manual for most lab exercises. You will be required to record data in the manual and submit pages from the manual to your instructor for grading.

An important part of this class involves use of the internet: Webmail (your Pellissippi email address), D2L (Desire to Learn), and other on-line course resources. Home access is recommended, but Internet, Webmail and other on-line resources can be accessed on campus at any of the library computers as well as those in the computer labs.

NOTE: Experience has shown that purchasing the course textbooks from the PSCC Bookstore prevents delays in obtaining the lecture materials and laboratory manual. Photocopies of the
laboratory exercises are not acceptable for grading.

I. Week/Unit/Topic Basis:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
</tr>
</thead>
</table>
| 1    | Lab: Microscopes (Lab Manual Chap. 5)  
      | Lecture: Scientific Study of Life and The Chemistry of Life (Hoefnagels, Chap. 1-2) |
| 2    | Lab: Metric Measurements and the Scientific Method (Lab Manual Chap. 1) and Mystery Boxes  
      | Lecture: The Chemistry of Life and Cells (Hoefnagels, Chap. 2-3) |
| 3    | Lab: Diffusion and Osmosis (Lab Manual Chap. 3)  
      | Lecture: Cells (Hoefnagels, Chap. 3) |
| 4    | Lab: Microscopes and Cell Types (Lab Manual Chap. 5)  
      | Lecture: The Energy of Life (Hoefnagels, Chap. 4) |
| 5    | Lab: Photosynthesis  
      | Lecture: Exam I over Chapters 1, 2, 3, 4  
      | Photosynthesis (Hoefnagels, Chap. 5) |
| 6    | Lab: DNA Extraction (Lab Manual Chap. 13)  
      | Lecture: How Cells Release Energy, DNA Structure and Gene Function (Hoefnagels, Chap. 6, Chap. 7) |
| 7    | Lab: Cell Division (Lab Manual Chap. 11)  
      | Lecture: DNA Structure and Function, DNA Replication and Cell Division  
      | (Hoefnagels, Chap. 7, 8) |
| 8    | Lab: TBA  
      | Lecture: Sexual Reproduction and Meiosis (Hoefnagels, Chap. 9)  
      | Exam II over 5, 6, 7, 8, 9 |
| 9    | Lab: TBA  
      | Lecture: Patterns of Inheritance (Hoefnagels, Chap. 10) |
| 10   | Lab: TBA  
      | Lecture: Evolution (Hoefnagels, Chap. 12, 13) |
| 11   | Lab: TBA  
      | Lecture: Speciation and Extinction (Hoefnagels, Chap. 14),  
      | Exam III over Chapters 10, 12, 13, 14 |
| 12   | Lab: TBA  
      | Lecture: Population Ecology (Hoefnagels, Chap. 18) |
| 13   | Lab: Energy Flow Within an Ecosystem (Owl Pellets)  
      | Lecture: Ecosystems and Biodiversity (Hoefnagels, Chap. 19, 20) |
| 14   | Lab: Field trip  
      | Lecture: Exam IV over Chapters 18, 19, 20 |
| 15   | Finals Week |
Final Exam

* This class has an integrated lecture and laboratory format. Lectures and hands-on activities may take place in the laboratory or lecture classroom on any class day as determined by the instructor.

II. Course Goals*:

The course will:

Natural Sciences: Issues in today’s world require scientific information and a scientific approach to informed decision making. Therefore, the goal of the Natural Science requirement is to guide students toward becoming scientifically literate. This scientific understanding gained in these courses enhances students’ ability to define and solve problems, reason with an open mind, think critically and creatively, suspend judgment, and make decisions that may have local or global significance. To achieve this outcome, students will:

A. Conduct an experiment, collect and analyze data, and interpret results in a laboratory setting.

B. Analyze, evaluate and test a scientific hypothesis.

C. Use basic scientific language and processes, and be able to distinguish between scientific and non-scientific explanations.

D. Identify unifying principles and repeatable patterns in nature, the values of natural diversity, and apply them to problems or issues of a scientific nature.

E. Analyze and discuss the impact of scientific discovery on human thought and behavior.

III. Expected Student Learning Outcomes*:

The student will be able to:

1. Read and critique scientific writings, including those from the text, biological journals, books and the Internet. (B, E)*

2. Listen to and discuss biological information presented by the instructor, educational videos, guest speakers and peers. (D, E)*

3. Work in teams to collect data, generate graphs and tables and summarize the data and draw conclusions using process skills such as: observing, measuring, classifying, communicating and inferring. (A, B, C)*

4. Write a formal paper based on a course topic and laboratory report based on one of the laboratory exercises completed. The laboratory report will include introduction, materials and methods, results, conclusion and reference sections. (A, B, E)*

5. Develop a scientific vocabulary that allows them to communicate scientific literacy more effectively with teachers, students, and community. (C, E)*

6. Locate and evaluate related scientific information in the Educational Resource Center (ERC) and on the Internet. (A, C)*

7. Interpret related biological information and evaluate its validity. (C, D)*

8. Exhibit enhanced critical thinking skills. (D, E)*
9. Transfer data files to/from one storage device to another and use the printing facilities available on the system. (A)*

10. Write essays. (A)*

* Capital letters after Expected Student Learning Outcomes reference the course goals listed above.

IV. Evaluation:

A. Testing Procedures: Five Exams -500 points (100 points each)

Each unit is evaluated using one or more exams. Exams 1 through 4 will not be cumulative. However, students are expected to retain basic information acquired in previous chapters. The final exam is cumulative. Exams may consist of any of the possible combination of formats: multiple choice, matching, short answer, True/False and/or essay questions. The exams will emphasize lecture and assigned reading materials from the Hoefnagels textbook, and may cover hands-on activities and labs.

**There are NO makeup exams.** If a unit is exam is missed, the comprehensive final may be used to take the place of **one** missed exam score if there is evidence of a valid and reasonable excuse, and arrangements are made with the instructor.

**The final exam is mandatory.** Failure to take the final exam will forfeit any bonus points earned during the semester.

B. Laboratory Expectations: 150 points

Learning activities: Students may conduct a variety of assignments, including hands-on laboratory activities, post-laboratory questions and quizzes as determined by the instructor. During and after each lab exercise, students will be required to complete post-laboratory questions. Post-laboratory assignments will not be accepted late.

C. Field Work:

N/A

D. Other Evaluation Methods:

Homework Assignments and Lesson Plans-320 points
Students may be required to complete homework assignments and create lesson plans for hands-on activities suited for K-6 students on the biological concepts covered in lecture. Students may also conduct peer reviews of their classmate’s lesson plans. Assignments will not be accepted late.

Participation- 30 points
Participation points will be based on participation and engagement in lecture discussions and attendance.

E. Grading Scale:

The grading scale is out of 1000 possible points

- 900-100% (900-1000 points) = A
- 87-89% (870-899 points) = B+
- 80-86% (800-869 points) = B
V. Policies:

A. Attendance Policy:

Pellissippi State expects students to attend all scheduled instructional activities. As a minimum, students in all courses (excluding distance learning courses) must be present for at least 75 percent of their scheduled class and laboratory meetings in order to receive credit for the course. Individual departments/programs/disciplines, with the approval of the vice president of Academic Affairs, may have requirements that are more stringent. In very specific circumstances, an appeal of the policy may be addressed to the head of the department in which the course was taken. If further action is warranted, the appeal may be addressed to the vice president of Academic Affairs.

B. Academic Dishonesty:

Academic misconduct committed either directly or indirectly by an individual or group is subject to disciplinary action. Prohibited activities include but are not limited to the following practices:

- Cheating, including but not limited to unauthorized assistance from material, people, or devices when taking a test, quiz, or examination; writing papers or reports; solving problems; or completing academic assignments.
- Plagiarism, including but not limited to paraphrasing, summarizing, or directly quoting published or unpublished work of another person, including online or computerized services, without proper documentation of the original source.
- Purchasing or otherwise obtaining prewritten essays, research papers, or materials prepared by another person or agency that sells term papers or other academic materials to be presented as one’s own work.
- Taking an exam for another student.
- Providing others with information and/or answers regarding exams, quizzes, homework or other classroom assignments unless explicitly authorized by the instructor.
- Any of the above occurring within the Web or distance learning environment.

Please see the Pellissippi State Policies and Procedures Manual, Policy 04:02:00 Academic/Classroom Conduct and Disciplinary Sanctions for the complete policy.

C. Accommodations for disabilities:

Students that need accommodations because of a disability, have emergency medical information to share, or need special arrangements in case the building must be evacuated should inform the instructor immediately, privately after class or in her or his office. Students must present a current accommodation plan from a staff member in Disability Services (DS) in order to receive accommodations in this course. Disability Services may be contacted by sending email to disabilityservices@pstcc.edu, or by visiting Alexander 130. More information is available at http://www.pstcc.edu/sswd/.

D. Other Policies:

**Electronic devices:** Use of electronic devices in the classroom is inconsiderate and disruptive.
If cell phones must be brought into the classroom, they need to be turned off or on silent mode and stored out of sight in backpacks or bags. During class, unrelated activities such as text messaging, reading e-mail, doing work for other courses, or playing computer games, are not permitted. Students should receive prior approval from the instructor before using a class or personal computer.

**Laboratory Safety:** Students must come to the laboratory prepared. Preparation includes, but is not limited to: 1) reading exercises in advance, 2) turning in completed assignments, and 3) bringing the lab manual to class.

No food, drink, shorts or open-toed/open-heeled shoes are allowed in lab. No one not appropriately dressed will be allowed in lab. Report spills or injuries to the instructor, and when unsure of what to do, ask your instructor.

**Missed work:** Missed course work cannot be made up. Exams and projects are due by the scheduled submission deadline. If a student arrives late for class or leaves class before dismissal, then credit including partial points will not be earned for the day’s course work.

**Participation:** PSCC expects students to attend all scheduled instructional activities and to be on time. Students in all courses must be present for at least 75 percent of their scheduled class and laboratory meetings in order to receive credit for the course. If a student is absent from class, it is the student's responsibility to follow the syllabus for the course.

Students are expected to continue learning even in the absence of class meetings, and should continue studying course materials in accordance with the course schedule as if they were attending class.

**Online access:** An important part of this class involves use of the Internet, Webmail, and online course resources. Home access is recommended, but these resources can be accessed on campus at any of the library computers as well as computer labs. Students are responsible for communications and course content posted online.

**Professionalism:** The professional attributes that will be evaluated include, but are not limited to:

1. The student adheres to the attendance policies established by the College and the timetable, including arrival and departure at the official course times.
2. The student is consistently well prepared and submits all assignments according to the deadlines set by the instructor, and the course syllabus and schedule.
3. The student demonstrates a respectful attitude and professional demeanor with faculty and peers.
4. The student demonstrates flexibility with changes to the course schedule.
5. The student demonstrates the ability to follow verbal and written instructions.
6. The student complies with all safety regulations.
7. The student is cooperative in class and laboratory and not disruptive of his/her peers.
8. The student checks his or her work for accuracy including spelling and grammar and factual correctness.
9. The student checks the web mail and D2L Email frequently, and consistently checks for updates on the course online site.
10. The student is attentive and participates in class.

**Syllabus Changes:** The course schedule is subject to change as opportunities for field trips, outreach programs, and guest speakers become available. Also, the instructor may make changes based on the timeline of the class, feedback from learners and/or logistical issues and
will inform you as a change is made. Changes to the syllabus and class schedule may include modifying reading assignments and learning activities.