

BIO 100 Syllabus

Fall 2016

Course Description:

Survey of biology emphasizing present and future relationships of humans to their environment.

Learning Goals:

- Students will be exposed to the amazing and diverse world of life by exploring the major themes of biology. Each biological theme will begin with a relevant question or a current problem applicable to everyday life.
- Students will address biological questions through inquiry-based laboratory experiments, a course undergraduate research experience, and exploration of dominant themes in biology. This investigation will begin by focusing on the structure and function of life at the chemical, subcellular and cellular levels, continuing with an examination of genetics and the mechanisms of cellular reproduction. Students will explore biodiversity including the evolutionary factors that have led to the form and function of life, and issues affecting biodiversity.
- Students will be able to critically analyze scientific issues in order to make scientifically literate decisions dealing with environmental and ethical issues related to biology and the human experience.

** All of these learning goals will be underscored with the scientific method and based on relevant, inquiry-based science.*

Required textbook:

Biology for a Changing World, Second edition, Shuster, Vigna, Tontono, Sinha

Required lab manual:

Biology 100 Laboratory Manual

(Available for purchase in the University Bookstore)

Put your lab manual in a 3-ring binder and bring it with you to **every** lab meeting.

Biological Principles & the Human Environment

Dr. Krista Slemmons

TNR 463

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715-346-2453

Office hours:

Tuesday 10:00-11:00

Wednesday 10:00-11:00

Or by appointment

Lecture:

Tuesday and Thursday

11:00-11:50

TNR 170

Lab:

Sect. 2 Wed 11-1:50

Sect. 3 Wed 2-4:50

Sect. 1 Thur 8-10:50

TNR 254



GEP and Course Learning Outcomes:

1

Solve problems by applying the scientific method as it pertains to the natural world and distinguish this process from other ways of knowing.

2

Infer relationships, make predictions and solve problems by **synthesizing** content derived from biological principles including:

- Cellular level functions necessary for life
- Inheritance and evolutionary change
- The diversity of life within an evolutionary context
- The basic function of populations, communities and ecosystems.

3

Evaluate social decision making in light of biological principles, particularly pertaining to aspects of your daily life and societal issues.

Example Class Assignment(s):

1

Identify the basic principles of the scientific method in a case study involving childbed fever.
Conduct self-designed, long term experiments (photosynthesis, bacterial growth) applying the principles of the scientific method.

2

Infer relationships, make predictions and solve problems based on data dealing with bacterial inhibition and experimental treatments in self designed experiment

3

Apply scientific concepts to a debate involving National Science Foundation's funding of basic vs applied scientific research and to solve problems involved in eight different case studies throughout the semester. Case studies involve current, real-life problems and determining solutions to those problems based on course content.

Teaching Method

1

Inquiry Lab
Case Study
Lecture
Group work
Individual work
Flipped videos
Oral presentation

2

Inquiry Lab
Group work
Written scientific paper

3

Debate
Case study
Group work
Independent work
Written work

Grading:

Lecture:

| | |
|---|--------------|
| 3 Lecture exams (100 points each) | = 300 points |
| 9 Online video lectures/case studies | = 100 points |
| Clicker questions (4 points/lecture, 25 lectures) | = 100 points |
| Subtotal | = 500 points |

Lab:

| | |
|--|--------------|
| 8 Labs (20 points each: 5 pre-lab, 15 lab) | = 160 points |
| 2 Presentations (one poster, one oral, 50 points each) | = 100 points |
| Peer evaluations | = 30 points |
| Lab report, Bacteria | = 50 points |
| CURES Project | |
| Chl <i>a</i> graph | = 20 points |
| Lake map | = 15 points |
| Background info | = 20 points |
| Phytoplankton analysis | = 20 points |
| Final Paper | = 75 points |
| Prelab – Photosynthesis/Bacteria | = 10 points |
| Subtotal | = 500 points |

| | |
|--------------|----------------------|
| Total | = 1000 points |
|--------------|----------------------|

Final grades will be assigned based on the following percentages:

| | | | | | |
|----|----------|----|----------|----|----------|
| A | = ≥93% | B- | = 80-82% | D+ | = 67-69% |
| A- | = 90-92% | C+ | = 77-79% | D | = 60-66% |
| B+ | = 87-89% | C | = 73-76% | F | = < 60% |
| B | = 83-86% | C- | = 70-72% | | |

Exams:

Exams are cumulative but will largely deal with topics covered since the previous exam (80%). Cumulative exams result in longer retention of material (Khanna et al. 2013; Lawrence 2013). Exams will cover assigned textbook readings as well as lecture and lab material. **Make-up exams will be provided only in the case of an acceptable excuse and the discretion of Dr. Slemmons.**

| | |
|-------------------|--------------------------------------|
| Exam 1 | Oct 6th |
| Exam 2 | Nov 8th |
| Final Exam | Dec 19th 2:45-4:45 |

Lecture:

Lectures will be held twice a week. I expect you to be prepared, engaged and attentive. Some lectures will involve group or independent work based on videos that you will watch outside of class. While lecture is not mandatory, you will be able to earn clicker points to improve your grade. If you attend every lecture, there is an opportunity to gain extra clicker points. **Absences from lecture will result in zeros for these clicker points.**

Partial lecture notes will be provided on D2L prior to class when deemed necessary (Cornelius and Owen 2008). Providing complete lecture notes decrease student success (Noppe, 2007).

Clickers:

This class uses “Clickers” to do interactive polling. You are required to lease a clicker from the UWSP’s Help Desk. You will need your UWSP Student ID. UWSP’s Help Desk is located in the basement of the Library. Help Desk website: <http://www.uwsp.edu/infotech/helpdesk/>. An \$8 semester lease fee will be automatically added to your UWSP student bill.

Important: Your clicker can be used in any class that requires clickers for the semester.

Returning clickers: Clickers must be returned to UWSP's Help Desk in LRC, room 025 before the end of finals. Students with unreturned clickers will be billed a late fee and/or may be billed the replacement cost of the clicker.

Online Quizzes:

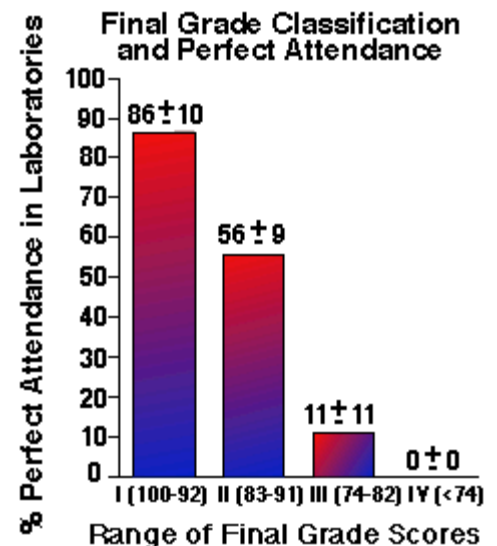
Throughout the semester, material will be presented on D2L in a flipped classroom format. Students will be assessed on their understanding of the content provided in these videos in the form of a D2L quiz. If you fail to complete the quiz by the designated deadline, you will not be able to make up the quiz.

Case Studies:

There will be 9 case studies throughout the semester. Case studies involve a real world application of some topic that we are covering in class. Case studies may be presented through online videos, a reading or participating in class discussions. Students will answer questions based on these case studies and be assessed based on their ability to apply content knowledge to a real life scenario.

Lab Attendance:

Regular attendance to lab is imperative for success in this course. There is a strong positive correlation



Daniloff 1994

between the amount of time a student spends in class and her/his final grade. It is **your** responsibility to get and understand the material covered during a missed lab/lecture.

Lab activities CANNOT be rescheduled. However, your lowest lab grade will be dropped. If you have a valid reason to miss additional labs please contact Dr. Slemmons as soon as possible, otherwise you will receive a zero for the lab. **If you miss a lab and an assignment was due on that date, the assignment should be turned in within 24 hours of the absence or arrangements should be made with Dr. Slemmons to turn in the assignment.**

Prelab: Each week you are expected to read the assigned lab ahead of time and complete a set of prelab questions that assess your understanding of the lab. These questions are posted in D2L under quizzes. Questions are assigned at random and therefore may be different between students. Some prelabs will have an associated video that should be viewed prior to answering the questions. Proper preparation for lab will ensure your understandings of the concepts and your ability to work cooperatively with your lab partners.

Lab report: Each week a portion of the lab will be graded. Often this is composed of the post lab questions, a graph or data collected. However, some portions of the lab will be solely graded based on completion. These graded sections are generally outlined in the lab manual. There is one formal lab report due based on the Laboratory 8: Bacteria. The requirements and rubrics for this report are included in the lab manual.

Presentations: Students will present in two different formats throughout the semester: 1) a group PowerPoint (or other means of presenting) on lab results from Lab 5: Photosynthesis, and 2) a Poster presentation on a biological topic of your choosing. Those students that are **elementary education majors** will be required to create a lesson plan on a biological topic and illustrate an activity that demonstrates those learning objectives. Students that are not education majors are encouraged to create a poster that merges their discipline with that of Biology. Students will be constructing a rubric that will be used to evaluate posters. Each student will evaluate the posters of three different peers. You will be assessed on your depth of evaluations. Requirements for these assignments are further detailed in the lab manual.

CURES Project: Students will be participating in a CURES (Course undergraduate Research Experience) project which will run the entire semester. This project will deal with a local environmental issue where students will:

- Be introduced to basic means of assessing lake quality
- Review recent scientific literature to generate potential testable hypotheses
- Choose a hypothesis and make an experimental plan
- Perform experiments, record data and replicate experiments
- Analyze data
- Present project to peers
- Add data and results to a larger database on lake quality

A CURES project involves:

- **ENGAGEMENT** in scientific practices, such as asking questions, building and evaluating models, proposing hypotheses, designing studies, and gathering and analyzing data.
- **DISCOVERY** meaning that students are addressing novel scientific questions aimed at generating and testing new hypotheses. Collectively, students' findings offer some new insight into how the natural world works.
- **RELEVANCY** that fits into a larger scientific effort relevant beyond the scope of the course.

- **COLLABORATION** both among students and between students and instructors.
- **ITERATION** to increase the reliability or scope of findings.

Late assignments: Pre-lab questions in D2L are due at the **START** of lab each week. Post-lab questions and/or reports are due the following week at the beginning of lab unless otherwise indicated. These will also be posted to D2L. Late assignments will not be accepted and will receive a zero. Extensions for D2L quizzes will not be granted. If you foresee a problem completing a quiz please contact Dr. Slemmons prior to the due date.

E-mail: UWSP students are expected to check their University e-mail regularly for information from the university and/or instructors. If you are using an e-mail account other than your campus account to contact Dr. Slemmons, be sure your full name is included in the message.

Academic Conduct: All students are expected to follow ethical practices of neither giving nor receiving any unauthorized assistance on their work in this class. Additionally, all students are expected to not divulge the nature or content of any questions or answers on exams to any other student or groups of students. If there are suspected violations of academic misconduct, as defined by the UWSP Chapter 14.03(1) code, then the Chapter 14 policies and procedures will be invoked. See web page at http://www.uwsp.edu/admin/stuaffairs_rights/rightsChap14.pdf for details. Any student that removes an exam from the classroom may be given a failing grade for the course.

Electronic Devices: Cell phones should be turned **off** and **not** be displayed during labs or exam. Laptops will not be allowed during lecture. Use of laptops decreases student success (Fried 2008; Mueller and Oppenheimer 2014). No other communication or musical devices are allowed. Students needing a foreign language dictionary during exams may use one with permission from me.

Need Help?

Extra Help Resources

Make an appointment with me

Come see Dr. Slemmons during scheduled office hours or make an appointment for extra help.

Form study groups

Find fellow classmates or Biology majors that you form a regular group with and review material and study for exams.

Attend the review sessions at TLC.

Tutors are available to help students with lecture and lab material. Interested students are encouraged to contact the Tutoring-Learning Center.

Contact Disability Services

Students with a disability requiring accommodations should register with the Disability and Assistive Technology Center in the Learning Resource Center (the Library) and contact me at the beginning of the course.

Contact Counseling Center

The counseling center is located on the 3rd floor of Delzell Hall. These counselors can assist you with test anxiety, time management and personal struggles.

Tutoring in Math and Science (TIMS) in the Tutoring-Learning Center (TLC) offers free group and Drop-in Study Table Sessions to support you in your biology classes. In addition, TIMS offers the option for individual biology tutoring sessions. The biology tutors are UWSP students who have done well in their classes and who are here to share their successful study habits and biology content knowledge to help others succeed. Talking about biology and working problem sets together helps to clarify and solidify knowledge, and the tutors in the lab are eager to help. If you have questions about the schedule or would like to make an appointment, please visit room LRC 018 or call (715) 346-3568 for information.

Biology Assistance – Fall 2016

| Name | Day | Time | Location | Cost |
|-------------|-----------------------|--|---|-----------------|
| Drop-in | Mon.- Thurs. | 6:00 p.m. - 9:00 p.m. | LRC 650 | Free |
| One-on-One | Mon. – Thurs. Fri. | 9:00a.m. - 6:00 p.m. 9:00a.m. - 1:00 p.m. | Sign up in TLC- LRC 018 Mon.-Fri. 9:00 a.m. - 4:30 p.m. | May have fee |

Note: This is a tentative syllabus. I reserve the right to make amendments to this document. Also, course materials may not be distributed or posted in any online format without permission from Dr. Slemmons.

BIO 100 FALL 2016 LECTURE and LAB SCHEDULE

| DATE | TOPIC | D2L VIDEO/QUIZ | READING | LAB |
|----------------|---|---|--------------|--|
| WEEK 1 | | | | |
| Sept 6 | Welcome, Syllabus, Intro to Bio What is Life? | Anatomy of an Experiment (due Sept 13 @ 11:00 am) | Chapter 1 | DUE: Pre-Lab 1 <ul style="list-style-type: none"> •Procedures/Syllabus •Lab 1: Scientific Investigation |
| Sept 8 | Case 1: Childbed Fever & Nature of Science | | | |
| WEEK 2 | | | | |
| Sept 13 | Nature of Science & Scientific Method | Molecules of the cell (due Sept 20 @ 11:00 am) | Chapter 3 | •DUE: Lab 1 & Pre-Lab 2 <ul style="list-style-type: none"> •Lab 2: Microscopes and Cells •Introduce CURES Project/Lake Ecology-Group Assignments. Filter samples |
| Sept 15 | Cellular Structure and Function & Cell Membrane/Transport | | Chapter 2, 4 | |
| WEEK 3 | | | | |
| Sept 20 | Case 2: The Peanut Butter Project & Biomolecules | Photosynthesis (due Sept 27 @11:00 am) | Chapter 5 | •DUE: Lab 2 <ul style="list-style-type: none"> •CURES: Chlorophyll a analysis •Lab 5: Hypothesis & Experimental Design |
| Sept 22 | Case 3: Killer Flea Dip and Cellular Respiration | | Chapter 6 | |
| WEEK 4 | | | | |
| Lab 4: Enzymes | | | | |
| Sept 27 | Cellular Respiration (cont.) | | Chapter 6 | •DUE: CURES Chl a Data upload & Pre-Lab 3 Lab 3: Osmosis and Diffusion Excel & Science writing workshop |
| Sept 29 | Case 4: Algal Bloom Case | | | |
| WEEK 5 | | | | |
| Oct 4 | Review Exam I | DNA, RNA, Replication (Short vs Long; due Oct 11 @11:00 am) | | •DUE: CURES Lake Map & Pre-Lab 5 - Hypothesis |

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|---------|---|--|----------------------|--|
| Oct 6 | EXAM I | | Chapter 7 | Lab 5: Prep/Plant Research CURES |
| WEEK 6 | | | | |
| Oct 11 | Case 5: Vampire Case DNA to Protein | Meiosis (Short vs. Long; due Oct 20 @11:00 am) | Chapter 8 | DUE: CURES Chl a graph & Pre-Lab 6 |
| Oct 13 | Wrap up DNA to protein | | Chapter 9, 10, 13 | Lab 6: Mitosis |
| WEEK 7 | | | | |
| Oct 18 | Mitosis, Cancer, Stem Cells | | Chapter 11 | DUE: CURES Background Info & Pre-Lab 5 |
| Oct 20 | Case 6: Mitosis/Meiosis Case | | Chapter 12 | Lab 5: Photosynthesis |
| WEEK 8 | | | | |
| Oct 25 | Mendelian Genetics | Non-Mendelian Genetics (due Nov 1 @11:00 am) | | Lab 5: Photosynthesis Presentations |
| Oct 27 | Genetic Engineering/Profiling | | | |
| WEEK 9 | | | | |
| Nov 1 | Genetic Engineering/Profiling | | | DUE: Pre-Lab 7 Lab 7: DNA/Meiosis |
| Nov 3 | Exam II Review | | | Lab 8: Set-up (prepare phytoplankton) |
| WEEK 10 | | | | |
| Nov 8 | EXAM II | | Chapter 14 | DUE: Lab 7 & Pre-Lab 8 |
| Nov 10 | Evolution | Bacterial Diversity (due Nov 17 11 am) | Chapter 15, 16 | Lab 8: Bacteria & CURES: Phytoplankton Identification and Analysis |

| WEEK 11 | | | | |
|--------------------------|---|---|------------|---|
| Nov 15 | Evolution | Fungus /Protist Diversity (due Dec 16 5 pm) | Chapter 18 | DUE: Pre-Lab 9 & Lab 8: Mini Paper |
| Nov 17 | Wrap up evolution, Biodiversity Issues | | Chapter 19 | |
| WEEK 12 | | | | |
| Nov 22 | Biodiversity Issues | | Chapter 19 | No Lab |
| Nov 24 | No Class - THANKSGIVING | | Chapter | |
| WEEK 13 | | | | |
| Nov 29 | Population Ecology | Animal/ Plant Diversity (due Dec 16 5 pm) | Chapter 23 | DUE: Lab 9 & Pre-Lab 10, CURES – Phytoplankton data upload |
| Dec 1 | Community Ecology | | | |
| WEEK 14 | | | | |
| Dec 6 | Case 9: Population Ecology | | Chapter 22 | DUE: Pre-Lab 11 |
| Dec 8 | Ecosystem ecology Case 7: Mystery of disappearing Seals | | | |
| WEEK 15 | | | | |
| Dec 13 | Human Biology | | Chapter 24 | DUE: Poster presentations |
| Dec 15 | Review Final EXAM | | | |
| WEEK 16 | | | | |
| Dec 16-22 Final Exams | Final Exam: Monday, Dec 19 th 2:45-4:45 | | | |

Seven Principles of Learning (Ambrose et al. 2012)

1. Students' *prior knowledge* can serve to help or hinder learning.
2. Students' *organization of knowledge* impacts how students learn and apply what they know.
3. *Motivation* determines, directs, and sustains what students learn.
4. To develop *mastery*, students must develop the skills, practice integrating them, and know when to apply them.
5. Goal-directed *practice* coupled with targeted *feedback* enhances learning.
6. Level of learner *development* interacts with “course” *climate* to impact learning.
7. To become self-directed, learners must be able to monitor and adjust their approaches to learning.

Ten things professors love:

1. Students
2. Students who come to class with an open mind
3. Students who come to class to fulfill a requirement but decide to make the most of the experience
4. Students who give eye contact during lecture (and maybe even smile)
5. Students who aren't afraid to ask questions
6. Students who come to me when they need help
7. Students who tell me not just that they enjoyed my course, but why
8. Students who have their own ideas
9. Students who give me unique and powerful things to say in a letter of recommendation
10. Students who are fully engaged in the learning process

*adapted from Jane E Dmochowski, University of Pennsylvania

References:

- Ambrose SA, Bridges MW, DiPietro M, Lovett MC, Norma MK (2010) How Learning Works: Seven Research-based principles for smart teaching. Jossey-Bass
- Cornelius TL, Owen-DeSchryver J (2008) Differential Effects of Full and Partial Notes on Learning Outcomes and Attendance. *Teaching of Psychology* 35: 6–12
- Fried C (2008) In-class laptop use and its effects on student learning (2008) *Computers & Education* 50 (3): 906–914
- Khanna MM, Badura Brack AS, Finken L (2013) Short- and Long-Term effects of cumulative finals on Student learning. *Society for the Teaching of Psychology* 40(3) 175-182.
- Lawrence, N. K. (2013). Cumulative exams in the introductory psychology course. *Teaching Psychology* 40 (1), 15–19.
- Mueller PA and Oppenheimer DM (2014) The Pen Is Mightier Than the Keyboard Advantages of Longhand Over Laptop Note Taking Psychological Science. DOI: 10.1177/0956797614524581
- Noppe IC (2007) PowerPoint Presentation Handouts and College Student Learning Outcomes. *International Journal for the Scholarship of Teaching and Learning* 1(1), Article 9.