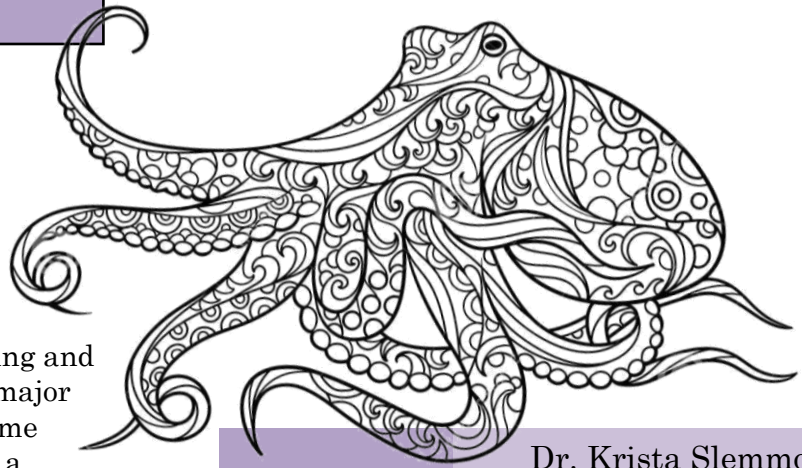


# BIOLOGY 100

Spring 2017



## 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 explore, synthesize and evaluate biological concepts 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 biological concepts 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.*

## Biological Principles & the Human Environment

Dr. Krista Slemmons  
TNR 463  
[kslemmon@uwsp.edu](mailto:kslemmon@uwsp.edu)  
<http://paleodiatom.com>  
715-346-2453

Office hours:  
Tuesday 10:00-11:00  
Wednesday 10:00-11:00  
Or by appointment

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**Lecture:**  
Tuesday and Thursday  
11:00-11:50  
TNR 120

**Lab:**  
Sect. 2 Wed 11-1:50  
Sect. 3 Wed 2-4:50  
Sect. 1 Thur 8-10:50  
TNR 254

**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.

**GEP & Course Learning Outcomes**

**Example Class Assignment(s):**

**Teaching Method**

<b>1</b>
Solve problems by applying the scientific method as it pertains to the natural world and distinguish this process from other ways of knowing.
<b>2</b>
Infer relationships, make predictions and solve problems by <b>synthesizing</b> content derived from biological principles including:
<ul style="list-style-type: none"> <li>• Cellular level functions necessary for life</li> <li>• Inheritance &amp; evolutionary change</li> <li>• The diversity of life within an evolutionary context</li> <li>• The basic function of populations, communities and ecosystems.</li> </ul>
<b>3</b>
Evaluate social decision making in light of biological principles, particularly pertaining to aspects of your daily life and societal issues.

<b>1</b>
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.
<b>2</b>
Infer relationships, make predictions and solve problems based on data dealing with bacterial inhibition and experimental treatments in self designed experiment
<b>3</b>
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.

<b>1</b>
Inquiry Lab Case Study Lecture Group work Individual work Flipped videos Oral presentation CUREs Project
<b>2</b>
Inquiry Lab Group work Written scientific paper
<b>3</b>
Debate Case study Group work Independent work Written work CUREs Project

**Grading:**

**Lecture:**

3 Lecture exams (100 points each)	= 300 points
10 Online video lectures	= 50 points
Clicker questions (4 points/lecture, 25 lectures)	= 100 points
<b>Subtotal</b>	<b>= 450 points</b>

**Lab:**

6 Labs (20 points each: 5 pre-lab, 15 lab)	= 120 points
2 Labs (15 points each: 5- pre-lab, 10 lab – animal & plant lab)	= 30 points
2 Presentations (one poster, one oral, 50 points each)	= 100 points
Peer evaluations	= 25 points
Lab report, Bacteria	= 50 points
CURES Project	
Chl <i>a</i> graphs	= 30 points
Lake map	= 15 points
Background info	= 20 points
Final Paper	= 50 points
Prelab – Hypothesis - Photosynthesis/Bacteria	= 10 points
<b>Subtotal</b>	<b>= 450 points</b>

<b>Total</b>	<b>= 900 points</b>
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**Final grades will be assigned based on the following percentages:**

A	= $\geq 93\%$	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** Feb 23<sup>rd</sup>  
**Exam 2** Mar 23<sup>rd</sup>  
**Final Exam** May 17<sup>th</sup> 8:00 am – 10:00 am

**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.

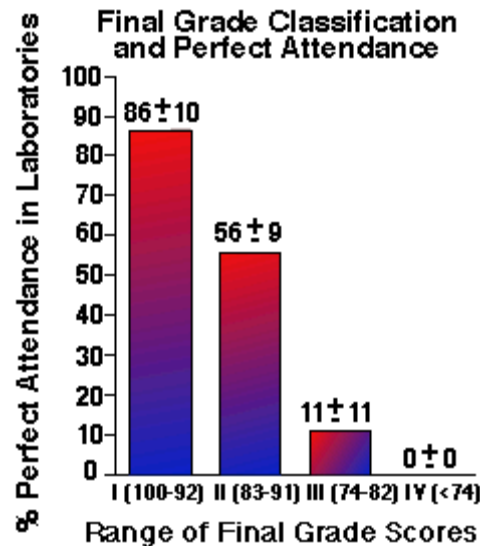
**Returning clickers:** Clickers must be returned to UWSP's Help Desk in LRC, room 025 before the end of finals. Students with unreturned clickers will be billed a late fee and/or may be billed the replacement cost of the clicker.

**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



Daniloff 1994

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 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](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 3<sup>rd</sup> 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.

### Science Tutoring – Spring 2017

Name	Day	Time	Location	Cost
Drop-In Tutoring	Mon.– Thurs.	. <a href="#">See TLC Website</a> for Drop-In Schedule	Drop-In Tutoring Center, DUC 205	Free
Group Tutoring and Supplemental Instruction (SI)	Mon. – Fri.	<a href="#">See TLC Website</a>	<a href="#">See TLC Website</a>	Free
One-on-One Tutoring	Mon. – Fri.	By appointment	Sign up in TLC, 018 ALB Mon.-Fri. 9:00 a.m. - 4:30 p.m.	May have fee

## BIO 100 SPRING 2017 LECTURE and LAB SCHEDULE

DATE	TOPIC	D2L VIDEO/QUIZ	READING	LAB
<b>WEEK 1</b>				
Jan 24	Welcome, Syllabus, Intro to Bio What is Life?	<b>Anatomy of an Experiment (due Jan 31 @ 11:00 am)</b>	Chapter 1	<b>DUE: Pre-Lab 1</b>  •Procedures/Syllabus/pre-assessment questions
Jan 26	Case 1: Childbed Fever & Nature of Science			•Lab 1: Scientific Investigation  Excel tutorial
<b>WEEK 2</b>				
Jan 31	Nature of Science & Scientific Method	<b>Molecules of the cell (due Feb 7 @ 11:00 am)</b>	Chapter 3	<b>•DUE: Lab 1 &amp; Pre-Lab 2</b>  •Lab 2: Microscopes and Cells
Feb 2	Cellular Structure and Function & Cell Membrane/Transport		Chapter 2, 4	
<b>WEEK 3</b>				
Feb 7	Case 2: The Peanut Butter Project & Biomolecules	<b>Photosynthesis (due Feb 16@11:00 am)</b>	Chapter 5	<b>•DUE: Pre-Lab 3 &amp; Lab 2</b>  Lab 3: Osmosis and Diffusion
Feb 9	Case 3: Killer Flea Dip and Cellular Respiration		Chapter 6	
<b>WEEK 4</b>				
Feb 14	Cellular Respiration (cont.)		Chapter 6	<b>•DUE: Pre-Lab 4 &amp; Lab 3</b>  Lab 4: Enzymes
Feb 16	Case 4: Algal Bloom Case, Review Photosynthesis			•Lab 5: Hypothesis & Experimental Design
<b>WEEK 5</b>				
Feb 21	Review Exam I	<b>DNA, RNA, Replication (Short vs Long; due Feb 28 @11:00 am)</b>		<b>•DUE: Pre-Lab 5 - Hypothesis</b>  Lab 5: Prep/Plant  •Lab: CAFO Project Introduce Freshwater



Feb 23	EXAM I		Chapter 7	Ecology Group Assignments CUREs Site Map Background Info
WEEK 6				
Feb 28	Case 5: Vampire Case DNA to Protein	<b>Meiosis (Short vs. Long; due Mar 9 @11:00 am)</b>	Chapter 8	<b>DUE: Pre-Lab 6 &amp; Lake Map</b>  Lab 6: Mitosis
Mar 2	Wrap up DNA to protein		Chapter 9, 10, 13	
WEEK 7				
Mar 7	Mitosis, Cancer, Stem Cells		Chapter 11	<b>DUE: Pre-Lab 5 &amp; Background Info CAFO</b>  Lab 5: Photosynthesis
Mar 9	Case 6: Mitosis/Meiosis Case		Chapter 12	
WEEK 8				
Mar 14	Mendelian Genetics	<b>Non-Mendelian Genetics (due Mar 30 @11:00 am)</b>		Lab 5: Photosynthesis Presentations  DUE: Pre-Lab 8 hypothesis  Lab 8: Set-up
Mar 16	Mendelian Genetics & Genetic Engineering/Profiling			
SPRING BREAK				
Mar 21	No class			No Lab
Mar 23	No class			
WEEK 9				
Mar 28	<b>Genetic Engineering/Profiling</b>		Chapter 14	<b>DUE: Pre-Lab 8</b>  Lab 8: Bacteria
Mar 30	Exam II Review		Chapter 15, 16	
WEEK 10				
Apr 4	Evolution	<b>Bacterial Diversity (due May 11, 11 am)</b>	Chapter 18	<b>DUE: Pre-Lab 9 &amp; Lab 8: Mini Paper</b>  Lab 9: Natural Selection
Apr 6	Evolution		Chapter 19	
WEEK 11				
Apr 11	Finish Evolution	<b>Fungus /Protist</b>	Chapter 19	<b>DUE: Lab 9 &amp; PreLab</b>



	Biodiversity	<b>Diversity (due May 11, 11am)</b>		<b>10</b>
Apr 13	Biodiversity Issues			Lab 10: Plants  Lab: CAFO Project – •Baseline chlorophyll analysis (filter samples) •Set up nutrient enrichment experiment
<b>WEEK 12</b>				
Apr 18	Biodiversity Issues	<b>Animal/ Plant Diversity (due May 11, 11 am)</b>		<b>DUE: nothing</b>  Lab: CAFO project Chlorophyll analysis of nutrient enrichment experiment
Apr 20	Biogeochemical Cycles			
<b>WEEK 13</b>				
Apr 25	Population Ecology		Chapter 23	<b>DUE: PreLab 11</b>
Apr 27	Population Ecology			Lab 11: Animal Diversity
<b>WEEK 14</b>				
May 2	Community Ecology		Chapter 22	<b>DUE: Chlorophyll Graphs</b>
May 4	Case 9: Population Ecology			Lab: CAFO project wrap-up, algae identification
<b>WEEK 15</b>				
May 9	Ecosystem ecology Case 7: Mystery of disappearing Seals		Chapter 24	<b>DUE: Poster presentations CAFO Lab: Final Report (Due May 15)</b>
May 11	Review Final EXAM			
<b>WEEK 16</b>				
May 15-19 Final Exams	Final Exam: Wednesday May 17 <sup>th</sup> , 8:00a.m.-10:00 a.m.			

## 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.

**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.