

BIOLOGY 141P (1 UNIT) CRN 5551 COURSE SYLLABUS
INTRODUCTORY BIOLOGY I: BIOCHEMISTRY, CELL BIOLOGY AND MOLECULAR GENETICS
FALL 2015

General Information:

Professor:	Dr. Alicia Slater, 137 Sage Hall, x8716 aschulth@stetson.edu
Office Hours:	Tues 10-11 a.m. & Wed 1:15 -2:15 p.m., Thursday 12:00- 2 p.m.
Lecture Schedule:	MW 12:00-1:15 p.m. (222 Sage Hall)
Laboratory Schedule:	Tuesday 8:30-11:15 a.m. or 1:00- 3:45 p.m. or Friday 2:30-5:15 p.m. (153 Sage Hall)
Lab Instructor:	Tuesday: Ms. Kim Mancas; Friday: Dr. David Stock
Textbooks:	<u>Principles of Life</u> , 2 nd Edition Hillis <i>et al.</i> 2014 Biology 141 Lab Manual available from the Stetson Bookstore
Blackboard:	http://blackboard.stetson.edu/
Clickers:	Required for this course. Purchase from Stetson Bookstore prior to first class meeting.

Course Overview: This is the first in a four course-series for beginning Biology and other *science majors* seeking a Bachelors of Science degree. General topics addressed in this course include: The Process of Science, Biological Chemistry, Cell Biology, Metabolism, and Molecular Genetics. This is a ‘flipped’ course—a type of learner-centered course—which emphasizes shared responsibility for learning, investigative exercises, student collaboration and peer-to-peer instruction. Lecturing will be kept to a minimum, and when used, will typically consist of pre-recorded lectures viewed online. You should watch these in their entirety and take notes on them prior to coming to class. This means that you, the student, will be actively working during most class periods, with me and Mandy (see below) as your guides. I employ this teaching method because it fosters powerful student learning and better long-term retention of knowledge (Figure 1). This teaching approach also allows class time to be used for development of higher order thinking skills (sensu Bloom’s taxonomy; Figure 2) rather than simply on content delivery and learning of facts.

Learning Pyramid

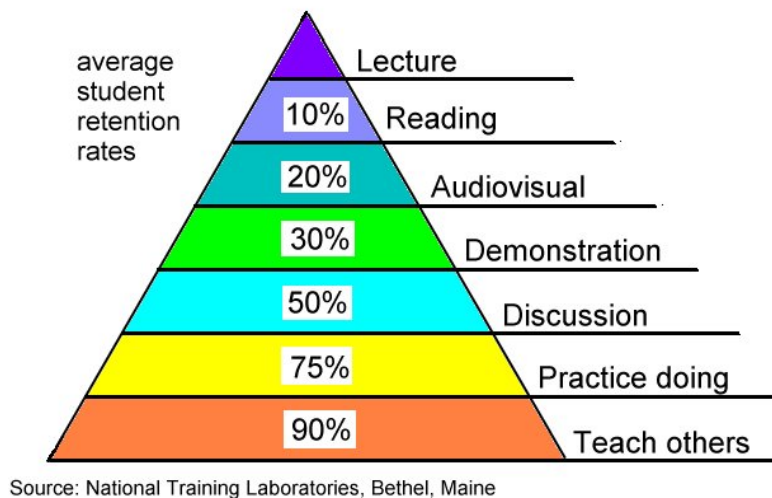
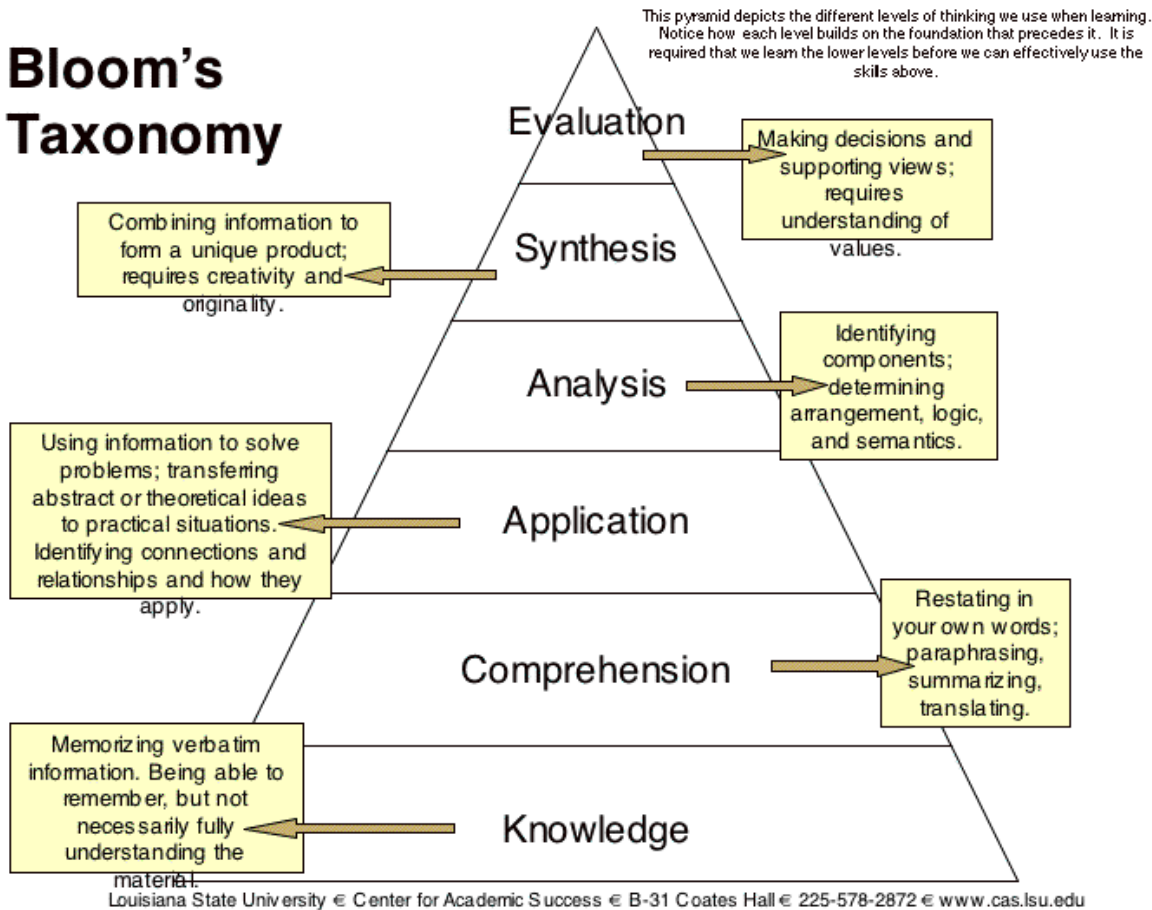


Figure 1: Summary of learning practices and commensurate retention of course knowledge by students. When students teach others, 90% of the material is retained on average, whereas with lecture less than 10% of material is retained.

Bloom's Taxonomy



Course assignments include clicker quizzes, in class-exercises, homework, case studies, student presentations, poems, laboratory exercises, and collaborative group activities. There will be very few formal lectures during class time. The class will be taught in Stetson's SCALE-UP classroom (Room 222 Sage Hall), which is designed to facilitate student-centered learning and maximize depth of understanding and retention of knowledge.

Due to the nature of this course, it is **expected** that your first contact with the material will occur outside the classroom through assigned readings and/or online lectures. The activities we do in class are designed with the assumption that students will come to class prepared, having done all items listed for a particular day under 'class preparation' on the syllabus. Proper preparation is necessary for you to fully participate in group work and achieve the learning goals for the course. Thus, a major component of your grade will come from pre-class assignments, which are intended to ensure that you have the necessary background knowledge for the class activities.

Blackboard: I will use Stetson's Learning Management System (BlackBoard) extensively in this course. Lectures, quizzes, and assignment descriptions will be posted there. Course grades can be accessed there at any time. BlackBoard is my primary means of communication with you, so check both the email address linked to BlackBoard and the BlackBoard page for the class at least once a day.

Peer Instruction: Stetson Peer Instruction (SPI) is offered for this course. SPI sessions are 45-minute group study opportunities, scheduled twice per week. These sessions are facilitated by Stetson Peer Instructor(s) (SPIs) who attend class and prepare SPI sessions based on the class content. Students should attend SPI sessions to ask questions about course content and to develop learning/study strategies. Students who participate in SPI sessions typically earn higher final course grades and exam grades than students who do not participate in SPI. Attendance at SPI sessions is voluntary, and attending SPI sessions is not a substitute for attending class or lab.

The SPI for this course is **Mandy Camp** and she is amazing.

Attendance: Attendance at all class and lab meetings is essential to your success in this course. If you must be absent due to scheduled athletic events, musical performances, illness, etc., it is your responsibility make arrangements with me prior to the absence to arrange a make-up so that you still hand assignments in on time. An assignment is due almost every day of class, and due to the interactive, collaborative nature of this course you will not be able to make up class activities missed due to an unexcused absence. If you have documentation that justifies an unexpected absence, you must contact me within 24 hours of class in order to be able to make up the assignment. **Thus, to make-up work, you must either pre-arrange it, or contact me within 24 hours of the missed class or lab, and after providing documentation of the need for the absence you will be allowed to make up the work within the week that the work was missed.** This schedule is necessary to keep both our lives manageable.

Cell phone policy: Please refrain from texting or using your cell phone for non class-related activities in class and lab.

Policy on late work: All assignment due dates must be adhered to; late work will not be accepted.

Academic Honesty: Unless you are explicitly told otherwise, it is expected that all exams, quizzes, and other assignments will be your own work. Obviously, on exams and quizzes (in class or online) you can neither give nor receive assistance of any kind. At certain times, (during lab and class activities) you will be expected to work as a group. However, the expectations for the work you hand in will be different for lab and collaborative group activities. For lab work, you should discuss your ideas for lab reports with your classmates, but you must complete all lab assignments independently. The contribution of others must be clearly recognized as literature citations or acknowledgements. For collaborative group work, a single assignment will be handed in and everyone who worked on it will affix their signature as a their pledge of academic honesty.

Important Note About Academic Honesty and Group Work: Unless you are told otherwise, you should assume that any assignment for this course is individual work. Handing in group work for an individual assignment will be considered a violation of the University Honor Code. It is your responsibility to make sure you understand the requirements for each assignment, and to ask me if you aren't sure.

Special needs: The Academic Success Center provides academic and disability resources for all Stetson University students. Students who anticipate barriers related to the format or requirements of a course should meet with the course instructor to discuss ways to ensure full participation. If disability-related accommodations are necessary, please register with the Academic Success Center (822-7127; www.stetson.edu/asc). The student, course instructor, and the ASC will plan how best to coordinate accommodations. The ASC also coordinates free tutoring on campus for students. You can

meet with a tutor to review principles, learn content-specific study strategies, and enhance content area knowledge.

Learning Outcomes (adapted from Vision & Change 2009): Upon successful completion of this course, students will be scientifically literate in reductionist topics from atoms to biotechnology. Specifically, this includes the following core concepts:

1. The process of science and its research methods (experimental, comparative, descriptive analysis, modeling, role of peer review and funding in science)
2. Structure and function of biological molecules and cells
3. Energy transformation pathways/metabolism (glycolysis, fermentation, cellular respiration, and photosynthesis)
4. Gene expression (transcription and translation) and its regulation
5. Mendelian Genetics
6. DNA replication and the Cell Cycle

Students will also develop the following core competencies/abilities:

1. Data presentation (Graphing, tabulation of data, simple descriptive statistics, oral presentation) & interpretation (Interpretation of tables and graphs, use of quantitative means to understand biological systems)
2. Formulating and testing hypotheses and supporting scientific arguments
3. The ability to make connections between biological, chemical and physical processes at various levels of cellular organization
4. Prepare a scientific report that integrates primary literature and includes graphical presentations of data
5. Demonstrate problem solving and critical thinking skills by creating activities that help their classmates investigate important biological principles

Grades:	Activities, Homework, Presentations	25%
	Hourly Exams	20%
	Final Exam	15%
	Clicker quizzes	10%
	Laboratory	<u>30%</u>
	Total	100%

Grading Scale:	
90-100%	A
80-89%	B
70-79%	C
60-69 %	D
<60%	F

Plus/minus grades may be used at the instructor's discretion.

Exams: Exams will cover material from assigned readings, online lectures, and class activities. The hourly exams are not cumulative; however, the final exam is. You must be present on the day of exams. Missed exams can be made up only if you have made prior arrangements with me (e.g., for participation in University events) or can officially document a medical or personal emergency. If you know you will miss an

exam or quiz, you must arrange to take it prior to the scheduled date. If you miss an exam without making prior arrangements to take it, you must contact me within 24 hours of the missed exam in order to schedule a time to take the exam and provide the required documentation.

Clicker Quizzes: Short clicker quizzes will be given in class on the dates indicated on the course schedule. Their purpose is to ensure that you completing the 'Class preparation' assignments and give feedback about your progress throughout the semester. To complete these quizzes, you must purchase a clicker from the Stetson Bookstore. Please purchase them prior to the first day of class.

Grading for group work: Although learning to work in groups can be challenging, working as a team is an important skill for scientists to develop. Very few professionals (scientists, physicians, attorneys, engineers, etc.) work alone and groups often accomplish much more than even the most brilliant individual working alone. During group work, everyone is expected to contribute equally (but not identically)—in order to encourage this, I use 'grade modifier' scores, which allow you to in part assign your group members' grades for group projects. This is how it works: any student who desires to do so will assign a grade modifier (range: 0-1) for all other members of her/his group. The grade modifier should be based upon each person's contribution to the group work. The grade modifiers from all group members will be averaged, used to adjust individual scores for group assignments. For example, if the group earns a grade of 95% and the average for your grade modifier =1, your score will be calculated as: $1 * 95\% = 95\%$. If your peers assigned an average modifier of 0.75 instead, your grade would be $95\% * 0.75 = 71.25\%$.

To receive full credit for group work, make certain to contribute appropriately to each assignment. If you are in a group of 3, you're expected to contribute 1/3 of the work, etc. Grade modifiers are optional. If you decide to submit them, they are due within 24 hours of when the assignment is turned in and that scores below 0.9 must be accompanied by a brief explanation. Grade modifiers may be emailed to me at aschulth@stetson.edu. Keep in mind that the scores are confidential and should not discussed with other members of the class. Please respect others' privacy by NOT asking about the grades they assigned or received. Although I will post mean scores for the modifier, I will not post the individual modifier scores, or reveal the number of students from your group who submitted them. Finally, I will not change the group modifier scores, but you may appeal to your group to do so by calling a meeting in my office.

Laboratory

Laboratory assignments comprise 30% of our your total course grade. There are two lab sections for this course. Each student is required to attend only the lab section in which he/she is enrolled. Labs are taught by Ms. Kim Mancas and Dr. David Stock. A separate lab syllabus will be handed out the first week of lab. Labs begin the week of August 24th.

General Education Assessment: In order to assure that Stetson University is meeting its goals in providing an excellent General Education, the College has established specific General Education Learning Outcomes for all courses meeting a particular area requirement in the General Education curriculum. To monitor how well students are meeting those outcomes, instructors of those courses regularly submit work to the committees assessing each outcome. While the outcomes of these assessments are primarily for our internal use in monitoring and enhancing our curriculum, we may occasionally report the results of these assessments in published research or academic conferences. All such reports will include aggregate (not individual) data and will not include information that could identify the student or the instructor. While the use of this information within the institution is part of normal educational practice, you may choose not to allow data derived from your own work to be used

for published reports or presentations by signing an “opt out” form in the Registrar’s office.

For those in the *Biology Secondary Education major* - who must fulfill certain State of Florida competencies by the time you complete this course: You will have gained knowledge of the nature of science, investigative processes in science, safety recommendations & practices, interaction of science & society, life processes, the chemical composition of living things, energetics, metabolic pathways, cell biology, genetics, investigative techniques, and foundations of biology.

Tentative Class Schedule, Reading Assignments, Class Activity and Quiz/Exam Dates:

DATE	TOPIC
8-24	Class introduction/Process of Science Clicker quiz 1 (Bloom’s taxonomy, Process of Science, Syllabus) <i>**Class preparation:</i> Read syllabus (posted on BlackBoard) and Vision Learning modules (The Process of Science , Experimentation in Scientific Research , Description in Scientific Research , Comparison in Scientific Research , Modeling in Scientific Research), read pages 12-15 in textbook <i>Homework due in class:</i> outline of presentation 1 (main point summary of your Vision Learning module)
8-26	Process of Science <i>Homework due at beginning of class:</i> Presentation 1
8-31	<i>Homework due at beginning of class:</i> Process of Science diagram (a group assignment) and paragraph describing new or challenging ideas about process of science; grade modifier for each member of your group due in 24 hours
9-2	Biological Chemistry Clicker Quiz 2 (Chapter 2 and online lecture 2) <i>Class preparation:</i> Take notes on online lecture 2, read Chapter 2 <i>Due at end of class:</i> Worksheet 1 Natural Sciences Picnic 5:00-7:00 p.m. Sage Hall Lawn Mini-Test: (Chapter 1 (pages 12-15), Vision Learning Modules, Chapter 2, online lectures 1 and 2) <i>Due at end of class:</i> Bloomed Exam Key
9-7	No class (Labor Day Holiday)
9-9	Structure and Function of Proteins & Lipids <i>Class preparation:</i> Take notes on online lecture 3, read Chapter 3 <i>Homework due at beginning of class:</i> Worksheet 2
9-14	Cell Structure <i>Class preparation:</i> Read Chapter 4 <i>Homework due at beginning of class:</i> Crossword puzzle constructed by your group (group assignment; hand in 9 copies) <i>Due at end of class:</i> Worksheet 3
9-16	Metabolism I Clicker Quiz 3 & 4 (Chapter 4 and online lecture 4 on Ch. 6) <i>Class preparation:</i> Review Chapter 4, Read Chapter 6, Take notes on online lecture 4 <i>Homework due at beginning of class:</i> Worksheet 4= solved crossword handed out in class on 9-16 (this is an individual assignment) <i>Due at end of class:</i> Worksheet 5
9-21	Exam 1 (Unit 1-Process of Science, Biological Chemistry, Metabolism, Cell Structure) Exam preparation: Review Vision Learning modules, pages 10-14 of Chapter 1, Chapters 2-4 & 6, online lectures 1-4, and Worksheets 1-3
9-23	Mitosis and Meiosis Read Chapter 7, <i>Due at beginning of class 9/23:</i> Worksheet 6 (individual assignment), Dear Gigi letter, poem, song, rap, etc. (group assignment)
9-28	DNA Replication Clicker Quiz 5 (Chapter 9 and online lecture 5) <i>Class preparation:</i> Take notes on online lecture 5, read Chapter 9 <i>Due at end of class:</i> Worksheet 7
9-30	Cell Cycle Control Clicker Quiz 6 (Chapter 7)

	Class preparation: Read Chapter 7	
	<i>Due at end of class:</i> Worksheet 8	
10-5	Genetics problem solving –Basics	Clicker Quiz 7 (Genetic problems)
	<i>Class preparation:</i> Read Chapter 8	
10-7	Genetics problem solving -Advanced	Clicker Quiz 8 (Genetic problems)
	<i>Class preparation:</i> Read Chapter 8	
10-12	Genetics Clicker Game Show (Chapter 8, Genetics problems)	
	<i>Class preparation:</i> Read Chapter 8; practice to get bonus points!	
10-14	Exam 2 (Unit 2: Mitosis & Meiosis, DNA Replication, Cell Cycle Control, and Genetics Problem Solving)	
	Exam preparation: Review Chapters 7-9, online lecture 5, and all genetics problems on Worksheets 6-8	
10-19	Transcription & Translation Interactive Lecture	
	<i>Class preparation:</i> Take notes on online lecture 6 read Chapter 10	
	<i>Due at end of class:</i> Muddiest points	
10-21	Great Experiments in Molecular Biology	
	<i>Class preparation:</i> Take notes on online lecture 7	
	<i>Due at beginning of class:</i> Worksheet 9	
10-26	Modern Molecular Biology	Clicker Quiz 9 (stem cells and fluorescent labeling)
	<i>Class preparation:</i> Read Stem cell paper	
	<i>Due at end of class:</i> Worksheet 10	
10-28	The Evolution of Antibiotic Resistance	
	Clicker Quiz 10 (online lecture 7, in-class lecture on Transcription and Translation, Chapter 10, Antibiotic resistance readings)	
	<i>Class preparation:</i> Read all pages listed in the Hillis <i>et al.</i> Index I-3 under ‘Antibiotic resistance’ and ‘Antibiotic resistance genes’	
	<i>Due at end of class:</i> Worksheet 11	
11-2	DNA Mutations & Disease Part I	Clicker Quiz 11 (online lecture 8, pages 179-183)
	<i>Class preparation:</i> Take notes on online lecture 8 and review pages 186-191 in textbook	
11-4	DNA Mutations & Disease Part II	
	<i>Class preparation:</i> Take notes on online lecture 8 and review pages 186-191 in textbook	
	<i>Due at beginning of class:</i> Worksheet 12	
	<i>Due at end of class:</i> Worksheet 13	
11-9	Write your own exam day	
	<i>Due at beginning of class:</i> Worksheet 14	
11-11	Exam 3 (Unit 3: Great Experiments, Modern Molecular Biology, Transcription & Translation, The Evolution of Antibiotic Resistance, DNA Mutations & Disease)	
	Exam preparation: Review Chapters 10 and pages 186-191 of Chapter 9, Worksheets 9-14, online lectures 6-8, antibiotic resistance readings	
11-16	Cancer, Chemotherapy, and Drug Resistance Part I	
	<i>Class preparation:</i> Take notes on online lecture 9, read all pages listed in Hillis et al. Index I-6 under ‘Cancer’, ‘Cancer Drugs’ and ‘Cancer Therapy’	
11-18	Cancer, Chemotherapy, and Drug Resistance Part II	
	<i>Due at beginning of class:</i> Ideas for ‘Current Topics’ discussions	
	<i>Due at end of class:</i> Worksheet 16	
11-23	Current Topics in Bioethics ‘	
	<i>Class preparation:</i> Bioethics readings (posted on BlackBoard)	
11-25	NO CLASSES (Thanksgiving Break)	
11-30	Current Topics in Bioethics ‘	
	<i>Class preparation:</i> Bioethics readings (posted on BlackBoard)	
12-2	Clicker Game Show Review for Final Exam	
	<i>Class preparation:</i> Review all material covered Aug. 23 - Dec. 4, 2013 11:30 a.m.	
12-8	(Tuesday) 9:00 a.m-11:00 a.m Final Exam	

Final Exam Preparation: same as above for Exams 1-3 PLUS review online lecture 9, Pages in Hillis et al. Index I-6 under 'Cancer', 'Cancer Drugs' and 'Cancer Therapy', Bioethics readings and Worksheets 15 and 16