

Lecture Instructors:	Dr. Linda Green A104 Cherry Emerson Tel: 404.385.6517 Linda.green@biology.gatech.edu	TA: Drew Sieg Clough Tutoring Desk M 11:30-12:30, R10:30-11:30 drew.sieg@gatech.edu
Lab Coordinator:	Dr. Cara Gormally 474D Clough Tel: 404.385.2762 cara.gormally@biology.gatech.edu	
Prerequisites:	None.	
Description:	An introduction to biology at the organ and organismal levels, with emphasis on physiological processes and integration of growth and development. This course will foster the development of critical scientific skills including hypothesis testing, experimental design, data analysis and interpretation, and scientific communication.	
Textbook & Mastering Biology:	Campbell, N.A. et al. (2008). Biology, 8th Edition. Benjamin Cummings, San Francisco. The bookstore sells hardcover and looseleaf-bound texts, each bundled with a Mastering Biology (MB) access code. If you plan to work solely with the on-line e-book within MB (not downloadable), then you can simply purchase MB access at the Mastering Biology website. Mastering Biology consists of required course homework assignments.	
Lab Manual:	Gormally, C, <i>Biology 1520 Lab Manual</i> , Hayden-McNeill 2011.	
Clickers:	A TurningPoint ResponseCard NXT unit ("clicker") is required and will be used for quizzes and interactive lecture sessions, which will contribute to the Participation portion of your course grade. The old PRS clickers are no longer in use at GT—these can be resold to the bookstore for \$5. This course is not set up to use the TurningPoint laptop or mobile device instead of a clicker.	
Honor Code:	All students are expected to abide by the Academic Honor Code, which can be viewed online at http://www.honor.gatech.edu . We take the Honor Code very seriously and are required to report any potential violations. Some specific examples of Honor Code violations that we've encountered include: copying during exams, use of another student's clicker in class, and plagiarism.	
Lectures:	Lectures are held in Clough 152. Attendance in lecture correlates strongly with performance in Biology 1520. I will make lectures available via T-Square and urge you to download and print them for use in taking notes during lecture. The lectures and readings are complementary and <u>some material will be presented only in lecture</u> . Lecture exams will be based on topics, materials, and discussions presented in class and in the assigned readings. Please turn off phones and computers while in lecture. I expect you to review each reading assignment before and after class for full comprehension of material.	
Group Projects:	Every student will take part in one group project during the semester. You may organize yourselves into groups of six students, and students not belonging to such a group will be assigned to a group at random. We will then assign each group a topic for an in-class presentation on one of two dates (see schedule). We will select the best submissions for presentations in class (extra credit). Additional details will be provided in class and via T-Square.	

- Labs:** Labs are held in Clough 473. Note that **labs do not start during the first week of classes**. Laboratory attendance is mandatory and each unexcused absence will lower your final grade by 5%. For more information about lab, please read the lab syllabus on the lab T-square site.
- Lecture Exams:** Midterm exams will be Thursday evenings in Van Leer W200 (see schedule). Exams will be multiple choice or a mix of multiple choice and short answer.
- Missed Exams:** If you miss an exam for any reason, you will receive a grade of 0 (zero) on that exam unless you petition us for a makeup exam within 24 h of the start of the missed exam, *and* I approve your petition. Your petition must be submitted in writing and must include documentation of a legitimate reason for missing the exam. You may submit your petition before the exam if you know of your scheduling conflict in advance. Examples of legitimate reasons to miss an exam include illness, illness or death in your immediate family, and participation in official university activities.
- If I approve your petition, I will remove the missed exam from your grade calculation by using the weighted mean of your other exam scores as your grade for the missed exam, making it completely neutral in your final point total. You may also petition for a makeup exam. If I accept your petition, I will administer a makeup exam before the end of the term.
- Recitation:** The graduate TA will lead a recitation each Thursday 6:05-6:55pm when we do not have an exam scheduled that day. This is an opportunity for you to discuss lecture material and text readings.
- Bonus Points:** You have the opportunity to earn bonus points which (if earned) will be added to your midterm exam grade. You may attempt to earn up to four bonus points for each module exam. There are no bonus point opportunities for the final exam.
- Podcasts: We will post several podcasts on T-square that are relevant to each module. You may select one, listen to it, and write a one-page paper, according to one of the following formats:
- Opinion piece: describe and justify whether you agree with the podcast
 - Critical review: critique the podcast with factual support
 - Popular summary: Summarize for a lay audience unfamiliar with biology
- Spelling, grammar, punctuation, and style all count toward the determination of bonus points earned for each attempt.
- Field trips: You may visit one of the following science-related museums, at your own expense, and write a one-page summary to describe what you learned to someone who has not attended. Attach your admission receipt. You may only visit each museum once for potential bonus points.
- Atlanta Botanical Garden www.atlantabotanicalgarden.org
 - Georgia Aquarium www.georgiaaquarium.org
 - Zoo Atlanta www.zooatlanta.org
 - Fernbank Museum of Natural History www.fernbankmuseum.org
 - Fernbank Science Center www.fernbank.edu

Grading:

Your final grade will depend on the following combination of grades:

In-class exams:	40%
Final exam:	20%
Group project:	10%
Participation:	10%
Laboratory:	25%

Note that these components total 105%. The maximum overall score we will allow in this course is 100%, so this scheme includes 5% of extra credit.

We will use the following procedure in calculating your final grade:

1. We will combine your exam, lab, participation, and group activity scores into a raw composite score (0 – 100%) using the weights shown above.
2. We will use the mean score earned by the top 5% of the class as a gauge of real student performance in the class.
3. We will normalize your score to actual student performance by dividing your raw composite score by the mean score earned by the top 5% of the class. If you're in the top 2.5% of the class, your score will be 100%.
4. We will assign final letter grades based on normalized scores using the following scale:

A:	≥ 90%
B:	≥ 80% and < 90%
C:	≥ 70% and < 80%
D:	≥ 60% and < 70%
F:	< 60%

Biology 1520 Module Themes and Teaching Goals

Module	Major theme	Teaching Goals
1	• Biodiversity	<ul style="list-style-type: none"> • Evolutionary history of life on Earth • Metabolic diversity • Biological diversity
2	• Growth and Reproduction	<ul style="list-style-type: none"> • Differentiation • Sexual and asexual reproduction • Reproductive strategies
3	• Chemical and Electrical Signals	<ul style="list-style-type: none"> • Hormones • Neurons and integration • Sensory systems
4	• Motility, Nutrition and Transport	<ul style="list-style-type: none"> • Motility • Metabolic diversity • Nutrient acquisition • Circulatory systems (plant and animal)
5	• Materials Balance	<ul style="list-style-type: none"> • Gas exchange • Water, ion, and mass exchange • Homeostasis

Date	Lecture Topics	Readings
22-Aug	Course overview Case study: A Strange Fish Indeed	
=> M1	Start Module 1: Biodiversity	
24-Aug	Beginnings of Life on Earth Origin and earliest signs of life Precambrian: prokaryotes, endosymbionts Ediacaran fauna	25: review 505-519 26: 551-553 27: 556-573 28.1: 575-579
26-Aug	Cambrian Cambrian explosion Body plans and diversity of marine life	32: 654-664
29-Aug	Early-mid Paleozoic (Ordovician & Silurian) Gondwana. Jawless and jawed fishes. Plants, arthropods, and apsid colonize land.	25: 519-525 29: 600-615 32: 654-664
31-Aug	Devonian Age of fishes, first tetrapods Plants, arthropods, and vertebrates colonize land.	29: 600-615 31: 642 34: 698-713
2-Sep	Carboniferous Amniote egg and Gymnosperms appear.	34: 713-720 30: 618-625
5-Sep	Holiday - Labor Day	
7-Sep	Permian Pangaea, Panthalassa Ocean and Tethys Sea Conifers and insects diversify End-Permian mass extinction	25: 519-525 33: 684-692
9-Sep	Mesozoic Dinosaurs dominate on land Mammals and angiosperms diversify Extinctions at end of Triassic and Cretaceous.	30: 625-634 34: 716-727
12-Sep	Cenozoic Diversification of mammals, angiosperms, grasses. Climate variability.	30: 625-634 34: 716-727
14-Sep	Group Activity Session	
15-Sep	Exam 1	Module 1
=> M2	Start Module 2: Growth and Reproduction	
16-Sep	Intro to reproduction and development Differentiation, colony formation, growth Alternation of generations	28: 587-588 40: 852-860
19-Sep	Plant Development Tissue development, differentiation and function Role of meristems, secondary growth	35: 738-761

21-Sep	Animal Development	32: 655
	Cleavage patterns, polarity, differentiation	47: 1021-1044
	Coelom formation and body plans	
23-Sep	Plant Reproduction	29: 602-603
26-Sep	Double fertilization, seeds, fruits	30: 618-634
	Vegetative growth	38: 801-814
28-Sep	Animal Reproduction	33:671-673
	Asexual reproduction (budding and parthenogenesis)	46: 997-1003
	Gametogenesis, hermaphroditism	
30-Sep	Human Reproduction	46: 1003-1018
	Spermatogenesis, oogenesis	
	Ovarian and uterine cycles	
	Hormonal control	
3-Oct	Group Presentations: Session 1	
6-Oct	Exam 2	Module 2
<hr/>		
=> M3	Start Module 3: Chemical and Electrical Signals	
5-Oct	Plant Hormones and Defenses	39: 821-847
7-Oct	Hormones controlling growth, dormancy, germination	
	Responses to injury, chemical defenses.	
10-Oct	Animal Hormones	45: 975-994
12-Oct	Hormone effects, production, distribution	
	Insect development	
	Vertebrate endocrine system	
14-Oct	Neurons and Nervous System I	48: 1047-1061
17-Oct	<i>Holiday - Fall Break</i>	
19-Oct	Nervous System II: Anatomy and function	49: 1064-1080
	Ion channels, synapses, neurotransmitters, integration	
21-Oct	Sensory Systems	50: 1087-1105
24-Oct	Sensory cells & organs, specificity	
	Mechano- and photoreception	
	Information processing	
26-Oct	Group Activity Session	
27-Oct	Exam 3	Module 3
<hr/>		
=> M4	Start Module 4: Motility, Nutrition, and Transport	
28-Oct	Effectors	6: 114-118
	Movement: role of cilia, flagella, muscles, skeletons	50: 1105-1117
31-Oct	Nutrition - Adaptations & needs	37:785-792
	Autotrophy, heterotrophy, mixotrophy	41: 875-880
		41: 891-896
2-Nov	Nutrition - Acquisition of nutrients	37: 792-798

4-Nov	Soil processes, N ₂ -fixation Digestive organs: structure and function	41: 880-890
7-Nov	Plant transport processes	36: 764-782
9-Nov	Uptake of water and minerals Xylem and evapotranspiration Phloem, sieve tubes, and translocation	
11-Nov	Animal circulation	42: 898-915
14-Nov	Evolution of circulatory systems Human vascular system, hormonal regulation	
16-Nov	Group Presentations: Session 2	
17-Nov	Exam 4	Module 4
<hr/>		
=> M5	Start Module 5: Materials Balance	
18-Nov	Gas Exchange and Transport	42: 915-927
21-Nov	Principles of diffusion Lungs and gills Mechanisms for transporting O ₂ and CO ₂	
23-Nov	Group Activity Session	
25-Nov	<i>Thanksgiving holiday</i>	
28-Nov	Ion and water balance in animals	44: 954-972
30-Nov	Excretory mechanisms and systems Adaptations to different environments	
2-Dec	Plant homeostasis and responses to the environment	10: 198-203
5-Dec	Photosynthetic strategies and water conservation Light, water, temperature, wounds, pathogens	36: 776-779 39: 835-847
7-Dec	Physiological Ecology	40: 862-868
9-Dec	Synthesis: Case Study	
14-Dec	Final Exam, 8 am - 10:50 am	Comprehensive