Biology 153 Principles of Physiology and Development

Instructor Information:

Instructor	Dr. Kristopher Blee	Dr. John Mahoney
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Office hours		
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Required Items:

1. Permanent fine tip marker for labeling test tubes, it is worth getting your own pen.
2. Lab course manual (purchase form Omicron).
3. Bound Laboratory Notebook (Composition style/Quad ruled).
4. Sadava *et al.*, 8th ed. 2008. Life the Science of Biology.

Course Assignments:

1. Reading. Reading is scheduled below from the text and /or journal articles that have been posted on the course VISTA site. Students should read the assigned material prior to coming to class.

2. Quizzes. Quizzes are taken online. They are timed and consist of 10 questions (for a total of 10 points) taken from the previous reading, lecture, and lab material. Questions are multiple-choice and/or fill in the blank and/or short answer. When assigned, take the quiz well before the deadline. Do not put off taking a quiz until the last minute, if you do and your computer crashes or you run out of time, too bad. Instead always attempt the quiz early enough, so if you have a problem you can notify me in class so I can make corrections leaving you still have time to complete the quiz. Quizzes are to be your personal efforts and no one else's. While taking the quiz you may use your notes, VISTA Biology 153 course materials, and your text book. Discussion of quiz questions with other students who have not yet taken the quiz or providing students copies of quiz questions are considered a breach of academic honesty.

3. Lab Notebook. You will keep a lab notebook which will be evaluated twice as scheduled. The notebook will have a table of contents including the title of the lab, the date and the inclusive page numbers. Entries from each lab period in your lab book will always begin on a right page with the left page empty. Entries should contain the following: introductory and procedural comments your instructor makes about a lab; your question and hypotheses if appropriate, the exact protocol you used; any and all raw data as well as summarized data with titles and legends for tables, graphs, and figures; all numerical values should have appropriate units; statistical treatments of the data or other analysis and a conclusion. Legible notebooks that adequately meet all these requirements will receive 15 pts. Illegible, disorganized, and/or incomplete notebooks will receive fewer than 15 pts. Notebooks with exemplary detail and organization displaying obvious extra effort and thought may receive up to 20 pts.

4. Exams. Four lecture and four lab exams. Both lecture and lab exams for a given date will be administered during the lecture hour. Exams consist of multiple choice, definitions, short answer, and data analysis/synthesis questions. The final is comprehensive.

5. Lab assignments. Lab assignment due dates are **bolded** on the course schedule. They are assigned in the lab course manual and outlined by the instructor during the lab. Examples include problem sets, figure and text preparation, transparency presentations, and/or written reports. All lab assignments will each be scored out of 5 pts possible. Work that is correct in every sense and meets all requirements of the assignment will receive 5 pts. Incorrect work or incomplete work will receive less than 4 pts. Excellent work displaying obvious extra effort may receive up to 5 pts.

6. Lab research presentation. During the last lab period, you and your group will formally present the background, question, hypothesis, methods, results with analysis, discussion and conclusions for one of the investigations you performed in this course's lab. All members of your group are expected to contribute somewhat equally in the preparation and each of you will function as presenter during a portion of the presentation. A computer and projector will be provided for display of your PowerPoint presentation. You should practice to make sure you can complete your presentation in about 20 minutes. Your group's efforts will be evaluated with respect to the quality of the presentation (dress, mannerisms, voice, visuals, response to questions) and your adherence to the scientific method (background, question, hypothesis, results, conclusions). Presentations that adequately meet all these criteria receive 15 pts. Superior presentations may earn up to 20 pts.

Course Assignments and Value	Point Value
Quizzes (4 at 10 pts each)	40
Exams (4 lab at 25 pts each, 3 lecture at 25 pts each, 1 lecture final at 75 pts)	250
Lab assignments (10 at 5 pts each)	50
Lab Notebook (2 at 20 pts each)	40
Research symposium presentation	20
Total Course Points	400

Percentage of Correct Points and Grade	Letter Grade
90 to 92 to 100%	A- to A
80 to 82 to 87 to 89%	B- to B to B+
70 to 72 to 77 to 79%	C- to C to C+
63 to 67 to 69%	D to D+
less than 63%	F
unauthorized withdraw	WU

Course Policies:

Exam attendance. Make-up lecture exams will not be given unless previous arrangements have been made.

Laboratory attendance. Experimental design and experimentation are very important in biology – your attendance at weekly labs is expected. If you are unable to attend a lab, notify the laboratory instructor and try to attend another section that week. Absences from lab will affect your grade. There will be no penalty for one absence; however, your laboratory grade will be lowered by 20 points for each absence after that.

Dropping. You may drop this course during the first 2 weeks by TRACS, and during the 3rd and 4th weeks with a drop card signed by the instructor. After the Census Date of the 4th week, a drop requires a "serious and compelling" reason. Therefore, before you request a late drop for this class, obtain written documentation of your reason for withdrawal. I will not consider any late drop without professional (*e.g.*, physician) verification of "serious and compelling" reason.

Students with disabilities. Additional efforts can be made to increase access of course materials for students with permanent and temporary disabilities. If you are disabled contact CSU Chico Disability Support Services (www.csuchico.edu/dss/index.shtml or University Center Room 100 or 898-5959) for help and notify your instructor as soon as possible.

Student Learning Objectives: Upon completion of Biology 153 students should be able to:

1. Describe how gradients of transcriptional regulatory molecule are created.
2. Provide a molecular explanation of root-shoot axis formation.
3. Diagram, describe/label, and explain how meristems function in the establishment of the plant body.
4. Describe the macromolecular composition of and modifications to cell walls during growth and differentiation.
5. List the major hormones controlling plant growth, name their sites of synthesis, comment on their biochemical origins, mechanisms of transport, and mechanisms of action at target tissues.
6. Explain structure-function relationships for features of the plant body that allow for nutrient uptake, transpiration, .and long distance translocation of photosynthate.
7. Explain at a molecular level events such as canalization, xylogenesis, responses to gravity, defense, and floral development.

Course Schedule

wk	date	section	lecture	text & pdf	lab
1	Aug24 Aug26 Aug28	I Establishment of meristems and differentiation	Course introduction, the *Agro'* experiment Info gradients, fly anterior-posterior axis Furlough	ch14, 15 ch19	Tissue culture
2	Aug31 Sep2 Sep4		Fly and frog dorsal-ventral axis Info gradients in plants, longitudinal axis Furlough	ch42 <p924 ch19,p428	Tissue print & histochem **Due: Regen meth**
3	**Sep7** Sep9 Sep11		**Labor Day No Class** PIN's, meristems, tissue systems IAA induced differentiation **Q1**	 ch34 >p754 ch37,803-05	**No Labs**
4	Sep14 Sep16 **Sep18**		Primary growth, differentiation, cell types Walls, wall mods, secondary growth **EXAM 1** **Census Date**	ch34,749-52	Tissue print & histochem **Due: Trouble shoot trans**
5	Sep21 Sep23 Sep25	II Responses to the environment and functioning	Germination, GA's and phytochrome Photomorphogenesis, cryptochromes Phototropism, phototropins	ch37,801-03 ch37 >p811	Stomate movement assay **Due: Tissue print trans**
6	Sep28 Sep30 Oct2		Gravitropism Transpiration Stomatal regulation, ABA **Q2**	 ch35<p775	Stomate movement exp **Due: Revis regen meth**
7	Oct5 Oct7 Oct9		Nutrient acquisition Phloem loading Phloem unloading	ch36 ch35>p774	Light directed movements **Due: Stomate trans**
8	Oct12 Oct14 Oct16		Plant immunity **EXAM 2** Immunology I (Mahoney)	ch39 Ch 18	J. Mahoney labs start **Due: Lab Notebooks**
9	Oct19 Oct21 Oct23		Immunology II Physiology, Homeostasis Body Temperature	Ch 18 Ch 40 Ch 40	 **Due: Neuro-Muscular Junction**
10	Oct26 Oct28 Oct30		Animal Hormones I Animal Hormones II Furlough	Ch 41 Ch 41	 **Due: Muscle Contraction**
11	Nov2 Nov4 Nov6		Furlough Neurons and Nervous System I Neurons and Nervous System II **Q3**	 Ch 44 Ch 44	 **Due: Physiology of Cardiac Muscle**
12	Nov9 **Nov11** Nov13		Sensory Systems I **Veterans Day** Sensory Systems II	Ch 45 Ch 45	**No Labs** **Nov 11** **Due: Cell Culture I**
13	Nov16 Nov18 Nov20		Effectors: How animals get things done I **EXAM 3** Effectors: How animals get things done II	Ch 47 Ch 47	Immunocytochemistry Cell Culture II **Due: PowerPoint draft**
	Nov23 Nov25 Nov27		**Thanksgiving Break - No Class**		
14	Nov30 Dec2 Dec4		Gas Exchange in Animals I Gas Exchange in Animals II Circulatory Systems I **Q4**	Ch 48 Ch 48 Ch 49	PowerPoint prep practice **Due: Lab Notebooks**
15	Dec7 Dec9 Dec11		Circulatory Systems II Nutrition, Digestion, and Absorption Salt and Water Balance	Ch 49 Ch 50 (pp 1068-1084) Ch 51 (pp 1092-1101)	Biol153 Research Symposium **Due: Presentations**
	Dec13		**Final Exam Monday 2 – 3:50 pm**		

8. Use the scientific method to identify roles for genes involved in development of, or the formation of features within the plant body.
9. Summarize observations and experimental results using tables and figures, and orally communicate their investigative efforts in a poster presentation.
10. Explain the evolutionary progress of immune defenses and the function of the various types of immune defense. Describe how the body is able to discriminate self from non-self and how this impacts transplantation of tissues. Point out the advantages and limitations of vaccinations in the human population.
11. Summarize the different types of physiological regulation found in ectotherms and endotherms including the advantages and disadvantages for both. Describe the mechanisms and metabolic costs for regulating body heat.
12. List the different families of hormones (using representative examples for each) and describe their physiological roles and mechanisms of actions (signal transduction and gene expression).
13. Elicidate the importance (advantages and disadvantages) of sexual reproduction. Qui bono?
14. Explain how the function of neurons and the nervous system constrains our abilities and response to the environment.
15. Defend the following position using specific example of animals' sensory systems: Animals have vastly different perceptions of the natural world.
16. Describe how the different sensory systems detect the perceivable world.
17. Give an accounting for how muscles function at different levels of organization (from the single cell to an entire organism).
18. Explain why is makes little sense to stock fish in hot springs.
19. Heart transplant recipients do not have their nervous system reconnected to the donor heart. Explain how this impacts cardiac function.
20. A decathlete arguably must display the best combination of strength and endurance. Describe what you might expect to see at the cellular level in the muscles of a world-class decathlete compared with a video game playing couch potato.
21. Explain the importance to maintaining water gradients in cells. Use specific examples of different animals to explain why animals have such varied water requirements.