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BIOB 161N.51B: Principles of Living Systems Lab

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BIOB 161 Syllabus Summer 2020

Principles of Living Systems Laboratory Remote Delivery

Course Information:

Laurie Minns, PhD: laurie.minns@mso.umt.edu
Teaching Assistant: Diandra Lewis
Email: diandra.lewis@umconnect.umt.edu
Office Hours: Announced on Moodle

General Course Information:

During this course, we will cover the unifying principles of biological structure-function relationships at different levels of organization and complexity. Lab experiences illustrate biological principles underlying growth, reproduction, development, genetics and physiology.

Principles of Living systems is a broad survey course that is a prerequisite for all options in the Biology and Wildlife majors and is generally required for all pre-professional programs in the health sciences. The content of this course will provide foundational knowledge for future studies in Cell and Molecular Biology, Genetics and Evolution, Developmental Biology, Anatomy and Physiology, Ecology, and related options.

Course Goals:

Upon successful completion of this course, you will have a broad knowledge of biology including cell and molecular biology, genetics and evolution, development biology, physiology, and ecology. You will also have a better understanding of the scientific method and the means by which scientific discoveries shaped our current understanding of biology.

Course Objectives:

- 1) Gain an appreciation for how science works and how the scientific method increases our understanding of biology.
 - 2) Gain an appreciation of biological concepts from the most basic macromolecules syntheses to the diversity of living systems.
 - 3) Understand how biological systems work to maintain homeostasis.
 - 4) Use critical thinking skills to predict the consequences of homeostatic imbalances.
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Course outcomes:

- 1) Demonstrate understanding of chemical and biological principles and knowledge.
- 2) Understand and analyze cellular processes governing development, growth and normal function of living organisms.
- 3) Understand the processes involved with maintaining homeostasis in living organisms and anticipate what may occur when homeostatic balance mechanisms are lost.
- 4) Demonstrate practical knowledge of basic chemistry, biological molecules, cells, membranes, energy and metabolism, the cell cycle, evolution and ecology.
- 5) Identify biological molecules and structures and analyze their relationship with other structures.

- 6) Practice the scientific method by making predictions, performing biological experiments and interpreting results, and determining the potential biological consequences.

Course Information:

Teaching methods: Laboratory

Student Responsibilities:

- 1) Students are expected to complete the required reading and pre-laboratory assignments prior to completion of lab activities.
- 2) Students are expected to log on to the course Moodle site regularly to download course materials and read updated course announcements.
- 3) Regular online attendance is required for successful completion of the course.
- 4) If absence from the class necessary due to illness, it is your responsibility to reach out to your TA immediately. Due to the accelerated nature of the course, missing one or two days of class activities can be very difficult to make up.
- 5) Students are expected to be respectful during all discussion board posts and during meetings with course staff and Dr. Minns. Students who fail to do so will be subject to the student conduct code.

Recommended Course Materials Information:

eScience Lab kit- available for purchase through the bookstore. REQUIRED.

Computers and Course Website Information

Students are expected to be familiar with computers and the Internet. Students are responsible for their own software and computer equipment maintenance and setup as recommended by the University of Montana.

<http://umonline.umt.edu/student-support.php>

Class-Specific Computer and Software Requirements:

- Students will complete activities in the University of Montana Moodle BIOB160 course website and in Mastering Biology. Students are expected to have a 'back up plan' if personal computers become compromised.
- The University of Montana maintains several computer labs on campus:
<http://www.umt.edu/it/support/computerlabs/default.php>
- Students are expected to download copies of course information from the Moodle website and to check email for class announcements.
- **For technical support for using Moodle, please contact UM IT support:**

<http://www.umt.edu/it/support/default.php>

Course Policies

Dr. Minns and the Laboratory Teaching Assistants follow academic policies as stated in the 2019-2020 UM Catalog. Students are responsible for being familiar with these policies. <http://www.umt.edu/catalog/>

These policies include but are not limited to:

- Student Conduct (http://life.umt.edu/vpsa/student_conduct.php)
- Class attendance
- Credit/No Credit Grading

- No more than 18 CR credits may be counted toward graduation. Courses taken to satisfy General Education Requirements must be taken for traditional letter grade. Courses required for the student's major or minor must be taken for traditional letter grade, except at the discretion of the department concerned.
- A CR is given for work deserving credit (A through D-) and an NCR for work of failing quality (F). CR and NCR grades do not affect grade point averages. The grades of CR and NCR are not defined in terms of their relationship to traditional grades for graduate course work.
- Election of the credit/no credit option must be indicated at registration time or within the first 15 class days on CyberBear. After the fifteenth day, but prior to the end of the 30th day of instruction, an undergraduate student may change a credit/no credit enrollment to an enrollment under the A F grade system, or the reverse by means of a drop/add form.
- The University cautions students that many graduate and professional schools and some employers do not recognize non traditional grades (i.e., those other than A through F) or may discriminate against students who use the credit/no credit option for many courses. Moreover, students are cautioned that some degree programs may have different requirements regarding CR/NCR credits, as stipulated in the catalog.
- Audit
- Incomplete Grading Policy
- Plagiarism
 - Plagiarism is the representing of another's work as one's own. It is a particularly intolerable offense in the academic community and is strictly forbidden. Students who plagiarize may fail the course and may be remanded to Academic Court for possible suspension or expulsion. (See Student Conduct Code section of this catalog.)
 - Students must always be very careful to acknowledge any kind of borrowing that is included in their work. This means not only borrowed wording but also ideas. Acknowledgment of whatever is not one's own original work is the proper and honest use of sources. Failure to acknowledge whatever is not one's own original work is plagiarism.

Students with Disabilities:

The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and Disability Services for Students. If you think you may have a disability adversely affecting your academic performance, and you have not already registered with Disability Services, please contact Disability Services in Lommason Center 154 or 406.243.2243. I will work with you and Disability Services to provide an appropriate modification.

Disruptive behavior

Students who are being disruptive in discussion boards will be warned once. Such behaviors impact the learning of other students in the classroom and will not be tolerated. Re-admittance to class is at the discretion of the instructor.

Late Work Policy

Late work is not accepted in this class due to the condensed nature of the course. If you have an extenuating circumstance, please reach out to your TA as soon as possible so that we can try to work with you.

Correspondence

An official UM student email address must be used for all correspondence.

Laboratory Activities

- In this course, you will practice good laboratory note-taking habits and laboratory preparation in order to attempt each lab exercise.
- All laboratory exercises must be completed by you using the materials required in the laboratory protocols.
- Missing Laboratory activities CANNOT be made up for any reason.
- Professional and courteous behavior during all class interactions is expected in each laboratory activity.
- Each student agrees to conduct the at-home laboratories using the appropriate safety precautions.
- Students can be injured or seriously harmed if they do not complete the lab procedures outlined in each activity.
- Please be sure to keep pets and children away from lab materials as some materials are harmful and could cause death.
- Students have access to Material Data Safety Sheets through the eSciences manual and website.

Laboratory Safety

- 1) Students are expected to conduct laboratory exercises away from animals and children.
- 1) Students should wear the appropriate Personal Protective Equipment while conducting experiments and while handling reagents. Close toed shoes, pants and lab coats or long-sleeved shirts should be worn,
- 2) Gloves and eye protection are available in the lab kits.
- 3) Contact lens wearers should be aware that chemical fumes can pass into gas permeable and soft lenses. These fumes irritate the cornea. Protective glasses (prescription or safety glasses) are recommended to protect against chemical splashes. Know the location of the eyewash station before you begin.
- 4) No foods, drinks, gum or the application of makeup are allowed while conducting experiments.
- 5) Wash hands after completing each lab exercise.
- 6) Label experiments so that housemates know not to disturb or ingest your lab activities

Evaluation Methods:

Your course grade will be determined by your performance weekly graded activities including post-lab questions, lab report, lab quizzes, discussion boards, a review of a research paper and a final exam.

Grading System:

Final Grades will be based upon your # of points earned/ 440 points.

Grades will be calculated based upon the following system; grades will be rounded. (i.e. if a student earns 83.44%, their grade will round to 83% or a B-; if a student earns 83.45% their grade will be rounded to 84% or a B):	
Grade	Percent of Total Points
A	94-100%
A-	90-93%
B+	87-89%
B	84-86%
B-	80-83%
C+	77-79%
C	74-76%
C-	70-73%
D+	67-69%
D	64-66%
D-	60-63%
F	59% and Below

Activity	# of points
Lab Quizzes (11x10pts each, drop 1)	100
Research Article and Summary	50
Discussion Boards (6x10 pts, drop 1)	50
Post-Lab Questions (11x15 pts each, drop 1)	150
Lab Report	50
Final exam	40
Total # of points	440

Netiquette:

Interactions in an online classroom are in written form. Your comfort level with expressing ideas and feelings in writing will add to your success in an online course. The ability to write is necessary, but you also need to understand what is considered appropriate when communicating online.

The word "netiquette" is short for "Internet etiquette. Wait to respond to a message that upsets you and be careful of what you say and how you say it.

- Be considerate. Rude or threatening language, inflammatory assertions (often referred to as "flaming"), personal attacks, and other inappropriate communication will not be tolerated.
- Never post a message that is in all capital letters -- it comes across to the reader as SHOUTING! Use boldface and italics sparingly, as they can denote sarcasm.
- Keep messages short and to the point.

- Always practice good grammar, punctuation, and composition. This shows that you've taken the time to craft your response and that you respect your classmates' work.
- Keep in mind that threaded discussions are meant to be constructive exchanges.
- Be respectful and treat everyone as you would want to be treated yourself.
- Use spell check
- Be sure to use appropriate citations in your discussion board posts and in your written work.

Important Dates and Assigned Readings (this may be amended by Dr. Minns and your TA during the Semester)

Lab Schedule (points earned)

Day of the week	Dates	To Do List	Lab Quizzes (drop 1)	Post-Lab Questions (drop 1)	Weekly Total
Week 1 All Lab exercises are due by 11:59pm MST on 5/17/2020		Lab 1: What is Science	10	15	60
		Lab 2: General Lab Safety	10	15	
		Discussion Board Posts Substantive Response by Tuesday, midnight Respond substantively to two other students by Saturday	10		
Week 2 All Lab exercises are due by 11:59pm MST on 5/24/2020		Lab 3: Diffusion	10	15	70
		Lab 4: Osmosis	10	15	
		Discussion Board Posts Substantive Response by Tuesday, midnight Respond substantively to two other students by Saturday	10		
		Finding Peer-reviewed Journal Articles Select Peer reviewed paper and get it approved by TA Review Tutorial on using Pubmed	10		
Week 3 All Lab exercises are due by 11:59		Lab 5: Enzymes	10	15	60
		Lab 6: Respiration	10	15	

MST on 5/31/2020	Discussion Board Posts Substantive Response by Tuesday, midnight Respond substantively to two other students by Saturday	10		
Week 4 All Lab exercises are due by 11:59pm MST on 6/7/2020	Lab 7: Cells	10	15	60
	Lab 8: DNA and RNA	10	15	
	Discussion Board Posts Substantive Response by Tuesday, midnight Respond substantively to two other students by Saturday	10		
Week 5 All Lab exercises are due by 11:59pm MST on 6/14/2020	Lab 9: Energy and Photosynthesis (Lab report to be written on this lab)	10	15	100
	Lab 10: Mendelian Genetics	10	15	
	Research Summary Due	40		
	Discussion Board Posts Substantive Response by Tuesday, midnight Respond substantively to two other students by Saturday	10		
Week 6 All Lab exercises are due by 11:59pm MST on 6/19 (NOTE- this is a Friday!)	Lab 11: Population Genetics	10	15	125
	Lab Report Due	50		
	Laboratory Final Exam	40		
	Discussion Board Posts Substantive Response by Tuesday, midnight Respond substantively to two other students by Saturday	10		
Total Points				440

Discussion Board Grading Rubric

Choose either one of the two discussion boards to comment on each week

Grade	Evaluation Criteria	Point Range
A	<ul style="list-style-type: none"> • Participates with the required number of relevant postings of required length • Initial response posted by <i>Tuesday</i>; comments posted by <i>Saturday</i>. • Posts are clear, coherent, relevant, logical, reflect original thought and critical thinking • Responses to the content discussed by others add to the discussion and move the discussion effectively • Supports position, agreement or disagreement with supporting evidence as needed with appropriate citations and references • Consistently uses grammatically correct, complete sentence in Standard American English with rare misspellings • Presents creative approaches to topic 	10-8
B	<ul style="list-style-type: none"> • Participates with the required number of relevant postings of required length • Initial response posted by <i>Tuesday</i>; comments posted by <i>Saturday</i> • Postings reflect the reading and some outside source material but may not be accurately cited • Uses citations and references to support assertions as appropriate • Consistently uses grammatically correct, complete sentence in Standard American English with rare misspellings • Comments are logical and reflect critical thinking 	7-5
C	<ul style="list-style-type: none"> • Participates with the required number of relevant postings of required length • Initial response posted by <i>Thursday</i> comments posted by <i>Saturday</i>. • Participates, but does not post anything that adds to the discussion • Minimal grammatical or spelling errors are noted in posts • Opinions and ideas are stated clearly 	4-3
F	<ul style="list-style-type: none"> • Provides an initial post after <i>Thursday</i> • Provides only one response to others by <i>Saturday</i> • Significant errors in spelling and/or grammar • Content was not relevant to discussion question and did not enhance the discussion • Posts do not meet length requirements • Comments are plagiarized 	2-0

Peer-reviewed Review Article Summary Rubric Select a peer-reviewed REVIEW article focused on a biology topic of your choice. Choices can include any type of biology that is interesting to you. Talk with your TA about topic choices. In two pages (12 point font, 1.5 line spacing) describe key topics covered in the REVIEW article. Use your own words and include in-text citations.			(writing topics: summarizing peer-reviewed journal articles)
	Available Points	Points Earned	Comments
<u>Introduction</u> Describe the journal and why you selected it (do not write in the first person though). Describe why the topic covered in the review article is important to the field of biology you are most interested in learning more about.	5		
<u>Main points of the Review Article</u> In your own words, describe the main topics covered by the journal article. You should include three-five paragraphs that summarize the key points of the article. DO NOT COPY and PASTE. Summarize in your own words. Each fact from the article should have an in-text citation (Author, year).	10		
<u>Conclusion</u> Summarize the key findings of	5		

the review article and why they are important in the biology field of your choice.			
<u>Referencing</u> Credible In-text citations and full length reference at the end . You may use any formatting system you wish, however, you must include: Author(s), Title of article, Journal Name, year of publication, volume, issue #, pages	5		
<u>Writing Mechanics</u> Proper writing mechanics Do not write in 3 rd person. Appropriate US grammar is used throughout. Use Headings for each section.	5		
<u>Original Paper Attached</u>	10		
Total	40		

Post-Lab Questions

These are the questions at the end of each experiment in your lab manual. Make sure that all the questions in each of the exercises are answered.

Answers should be clear, coherent, and logical. Follow the instructions in the questions clearly. Answers should be well-researched and well-thought out. Make sure that sentences are complete, in Standard American English, and that they use correct grammar. For numerical problems, make sure you show your work.

Download the lab workbook at the end of each lab and answer the questions in the work document. Submissions should be in the form of a word document or PDF document and should be submitted on the Moodle page by *Sunday at 11.59 pm*.