

BIO 122 – 03, World of Cells, Spring 2012

Instructor: Ryan Fisher PhD.

Office Hours: Tues: 9-10am

Office: MH418

Weds: 1-2pm

Classroom: MH539

Thurs: 9-10am

Phone: 978-542 6841

Fri: 12-1pm

Email: ryan.fisher@salemstate.edu **Class Times:** TTh 1.40 – 2.55pm

If you need to see me urgently outside the office hours above please contact me by phone or email.

THE CLASSROOM IS A PLACE OF LEARNING. LET US LEARN TOGETHER!

Textbooks:

Lectures:

Mader, S. 2011. Concepts of Biology, 2nd edition. McGraw-Hill, 819pp.

Lab:

Fisher, R., T. Maney, D.W. Tapley & A.M. Young. 2011. Biology 122 The World of Cells - Lab Manual, Biology Department, Salem State University. Hayden McNeil, Plymouth, MI. 170pp.

Course Description:

Basic biological principles common to all things are emphasized. Topics include basic chemistry, cell form and function, respiration, photosynthesis, principles of Mendelian and molecular genetics, the origin of life, and principles of evolution. Three lecture hours and one two-hour laboratory per week.

Overarching Goal:

1. To enable students to understand the structure and function of cells from the molecular to the evolutionary scale.

Learning Objectives:

After completing this course students will be able to:

1. Explain the role of electrons in chemical bonds.
2. Describe the properties of water and how these affect living organisms.
3. Identify a prokaryote and a eukaryote cell.
4. Describe the four macromolecule groups.
5. Explain the importance of membranes to eukaryotes.
6. Describe important cell processes including enzymatic activity, membrane transport, cellular respiration and photosynthesis.
7. Describe the stages and significance of non-sexual and sexual cellular reproduction.
8. Explain Mendel's principles and their significance.
9. Describe the various forms of non-Mendelian genetics.
10. Describe the role of DNA and RNA in protein synthesis.
11. Describe the various ways in which biological techniques have been harnessed in the 21st century.

<i>Learning Objective</i>	<i>Where Addressed</i>	<i>How assessed</i>
1. Explain the role of electrons in chemical bonds.	Lecture 4	Group quiz 2, exam 1, final exam
2. Describe the properties of water and how these affect living organisms.	Lecture 4	Group quiz 2, exam 1, final exam
3. Identify a prokaryote and a eukaryote cell.	Lecture 7	Exam 1, final exam
4. Describe the four macromolecule groups	Lecture 5	Group quiz 2, exam 1, final exam
5. Explain the importance of membranes to eukaryotes	Lecture 12 & 13	Group quiz 3, exam 2, final exam
6. Describe important cell processes including enzymatic activity, membrane transport, cellular respiration and photosynthesis	Lectures 12 - 17	Group quiz 3, exam 2, final exam
7. Describe the stages and significance of non-sexual and sexual cellular reproduction.	Lecture 19 - 21	Group quiz 4, exam 3, final exam
8. Explain Mendel's principles and their significance	Lectures 22 & 23	Group quiz 4, exam 3, final exam
9. Describe the various forms of non-Mendelian genetics	Lectures 22 - 26	Exam 3, final exam
10. Describe the role of DNA and RNA in protein synthesis	Lecture 24 and 25	Exam 3, critical essay, final exam
11. Describe the various ways in which biological techniques have been harnessed in the 21 st century.	Lecture 29 and 30	Critical essay, final exam

Plagiarism:

Plagiarism in any form will not be tolerated. Students should never copy the work of another student or reference and present it as their own work. Cheating by using written material during an exam is also forbidden. Anyone caught cheating or plagiarizing work will receive zero for that exam or assignment and may receive an F as the final course grade. Further action may be taken in accordance with the Academic Dishonesty policy.

Electronic Devices during Assessments

According to Department policy, **NO electronic devices may be used during assessments.** Stand-alone calculators or devices pre-approved by the instructor are the only exceptions. Any student with a visibly exposed electronic device may receive a **ZERO** for that exam/quiz.

Grading:

Your overall grade comprises both lecture and laboratory components. It is made up as follows:

	<u>Points</u>
Three semester exams (75 points each)	225
Comprehensive final exam	200
PowerPoint/Poster Presentation	75
Critical Reading	100
Clicker Questions	50
Darwin Festival	50
Review Essay	50
<u>Laboratory</u>	<u>250</u>
Total	1000 = 100%

Grades are based on a standard grading scale: A – 90-100%, B – 80-89.9%, C-70-79.9% etc. There will be four homework assignments. Presentations will be presented during the last class of the semester. You are responsible for completing all course requirements whether you are present or not. **If you miss 4 labs you receive zero and fail the course!**

Late Submission Penalties:

Most students make deadlines but it is unfair not to penalize those who do not! Work submitted up to 48 hours after the deadline will receive a 20% penalty. Work submitted after this time period will not receive a grade.

Attendance:

Class attendance is compulsory! It is in your best interest to attend all classes. Those who skip many classes generally do not perform well.

Pandemic Plan

In the event of a university declared critical emergency, Salem State University reserves the right to alter this course plan. Students should refer to www.salemstate.edu for further information and updates. The course attendance policy stays in effect until there is a university declared critical emergency. In the event of an emergency, please refer to the alternative educational plans for this course located in the **WebCT pages for this course**. Students should review the plans and gather all required materials before an emergency is declared.

Exams:

Examinations are compulsory. Exams will comprise multiple-choice questions, true-false type questions and short answer questions. Each semester exam will cover work from the preceding exam. The final exam will be comprehensive. **If classes are cancelled due to poor weather, the exam will be held in the next lecture class.**

Presentations:

The presentation will be held during the final class. I have allocated people to groups according to the class register. Presentation titles and form (PowerPoint or Poster) need to be submitted to me by **Thursday March 8th, 2012** (in class or by email to ryan.fisher@salemstate.edu). A proposal outlining what your group is going to do must be submitted to me by **Tuesday March 27th**. Details of what needs to be included in the proposal can be found in Appendix B.

Topics are as follows:

1. The Role of Electrons in Living Organisms.
2. “Prokaryotes – We Should Eradicate Them!” Discuss.
3. What we Know about Human Genetics in the 21st Century
4. Photosynthesis – The Most Important Chemical Pathway on Earth?
5. The Role of DNA Fingerprinting in 21st Century America.

Critical Reading:

You will be provided a reading from Watson, James D. 2003. *DNA – The Secret of Life*. Chapter 9 – Out of Africa: DNA and the Human Past. Knopf. New York. I would like you to respond to the chapter by weaving in some of your own ancestral details. The completed essay should not exceed 3 typed pages (12 point, double spaced) and be submitted by **Tuesday April 3rd, 2012**.

Clicker Questions

During every lecture I will ask you a number of questions to be answered using your Clicker. A straight average of all questions answered will be used for this grade component. You must ensure you have your clicker in class as I do not have ones to lend out. You will have 3 ‘grace lectures’ where a forgotten clicker will not count against you. These ‘grace lectures’ include general absence from class.

Darwin Festival

33rd Darwin Festival – February 13 - 17th, 2012

(<http://www.w3.salemstate.edu/~pkelly/darwin>)

This is a unique event in any college setting. All classes and labs do not run for this week within the Biology Department. All students must attend 2 talks from visiting speakers and complete the worksheet for each talk – see Appendix A. Any students witnessed by me asking questions at the end of a talk will get a 5% addition to their summary grade.

Review Essay

Many of you will not have taken a biology course ever or for some time. I would like you to write a *one page essay* explaining why you feel this course is important. You will prepare a draft for me at the start of the semester for submission by **Thursday January 26th, 2012**. As we move through the course you will no doubt learn of many of the delights of the natural world around you. With this new knowledge I would like you to review what you had written earlier in the term and submit it for grading by **Thursday April 26th, 2012**.

Make-ups:

Absence from an exam/quiz for a **valid reason** (death in family, serious illness, official university event) is allowed provided you inform me in advance of the exam. A make-up exam can then be scheduled. Please note that this exam will be in an essay format. The poster session may not be missed. Work submitted late will be penalized 10% per day. I do not allow *extra credit* work.

Effort Required:

BIO 121 is a fairly demanding class with components that count toward your final grade being completed throughout the semester. *It is vital that you keep up with lecture material as you are contributing to your final grade each day of the term.* I would recommend reading the relevant text section before each class. The more you are prepared for each class the better you will be able to ask and answer questions! Preparation for exams is a continuous process that you can make easier by reviewing the lecture material and re-reading the text after each lecture. If you wish to excel you need to spend at least 5 hours per week outside of the classroom. Please feel free to come and see me during my office hours or by appointment if you are having trouble with any of the work.

Classroom Culture:

The classroom is a forum for learning and as such should be respected. A relaxed, informal environment is conducive to learning but there are basic standards of behavior. So that everyone may have the same opportunity to learn please be mindful of the following:

1. Please be on time for class – walking in late not only distracts the instructor but also fellow students.
2. Please keep talking to a minimum unless you are asking questions in which case do not be shy.
3. Please be tolerant of others questions – we all learn at different speeds and another’s question may actually help those who are too shy to ask.
4. Food and drink are not allowed in the class at any time.

Please turn off your electronic devices during class ie pagers and cell phones. *Disruptive behavior will not be tolerated and will lead to suspension from the class. If you are suspended you will need to meet with me to discuss why you should be readmitted.*

Assistance:

Salem State University has excellent facilities to help students be successful. These include: the Reading Laboratory (4th floor of Library, 542-6717); the Writing Center (223 Meier Hall, 542-6491); the Mathematics Laboratory (Sullivan 306, 542-6348). If you have a disability the Office for Students with Disabilities can assist you (Library 436, 542-6217). Please make use of these services if you are having trouble.

Access Policy:

Salem State University is committed to providing equal access to the educational experience for all students in compliance with Section 504 of the Rehabilitation Act and The Americans with Disabilities Act and to providing all reasonable academic accommodations, aids and adjustments. Any student who has a documented disability requiring an accommodation, aid or adjustment should speak with the instructor immediately. Students with Disabilities who have not previously done so should provide documentation to and schedule an appointment with the Office for Students with Disabilities and obtain appropriate services.

BIO 122 – Tentative Course Syllabus – Spring 2012

Date:	Lecture	Topic	Reading
January 16 th	1	Introduction	
	2	Biology, the study of Life	Ch1
	3	<u>DVD: Darwin and the Tree of Life</u>	
January 23 rd	4	Basic chemistry & cells	Ch2
	5	Organic Molecules & Cells	Ch3
January 30 th	6	<u>Review of Basic Chemistry</u>	
	7	Structure & Function of cells	Ch4
	8	<u>Review for Exam One</u>	
February 6 th		Semester Exam One (lectures 1 – 6)	
	9	<u>DVD: “Life’s Greatest Miracle</u>	
	10	<u>Review of Cells</u>	
February 13 th		Darwin Festival – No Classes or Labs	

February 20 th	11	Microscopes	Ch4 (p66)
	12	Dynamic Activities of cells	Ch5
	13	Dynamic Activities of cells	Ch5
February 27 th	14	<u>Course Catch-Up</u> <u>DVD: "The Deep" – Bioluminescence</u> <u>Review for Exam Two</u>	
		Semester Exam Two (lectures 7 – 13)	
March 5 th	15	Pathways of Photosynthesis	Ch6
March 12 th		Spring Break – No Classes or Labs	
March 19 th	16	Pathways of Cellular Respiration	Ch7
	17	<u>Review of Photosynthesis/Respiration</u>	
March 26 th	19	Cell division & reproduction	Ch8
	20	Cell division & reproduction	Ch8
April 2 nd	21	<u>Review of Cell Division</u>	
	22	Patterns of genetic inheritance	Ch9
	23	<u>DVD: Human Genetics</u> <u>Review for Exam Three</u>	
April 9 th	24	Semester Exam Three (lectures 15 – 22) Molecular biology of inheritance	Ch10
April 16 th	25	<u>Review of Genetics</u>	
	26	Regulation of gene activity	Ch11
April 23 rd	27	Biotechnology & Genomics Review/Presentation Work	Ch12
April 30 th		Presentations	

Final examination: Monday May 7th, 2012 – 2-4pm
Format - The final exam will be comprehensive.

BIO122 World of Cells, Spring 2012, Schedule of Labs

Week Beginning

Lab and Topic

January 16th, 2012

No Labs

January 23rd, 2012

Lab 1 – Data Analysis

January 30th, 2012

Lab 2 – Biological Chemistry

February 6th, 2012

Lab 3 – Amino Acid Chromatography

February 13th, 2012

Darwin Festival – No Labs

February 20th, 2012

Lab 4 – The Microscope

February 27th, 2012

Lab 5 – Cell Membranes & Transport

March 5th, 2012

Lab 6 – The Spectrophotometer

March 12th, 2012

Spring Break – No Labs

March 19th, 2012

Lab 7 – Enzyme Activity

March 26th, 2012

Lab 8 – Photosynthetic Pigments

April 2nd, 2012

Lab 9 - Fermentation

April 9th, 2012

Lab 10 – Cell Cycle and Mitosis

April 16th, 2012

Lab 11 - Genetics

April 23rd, 2012

Lab 12 - DNA and Proteins

Appendix A Worksheet for Darwin Festival Talks

Attend two sessions of the Darwin Festival instead of lab during the week of February 13th. One presentation must be a lecture. Answer the questions below and attach your attendance tickets.

1. Presentation Title:
2. Type of presentation (lecture or video):
3. Name of presenter (lecture)
4. Institution of presenter or organization that produced the video
5. State a hypothesis for one of the main points presented
6. Give at least 2 pieces of evidence presented that supported the hypothesis
7. Give any evidence presented that refuted the hypothesis
8. What were two strengths of this presentation
9. What were two weaknesses of this presentation
10. What attracted you to this presentation and why
11. Were you satisfied with your choice? Why or why not?

Appendix B – Proposal for Group Presentation

You and your group have already selected a topic and a format from the list below. However, please include the topic and format in your proposal.

1. The Role of Electrons in Living Organisms.
2. “Prokaryotes – We Should Eradicate Them!” Discuss.
3. What we Know about Human Genetics in the 21st Century
4. Photosynthesis – The Most Important Chemical Pathway on Earth?
5. The Role of DNA Fingerprinting in 21st Century America.

Group Presentation Proposal

Group Members _____

Topic _____

Format poster/PowerPoint (circle option chosen)

Provide a summary of what your group is going to cover below.

Provide an overview of how the work will be divided up.