Course Title/Number	**BSC 322: PRINCIPLES OF CELL BIOLOGY - WI**
Semester/Year	**Fall 2015**
Days/Time	Lecture: TR 11:00 am - 12:15 am Laboratory: Section 101: 1:00 - 3:50 p.m. on Wed.; Section 102: 1:00 - 3:50 p.m. on Thurs.; Section 103: 9:00 - 11:50 am on Fri.
Location	Lecture: Science 376; Lab: Science 381
Instructor	**Marcia Harrison-Pitaniello**
Office	Office: Science 200A; Lab: Science 107
Phone	(304) 696-4867
E-Mail	harrison@marshall.edu
Office/Hours	**Harrison**: M 3:00-4:00 pm; T/R 10:00-11:00 am; T/R 4:00 - 5:00 pm; by appointment
Teaching Assistant	**Kramer Kaplan**
Office	Office: Science 209
Phone	(304) 696-4867
E-Mail	kaplan8@marshall.edu
Office/Hours	Office hours: T 2-3 pm; W 2:30-3:30 pm
University Policies	By enrolling in this course, you agree to the University Policies listed below. Please read the full text of each policy be going to www.marshall.edu/academic-affairs and clicking on "Marshall University Policies." Or, you can access the policies directly by going to http://www.marshall.edu/academic-affairs/?page_id=802 Academic Dishonesty/ Excused Absence Policy for Undergraduates/ Computing Services Acceptable Use/ Inclement Weather/ Dead Week/ Students with Disabilities/ Academic Forgiveness/ Academic Probation and Suspension/ Academic Rights and Responsibilities of Students/ Affirmative Action/ Sexual Harassment

Course Description: From Catalog

Principles of Cell Biology. 4 hrs.
A fundamental approach to the principles of cell biology covering the molecular basis of cellular structure and function, and gene regulation. Explores intercellular interactions, molecular interactions with modern cellular and molecular methods. 3 lec-3 lab. (PR: BSC 121 with a grade of *C* or better; CHM 355 recommended)

The table below shows the following relationships: How each student learning outcomes will be practiced and assessed in the course.

Course Student Learning Outcomes	**How students will practice each outcome in this Course**	**How student achievement of each outcome will be assessed in this Course**
Students will gain basic understanding of the structure and function of cells and their structures and organelles.	Students will receive assigned textbook readings and lecture preparation assignments. In-class exercises will review chapter content.	Clicker questions will be used to collect students' responses and to grade in-class quizzes.
Students will apply cellular concepts to their role in the physiology of living organisms.	In-classes exercises will include application problems and case studies.	Clicker questions will used to assess problems and case studies.

Students will evaluate publications in cell biology.	Read and discuss articles as part of the lecture and laboratory work.	Exam questions will include problems associated with the publications reviewed in class.
Students will employ basic laboratory techniques to analyze cell structure and function.	Laboratory exercises will provide an overview of basic skills and hands-on use of equipment used in cell biology research.	Graded laboratory work and written lab reports will be components of the lab grade.
Students will apply basic laboratory techniques to develop experiments about cell structure and function.	Student teams will use the laboratory skills to design laboratory experiments, including a small independent project.	Graded project design worksheets and data analysis will be components of the lab grade.
Students will be able to analyze data associated with the laboratory exercises.	Laboratory exercise will provide data for analysis.	Graphs will be graded as part of the written lab reports.
Improvement in student's scientific writing.	Four formal written assignments will require draft and revision of the student's writing. The student will also write short statements in the laboratory exercises, and provide short written answers on exams.	Written assignments, laboratory work, and written portions of the exams will comprise over 50% of the graded course material.

Required Texts, Additional Reading, and Other Materials

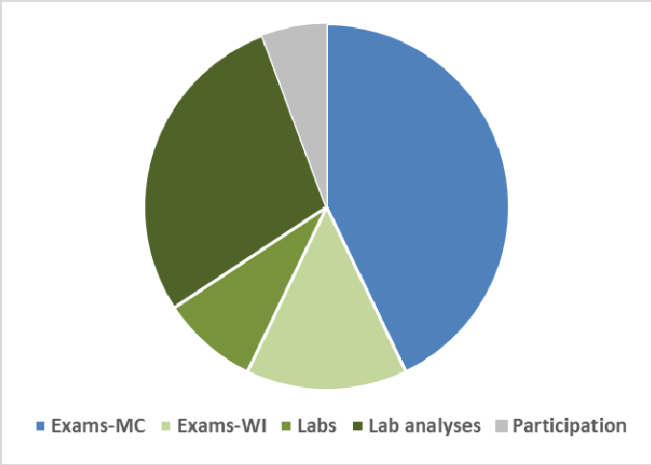
1. The World of the Cell, 8th. Edition. Becker, Kleinsmith, Hardin, Bertoni 2012
2. BSC 322: Principles of Cell Biology Laboratory Manual will be available on MU Online
3. Turning Technologies: Response Card RF (RFC-02)

Course Requirements / Due Dates

1. **Exam 1**: Thursday 9/17
2. **Exam 2**: Tuesday 10/13
3. **Exam 3**: Thursday 11/5
4. **Exam 4**: Thursday 12/10 from 10:15 a.m. – 12:15 p.m. (according to the Fall 2015 exam schedule)
5. **Laboratory:**
   a. In-class lab work: Requires completion of the prep and exit questions, in-lab work, data analysis, and/or quizzes (5 points per lab).
   b. Laboratory analyses: *All assignments are* ***to be submitted to MUOnline by midnight of the due date****.*
   Writing Assignment 1 - Mini-Poster: Draft due on 9/18; Final revision due on 9/29 (45 points)
   Writing Assignment 2 - Graphs and Results: Draft Due on 10/16; Final revision due on 10/16 (45 points)
   Writing Assignment 3 - Molecular Analysis and Discussion: Draft due on 11/13; Final revision due on 11/20 (45 points)
   Writing Assignment 4 – Independent Study Short Report: Draft due on 12/4; Final revision due on 12/11 (65 points)
6. **Class participation**: Students will be asked to prepare for lecture content, participate in class discussion, write, and work on problems and case-studies during class time. Lecture content will be evaluated by in-class quizzes assessed by the response cards (i.e. clickers). (40 points)

Grading Policy

Graded material:	
Lecture exams	400 pts
Laboratory	
Lab work	60 pts
Lab analyses	200 pts
Class participation	40 pts
Total points	**700**



Grading scale:
A = 100–90% (700-630 pts)
B = 89–80% (629-560 pts)
C =79–70% (559-490 pts)
D = 69–60% (489-420 pts)
F = <60%
(less than 419 pts)

Lecture exams: There will be 4 exams each contributing 100 points towards your total course grade. Exams will be based on the material presented and discussed during lecture. Lecture slides will be posted on MUOnline. While none of the exams are cumulative, the molecular and cell biology concepts build on one another and are, therefore, cumulative. Exams are in multiple choice and short answer format. *WI: Approximately 25% of the exam answers will be short-answer format.* **Exam records**: Students should mark the exams sheets and return them to the professor at the end of the exam period. Should a question arise concerning grading the clicker or written response will be the official response. Exams will be kept for one semester or summer term following completion of the course. You may examine these records at any time in the instructor's office. After that period the exams will be discarded and an Excel grade spreadsheet will be the official record. Grades cannot be e-mailed or given over the phone.

Laboratory evaluation: Your laboratory performance will contribute 60 points (5 points per lab for in-class work) towards your total course grade. Lab work will be evaluated during the lab period. Successful completion of the lab work will earn the total 5 points.

Laboratory analyses (writing assignments): Four writing assignments will contribute 200 points towards your total course grade. The written assignments include the data analysis, graphs and images, and written reports. Written instructions for these will be posted to MUOnline. These include Writing Assignment 1 - Mini-Poster (45 points), Writing Assignment 2 - Graphs and Results (45 points); Writing Assignment 3 - Molecular Analysis and Discussion (45 points) and Writing Assignment 4 – Independent Study Short Report (65 points). All reports are to be submitted to MUOnline.

Class participation: Lecture content will be evaluated by in-class quizzes assessed by the response cards (i.e. clickers). Points will be based on the top 20 in-class clicker grades as follows: >80% = 40 points; 70-79% = 25 points; 60-69% = 15 points; <60% = 0 points. **Note**: The lecture schedule on page 5 is meant only as a guide to the basic textbook coverage. The amount of lecture time on each topic will vary (i.e., topics that include discussion of a case study or article will require more class time). *Lecture preparation and coverage will be posted on the preceding Friday by 5:00 pm on MUOnline.*

Attendance Policy

Attendance in lectures and laboratory exercises is integrated into your grade. You are responsible for any material missed by being absent. Absences from exams or quizzes due to illness, death in the family, or institutional activities will be excused and accommodated with the appropriate notification from Marshall University Student Affairs Office (MSC2W38, 696-6422). Note that according to the current attendance policy, "*A student who is briefly ill or injured with fewer than three consecutive hours of class, and is therefore unable to attend class, should first consult with his or her course instructor about the absence.*" Class and/or lab will be cancelled due to inclement weather, according to the policy described at http://www.marshall.edu/academic-affairs/?page_id=802.

Laboratory Policies

1. Safety: All students must complete a safety tutorial during the first lab session.
2. Living organisms: Living organisms used in this course include microbes, cell cultures, excised tissues, and plants. Proper handling of living material and microbes will be discussed in the appropriate labs.
3. **Make-up labs are not possible beyond the week the lab is normally scheduled**. Unexcused absences will result in loss of credit for that lab. Students are encouraged to attend a different laboratory section, with permission of the instructor.
4. Completion of the laboratory analysis will be part of your laboratory grade. Data analyses include calculations, graphing, and statistical analyses (regression equations and t-test) will be evaluated as part of your lab grade. Make sure you have a personal copy of data and graphs for each laboratory exercise.

Laboratory Outcomes

1. Understand safe laboratory practices in cell biology.
2. Evaluate the capabilities of the light/phase contrast microscope.
3. Evaluate the views of cellular organelles and structures from different types of microscopes.
4. Measure sizes of cells and cellular components using the light microscope and from digital images.
5. Use electrophoresis to separate DNA or proteins for analysis.
6. Use a computer for word processing, graphing, Internet exploration, and statistics.
7. Use a spectrophotometer to measure amounts of biological substances and enzyme activity.
8. Use Internet databases and tools to analyze protein and nucleic acid structure.
9. Use Excel and other software programs for graphing, image processing, and data analysis.

BSC 322 Schedule: Dr. Harrison: Office: Science 200A; Lab: Science 107; (304) 696-4867; harrison@marshall.edu
Harrison: M 3:00-4:00 pm; T/R 10:00-11:00 am; T/R 4:00 - 5:00 pm; by appointment
Kramer Kaplan (TA): Office hours: T 2:00-3:00 pm; W 2:30-3:30 pm in S209; kaplan8@marshall.edu

Week	Dates	Lab Schedule	Lecture and Exam Schedule
1	8/24-8/28	Lab 1: Safety Tutorial; Microscopy I: The Phase Contrast Microscope	Course syllabus and overview Chapter 1: A Preview of the Cell Appendix: Microscopy Chapter 4: Cells and Organelles and Microscopy Chapter 5: Bioenergetics Chapter 6: Enzymes [Chapter 2: The Chemistry of Life and Chapter 3: Macromolecules - Proteins] Exam review **Exam 1: Thurs. 9/17**
2	8/31-9/4	Lab 2: Microscopy II: Microscopy and Measurement of Cells and Cell Structures; Organellar Scaling Project Setup	
3	9/7-9/11	Lab 3: Microscopy III: Organelle Scaling Experiment	
4	9/14-9/18	**No Lab this week** **Writing Assignment 1: Draft due on 9/18**	
5	9/21-9/25	Lab 4: Enzymes I: Introduction to Enzyme Kinetics	Chapter 7: Membranes [Chapter 3: Macromolecules - Lipids, carbohydrates] Chapter 8: Transport Across Membranes Chapter 9: Chemotropic Energy Metabolism: Glycolysis and Fermentation Chapter 10: Chemotropic Energy Metabolism: Aerobic Respiration Chapter 11: Phototropic Energy Metabolism: Photosynthesis Exam Review **Exam 2: Tues. 10/13**
6	9/28-10/2	Lab 5: Enzymes II: Enzyme Kinetics - Continued Analysis **Writing Assignment 1: Due on 9/29**	
7	10/5-10/9	Lab 6: Enzymes III: Isozyme analysis; [Fluorescence Microscopy-Demonstration]	
8	10/12-10/16	**No Lab this week** **Writing Assignment 2: Draft due on 10/16**	Chapter 12: Intracellular Compartments Chapter 13: Signal Transduction I Chapter 14: Signal Transduction II Chapter 15: Cytoskeleton Chapter 16: Cellular Movement Chapter 17: Beyond the Cell Exam review **Exam 3: Thurs. 11/5**
9	10/19-10/23	Lab 7: Molecular I:	
10	10/26-10/30	Lab 8: Molecular II: **Writing Assignment 2: Due on 10/27**	
	10/30	**Last Day to Drop an Individual Course**	
11	11/2-11/6	Lab 9: Molecular III:	
12	11/9-11/13	Lab 10: Independent Project Design and Laboratory Preparation **Writing Assignment 3: Draft due on 11/13**	Chapter 18: Structural Basis of Cellular Information [Chapter 3: Macromolecules - Nucleic Acids] Chapter 19: The Cell Cycle Chapter 22: Protein Synthesis and Sorting Chapter 24: Cancer Exam review **Exam 4: 12/10 from 10:15 am -12:15 pm**
13	11/16-11/20	Lab 11: Independent Project **Writing Assignment 3: Due on 11/20**	
	11/23-11/27	**Thanksgiving Break**	
14	11/30-12/4	Lab 12: Independent Project Analysis **Writing Assignment 4: Draft due on 12/4**	
		Writing Assignment 4: Due on 12/11	