

Biology 111-F: General Biology Syllabus and Schedule
T-R 12:00-1:15 pm, Hederman 100

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Credit: 3 hours of lecture
+ 1 hour of lab (3 hr actual time)
4 hours of credit
CRN: 11786

Prerequisites: None

Catalog Course Description: lecture for three hours a week and laboratory for three hours a week. An introduction to the living organism emphasizing the structure and function of the cell and genetics. This course is designed for Biology majors and minors.

Course rationale: The general biology courses at Mississippi College are designed to introduce students to the study of living things, beginning with the chemistry of life and ending with ecology. General Biology I is focused on the study of life at the molecular and cellular level. This course is required for all biology majors and minors. The discussion in this course will center around the fundamental concepts of biology. An important part of students' training in this course involves the application of these new concepts to the discussion of biological problems. A solid foundation in biology is essential to the liberal arts education and it is hoped that at the conclusion of this course, students will not only have broadened their intellects, but will have a greater appreciation for the world around them and the life that exists in it.

Course objectives and student outcomes:

(Lecture)

1. state and define the properties of life and the classification of living organisms using the binomial system of nomenclature.
2. explain the scientific method and analyze data derived from this technique of acquiring knowledge.
3. describe the atomic and molecular composition of living organisms including the four major classes of organic (carbon containing) molecules — carbohydrates, lipids, proteins, and nucleic acids.
4. describe the structure of water to various novel properties of aqueous solutions and how these properties influence living systems.
5. explain the cell as the basic unit of life and describe the two major types of cells, prokaryotic and eukaryotic.
6. compare and contrast properties of eukaryotic and prokaryotic cell types.
7. explain the fluid-mosaic model of the plasma membrane.
8. explain energy and summarize conversion of energy in living systems through the metabolic processes of photosynthesis, glycolysis, anaerobic respiration (fermentation) and aerobic respiration (Krebs cycle and electron transport).
9. define enzymes as biological catalysts.
10. explain the stages and regulation of the cell cycle.
11. explain the mechanism of reproduction of prokaryotic (binary fission) and eukaryotic (mitosis and meiosis) cells.
12. explain the concepts of Mendelian genetics and apply the concepts to inheritance of human traits, including various diseases such as hemophilia, Down syndrome, Huntington disorder, Turner syndrome, Klinefelter syndrome, cystic fibrosis etc..
13. apply the Hardy Weinberg equation to calculate gene frequencies within a population.
14. describe the modern concept of the gene including the expression of protein via the central dogma of molecular biology including the processes of replication, transcription and translation.

15. summarize the basics of biotechnology including recombinant DNA technology.
(Laboratory)
16. explain the different tests used to identify carbohydrates, proteins, and lipids.
17. demonstrate the nature of enzymes functioning as biological catalysts.
18. demonstrate their ability to set up, carry out, and analyze a dihybrid genetic cross.
19. demonstrate their ability to microscopically examine cells and to carry out experiments involving osmosis and diffusion.
20. demonstrate aerobic and anaerobic respiration in living cells.
21. demonstrate and identify photosynthetic pigments by paper chromatography.
22. explain the stages of mitosis and demonstrate the use of X2 analysis to show how well experimental genetic cross data fits the expected results.
23. explain aspects of human inheritance, demonstrate understanding human blood types, and use the Hardy-Weinberg equation to predict the frequency of homozygous, heterozygous, and recessive traits.
24. demonstrate genetic transformation in E.coli with the pGLO plasmid.
25. contrast and compare DNA fingerprints created with gel electrophoresis.

Methods of instruction: The course will consist of three hours of lecture per week and one credit hour of lab per week. Because this is a lower level course, some basic concepts will be reviewed. Students are responsible for bringing themselves up to speed on topics. PowerPoint presentations, overheads, notes on the dry-erase board, oral instructions/examples, videos, and podcasts are all methods that will be used to convey course material.

Instructional materials:

Text: Neil A. Campbell and Jane B. Reece, 2009, Biology, Ninth edition, Benjamin Cummings.
ISBN: 978-0-321-54325-7/0-321-54325-4

Mastering Biology access code

Laboratory manual: Biology I Laboratory Manual, Department of Biological Sciences, Mississippi College

Lecture notes will be posted online on Moodle.

Required Practices: reading, memorization, diagramming, writing out-of-class assignments, computer use, and working practice problems out of class.

NOTES: A tuition refund cannot be made on dropped classes *after the first week* of classes. The last day to withdraw from class with a W is **Friday October 25, 2013.**

Refund schedule for withdrawal:

| | |
|---------------|------|
| 1st Week..... | 100% |
| 2nd Week..... | 75% |
| 3rd Week..... | 50% |
| 4th Week..... | 25% |
| 5th Week..... | 0% |

Important college dates:

Monday September, 2013: Labor Day. No class.

Tuesday September 3, 2012: Last day to drop the class with 100% tuition refund.

Monday-Tuesday October 7-8, 2013: Fall Break. No class.

Last day to drop a class is October 25, 2013 (zero tuition refund)

Wednesday – Sunday November 27- December 1: Thanksgiving holidays

All classes meet Monday November 25
All day classes meet Tuesday November 26
Night classes do NOT meet Tuesday November 26

Attendance: Your attendance in lectures is welcomed and expected. I will follow the University attendance policy as described in the school catalog, which can be found in The MC Undergraduate Catalog, p.56 – 57. (<http://www.mc.edu/resources/publications/catalogs.php>).

Please note that your grade can be reduced as a result of excessive absences. If you miss >25% of the classes (12 classes), you will be given an F automatically. Your grade may be lowered if you have excessive absences.

Absence from class: It is the student's responsibility to make-up missed assignments. No make-up quizzes. Tests missed for any reason will be made up on Monday Dec. 9 at 6:00 PM.

Academic integrity: You are members of an institution that is dedicated to scholarship and spiritual growth. This institution is part of the larger academic community, the foundation of which is based on personal honesty. The success of this community depends on the commitment of both students and faculty to this principle and therefore cheating and plagiarism cannot and will not be tolerated. More importantly, Mississippi College is dedicated to empowering its students to develop the skills necessary for "making responsible, moral choices," and thus, the University will accept nothing less than scrupulous honesty from its students. We will follow the University policy on Academic Honesty (Policy 2.19), which can be found in the student handbook, The Tomahawk, pp. 41 – 43.
<http://www.mc.edu/publications/handbook/academic.pdf>

Cell phones are not allowed out in the classroom after class begins. They are to be kept in your book bag, purse or pocket. They are not allowed on the desk or in your lap. Before class begins, turn cell phone ringers OFF.

Audio recording of lectures is permitted. Video recording is **NOT** permitted at any time. **Taking photos with cell phones or other devices is also NOT permitted.**

Recording of any type (video, audio or photos) during the review of quizzes and exams is NOT permitted.

Testing procedures:

- Touching a cell phone after an exam is passed out will result in loss of 20 points on the exam.
- Failure to turn off recording devices during such times is considered cheating and will result in an F on the exam and possible disciplinary procedures for cheating.
- Touching a cell phone or other electronic devices other than the calculator that was provided to you is NOT permitted and will result in an F on the exam.

Academic tutoring: This is a free service provided by the university for its students. Students who need help with studying should take advantage of this. Information can be found using the following link: <http://www.mc.edu/academics/academic-tutoring>

Students may also request one on one tutoring through the Biology department, by signing up with Mrs. Sue Caldwell in Hederman 104.

NOTES: A full tuition refund cannot be made on dropped classes *after September 4*. The last day to withdraw from class with a W is **October 25, 2013**.

Class etiquette: This is our class and it belongs to each one of us. Arriving late, texting, receiving cell phone calls or pages, having temper tantrums, and being disruptive robs us of the time that we have to

work together. Stealing is wrong. Therefore, arriving late, texting, receiving cell phone calls or pages, having temper tantrums, and being disruptive is wrong. It isn't beautiful logic, but you can catch the drift.

Student grading: In lecture, there will be three tests worth 100 points apiece. The second and third tests will have questions from the material covered on the first and second tests, *i.e.* all tests are comprehensive. A final comprehensive exam worth 100 points will be given on Saturday December 14. All tests will constitute 90% of the final lecture grade. Quizzes will be given weekly to encourage regular study of the course material. These will constitute about 10% of the final lecture grade. Extra credit assignments will be given in the Mastering Biology online supplemental course materials. **The grade from laboratory is combined with your grade from lecture to obtain your final grade for the course (lab = 25% and lecture = 75%).**

-Grade calculation:
$$\frac{\text{Number of points received by Sally Student (e.g. 431)}}{\text{Total number of points that are available (e.g. 450)}} = 96\%$$

-Extra credit is added to Sally Student's points (the numerator).

Grading scale: 90-100% = A, 80-89% = B, 70-79% = C, 60-69% = D, and <60% = F.

Guidelines for doing well:

1. Come to class and take notes
2. Rewrite your notes after class and highlight the sections covered in the chapter
3. Make vocabulary lists (by looking up the definitions **IN THE CHAPTER, NOT IN THE GLOSSARY**)
4. Don't read the whole chapter. You should learn to spot read and look for specific information using the chapter objectives. Make additional notes to those you took class
5. Study biology at least six hours per week, outside of class
6. Keep a record of your grades

Special accommodations at Student Counseling Services:

In order for a student to receive disability accommodations under Section 504 of the Americans with Disabilities Act, he or she must schedule an individual meeting with the Director of Student Counseling Services **immediately upon recognition of their disability** (if their disability is known they must come in before the semester begins or make an appointment **immediately** upon receipt of their syllabi for the new semester). The student must bring with them written documentation from a medical physician and/or licensed clinician that verifies their disability. If the student has received prior accommodations, they must bring written documentation of those accommodations (example Individualized Education Plan from the school system). Documentation must be current (**within 3 years**). The student must meet with SCS **face-to face** and also attend two (2) additional follow up meetings (one mid semester before or after midterm examinations and the last one at the end of the semester). Please note that the student may also schedule additional meetings as needed for support through SCS as they work with their professor throughout the semester. Note: Students must come in **each semester** to complete their Individualized Accommodation Plan (example: MC student completes fall semester IAP plan and even if student is a continuing student for the spring semester they must come in again to complete their spring semester IAP plan).

Student Counseling Services is located in Alumni Hall Room #4 or they may be contacted via email at : mbryant@mc.edu or rward@mc.edu or by phone at [601-925-7791](tel:601-925-7791).

Course Topics and Schedule

| <u>Week</u> | | <u>Topics / Chapters</u> |
|-------------|---------------|--|
| 1 | | Fundamental concepts in biology (1), elements (2), properties of water (3), uniqueness of carbon (4) |
| 2 | | Uniqueness of carbon (4) groups of biological molecules (5) |
| 3 | | Cells and organelles (6), lipid bilayer (7), types of cellular transport (7) |
| 4 | Test 1 | Tuesday September 24 (chapters 1-5) |
| 5 | | free energy & coupled reactions (8), role of enzymes in biological processes (8), enzymatic control of cellular metabolism (8) |
| | | redox (9), glycolysis (9), the citric acid cycle (9), oxidative phosphorylation (9), fermentation, anaerobic respiration, feedback loops (9) |
| 6 | | Photosynthesis (10) |
| 7 | | Cell signaling (11) |
| 8 | Test 2 | Tuesday October 22 (chapters 6-10), mitosis & regulation of the cell cycle (12) |

*******THE FINAL DROP DATE FOR THIS CLASS IS FRIDAY OCTOBER 25*******

| | | |
|-----------|---------------|---|
| 9 | | Cell cycle control (12), Meiosis (13), Mendelian inheritance & probability (14) |
| 10 | | dominant & recessive genetic disorders (14), inheritance of organelle genes (15), inheritance of sex-linked genes (15), |
| 11 | | Gene linkage (15), disorders resulting from abnormal chromosome numbers (15) |
| 12 | | Genes & DNA (16), DNA replication (16) |
| 13 | Test 3 | Tuesday November 19 (chapters 11-14) |
| 14 | | Transcription & RNA processing (17), |
| 15 | | Translation (17) |

Final comprehensive exam Saturday December 14 12:00 pm – 3:00 pm