GENETICS

Spring 2015 Course Syllabus for BIO 334

Genetics studies the inheritance of traits and have become integral to science and health care over the past half-century. New uses, new technologies, and potentially new dangers make DNA, genetics, and molecular biology even more critical to the future of humanity. While the technology involved in molecular biology is advancing so rapidly that half of the knowledge is superceded and most of the techniques become obsolete every two years, the core principles of genetics have held constant since first enunciated by Gregor Mendel 150 years ago. Therefore, this course concentrates on providing a deeper understanding of classical and molecular genetics. Emphasis is placed on eukaryotic genetics, beginning with basic inheritance patterns and their uses in pedigrees and chromosomal mapping, continuing with the molecular biology of the cell, and ending with molecular genetics techniques and their potential uses.

Credit Hours: 2 (two for lecture)
Prerequisites: Biology
Class Times: Mondays from 1:00 p.m. – 2:50 p.m. (3411)
Lecture Text: Griffiths, A.J.F., Miller, J.H., Suzuki, D.T., Lewontin, R.C., & Gelbert, W.M. (2000). An introduction to Genetic Analysis (7th ed). New York, W.H. Freeman. Available online at http://www.ncbi.nlm.nih.gov/books/NBK21766/
Instructor: James Bier, Ph.D.

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- **Office Hours**: Office hours are set up so that you can discuss concerns about the class, ask for clarification on the classes or reading material, or just to talk about microbiology, biology, or life in general. If the set hours are not convenient, call me so that we can set up a time that is mutually agreeable. Please visit the web site to see the current office hours.

The instructors reserve the right to make changes to the syllabus. All policies in the College Catalog, Program Handbooks and the Mercy College of Ohio Student Handbook are applicable to this course.

GRADING

I believe that genetics is best studied from its application rather than by memorization. Thanks to the abundance of case studies, we can have plenty of fun exploring real life cases. However, to fully decipher these cases, it will be necessary to understand the basic biology involved. I also believe that each of can learn from each other, so I encourage discussion in the classroom and collaboration outside of it. For the discussions to be fruitful, we **must** all read the text and attempt to comprehend it as well as possible as well as preparing lists of questions to discuss. I view my role as that of a coach helping you develop the skills to more completely understand genetics and genetic illnesses.

Grades for this course will be based on two tests and a comprehensive final. **Note**: Additional assignments may be added if I find them useful for helping you learn. Also, the grading system may be adjusted to better measure student performance.

•	**Points**
• Quizzes (two worth 50 points each)	100
• Comprehensive Final Exam	100

The tests, each worth 50 points, will predominantly be made up of short answer, application questions. These tests will cover four or five weeks of class and will be given about one week after a topic has been covered. The final is comprehensive and will consist of short answer and application questions. It carries the weight of two tests.

The number of points that you achieve throughout the semester will determine your final grade. The table to the right lists the minimum percentage required for each letter grade. You can determine your grade by dividing the number of points that you have achieved and dividing by the total points available (200 at the end of the semester).

Course Grade	**Percent Needed**
A	90%
B	80%
C	70%
D	60%

COURSE OBJECTIVES

1. Apply Mendelian genetics to the inheritance of single and multiple traits.
2. Describe advances in the Mendelian Laws of inheritance.
3. Relate the behavior of inheritance with the behavior of chromosomes.
4. Discuss violations of Mendelian inheritance and their application to chromosomal mapping.
5. Describe the chemical properties of DNA and relate them to inheritance.
6. Explain the mechanisms by which genes produce proteins and other cell structures
7. Discuss the causes and solutions to mistakes in chromosomes.
8. Discuss the modern uses of the new knowledge of DNA to modern society.
9. Explore the mechanisms by which genes are controlled and their effects of the fates of cells.
10. Examine traits controlled by more than one gene.
11. Apply genetic principles to examine genetic variation in entire populations.