



# SCHOOL OF STEM SYLLABUS



**TERM:**

**COURSE CODE:** BIO-240

**COURSE TITLE:** Genetics

**DAY(S) AND TIME(S):**

**LOCATION:**

**INSTRUCTOR:**

**OFFICE HOURS:**

**OFFICE LOCATION:**

**EMAIL:**

**PHONE:**

**COURSE PREREQUISITE:** BIO-115 OR BIO-111, MAT 100

**CREDITS:** 4

## **COURSE DESCRIPTION:**

This course is a combination of selected genetic topics for both lecture and lab. In this course students will study various genetic topics including mendelian genetics, chromosome mapping, the genetic code, DNA repair & mutations, genetics of cancer, DNA technology, and epigenetics. Students will also conduct various labs including polymerase chain reaction lab, southern blotting, northern blotting, and restriction enzyme analysis

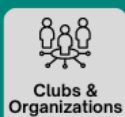
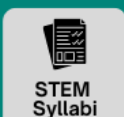
## **STUDENT LEARNING OUTCOMES:**

Upon completion of this course, students will be able to:

1. Explain the modification of Mendelian genetics, and how chromosome mutations result in variation in number and arrangement.
2. Analyze linkage and chromosome mapping in eukaryotes
3. Analyze genetic mapping in bacteria and bacteriophage
4. Describe DNA replication, recombination, repair and transposition
5. Describe the most common techniques in molecular genetics, DNA cloning, and DNA recombinant.
6. Explain the steps of DNA transcription and translation
7. Explain the mechanism of genetic in causing different kinds cancer
8. Evaluate the usage of genomics, bioinformatics and proteomics in identifying human genetic disorders
9. Assess ethical aspects of genetic engineering and biotechnology
10. Analyze population and evolutionary genetics
11. Experiment different DNA technology PCR, electrophoresis, and southern blotting

## **STEM STUDENT HUB**

Information & Resources tailored towards students taking any STEM courses



## **TEXTBOOK AND SUPPLEMENTAL MATERIALS:**

Peter J. Russell. (2003). Essential iGenetics. Pearson Education

Thomas R. Mertens & Robert L.Hammersmith. (2007).Genetics Laboratory Investigations 13ed.  
Pearson Education

## **GRADING POLICY:**

|                          |     |
|--------------------------|-----|
| Two Lecture Exams        | 20% |
| Two Lab Exams            | 20% |
| Lab Reports              | 10% |
| Written Paper Assignment | 10% |
| Midterm Exam             | 15% |
| Final Comprehensive Exam | 25% |

Lab Format: Unless indicated otherwise, each laboratory exercise is set up for team of four-five students. Each student on the team is to participate in every aspect of the lab exercise. After each exercise, a formal lab report is handed in for grading. The lab reports are written (word processed) individually, not as a team, and handed in during the next lab session. You are required, by department policy, to follow all safety procedures. Each lab team is responsible for cleaning up their work area after every lab.

Students are expected to follow attendance guidelines as presented in the syllabus provided by the instructor. However, in case of an emergency or illness, students are advised to notify their instructor or counselor immediately. The instructor will determine the validity of the absence. The exceptions to instructor discretion exist when members of armed forces are called for training or assignment or any case where students are legally required to be elsewhere. Pending the submission of appropriate documentation reasonable accommodations for make-up work shall be provided, and in accordance with guidelines included in the syllabus. Make up exams will be given only in extenuating circumstances. It is your responsibility to let me know that you missed an exam. All make up exams are more difficult than the original.

Attendance, Punctuality and participation are required. Students that miss 20 minutes of class will be counted as absent. At the start of each meeting a quiz could take place for only five minutes if you late for any reason you receive zero for it. Students missing more than 3 classes will receive a Failing Final Grade

### SAMPLE COURSE SCHEDULE:

| Week             | LECTURE  | LAB  |
|------------------|--|--|
| 1 <sup>st</sup>  | Mendelian Genetics   | Lab Orientation & Discussion of Research Papers        |
| 2 <sup>nd</sup>  | Sex Determination and Sex Chromosomes  | Monohybrid & dihybrid cross (Fast Plants)              |
| 3 <sup>rd</sup>  | Linkage and Chromosome Mapping in Eukaryotes<br><br><i>Submission of Research Paper Topics</i>             | Principles of Probability, Chi-Square test             |
| 4 <sup>th</sup>  | .<br><br>Genetic Analysis and Mapping in Bacteria and Bacteriophages                                       | Mitosis & Set up Drosophila opened-ended cross         |
| 5 <sup>th</sup>  | DNA Replication and Recombination  | Drosophila opened-ended cross continue                 |
| 6 <sup>th</sup>  | The Genetic Code and Transcription<br><br><i>Submission of Research Paper Draft</i>                        | Human Chromosomes & Drosophila                         |
| 7 <sup>th</sup>  | <b>Midterm Exam</b>  | Drosophila locating a mutant gene in its chromosome    |
| 8 <sup>th</sup>  | The Genetics of Cancer   | Methods in Mutagenesis<br><br>Cancer Genetic Databases |
| 9 <sup>th</sup>  | Recombinant DNA Technology   | Isolation of DNA<br><br>Restriction endonuclease       |
| 10 <sup>th</sup> | Genomics, Bioinformatics, and Proteomics   | Isolation of Proteins                                  |
| 11 <sup>th</sup> | Application of Ethics of Genetic Engineering and Biotechnology<br><br><i>Submission of Research Papers</i> | Polymerase Chain Reaction (PCR)                        |
| 12 <sup>th</sup> | Population and Evolutionary Genetics   | Polymerase Chain Reaction (PCR)                        |

|                  |                                 |                    |
|------------------|---------------------------------|--------------------|
|                  |                                 |                    |
| 13 <sup>th</sup> | Presentation of Research Topics | DNA Fingerprinting |
| 14 <sup>th</sup> | Review for the final exam       | Review of Labs     |
| 15 <sup>th</sup> | <b>Comprehensive Final Exam</b> |                    |

### HCCC POLICIES, STATEMENTS, AND SERVICES:

<https://www.hccc.edu/administration/academic-affairs/syllabus-addendum.html>



