

LEARNING OUTCOMES

LEARNING ACTIVITIES

LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS
9. Design and perform relevant experiments that generate scientific data pertaining to the above outcome.	Class Discussion Group Problem Solving Activities Integrated Laboratory Techniques in Classical and Molecular Genetics Data Presentation Computer-Based (Local and Internet) Instruction	Quizzes Lecture Examinations Departmental Final Laboratory Experiments
10. Critique current literature in molecular and classical genetics, including clinical applications.	Class Discussion Computer-Based (Local and Internet) Instruction Written Assignments/ Bibliographic Instruction in Genetics	Essays and or Term Paper

At the conclusion of each semester/session, assessment of the learning outcomes will be completed by course faculty using the listed evaluation method(s). Aggregated results will be submitted to the Associate Vice President of Academic Affairs. The benchmark for each learning outcome is that *70% of students will meet or exceed outcome criteria.*

SEQUENCE OF TOPICS:

Lecture Topics

1. Simple Mendelian inheritance
2. Chromosome theory of inheritance
3. Meiosis
4. Advanced Mendelian inheritance: multiple alleles, incomplete dominance, etc.
5. Linkage and genetic mapping
6. Mapping in fungi, bacteria and viruses
7. Biological systems of genetic analysis: yeast, *Drosophila*, *Arabidopsis*, mice, humans
8. Population genetics
9. DNA structure
10. Transcription and Translation
11. Recombinant DNA technology
12. Regulation of gene expression in prokaryotes and eukaryotes
13. Regulation of gene expression during development
14. Genomics
15. Chromosomal and DNA mutations, transposable elements
16. Genetics of cancer

Laboratory Experiments

1. Biology of Drosophila
2. Drosophila Autosomal & Sex linked Cross (lasts for 3 weeks)
3. Probability & Statistics in Genetics*
4. Basic molecular genetic techniques: pipetting, restriction enzymes, gel electrophoresis
5. Karyotypes (Web Assignment)*
6. Complementation testing in Ascomycete genetics (yeast)
7. Arabidopsis Genetics: PCR detection and molecular phenotyping
8. Subcloning using pUC Vectors
9. Plasmid Miniprep and Restriction Enzyme Analysis
10. Blast Searches and Sequence Alignments (PC lab and out of class)
11. PCR Based DNA Fingerprinting

LEARNING MATERIALS:

Required Text:

Klug, Cummings, Spencer & Palladino. (2012). *Concepts of Genetics* (10th