

BSCI222: Principles of Genetics

Course Description:

The BSCI222 lecture will provide the basic principles, concepts, theories, and language of the field of genetics. The course will also provide a framework for understanding how genetic information is organized, stored, changes, and influences biological processes and the world we live in. In addition, the course will clarify how genetics is used as a tool for addressing biological, societal, and ethical questions.

The BSCI222 discussions will provide the opportunity for student to solve genetic problems, read primary literature, work on case studies, and use on-line programs to analyze data in a similar way that professional geneticists do.

Prerequisites:

CHEM131 and CHEM132 **AND** BSCI160 and BSCI161 (or BSCI106) **AND** BSCI170 and BSCI171 (or BSCI105) or must have successfully completed BSCI170 and BSCI171 (or BSCI105) **AND** two semesters of chemistry.

Recommended: For Science majors.

Course Credit: 4

Textbook:

Genetics: Conceptual Approach by Pierce (5th Edition)

Major Topics Covered in the BSCI222 Lecture Include the Following:

1. Chromosomes, Cell Division, Meiosis
2. Mendelian Genetics
3. Sex Determination and Linkage
4. Pedigrees
5. Linkage and Mapping
6. DNA and Chromosome Structure
7. Replication
8. Transcription
9. Translation of Proteins
10. Gene Regulation
 - a. Prokaryotes (*lac* operon)
 - b. Eukaryotes
11. Genomics
12. Epigenetics
13. Genetics of Cancer
14. Quantitative Genetics (Some Instructors)
15. Populations Genetics
16. Evolutionary Genetics (Some Instructors)

17. Biotechnology (Some Instructors)

Major topics covered in the BSCI222 discussion include the following:

- 1 Mendelian Inheritance
- 2 Using the BLAST program to study Gene Sequences
- 3 Dominance and Disease Alleles (a Case Study of Cystic Fibrosis)
- 4 Gene Expression
- 5 Gene Annotation
- 6 The Central Dogma of Genetics
- 7 Phylogenetics (by using the program ClustalX)
- 8 SNP Markers
- 9 Population Genetics