Inver Hills Community College

BIOL 2303: Genetics

A. COURSE DESCRIPTION

Credits: 5

Lecture Hours/Week: 4

Lab Hours/Week: 3

OJT Hours/Week: *.*

Prerequisites:
This course requires the following prerequisite
BIOL 1154 - Principles of Biology I (Minimum grade: 1.67 GPA Equivalent)

Corequisites: None

MnTC Goals: Goal 02 - Critical Thinking, Goal 03 - Natural Science

Introduces students to major concepts in Mendelian, molecular and population genetics. Experiments with viruses, bacteria, insects and plants highlight the study of gene expression, recombination, gene mapping, chromosome analysis and population genetics. Includes discussion of current societal, ethical, and political issues relevant to genetics and covers new discoveries and current directions in molecular genetics. Lecture hours include a weekly recitation. Students will gain hands-on experience in the safe handling, growth, maintenance and manipulation of model organisms.

B. COURSE EFFECTIVE DATES: 08/01/2007 - Present

C. OUTLINE OF MAJOR CONTENT AREAS

1. DNA Structure and Function 10%
2. Cell Cycle, Mitosis, and Meiosis 10%
3. Mendelian & Non Mendelian Principles and Analysis of Inheritance 20%
4. DNA Replication, Transcription, Translation & Mutation 15%
5. Multi Gene Expression 5%
6. Gene Mapping 5%
7. Chromosomal Abnormalities 5%
8. Genome Organization in viruses, prokaryotes, and eukaryotes 10%
9. Population, Evolutionary & Developmental Genetics 10%
10. Current Issues and Bioethics 10%

D. LEARNING OUTCOMES (General)

1.
   1.) Recognize and explain the major concepts and principles of theories of Classic, Molecular and Population Genetics, & analyze classic experiments that contributed to our current knowledge of genetics.

   2.) Explain and apply fundamental concepts related to the storage, transfer, and expression of genetic information at the cellular, organismal, and population level.

   3.) Use critical thinking skills to understand, evaluate, and analyze processes of inheritance.
2. 4.) Translate verbal material to mathematical expressions, apply mathematical formulas, and interpret and construct charts and graphs.

   5.) Apply basic principles of probability and statistics to genetics & apply relevant statistical tests to genetic data.

   6.) Formulate a hypothesis, and conduct and analyze an experiment with a model organism.

   7.) Organize, draft, edit, and revise formal scientific writing.
3. 8.) Read, interpret, incorporate, and cite information and ideas from primary literature into writing.

   9.) Utilize and understand the application of a genetic technology.

   10.) Explain and illustrate the role that genetics and its applications play in medicine, agriculture, biotechnology, and social issues.

4. 11.) Identify, summarize, and critique key debates and arguments about current societal, ethical, and political issues that are relevant to genetics. Summarize and discuss new discoveries and the current directions of molecular genetics research.

   12.) Demonstrate competence in the growth, maintenance, and crossing of experimental organisms.

   13.) Demonstrate current standard lab safety practices and procedures.

E. Minnesota Transfer Curriculum Goal Area(s) and Competencies

Goal 02 - Critical Thinking

1. Gather factual information and apply it to a given problem in a manner that is relevant, clear, comprehensive, and conscious of possible bias in the information selected.
2. Imagine and seek out a variety of possible goals, assumptions, interpretations, or perspectives which can give alternative meanings or solutions to given situations or problems.
3. Analyze the logical connections among the facts, goals, and implicit assumptions relevant to a problem or claim; generate and evaluate implications that follow from them.

Goal 03 - Natural Science

1. Demonstrate understanding of scientific theories.
2. Formulate and test hypotheses by performing laboratory, simulation, or field experiments in at least two of the natural science disciplines. One of these experimental components should develop, in greater depth, students' laboratory experience in the collection of data, its statistical and graphical analysis, and an appreciation of its sources of error and uncertainty.
3. Communicate their experimental findings, analyses, and interpretations both orally and in writing.

F. LEARNER OUTCOMES ASSESSMENT

As noted on course syllabus

G. SPECIAL INFORMATION

None noted