COURSE SYLLABUS

LAST REVIEW	Spring 2021
COURSE TITLE	Introduction to Genetics
COURSE NUMBER	BIOL-0240
DIVISION	Math, Science, Business & Technology
DEPARTMENT	Biology
CIP CODE	CIP
CREDIT HOURS	4
CONTACT HOURS/WEEK	Class: 3 Lab: 2
PREREQUISITES	BIOL-0135 Cell & Molecular Biology **and** MATH-0105 College Algebra or higher
COURSE PLACEMENT	Students must meet the correct placement measure for this course. Information may be found at: https://www.kckcc.edu/admissions/information/mandatory-evaluation-placement.html

COURSE DESCRIPTION
This course provides an introduction to basic genetic principles from classical Mendelian inheritance to modern molecular biotechnology. Emphasis will be placed on problem-solving. Topics include: inheritance, molecular genetics, regulation of genetic information, application of genetic technology and population genetics. The laboratory component supplies hands-on experience with relevant genetic techniques.

TEXTBOOKS
http://kckccbookstore.com/

METHODS OF INSTRUCTION
A variety of instructional methods may be used depending on content area. These include but are not limited to: lecture, multimedia, cooperative/collaborative learning, labs and demonstrations, projects and presentations, speeches, debates, panels, conferencing, performances, and learning experiences outside the classroom. Methodology will be selected to best meet student needs.

COURSE OUTLINE
I. A Brief History of Genetics
   A. Mendel & Classical Genetics
   B. Molecular Genetics

II. Mendelian Genetics
    A. Dominance Relationships
    B. Segregation & Independent Assortment
    C. Mendelian Crosses
    D. Pedigrees
III. Beyond Mendel
    A. Incomplete & Codominance
    B. Multiple Alleles
    C. Epistasis
    D. Linkage & Mapping
IV. Chromosomes
    A. Structure
    B. Mitosis & Meiosis
    C. Recombination
    D. Chromosome Abnormalities
    E. Cell Cycle
V. Molecular Genetics
    A. DNA Replication & Repair
    B. DNA Transcription and Translation
    C. Mutations
    D. Cancer
VI. Regulation of Genetic Information
    A. Bacteria
    B. Eukaryotes
    C. Transposons
VII. Recombinant Technology
    A. Molecular Analyses
    B. Polymerase Chain Reaction
    C. Applications of Recombinant Technology
VIII. Applied Genetics
    A. Disease Detection
    B. Gene therapy
IX. Population Genetics
    A. Hardy-Weinberg Equilibrium
    B. Effects of Selection & Genetic Drift
X. Laboratory
    A. Model Organisms
    B. Transformation
    C. Restriction Enzymes
    D. Electrophoresis
    E. Polymerase Chain Reaction
    F. Southern Blot
    G. Microarrays
    H. Bioinformatics

COURSE LEARNING OUTCOMES
Upon successful completion of this course, the student will:

A. The student will be able to explain the basic history of genetics.

B. The student will be able to solve problems using Punnett squares and pedigrees.

C. The student will be able to discuss recombination and chromosomal abnormalities.

D. The student will be able to explain DNA replication, repair and expression.

E. The student will be able to discuss how genetic information is regulated.

F. The student will be able to explain the techniques of recombinant DNA technology.

G. The student will be able to discuss the application of genetic technology to disease detection and gene therapy.

H. The student will be able to solve problems in population genetics.

I. The learner will demonstrate familiarity with the tools and techniques of laboratory genetics.

ASSESSMENT OF COURSE LEARNING OUTCOMES
Student progress is evaluated through both formative and summative assessment methods. Specific details may be found in the instructor's course information document.

COLLEGE POLICIES AND PROCEDURES
Student Handbook
https://www.kckcc.edu/files/docs/student-resources/student-handbook-and-code-of-conduct.pdf

College Catalog
https://www.kckcc.edu/academics/catalog/index.html

College Policies and Statements
https://www.kckcc.edu/about/policies-statements/index.html

Accessibility and Accommodations
https://www.kckcc.edu/academics/resources/student-accessibility-support-services/index.html.