COURSE SYLLABUS

LAST REVIEW	Fall 2022
COURSE TITLE	Principles of Cell and Molecular Biology
COURSE NUMBER	BIOL 0135
DIVISION	Math Science Business and Technology
DEPARTMENT	Biology
CIP CODE	24.0101
CREDIT HOURS	4
CONTACT HOURS/WEEK	Class: 3 Lab: 2
PREREQUISITES	None

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 is an integrated lecture and laboratory course for biology majors and students planning to take additional courses in biology. This class introduces the fundamental biological principles characteristic of all living things. Since the cell is the basic unit of life, this course will focus on life at the cellular and molecular levels. Subjects covered include basic biochemistry, cell anatomy and physiology, bioenergetics, genetics and evolution. Emphasis will be placed on learning the process skills and equipment associated with being a biologist.

KANSAS SYSTEMWIDE TRANSFER: BIO 1020/1021/1022
The learning outcomes and competencies detailed in this course outline or syllabus meet or exceed the learning outcomes and competencies specified by the Kansas Core Outcomes Groups project for this course as approved by the Kansas Board of Regents.

PROGRAM LEARNING OUTCOMES

1. Overview of Biomanufacturing: Demonstrate an understanding of the subjects at the interface of Biology and Business central to Biomanufacturing field.

2. Lab Skills: Demonstrate proficiency in basic bio-manufacturing/biotechnology laboratory skills including: making measurements, preparing cultures and solutions, checking pH, using a microscope, DNA extraction, western blotting, agarose gel electrophoresis, bacterial transformations, PCR, growing cells in the Bioreactor, centrifugation and chromatography.

3. Documentation Skills: Learn and follow required recording, analyzing and documenting skills for maintaining a laboratory notebook with experimental procedures, results, and analysis.

General Education Learning Outcome

☐ Basic Skills for Communication
☐ Mathematics
☐ Humanities
☒ Natural and Physical Sciences
☐ Social and Behavioral Sciences

Institutional Learning Outcomes

☒ Communication
☒ Computation and Financial Literacy
☒ Critical Reasoning
☐ Technology and Information Literacy
☐ Community and Civic Responsibility
☐ Personal and Interpersonal Skills

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. Nature of science
   A. Scientific processes
   B. Scientific methods
II. Chemistry of life
   A. Basic chemistry
   B. Biological molecules
III. Cellular organization
   A. Cell structure
   B. Cell functions
IV. Bioenergetics
   A. Enzymes
   B. Cellular respiration
   C. Photosynthesis
V. Cellular reproduction
   A. Binary fission
   B. Mitosis
   C. Meiosis
VI. The principles of genetics
   A. Mendelian genetics
   B. Molecular genetics
VII. Experimental science
   A. Microscopy
   B. Measurement using the metric system
   C. Analyze results
   D. Living organisms

COURSE LEARNING OUTCOMES AND COMPETENCIES

Upon successful completion of this course,

A. Demonstrate an understanding of the nature of science.
   1. Scientific processes
   2. Scientific methods.
B. Demonstrate an understanding of the levels of organization and emergent properties of life
   3. Basic biological chemistry
   4. Structure and function of biological molecules
   5. Cellular structure and functions.
C. Demonstrate an understanding of bioenergetics
   6. Enzyme activity
   7. Cellular respiration
   8. Photosynthesis
D. Demonstrate an understanding of cellular reproduction.
   9. Binary fission
   10. Mitosis.

11. Meiosis.

E. Identify the basic principles of Mendelian and molecular genetics and relate these to the basic principles of natural selection and evolution.
   12. Classical genetics.
   13. Molecular genetics
      a. DNA replication.
      b. Gene expression and regulation.

F. Design and perform experiments in a laboratory setting.
   14. Microscopy.
   15. Quantitative measurement skills incorporating the metric system.
   16. Analytical and statistical skills including presenting and/or interpreting graphs and tables.
   17. Living organisms in the laboratory.

ASSESSMENT OF COURSE LEARNING OUTCOMES AND COMPETENCIES

Student progress is evaluated by means that include, but are not limited to, exams, labs, written assignments, and class participation

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.