Minnesota State University Moorhead

BIOL 360: Cellular and Molecular Physiology

A. COURSE DESCRIPTION

Credits: 4

Lecture Hours/Week: 3

Lab Hours/Week: 3

OJT Hours/Week: *.*

Prerequisites:
This course requires the following prerequisite
BIOL 111 - Cell Biology

Corequisites: None

MnTC Goals: None

This course involves the biological, biochemical, and molecular study of homeostasis at the cellular level. Key concepts include protein function, membrane function, signal transduction, electrical conduction, and cellular and intracellular movements.

B. COURSE EFFECTIVE DATES: 08/25/2008 - Present

C. OUTLINE OF MAJOR CONTENT AREAS

1. Membrane Structure and Function, From Fluid Mosaic Model to Today
2. Molecular Motors
3. Cell Physiological Basis for Cancer Development and Metastasis
4. Diffusion and Permeability: Quantitative Diffusion Analysis; Partition Coefficients and Membrane Permeability
5. Osmotic Pressure and Water Movement
6. Electricity and Ion Gradients: Electrochemical Gradients
7. Ion Channels and Channel Diversity
8. Passive Electrical Properties
9. Action Potentials
10. Passive and Active Transport: Thermodynamics of Transport Systems;Energy dynamics and ion gradients
11. Cell Signaling

D. LEARNING OUTCOMES (General)

1. Students will gain a greater understanding of the normal cellular and molecular physiology of eukaryotes.
2. Students will learn to integrate fundamental biochemistry and molecular biology tools and approaches as well as their functional significance to cellular homeostasis; cellular communication; and cellular movement.
3. Students will be engaged in a research-focused, collaborative laboratory experience doing cellular physiology related research.
4. Students will collect, analyze, and present data in formats consistent with current scientific conventions.
5. Students will explore, assess, and integrate relevant primary literature into a larger context; with appropriate citations of that literature.

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

None

F. LEARNER OUTCOMES ASSESSMENT

As noted on course syllabus

G. SPECIAL INFORMATION

None noted