

# 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 both of these prerequisites

BIOL 111 - Cell Biology

CHEM 210 - General Chemistry II

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

### D. LEARNING OUTCOMES (General)

1. Will gain a greater understanding of the normal cellular and molecular physiology of higher mammals.
2. Will learn to integrate fundamental biochemistry and molecular biology tools and techniques and their functional significance to cellular homeostasis; cellular communication; and cellular movement.
3. Will be engaged in a research-based, team-centered laboratory experience doing primary cellular physiology related research.
4. Will collect, analyze, and present cell-based data in formats consistent with professional standards of the American Physiological Society.
5. Will be prepared for careers, graduate and/or professional school courses involving modern molecular medicine and functional genomics and their applications to cellular and systems level physiology.

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

None

**F. LEARNER OUTCOMES ASSESSMENT**

As noted on course syllabus

**G. SPECIAL INFORMATION**

None noted