

Minnesota State University Moorhead

BCBT 463: Genomics, Proteomics and Beyond

A. COURSE DESCRIPTION

Credits: 3

Lecture Hours/Week: 3

Lab Hours/Week: 0

OJT Hours/Week: *.*

Prerequisites:

This course requires all three of these prerequisites

CHEM 400 - Biochemistry I

CHEM 405 - Biochemistry Laboratory I

BIOL 341 - Genetics

Corequisites: None

MnTC Goals: None

An introduction to the science and practice of omics disciplines including genomics, transcriptomics, proteomics, and metabolomics. Students will learn the theory, development, and practice of omics technologies as a key component of systems biology. Students will explore how omics data can be integrated and applied to gain insight into a wide variety of biochemical and biotechnological research problems, such as personalized medicine and agricultural sustainability. Advanced techniques practiced in lab may include long and short read DNA sequencing, RNAseq, 2D electrophoresis, liquid chromatography, quantitative and tandem mass spectrometry, and bioinformatics. This is a lab/lecture course where students will study background and theory and practice some of these techniques in the lab.

B. COURSE EFFECTIVE DATES: 10/14/2021 - Present

C. OUTLINE OF MAJOR CONTENT AREAS

D. LEARNING OUTCOMES (General)

1. Identify the benefits and limitations of omics technologies for addressing scientific research questions.
2. Design appropriate sample preparation work flows for diverse biological samples on a systems level based on an understanding of the biochemistry of macromolecules.
3. Determine appropriate equipment, techniques, and requirements for identification and/or quantification of biomolecules at the systems level.
4. Recognize bioinformatic tools and prominent databases used in omics studies and use these tools for comparative analysis.
5. Understand the relationship between proteomics, genomics, metabolomics, and the other omics areas of systems biology.
6. Utilize omics techniques to address research interests in biochemistry and biotechnology.

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

None

F. LEARNER OUTCOMES ASSESSMENT

As noted on course syllabus

G. SPECIAL INFORMATION

None noted