COMMON COURSE OUTLINE

Course discipline/number/title: BIOL 1300: Biological Applications of GIS Technology

A. CATALOG DESCRIPTION
1. **Credits: 3**
2. **Hours/Week: 2 lecture/2 lab**
3. **Prerequisites (Course discipline/number):** None
4. **Other requirements:** None
5. **MnTC Goals (if any):** Goal 3/Natural Sciences

B. COURSE DESCRIPTION: This course will teach the use and application of Geographic Information Systems (GIS), computerized systems designed for the storage, retrieval, and analysis of geographically referenced data through a combination of class presentations and laboratory exercises. Applications of GIS technology will include using analytical tools to explore at a scientific level the spatial relationships, patterns, and processes of organisms in relation to environmental, biological, demographic, geographic, and physical phenomena. The course revolves around analytical problem-solving and will be computer-intensive and project-based.

C. DATE LAST REVISED (Month, year): November, 2022

D. OUTLINE OF MAJOR CONTENT AREAS:
1. Introduction to Geographic Information Systems (GIS)
2. Mapping and presenting GIS data
3. GIS coordinate systems
4. Managing and editing GIS data
5. Methods of spatial data analysis, including vector and raster data
6. Sources of GIS data
7. Biological-based GIS research project

E. LEARNING OUTCOMES (GENERAL): The student will be able to:
1. Apply GIS technology to identify spatial characteristics of an environment, habitat, community, or a general site that will enable students to integrate spatial thinking and GIS analysis into their academic research and careers.
2. Understand and perform the basic functions of ESRI's ArcGIS software, the industry-leading program.
3. Evaluate and spatially analyze information on large spreadsheets and databases.
4. Apply this information to understand relationships within and between systems, organisms, environments, and communities.
5. Apply the tools and knowledge of GIS technology to analyze findings and solve problems in their research, projects, and presentations of their work in this course.

F. LEARNING OUTCOMES (MNTC):
Goal 3/Natural Sciences: The student will be able to:
1. Formulate and test hypotheses by performing laboratory, simulation, or field experiments in at least two of the natural science disciplines. One of these experimental components should develop, in greater depth, student's laboratory experience in the collection of data, its statistical and graphical analysis, and an appreciation of its source of error and uncertainty.
2. Communicate their experimental findings, analyses, and interpretations both orally and in writing.
3. Evaluate societal issues from a natural science perspective, ask questions about the evidence presented, and make informed judgments about science-related topics and policies.

G. METHODS FOR EVALUATION OF STUDENT LEARNING: Methods may include but are not limited to:
1. Participation
2. Weekly lab assignments
3. Project development
4. Project presentation

H. **RCTC CORE OUTCOME(S).** This course contributes to meeting the following RCTC Core Outcome(s): **Critical Thinking.** Students will think systematically and explore information thoroughly before accepting or formulating a position or conclusion.

I. **SPECIAL INFORMATION (if any):** None