A. Course Description

Credits: 3

Prerequisites: PHYS 211 Calculus Based Physics I AND PHYS 212 Calculus Based Physics II and all upper division coursework in Biology, Chemistry and Physics

Lab Hours/ Weeks: Corequisites: None

Lecture Hours/ Week :

MnTC Goals: None

Geographical information systems and their use in biology, particularly ecology and public health. Students learn to use current version of ArcGIS software and apply their knowledge to contemporary problems in the areas of spatial ecology, conservation biology and ecoepidemiology.

B. Course Effective Dates: 05/10/2014 - Present

C. Outline of Major Content Areas:

See Course Description for major content areas.

D. Learning Outcomes (General)

1. Understand and be able to explain the concepts and vocabulary of geographical positioning systems (GPS) and geographical information systems (GIS), including concepts of location identification and description, compass direction, triangulation, trilaterization, geographical coordinates and map projections;
2. Be able to use ArcGIS for the entry, analysis and display of geographical information, including use of tools to buffer, clip, dissolve, overlay, intersect, and manipulate symbology;
3. Be able to apply ArcGIS tools to ecological problems, including the mapping of wildlife areas, design of parks, analysis of range limits, and testing of ecological hypotheses (e.g. Reid’s paradox, Yoda’s Law, Island Biogeography etc.);
4. Understand and be able to use concepts and tools of spatial analysis including the calculation of distance (Euclidean and Manhattan), area, perimeter, population density, and clustering (nearest neighbor and hot-spot) etc.;
5. Demonstrate understanding of and the ability to apply the biological and ecological principles underlying the application of GIS to natural resources problems, including the biological species concept, evolution by natural selection, resource competition, demographics etc.

E. Learning Outcomes (MN Transfer Curriculum)

This contains no goal areas.

G. Special Information

Note: First day attendance required except by instructor permission.