Course Title: Geographic Information Systems

Course Code: DVST-857

Credit Hours: 2-1

Pre-requisite Courses: DVST-851. Students must also demonstrate sufficient background in statistics and quantitative reasoning.

Course Description:

1. This course is designed to give students a basic and working knowledge Geographic Information Systems (GIS), Global Positioning Systems (GPS), and Remote Sensing technologies in the context of development practice. Through a combination of lectures and hands-on laboratory exercises, students will learn about the variety and structure of spatial data and databases, the principles of raster and vector based spatial analysis, and how the two can be combined to support development planning and program monitoring and evaluation. Further study of basic cartographic principles will enable students to prepare maps that effectively communicate the results of spatial data analysis.

2. Course Objectives:

a. To introduce students to basic cartographic principles, spatial data, spatial databases, and vector and raster analysis.
b. To provide climate change concentration students with the spatial analysis tools necessary to understand and contribute to emerging climate change and sustainability debates.
c. To encourage students to consider and analyze issues in terms of space and geographical context.
d. To teach students how to use spatial analysis software such as ArcGIS and ERDAS.

Course Outcomes:

3. At the end of this course, students should be able to,
   a. Understand the dynamics and nature of raster and vector data;
   b. Collect, create, process, and manipulate spatial data as needed for analysis;

c. Conduct basic spatial analysis in order to practically address a development challenge, such as food deserts, unequal service provision, or changing weather patterns.

4 **Course Contents:**

This course will cover the geodatabases, map projections, the physical basis for remote sensing, remote sensing systems, digital image processing, data structures, database design, and spatial data analysis.

5 Lab work: Lecture material will be supplemented by weekly, hands-on laboratory exercises and assignments using ArcGIS and ERDAS.

6 Textbooks or Reference Books:

Bolstad, P. (2007) *GIS Fundamentals: A First Text on Geographic Information Systems (3rd Edition).* St. Paul, MN: Eider Press.