

Tennessee Technological University
Department of Civil & Environmental Engineering
CEE 5990/4990 – GIS Applications in CEE (Special Problems)

2017 Catalog Data:	CEE 5990/4990
Required Textbook:	Bolstad, P. (2016). "GIS Fundamentals: A First Text on Geographic Information Systems, Fifth Edition" Eider Press, White Bear Lake, Minnesota, ISBN: 978-1-50669-587-7
Faculty Coordinator:	Alfred J. Kalyanapu, Professor of Civil Engineering
Prerequisites:	CEE 3420 or equivalent; Instructor Consent
Goal:	Geospatial data and analysis is crucial for Civil and Environmental Engineering. Through this course, students will understand how to use geospatial data, analyze and process it and develop new geospatial data, for several CEE applications including hydrology, transportation engineering and others. The goal of this course is to introduce you to: <ol style="list-style-type: none">1. basic understanding of spatial data and concepts of cartography2. basic understanding of GIS and its applications to Civil and Environmental Engineering3. hands-on experience of the state-of-the-practice GIS modeling software

Course learning objectives:

1. To understand the basics of map-making, cartographic principles and spatial nature of engineering data
2. To understand the applications of geographic information system (GIS) and its relevance to Civil and Environmental Engineering applications
3. To gain hands-on experience on the state-of-the-practice GIS modeling software

Major Topics Covered:

1. GIS & Spatial Data Models
2. Projections & Coordinate Systems
3. Maps, Data Entry, Editing & Output
4. GPS & GNSS
5. Aerial & Satellite Images
6. Basic Spatial Analysis
7. Spatial Models and Modeling
8. Raster Analysis
9. Terrain Analysis

Measurable outcomes:

Students will be expected to:

1. Understand the basics of map-making, cartographic principles, and spatial nature of engineering data;
2. Understand the concepts of Geographic Information System;
3. Perform detailed maps based on cartographic principles;
4. Perform geo-referencing of vector and raster data;
5. Perform spatial analysis of vector and raster datasets;
6. Develop basic spatial applications in ArcGIS Model Builder to aid in civil and environmental engineering applications.