

## Syllabus AGET 782

- Course Title:** *GIS for Agricultural and Natural Resources Management*
- Course Abbreviation:** AGET 782
- Course Credits:** 3 hours
- Instructor:** Timothy N. Burcham, P.E., and Ph.D.
- Course Description:** **AGET 782 (3)** Principles and application of Geographic Information Systems (GIS) technologies with emphasis on the use of GIS for collecting, storing and analyzing spatial data associated with agricultural and natural resource-based enterprises. GIS software techniques are developed using an interactive/inductive learning process. Students will collect and analyze data to complete a research project using GIS to answer questions related to an agricultural or natural resources topic.
- Required Text:** Mastering ArcGIS, 4<sup>th</sup> Edition. Author: Maribeth Price. McGraw Hill Co. ISBN: 978-0-007-729332-1.

### Grading

Weekly Quizzes	35%
Lit Review Reports	15%
GPS/GIS Term Project	20%
Mid-Term Exam	15%
Final Exam	15%

Grades	
90-100	A
80-89	B
70-79	C
65-69	D
<65	F

**Punctuality:** Each lecture module and associated assignments will have a definite completion date (as assigned by the instructor). Assignments, formal reports, quizzes, etc. turned in after the posted due date will receive a letter grade deduction per day late.

**Term Project:** A graduate level term project associated with the application of GIS principles to agricultural and natural resources based problems is required.

# Topic Outline

## Introduction

### What is GIS?

#### Concepts

- What is GIS?
- A history of GIS
- What can a GIS do?
- GIS project management
- Project case study: A thorny issue
- Types of GIS projects
- Planning a GIS project

### Example of a GIS proposal

## Chapter 1. Introducing ArcGIS

### Mastering the Concepts

#### Concepts

- ArcGIS overview
- Intro to raster and vector data models
- Data files in ArcGIS
- Properties of spatial data files
- Introduction to metadata
- Overview of the ArcGIS Interface
- Object properties
- About ArcCatalog
- About ArcToolbox

#### Summary

## Chapter 2. Working with ArcMap

### Mastering the Concepts

#### Concepts

- Map documents
- ArcMap windows and menus
- The Help System
- Data Frames
- Data layer properties
- Working with symbols and styles
- Map scale concepts
- Labeling concepts

#### Summary

## **Chapter 3. Coordinate Systems and Map Projections**

### **Mastering the Concepts**

#### Concepts

About map projections and GIS

Geographic coordinate systems

Spheroids and datums

Map projections

A note on terminology

Common projection systems

Map projections in ArcMap

Managing coordinate systems

Projecting data

Using ArcToolbox

Summary

## **Chapter 4. Drawing and Symbolizing Features**

### **Mastering the Concepts**

#### Concepts

Types of maps

Classifying numeric data

Using map layer files

Editing symbols and using styles

Displaying rasters

Summary

## **Chapter 5. Working with Tables**

### **Mastering the Concepts**

#### Concepts

Overview of tables in ArcGIS

Table formats

Field types

Queries on tables

Joining and relating tables

Getting statistics on tables

Summarizing tables

Editing and calculating fields

Summary

## **Chapter 6. Queries**

### **Mastering the Concepts**

#### Concepts

What are queries?

Interactive selection

Selecting by attributes

Selecting by location

Choosing the selection method

Selection states

Definition queries

Using queries in GIS Analysis

#### Summary

## **Chapter 7. Spatial Joins**

### **Mastering the Concepts**

#### Concepts

What is a spatial join?

Types of spatial joins

Setting up a spatial join

#### Summary

## **Chapter 8. Map Overlay**

### **Mastering the Concepts**

#### Concepts

Map overlay

Examples of using map overlay

Other spatial analysis functions

Coordinate systems and map units

#### Summary

## **Chapter 9. Presenting Data**

### **Mastering the Concepts**

#### Concepts

Tips for making maps

Maps and reports in ArcGIS

Working with map elements

The Layout Toolbar

Working with map scales

Setting up scale bars

#### Summary

## **Chapter 10. Geocoding**

### **Mastering the Concepts**

#### Concepts

What is geocoding?

How does geocoding work?

Available geocoding styles

The geocoding process

Setting up an address locator

The reference data

Adding x-y coordinates

Summary

## **Chapter 11. Basic Editing in ArcMap**

### **Mastering the Concepts**

#### Concepts

Editing overview

The Editor Toolbar

General information about editing

Snapping features

Creating adjacent polygons

Editing features

Editing attributes

Saving work

Summary

## **Chapter 12. More Editing Techniques**

### **Mastering the Concepts**

#### Concepts

Using different sketch tools

Changing existing features

Combining features

Buffering features

Topology and shared features

Summary

## **Chapter 13. Working with Geodatabases**

### **Mastering the Concepts**

#### Concepts

- About geodatabases
- Creating geodatabases
- Creating features datasets
- Using default values
- Setting up domains
- Split and merge policies
- About subtypes

#### Summary

## **Chapter 14. Analyzing Networks**

### **Mastering the Concepts**

#### Concepts

- About networks
- Types of networks
- Network analysis
- The Utility Network Analyst toolbar
- Generic trace solvers
- Utility trace solvers
- Building networks

#### Summary

## **Chapter 15. Raster Analysis**

### **Mastering the Concepts**

#### Concepts

- Raster versus vector models
- About rasters
- Coordinate systems and rasters
- Raster analysis
- Boolean map overlay
- Controlling analysis options
- Spatial Analyst and ArcToolbox

#### Summary