

MORAVIAN COLLEGE

PHYSICS & EARTH SCIENCE DEPARTMENT

COURSE SYLLABUS

Instructor: Thomas K. Edinger
Office Location: HOSCI 112, or as designated
Office Hours: Tuesday 5:30pm to 6:30pm
Office Phone: 610-504-5147
Email Address: edingert@moravian.edu

Course Title: Introduction to GIS
Course Number: EASC 210 PM
Term & Year: Spring 2016
Credit Hours: 1 course unit
Class/Lab Room: HOSCI 206
Class Time: Tue. 6:30pm-9:30pm

Catalog Description:

Geographic Information Systems is a primary tool for analysis of spatial data. Esri ArcGIS desktop software is used to edit, query, and analyze spatial databases and display the results of analysis. Both vector and raster data are considered. Emphasis on applications of GIS in the lecture/laboratory sessions.

Prerequisite Course(s):

None

Text(s), required:

Getting to Know ArcGIS Desktop, Fourth Edition, Updated for ArcGIS 10.2 and 10.3, Esri Press, ISBN: 9781589483828, 2015 794 pp.

Recommended text and material:

Some additional book and reading materials will be provided in the library. Other materials are found in ArcGIS Desktop online documentation. Optional book ordering information will be provided in class.

Suggested Materials:

Flash Drive

Course Goals/Objectives:

The course is designed to promote spatial thinking, developing global awareness, and supporting the critical thinking process. An intermediate working knowledge of computers and the Windows environment will be helpful. Lab and lectures are intimately linked and “live” software demonstrations are included in the lecture. The first weeks of the course will provide a broad view of how you can display and query spatial data and produce map products. The remainder of the course will focus on applying spatial

analytical tools to address questions to solve problems. As the semester develops, more tools will be added to your GIS toolbox so that you can complete a final independent project that integrates material learned during the course. Students will be encouraged to design individualized final projects using your own or other available data.

Upon successful completion of this course students will be able to do the following:

- Describe the various concepts, terminology and technology used in GIS.
- Demonstrate the ability to successfully use Esri's ArcGIS 10.3 GIS software.
- Understand and utilize the physical geography principles used in GIS such as projections, datum and coordinate systems.
- Demonstrate an understanding of the database administration principles used in GIS, such as data models, tables and relationships.
- Demonstrate an understanding of map accuracy issues.
- Demonstrate a basic understanding of GPS.
- Demonstrate a basic understanding and use of GIS web maps.
- Utilize multiple GIS data sources, including CAD, dBASE, and EXCEL.
- Demonstrate a functional knowledge of layer display, control and editing.
- Demonstrate a functional knowledge of map document creation, editing and output.
- Demonstrate a functional knowledge of cartographic layout creation.
- Demonstrate a functional knowledge of standard GIS analysis tools.
- Demonstrate a functional knowledge of common GIS applications and uses, including environmental studies and civil technologies.
- Demonstrate a conceptual and working knowledge of some ArcGIS extensions and customization options, including 3D Analyst and Spatial Analyst.
- Demonstrate first-hand experience with GIS analysis from start to finish through individual projects.

Grading System & Course Requirements:

Assignment & Quizzes	35%
Exams (2)	35%
Final Project	30%

An average of 90% or higher will earn a grade of "A"

An average of 80% or higher will earn a grade of "B"

An average of 70% or higher will earn a grade of "C"

An average of 60% or higher will earn a grade of "D"

An average below 60% will earn a grade of "F"

Attendance Policy:

Attendance is required at class and laboratory time.

Students with learning disabilities:

Students who wish to request accommodations in this class for a disability should contact the Academic Support Center, located at the lower level of Monocacy Hall, or by calling 610-861-1401. Accommodations cannot be provided until authorization is received from the Academic Support Center.

Assignment & Course Calendar (tentative)

Week 1 (1/19) GIS Basics - Introduction and Overview of Geographic Information Systems

Lab Activity - Chapters 1, 2 & 3

Assignment 01 & 01-1: Getting started with displaying map data and creating a summary report of a GIS project.

Week 2 (1/26) Interacting with data - Importing spatial and attribute data; projections and datums; data management; web mapping

Lab Activity – Chapters 4, 5 & 6

Assignment 02: The concepts of data, downloading data from Internet and getting data into the GIS.

Week 3 (2/2) Representing Data - Tabulating, symbolizing, classifying and labeling data

Lab Activity – Chapters 7, 8 & 9

Assignment 03: Tabulate Decennial Census and American Community information and prepare municipal and regional thematic maps.

Week 4 (2/9) Data Relationships - Querying and summarizing data; building relationships between tables and creating reports

Lab Activity – Chapters 15 & 17a-b

Assignment 04: Analyze City of Bethlehem parcel and zoning data; prepare data models of American Community Survey and other regional data using database joins and relates.

Week 5 (2/16) Creating and Editing Data – Preparing and updating data; GPS basics

Lab Activity – Chapters 11, 12 & 13

Assignment 05: Build Moravian campus GIS databases and prepare mapping.

Week 6 (2/23) Spatial Analysis – Querying and analyzing features using spatial queries and joins

Lab Activity – Chapters 16 & 17c

Assignment 06: Perform demographic and environmental spatial analysis tasks.

Week 7 (3/1) Mid-Term and preparing data for analysis, and performing spatial analysis using intersects and overlays

Lab Activity – Chapters 18a-c & 19a-c

Assignment 07: Prepare Monocacy Creek Watershed Land Use Suitability Analysis.

Spring Recess Begins Saturday March 5, 12:00 noon

Spring Recess Ends Monday, March 14, 7:30am

Week 8 (03/15) Maps and Geocoding - Presenting Data & Map Production; Geocoding and Matching Addresses

Lab Activity – Chapters 10 & 14

Assignment 08: Geocode employer databases.

Week 9 (3/22) Model Builder, Spatial and 3D Analyst – Automating geo-processing tasks and performing surfaces/terrain analysis and 3D modeling

Lab Activity – Chapters 18d, 20 and assigned readings

Assignment 09: Utilizing Model Builder for Monocacy Creek Watershed Land Use Suitability Analysis.

Assignment 10: Calculating raster surfaces and preparing 3D model of Monocacy Creek Watershed.

Week 10 (3/29) Begin Research Project

Week 11 (4/05) Continue Research Project

Week 12 (4/12) Continue Research Project

Week 13 (4/19) Continue Research Project

Week 14 (4/26) Project Presentations

Week 15 (5/03) Final Exam

All assignments are due the next week of class and no later than 3 weeks after the handout date.