# Syllabus – Spring 2012
## Intro to GIS for Civil and Environmental Engineers

**Dear Students,**

Welcome to GIS for Civil and Environmental Engineers! In this class we will be using ESRI's ArcGIS software version 10.0.
My name is Elizabeth Dudley Murphy (I go by Beth Murphy - feel free to call me Beth) and I will be your instructor for this course. I may be laid up the first week, as I am having screws removed from my knee on Friday. I hope to meet the class Wednesday of the first week or Monday of the second week to distribute the DVD's with the software and to show you how to install it. I would like you in the meantime, to read the syllabus and to make a decision regarding the class. The last two semesters, part of the class has been online and the outcome has been successful. This semester I am going to give you the choice to take the class entirely online, or if you are having problems or would like my assistance, I will be in class. I am working towards putting the class entirely online beginning summer or fall semester.
I use two websites for the class – the first, that will have the introductory power points, is located at **www5.egi.utah.edu**.
All of the labs, the syllabus, and your grades will be available through the TACC online website at:

https://online.uen.org/webct/urw/lc257461621151.tp0/logout.dowebct?insId=257461621151&insName=University%20of%20Utah&glcid=URN:X-WEBCT-VISTA-V1:ca7be239-cd7f-e253-01ab-a779aaa87069

You will be able to log on with your UNID and password - click on CVEEN 5110 – 001 sp12 (or CVEEN 6110-001 sp12) and you will taken to the class website.

I have ordered the ArcGIS software for the class for you to install on your laptops, the software is also available in the CADE lab. It is also available remotely on a CVEEN server, but there were updates that were being made at the end of last semester and I do not know where that is now in the process. I will either have you meet with Doug Ressler, who is in charge of the server and all of the recent changes, to make sure you have a good understanding of how to access folders which you will set up for the individual labs.
I will be available via e-mail through either my office e-mail (see the below) or via the Mail icon in WebCT. I will send you many e-mails for the first six weeks, alerting you to the location of icons you need to be aware of, but to begin with, I want you to go through the first introductory PowerPoint presentations and then begin to familiarize your self with the software. I will send you an e-mail every class day to set up the objective of the tasks to be accomplished that day. You of course can complete these tasks any time, but I would like you all to pay close attention to the DUE dates of all of the labs and stick to them. It is confusing to move on to new labs, without completing the basic steps. I have been quite lenient in the past with due dates, but feel it is to the detriment of the students

in the long run, so I will be stricter this semester about following the schedule as printed. I give you plenty of time to complete each lab based on the complexity.
When you begin to use the software, I will send you explicit steps explaining the icons in ArcGIS that we will use the most. I also will have you view a video that I will post on Wednesday the 11th that should complement the Intro to GIS PowerPoint.

**Instructor:**

Elizabeth Dudley-Murphy, Ph.D., Research Associate Professor, Dept. of Civil and Environmental Engineering, University of Utah

**Office hours**: by appointment
E-mail: **bmurphy@egi.utah.edu**

**Office:** 423 Wakara Way, Suite 300 (Research Park – across the street from the Marriott University Park Hotel)
**Prerequisites:** Basic computer skills and a"C-" or better in (MG EN 1050 AND MG EN 2400)

**Class Organization:**

Class Begins: 1/9/12
Class Ends: 4/25/12
M W - Combination lecture/lab 3:00 pm – 4:20 pm
Meet in MCE 1001

**The Course:** This course prepares students with a basic knowledge of concepts of cartography and GIS with an emphasis on a hands-on experience with the use of ESRI ArcGIS leading to a basic understanding of cartographic concepts and their incorporation into a geographic information system environment to facilitate the development of intelligent maps and geospatial databases. Labs are designed to inculcate important GIS concepts and prepare students for a final project. Final projects can be either individual or team efforts. This will prepare students for professional interaction with GIS analysts and to use GIS as necessary as professional engineers.

**Grading:** The final grade will be based on 100% - 50% from lab assignments and an annotated bibliography; 30% from a final project; and 20% from a midterm quiz. The grading is broken down as follows:

94.00 - 100 = A
90.00 – 93.99 = A-
86.00 – 89.99 = B+
83.00 – 85.99 = B
80.00 – 82.99 = B-
76.00 – 79.99 = C+

73.00 – 75.99 = C
70.00 – 72.99 = C-
66.00 – 69.99 = D+
63.00 – 65.99 = D
60.00 – 62.99 = D-
<=59.99 = E

**Learned Outcomes:** Upon completion, students will have a working knowledge of the following:

A. Cartographic principals
    a. Understanding maps
    b. Map design
    c. Datums and projections
B. Data
    a. ArcGIS file types
        i. Shapefiles
        ii. Personal Geodatabases
        iii. Layer files
        iv. Coverages
    b. Data amenable to GIS development
    c. Data processing and input
        i. Heads-up digitizing/GIS map creation
            1. Points
            2. Lines
            3. Polygons
        ii. Data input using metes and bounds
        iii. Event theme development using text and .dbf data files
        iv. Simple macro development for data reformatting
    d. Data Analysis
        i. Building queries
        ii. Data joins and relates
        iii. Overlays
        iv. Area calculations
        v. Proximity analysis
    e. Incorporation of hyperlinks
C. Incorporating imagery
    a. Remote Sensing
        i. Multispectral imagery use
    b. Creating world files
D. Georeferencing
E. Research project design
    a. Identification of a problem
    b. Methodological solution development
    c. Data collection
    d. Application of solution in GIS

e. Professional report writing

**Course Overview:** This is a hands-on course consisting of lecture notes and assignments that lead to a basic understanding of cartographic concepts and their incorporation into a geographic information system environment. This will facilitate the development of intelligent maps and geospatial databases.

## Course Program

**Week 1**
1/9 - Introduction to course – Syllabus
1/11 - Introduction to ArcGIS – View **Intro to GIS** *PowerPoint* on www5.egi.utah.edu

**Week 2**
1/16 – ***HOLIDAY*** *(MLK Day)*
1/18 – Introduction to **Maps and Cartographic Principals** text and *PowerPoint* on www5.egi.utah.edu

**Week 3**
1/23 – Meeting with Doug Ressler in the classroom to trouble shoot server problems – Beth will help with ArcGIS
1/25 – **Lab 1 -** Creating a map from scratch - Digitizing

**Week 4**
1/30 – **Lab 1** – Editing & Attributing
2/1 – **Lab 1** - Symbology & text

**Week 5**
2/6 - **Lab 1** - Map Layout
2/8 - **Lab 2a -** Virtual surveying – developing maps with metes and bounds property descriptions **– (Lab 1 DUE)**

**Week 6**
2/13 - - Continued work on Lab 2a
2/15 - **Lab 2b** - Proximity analysis – (**Lab 2a DUE**)

**Week 7**
2/20 – ***HOLIDAY*** *– (Presidents' Day)*
2/22 - **Lab 3** – Clipping **(Lab 2b Due**)

**Week 8**
2/27 - **Lab 4** – Importing files - (**Lab 3 DUE**)
2/29 - **Lab 5a** - Assigning coordinates to images (**Lab 4 DUE**)

**Week 9**
3/5 - **Lab 5b** – catching up on unfinished Labs **(Lab 5a DUE)**

3/7 - **Lab 6** - Joins, Relates, and Hyperlinks - ***Annotated Bibliography assigned*** (**Lab 5b DUE**)

**Week 10**
***Spring Break*** 3/12 - 3/17

**Week 11**
3/19 - **Lab 7** – Projections (**Lab 6 DUE**)
3/21 - **Lab 8** - Remote Sensing (**Lab 7 DUE**)

**Week 12**
3/26 **– Lab 9 –** Projection Conversion (**Lab 8 DUE**) - Annotated Bibliography and **Project Outline DUE (firm deadline)**
3/28 - **Lab 10** - Working with DEM's (**Lab 9 DUE**)

**Week 13**
4/2 – **QUIZ**
4/4 – **Lab 11** – Creating Graphs – (**Lab 10 DUE**)

**Week 14**
4/9 – **Lab 12 –** Labeling and Editing tips **– (Lab 11 DUE)**
4/11 – **Lab 12 DUE**

**Week 15**
4/16 **– Working on Projects**
4/18 – **Working on Projects**

**Week 16**
4/23 - **Projects – *Final Papers* DUE**

**It is expected that students keep up with the Lab assignments. Notes on the web site will help, but if a large time lapse occurs between lab assignment work, you will be considerably more confused. All labs will be due on due date noted. All assignments will be turned in via e-mail as attachments.**

**Course Text**
No text is required; however, ESRI offers a number of good GIS books at http://store.esri.com/esri/
Course labs and lecture notes can be found at **http://www5.egi.utah.edu and on the WebCT site.**