

Principles of Geographic Information Systems (GIS)

GEO4/526: Fall 2008, Section 101 - CRN 26__ or CRN 26__

Prerequisite: MTH121 or higher or permission

3 credit hours

Instructor: James Leonard, Ph.D.	Time: M 6:30-9:00pm
Phone: (304) 696-4626	Place: HH202
Office hours (Harris Hall 208): MWF 9:30-11:00am; T 2:30-4:00pm; or by appointment	leonard@marshall.edu

Course objectives:

- Recognize and apply the geographic principles that form the foundation of GIS:
 - Globe properties and the graticule
 - Ellipsoids, geoids, datums
 - Map projections
 - Coordinate systems
 - Cartographic design
- Practice and employ the basic techniques of ArcGIS software
- Construct your own GIS finished project by integrating techniques and principles

Required materials:

- Price, Meribeth. 2005. Mastering ArcGIS, 3rd ed. NY: McGraw-Hill. *This will also be used as a textbook for GEO4/529 - Vector Analysis offered next year.* Cost = \$80 or so.
- USGS 7.5' Topographic map of Huntington, WV quadrangle. Cost = \$6-10.
- Rulers, colored pencils, calculators, and globes will be supplied by the department.
- Readings posted online. Free to download and use in GEO4/526.

Time Inside and Outside of Class:

Class time will consist of one or more of the following: 1) short review quizzes; 2) presentation and discussion of GIS principles; 3) learning GIS principles using globe and map analysis and ArcGIS exercises. Some class time each week will normally be devoted to exercises. Make good use of this class time. **You must attend every class!** This class, though, consists of more than simple class attendance. **Expect to spend about nine hours inside and outside class each week** on course material. You may

require extra practice with the ArcGIS software on your own time. The software is available campus-wide in University Computing Facilities Labs. The exercise data is available on a network drive (`\\marshall.edu\munet\geography\`) and is accessible campus-wide.

Software access:

Every Computing Facilities Lab will have ArcGIS available. You may access the Geography Lab in Harris Hall 202 by swiping your ID card. The exercise data is available on a network drive (`\\marshall.edu\munet\geography\`).

You can access ArcGIS from home! For free! Here's how:

1. Go to <http://muremote.marshall.edu/>
2. You may need a little piece of software that takes about 5 seconds to download. If you need it, there will be a pop-up window with the information.
3. Leave the Server box blank; just click Connect.
4. Login to the MU Virtual Machine. This will log you in to an MU computer on campus. You will not be able to access data on your home computer from here. The ArcGIS software will be available on this remote computer. The exercise data is available on a network drive (`\\marshall.edu\munet\geography\`) on this remote computer.
5. Save projects and work on your V:\ drive. The V:\ drive will be accessible from campus and on the muremote computer.

Grading:

Grades will be based on twelve exercises assigned during class (20 points each) for 240 points; six review quizzes (10 points each) for 60 points; two exams (100 points each) for 200 points; five online ESRI Virtual Campus Modules (20 points each) for 100 points, and a final project for 100 points. Graduate students will have more extensive graded exercises, exam questions, and projects. Final grades will be determined by the total number of points you have earned:

- A = 700 - 630 points (100-90%)
- B = 629 - 560 (89-80%)
- C = 559 - 490 (79-70%)
- D = 489 - 420 (69-60%)
- F = 419 and below (less than 60%)

Make the best use of the assignments, quizzes, project, and exams, because there will be **no additional credit** and **no grades will be scaled or curved**.

- This is a senior-/graduate-level course. You will be expected to perform at a high level. The pace of the course is rapid.

- You must be thorough and complete on all exercises to receive full credit.
- You must master all exercises, textbook and article readings, online course material, lecture material, and ArcGIS skills and concepts to do well on the exams.
- Exams will be approximately 50% short answer, multiple choice, and true/false questions, and approximately 50% of the points will be based on your use of your notes, readings, ArcGIS, and other software to solve problems and determine answers.
- The ESRI Virtual Campus course modules can only be completed by passing mini-exams. You may take each mini-exam as often as you like. As long as you complete the module when assigned, you will get full credit for that module.

Attendance Policy:

You must attend every class. Exercises assigned during class will be turned in during the next class period. You must submit assignments by the announced deadlines or you will receive zeros for any such assignments. If you will not be present for an excused reason on a day an exercise is due, you **MUST** turn it in early. **Failure to follow these instructions will result in a ZERO on the missed exercise or project.** I do not accept unexcused absences. I follow University policy for excused absences. You must provide adequate documentation for any excused absence. Missing 2 days or more (excused or unexcused) probably means failure in this class. **You will be held to the highest standards in regard to academic attendance, participation, and punctuality.**

Academic Honesty and Plagiarism:

University policy states that any act of a dishonorable nature which gives the student engaged in it an unfair advantage over others engaged in the same or similar course of study is prohibited. You must do your own work inside and outside of this class. Cheating/plagiarism in or out of this class is prohibited. **You will be given a final grade of F for any instance of academic dishonesty.** I am happy to assist you with anything you do not understand or have questions about. Cheating in this course includes, but is not limited to:

- Recording identical answers and screen captures as a classmate for your assignments.
- Plagiarizing material from the textbook or readings. To avoid plagiarism, read all assigned material first; complete your exercises second; then base your written answers to review questions on your experience; only refer to the textbook or readings as necessary.

Withdrawal Policy:

A drop slip signed by me or the chairman of the Geography Dept. must be submitted to the Registrar to receive a W during the period set by the university. After the W period, you may only drop this class by complete university withdrawal. **Failure to follow these university procedures will result in a final grade of F.**

Tentative Schedule (subject to change):

Assignments are due at the BEGINNING of the next class period after they are assigned, unless otherwise stated in class.

- Aug. 25: Chapter 1 - What is GIS?; Jobs in GIS
 - Classroom: Textbook Chapter 1 exercises
 - Assignment #1 - Textbook Chapter 1 exercises and review questions; find five jobs in your field that have GIS skills as a primary qualification
- Sept. 1: Holiday!
- Sept. 8: Chapter 2 - Working with ArcMap; Semester Project instructions
 - Classroom: Review Chapter 1; Textbook Chapter 2 exercises
 - Assignment #2 - Textbook Chapter 2 exercises and review questions
- Sept. 15: Globe properties
 - Classroom: Review Chapter 2; ESRI Virtual Campus; Globe properties overview
 - Geodesy reading
 - Assignment #3 - Globe exercises handout
 - ESRI Virtual Campus course *Map projections and coordinate systems*: Module 1
- Sept. 22: **Quiz 1**; Chapter 3 - Map projections and coordinate systems
 - Classroom: Review Globe exercises; Projections overview; Textbook Chapter 3 exercises
 - Assignment #4 - Textbook Chapter 3 exercises and review questions
 - USGS projections reading
 - ESRI Virtual Campus course *Map projections and coordinate systems*: Module 2
- Meet with me about Semester Project ideas
- Sept. 29: **Quiz 2**; Chapter 4 - Drawing and Symbolizing Features
 - Classroom: Review Chapter 3; Chapter 4 exercises
 - Assignment #5 - Chapter 4 exercises and review questions
 - ESRI Virtual Campus course *Map projections and coordinate systems*: Module 4
- Oct. 6: Data classification
 - Classroom: Manual data classification examples
 - Assignment #6 - Data classification
 - ESRI Virtual Campus course *Map projections and coordinate systems*: Module 5
- Oct. 13: **Quiz 3**; GPS overview (Trimble website)
 - Classroom: GPS in GIS (point, line, polygon features); GPS field work handouts
- Oct. 20: **Exam #1**; Chapter 5 - Working with Tables
 - Classroom: Exam #1
 - Assignment #7 - Chapter 5 exercises and review questions
 - Project Parts 1,2,&3 due in two weeks
- Meet with me about Semester Project data
- Oct. 27: Coordinate systems, map scale, scale in a GIS
 - Classroom: Review Chapter 5 (summarize, cardinality); Coordinate systems and scale illustrated using a topographic map
 - Assignment #8 - Topographic map exercise

- ESRI Virtual Campus course *Map projections and coordinate systems*: Module 6
- Nov. 3: **Quiz 4**; Chapter 9 - Presenting Data; Cartographic design principles
 - Project Parts 1,2,&3 due
 - Classroom: Topographic map exercise review; Cartographic design rules
 - Assignment #9 - Chapter 9 exercises and review questions
- Nov. 10: Cartographic design review
 - Classroom: Chapter 9 review; Cartographic design exercise I
 - Assignment #10 - Cartographic design exercise II
 - Cartographic design reading
 - Project Parts 4&5 due in three weeks
- Meet with me about Semester Project completion
- Nov. 17: **Quiz 5**; Chapter 6 - Queries
 - Classroom: ESRI Virtual Campus *Understanding GIS Queries*
 - Assignment #11 - Chapter 6 exercises and review questions
- Nov. 24: Holiday!
- Dec. 1: **Quiz 6**; Chapter 10 - Geocoding
 - Project Parts 4&5 due.
 - Classroom: Review Chapter 6 (query challenge); printing large maps for Semester Project
 - Assignment #12 - Chapter 10 exercises and review questions
- Dec. 8: Project presentations; Chapter 11 - Basic Editing
 - Classroom: Project presentations
 - Assignment: Chapter 11 exercises and review questions
- Dec. 15: **Exam #2**