

# **GEOG 125: Geographic Information Systems-II**

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## **Course Objectives**

GEOG 125 is an introductory course covering the theory and application of Geographic Information Systems (GIS). This course introduces you to the ArcGIS desktop software applications and provides you with the foundation to become a successful user of Arc View. The course includes an overview of the general principles of GIS and practical experience in its use. The practical component involves the use of desktop GIS software packages including ArcGIS, Spatial Analyst and 3D Analyst. This course also covers the theory and methods of building GIS databases for applications, ranging from natural resources management, parcel and cadastral mapping, transportation and location analyses, census and land survey, and cartographic representations. Students will learn in lectures several basic and advanced spatial data automation and integration methods. Both the theoretical and practical components of the course are important.



**Do not let it pass by----- learn it**

## **Text and Readings**

The required textbook for this course is "*Introduction to Geographic Information Systems 4th Edition*" (Chang, Kang-tsung 2008, McGraw Hill). Another book that will be used for the computer labs is "*Getting to Know ArcGIS Desktop 2<sup>nd</sup> Edition*" (Ormsby Tim et al, ESRI, 2004). Both books are required. The books are available at the DVC book center and from Amazon.com. Using ESRI's "Virtual Campus" we will also further explore the capabilities of ArcGIS. ESRI's courses and exercises will be provided by the instructor.

## Practical Component

During the lab sessions you will do practical GIS exercises on the computers. If you do not finish the labs during the assigned time periods the lab also has open hours. The practical exercises provide a way to acquire skills using ArcGIS and other software packages and to apply the course concepts to real data.

## Grading

This course is designed primarily to teach you how to use specific software packages. The majority of your grade will be based on a series of exercises, midterm, final Exam and a short project (PowerPoint presentation). In addition, you will be graded on short quizzes and one exam.

Lab Assignments	30%
Midterm	20%
Participation	10%
Final	20%
Project	20%

Attendance is very important. Students are expected to attend all classes. I record attendance everyday. Students who do not attend class regularly will not do well in this course. You are given two free absences. If you miss more than two class periods then you will be penalized five percent of your final grade per absence. Please make every effort to come to class on time. The labs are due by 4:30pm Wednesday the week after they are assigned in the mailbox. You can also submit to me during the lab section.

### To earn a grade of 4.0 you need to:

1. Complete all assignments 2. Produce work of high quality, 3. Assume a leadership role in the class. 4. Earn at least 95%

### To earn a grade of 3.0- 3.9, you need to:

1. Complete all assignments 2. Produce work of good quality. 3. Earn at least 85%.

### To earn a passing grade of 0.7, you need to:

1. Turn in all assignments 2. Produce work of possible quality. 3. Earn at least 65%

## Course Goals and Policies

1. Achieve a high level of basic GIS literacy
2. Cultivate geographic skills through understanding, collecting, analyzing and interpreting information about the world regions.

3. Develop general skills needed for success in college and in the work world, including critical and creative thinking, oral and written communications, and technological expertise.

**For attaining our goals, this class abides by five policies.**

Arrive on time prepared to do the scheduled activities during the entire class.

Conduct yourself with maturity and personal self-management at all times.

Do the best work and go over what you have learned in class

Be attentive, disciplined and active in class and perform non-class related activities elsewhere.

Respect yourself, your colleagues and your instructor.

**PLAGIARISM:**

All forms of **cheating and plagiarism** are absolutely forbidden. If you are caught cheating, you will obtain a failing grade. Cheating on exams or plagiarism in written assignments will result in a zero score for the assignment.

**Schedule of Lectures, Readings, and Labs (Subject to Change)**

Date	Monday Discussion Topic/ Readings	Wednesday Discussion Topic/ Readings/ Lab
Week 1	Course Overview What is GIS?	Please use (Ormsby et al, 2004) for Lab part 1, ( <u>Chang, 2008</u> ) for Lab part 2, and for Lab Part-3 use ESRI Exercises provided to you <u>Lab 1 (Part-1) Introduction to ArcGIS</u>
Week 2	<u>Slides</u> Geodesy & Map Projections	Lab-2 (part-2) <u>Map Projection and Coordinate Systems (Ch 2)</u>
Week 3	Attribute Data Input and Management Chang Ch 9,11 <u>Slides</u>	<u>Lab-3 (Part-2, Chang Ch 9,11) Attribute Data Manipulation</u>

Week 4	<b>Labor Day-Class Closed</b>	Georeferencing (Slides) The Nature of Geographic Data (Slides) Lab 4 (part-1) <u>Symbology &amp; Classification</u> <u>Labeling Features and</u> <u>Querying Data</u>
Week 5	Geographic Data Modeling and GIS data Collection  (Discussion on Project)	<u>Lab 5 (Part 1)</u>  <u>Joins, Relates and Selecting Features by Location</u>  <u>Lab 5 (Part -1)</u>  <u>Preparing Data for Analysis and Spatial Analysis</u>
Week 6	Vector Data Model (Chang Ch 3, 4, 6) <u>Slides</u>	<u>Lab 6 (part-2):</u>  <u>Data File and Geodatabase Structure</u>
Week 7	Raster Basics Displaying Rasters in ArcMap Managing Raster Data (Slides, ESRI)	<u>Lab 7 (Part-3) Explore raster datasets</u> <u>Create a map with a raster background</u> <u>Add multiband rasters to a map</u>
Week 8	Exploring the raster data model and its relationship to ArcGIS Desktop and to prepare students for the countless GIS tasks that use raster data for City, County and State Agencies (Slides)	<u>Lab 8 (Part-3) Create and manage rasters</u> <u>Georeference and transform a digital ortho quadrangle</u> <u>Lab 8 (Part-2)</u> <u>Raster and Terrain Data Manipulation</u>
Week 9	Raster Data (Chang Ch 5) (Slides)  <b>Thanksgiving – Class Closed</b>	<u>Lab 9 (Part-2)</u> <u>Raster and Terrain Data Manipulation</u>
Week 10	GIS Data Analysis (ESRI Slides)  (Project Discussion)	Spatial Data Editing (Chang Ch 8 + ESRI), Slides  <u>Lab 10 (Part-1) Projecting</u>

		<u>Data and Building Geodatabase</u>
Week 11	Advanced Spatial Analysis (ESRI Virtual Campus) Introduction to ArcGIS 9 ModelBuilder (Slides)	<u>Lab 11 (Part-1): Creating Features, Editing Features and Attributes</u>
Week 12	Geocoding (Slides) <b>Midterm Exam</b>	<u>Lab 12 (Part-1): Geocoding Address</u>
Week 13	Presenting Data & Making Maps  Parts of a map: legend, neat line, title, north line, scale.  Representation of scale	<b>Veteran Day</b>  <b>Closed</b>
Week 14	Designing a map: use of symbol, pattern, and color  Working with Labels (Slides, ESRI)	(ESRI Virtual Campus Training)  <u>Lab 13-Part-3-Making Maps &amp; Working with Labels</u>
Week 15	Working with Annotation (Slides, ESRI)	(ESRI Virtual Campus Training)  <u>Lab 14 (Part-3) Working with Annotation</u>
Week 16	Dynamic Segmentation (Chang Ch 17) Slides	<u>Lab 15 (Part-2): Network and Dynamic Segmentation, Network Analyst</u>
Week 17	<b>Student Presentations</b>  During Scheduled Exam Time	Student <b>Presentations</b> During Scheduled Exam Time  <b>Project submission</b>