

**Geography 250-01**  
**Introduction to Geographic Information**  
**Systems and Cartography**  
**Syllabus**

**Classroom** 240 Monroe Hall  
**Day and Time** MWF 9:00 – 9:50am  
**Lab Sessions** Mondays at 1:00pm in 320 Monroe

**Instructor** Stephen P. Hanna  
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**Office Hours** MW 10:00 – 11:00am  
T 1:00 – 3:00pm

**Text** Paul Longley *et al.* 2005. *Geographic Information Systems and Science*. Wiley.

**Course Description**

This course introduces students to the principles of Geographic Information Systems (GIS) and cartography and their use in analyzing and presenting geographic information. GIS is not simply a set of software tools, but involves a scientific approach to the examination geographic phenomena known as *spatial analysis*. This approach involves key components of the scientific method including formal statements of the question or problem, the creation of a model of the geographic phenomena under investigation, and a clear presentation of the results of the examination. Building a GIS model and presenting results requires an understanding of cartographic principles. Therefore, a portion of this course is devoted to learning how to create publishable quality maps.

**Course Objectives**

1. to learn the principles of GIS including: different kinds of spatial data models, georeferencing, and an introduction to spatial analysis;
2. to learn the principles of map making and geographic visualization including: scale and projections, design and layout guidelines, symbolization, generalization, processing and classifying geographic information;
3. to learn to use ArcGIS suite (ArcView, ArcCatalog, ArcToolbox) to create and edit geographic information, organize geographic databases, perform basic spatial analyses, and to create maps.
4. to gain a solid command of the terminology used in GIS and cartography

**Attendance**

For the most part students will be responsible for their own attendance. The exceptions are the laboratory and exam dates (see schedule below). In order to receive a grade for exercises and exams you **must** either be present or call me **prior to class** to explain your absence. There will be no exceptions.

## Evaluation

As GIS and cartography have both technical and theoretical aspects, your progress will be evaluated by a combination of laboratory exercises and exams designed to help you integrate the concepts and techniques covered in this course. Each exercise and exam is worth a particular number of points. Your final grade will be calculated as a percent of the total number of possible points (200).

Laboratory Exercises: There will be a total of eight exercises that will give you the opportunity to use the knowledge you have obtained from the lectures, text, and other readings.

The eight lab exercises will be assigned and due at the beginning of the laboratory session on the following dates. **Late exercises will not be accepted.**

<b>Section 1</b>	<u>Exercise</u>	<u>Assigned</u>	<u>Due</u>	<u>Points</u>
	1. Introduction to ArcGIS	8/31	9/7	10
	2. Map projections and scale	9/5	9/12	10
	3. Building the GIS database	9/12	9/26	15
	4. Map design in ArcGIS	9/26	10/10	15
	5. Making a thematic map	10/10	10/24	10
	6. Mapping surfaces and 3-D modeling	10/24	11/7	15
	7. Vector Analysis in GIS	11/7	11/21	15
	<u>8. Raster Analysis in GIS</u>	<u>11/21</u>	<u>12/9*</u>	<u>20</u>

\* Note Friday due dates. All labs must be turned in by the beginning of class

Completion of laboratory exercises will require substantial time in the GIS and Cartography Laboratory beyond lab hours.

Exams: There will be three exams which will test your understanding of the information given in lectures, your text, and assigned readings. These exams will include fill-in-the-blank questions, problem solving, short answer questions, and essays. The dates for the exams are as follows.

<u>Exam</u>	<u>Date</u>	<u>Points</u>
1 <sup>st</sup> Exam	9/28	25
2 <sup>nd</sup> Exam	11/7	25
Final	12/14	40

Final Grade: Your final grade will be calculated as follows:

The eight lab exercises are worth	110 points
<u>The three exams are worth</u>	<u>90 points</u>
Total Possible Points	200 points

Letter Grade point ranges are as follows:

A	186 - 200	B-	160 - 165	D+	134 - 139
A-	180 - 185	C+	154 - 159	D	120 - 133
B+	174 - 179	C	146 - 153	F	less than 120
B	166 - 173	C-	140 - 145		

### **Policies and Resources:**

Honor Code: As in every class, you must follow the tenets of the UMW Honor System. While I encourage each of you to offer help to your colleagues to solve problems and to seek such help as you work on your laboratories, remember that your lab reports, maps, databases, and other items you turn in to me must be your own work. Please remember to write and sign a short form of the pledge on every exam and lab report turned in on paper.

Disability Services: The Office of Disability Resources (Lee Hall 401) has been designated by the University of Mary Washington as the primary office to guide, counsel, and assist students with disabilities. If you receive services through that office and require accommodations for this class, please make an appointment with me as soon as possible to discuss your approved accommodations. I will hold any information you share with me in strictest confidence unless you give me permission to do otherwise. If you have not made contact with the Office of Disability Resources and have reasonable accommodation needs, I will be happy to help you contact them. The office will require appropriate documentation of a disability. Their phone number is 540-654-1266 and their e-mail is [ods@umw.edu](mailto:ods@umw.edu).

Technical Problems in the GIS Lab: Should you encounter technical problems (network problems, workstation not working, printer not working) while in the laboratory, please call or e-mail the Help Desk (654-2255 [helpdesk@umw.edu](mailto:helpdesk@umw.edu)) and notify me with an e-mail. Please describe the problem as thoroughly as possible. Except in **extreme** cases, such problems are **not** a valid excuse for not completing a lab exercise by the deadline.

### **Course Outline** (subject to change)

<u>Date</u>	<u>Topic</u>	<u>Readings Due</u>
8/29 – 8/31	Defining GIS and Cartography What is Geographic Information? Applications of GIS	Longley, chpts. 1&2
9/2 – 9/9	Projection and Scale Coordinate Systems	Understanding Map Proj. (Canvas) Longley, chpt 5
9/12 – 9/14	Representing Geographic Information in Cartography and GIS: The Nature of Geographic Information	Longley, chpt 3
9/16	Scale and Generalization	
9/19 – 9/26	Spatial Data Models Raster and Vector Data Formats Building the Geodatabase	Longley, chpts. 3,8, & 9
<b>9/28</b>	<b>1<sup>st</sup> Exam</b>	

Date	Topic	Readings Due
9/30 – 10/7	Map Design and Typography Designing Map Symbols	Longley, chpt. 12
10/10 – 10/14	Working with Attribute Data Data Measurement	Dent, chpt 5 (Canvas)
<b>10/17</b>	<b>Fall Break</b>	
10/19 – 10/21	Working with Attribute Data Descriptive Statistics Data Classification	Longley, chpt. 12 Dent, chpt. 5 (Canvas) Dent, chpt. 7 (Canvas)
10/24 – 11/2	Working with Raster Data Interpolation, surface mapping	Longley, 333-337 Dent, chpt 10 (Canvas)
11/4	3-D Modeling	
<b>11/7</b>	<b>2<sup>nd</sup> Exam</b>	
11/9	Spatial Analysis with GIS Report writing	
11/11 – 11/16	Vector Analysis in GIS Overlays and Buffers	Longley, chpt. 14
11/18 – 11/21	Raster Analysis in GIS	Longley, chpt. 14
<b>11/23 – 11/25</b>	<b>Thanksgiving Break</b>	
11/28	Spatial Analysis Workshop	TBA
11/30	GIS and Remote Sensing	TBA
11/2	GIS and Global Positioning Systems	TBA
12/5 – 12/7	Alternative Mapping Techniques Cartograms and mash-ups	TBA
12/9	GIS and Society	
<b>12/14</b>	<b>Final Exam @ 8:30 – 11:00am</b>	

**Supplies:**

To complete the laboratory exercises and exams in this course you will need the following:

- A 4+ gigabyte flash drive to back up your laboratory work
- A simple calculator