

# Principles of GIS (GEOL 403/503)

**Class Schedule: Wednesday - 1.30 PM – 4.30 PM (Section 1)**

**Thursday - 1.30 PM – 4.30 PM (Section 2)**

**Instructor: Dr. Sudhanshu Sekhar panda**

## **Week 1** August 24/25

Lecture 1: Overview/introduction/maps in general/concepts of layers, ArcMap 9

- Brief history of maps
- Concept of geo-technology (remote sensing, GIS, GPS....)
- History of GIS
- Corporate cultures (ESRI, INTERGRAPH, .....
- What is GIS
- Types of GIS data
- Basic GIS functionality
- Maps (GUI)
- Remote sensing (raster,
- GPS

Reading: Bolstad\* Chapter 1, pp 1-19  
GTK\*\* Chapter 1-2

Exercise: GTK 3abc

## **Week 2** August 31/September 1

Lecture 2: Getting to know ArcGIS – this is all software/application focused lecture/ example/lab stuff,

Reading: None

Exercise: ISU Getting Acquainted with ArcGIS  
GTK 4abc Exploring ArcMap and Exploring ArcCatalog

## **Week 3** September 7/8

Quiz 1: ArcGIS, etc.

Lecture 3: Data models - file types (shapefile etc), and data types (vector/raster/TIN)

- Graphic features
- Graphic data types (vector, raster, TIN, ..)
- Vector data (points, lines, polygons)
- Raster data (different formats)
- TIN's
- File formats

Reading: Bolstad Chapter 2, pp. 23-52

Exercise: ISU Data Visualization Techniques in ArcGIS

## **Week 4** September 14/15

Lecture 4: Data sources (web sites... ) ? Data importing (txt files, cad files, etc). GPS Digitizing (paper maps/on screen/heads up)

Reading: Bolstad Chapter 4, 89-110

Exercise: Bolstad Chapter 5, 127-143  
ISU Digitizing Exercise

**Week 5** September 21/22

Lecture 5: Data Editing  
Reading: Bolstad Chapter 7, 183-201  
Exercise: GTK Exercise 15ab, 16abc  
ISU Editing Geographic Features in ArcGIS

**Week 6** September 28/29

Quiz 2: On the Bolstad reading assignments.  
Lecture 6: Datums, Projections  
Reading: 1) Bolstad Chapter 3, 57-84  
2) Bolstad Chapter 4, 111-122  
3) ESRI PDF File “Understanding your projection” (optional)  
Exercise: GTK 13ab

**Week 7** October 5/6

Lecture 7: Databases/attribute tables, linking tables  
Reading: Bolstad Chapter 8, 203 – 222  
Exercises: GTK Exercise 14abc  
ISU Database Tools in ArcGIS

**Week 8** October 12/13  
Mid Term Exam

**Week 9** October 19/20

Lecture 8: Cartography – Symbology, classification and labeling  
Reading: None  
Exercise: GTK Exercise 5abcd, 6abcd, 7abc

**Week 10** October 26/27

Lecture 9: Search/select by spatial vs. attribute (Getting information about features)  
Reading: None  
Exercises: GTK Exercises 8abcd  
(Potential) ISU Query and Summarization Tools

**Week 11** November 2/3

Quiz 3: Cartography and getting information about features  
Lecture 10: Basic spatial analysis (vector analysis: intersection, append, overlay, union, buffer, )  
Reading: Bolstad Chapter 9, 225-264  
Exercises: ISU Spatial Analysis with ArcGIS

**Week 12** November 9/10

Lecture 11: Cartography - map making, north arrows, legends, scales, distance, Crystal Reports for high quality maps, export to graphics program external editing.

Reading: Two journal papers on cartography from S.P.

Exercises: GTK 18abcd, 19abcd  
ISU Creating Cartographic Products with ArcGIS

**Week 13** November 16/17

GIS Day: Optional November 16 event. Take home material for Wed students.

Lecture 12: Metadata – Lecture focus on FGDC metadata standard, demonstration on how to create metadata using ArcCatalog tool

Reading: ESRI metadata document, FGDC download a pdf file on metadata

Exercise: (NEW) metadata exercise that includes a demo of how to create a simple meta data file in ArcGIS and instructions for them to create metadata for their own project (at least 3 data sets or something).

**Week 14** November 23/24

Thanksgiving Break

**Week 15** November 30/December 1

Lecture 13: Other Software and programming (ArcView 3.1, IDRISI, MapInfo, MapWindow, AutoCAD Map, GRASS, Web Based vs. PC, ArcExplorer, geography network, ArcReader, UNIX vs. PC, Customization vs. not, customization languages AML, Avenue, VBA, Python; market share of different platforms, companies)

Reading: None

Exercise: (NEW) demonstration on geographic network. “find info on all available GIS software/compare and contrast functions uses/ etc...”

**Week 16** December 7/8

Lecture: Review for final exam. Student project presentations. Posters and written reports due this day.

Reading: None

Exercise: None

### Grading

	<b>Geol 403</b>	<b>Geol 503</b>
Quizzes	75	75
Mid Term Exam	100	100
Final Exam	200	200
Homework	200	200
Class Project	125	175
Project Presentation	N/A	50
<b>Total Possible</b>	<b>700</b>	<b>800</b>

\* **GIS Fundamentals by Paul Bolstad**

\*\* **Getting to Know ArcGIS Desktop by T. Ormsby, E. Napolean, R. Burke, C. Groess, and L. Feaster**

Students with disabilities who wish to have accommodations provided by the university must self-identify in order to have accommodations provided. Contact ADA and Disabilities Resource Center at 236-3599