Introduction

What is Geospatial Technology?
Geospatial technology is a collective term used to describe the integrated use of geographic information systems, remote sensing, global navigation satellite systems, digital cartography and Internet mapping.

What is a GIS?
- definition: A geographic information system is a computer system* designed to manage and analyze spatial data, where spatial data can be any data that are tied to places or geographic coordinates.
  *the five components of a computer system include:
    1) hardware, 2) software, 3) data, 4) people, and 5) work flow procedures
- to manage and analyze spatial data, a GIS has six major functions.
  GIS software provides users with the ability to: 1) capture, 2) store, 3) manipulate, 4) query, 5) analyze and 6) display spatial data (know these six main functions).

Origins of GIS
- the Canadian Geographic Information System (CGIS) was the first operational GIS
  - developed in the early 1960’s, the era of mainframe computers
  - the system was designed to inventory land use and assist in the management of natural resources
  - Roger Tomlinson is considered the “father of GIS” for his role in the development of the CGIS

Esri Software History
- in this class we will use GIS software products developed by Esri
  - original name: Environmental Systems Research Institute
  - then the company became known as ESRI and now the name is simply Esri
  - Esri is a privately owned software company owned by Jack and Laura Dangermond
  - headquarters located in Redlands, California – regional offices throughout the U.S. and the world

ARC/INFO
- prior to the summer of 2001 ESRI had two main software products
  ARC/INFO - a professional GIS originally developed in the 1970’s
    - a command-line software package - very powerful but difficult to use
ArcView
  ArcView - a desktop GIS developed in the 1990’s
    - original version was developed as a viewer (for data analyzed in ARC/INFO)
    - throughout the 1990’s ArcView evolved into a fairly powerful desktop GIS
    - the software was easy to use and had a nice graphical user interface

ArcGIS
- in the summer 2001 - ESRI introduced ArcGIS (a suite of GIS software programs)
  - ArcGIS consists of two application programs: ArcMap and ArcCatalog
    - ArcMap is used for data analysis and to create map products
    - ArcCatalog is used for file management
  - ArcGIS can be licensed at three levels with increasing functionality
    - the three versions of ArcGIS 10 are called Basic, Standard, and Advanced
    - as you move from Basic to Standard to Advanced, the software includes more tools (functionality)
    - main advantage: user interface is the same across the Basic, Standard, and Advanced versions
  - there are also dozens of extensions available for core ArcGIS software
- some of the extensions are licensed and some are free
- some common extensions include: Spatial Analyst, Network Analyst, 3D Analyst, etc
- these extensions add specialized tools (functionality) to the core software

**Summary** of Esri software development

<table>
<thead>
<tr>
<th>ARC/INFO</th>
<th>ArcView</th>
</tr>
</thead>
<tbody>
<tr>
<td>- professional GIS</td>
<td>- desktop GIS</td>
</tr>
</tbody>
</table>

summer 2001

**ArcGIS**
- suite of software
  - two main application programs

- **ArcMap**
  - mapping and analysis

- **ArcCatalog**
  - file management

Versions of ArcGIS with increasing functionality:

- **Advanced**
  -
- **Standard**
  -
- **Basic**
  -
WELCOME TO:

GIST 3300 / GEOG 5300
Geographic Information Systems

Lucia Barbato, GISP
Instructor
Department of Geosciences

Associate Director
Center for Geospatial Technology,
Esri Certified Instructor,
CTT+ Certified Technical Trainer,
Esri Desktop Desktop Associate
GIST 3300 / GIST 5300
Geographic Information Systems

Lucia Barbato
Office: 118 Experimental Sciences Building
Office Hours: M W 1 p.m. or by appt.

Phone: 834-8999
E-mail: lucia.barbato@ttu.edu
Syllabus

Instructor
- Lucia Barbato

Teaching Assistants
- Michele Freyder
- Zach Coomes
- Morgan Kraft

You
- 60+ different majors – 9 colleges
- Freshman to Seniors - about 90 undergraduates
- Masters to PhDs - about 25 graduate students
- many GIST minors
Syllabus

Geographic Information Systems GIST 3300 and GIST 5300 - Locations
Course Web Site

gis.ttu.edu/gist3300

Lecture: Monday / Wednesday 12:00 – 12:50 pm

Geographic Information Systems

GIST 3300 / 5300 Course Web Page
FALL 2015

Lecture: Biology 101, MW 12:00- 12:50 p.m.
Labs: Holden Hall 204

Geographic information systems are computer systems designed to manage and analyze spatial data, where spatial data are any data that can be tied to places or geographic coordinates.

In this course is to develop a basic understanding of geographic information systems using ArcGIS, a very powerful and widely-used desktop GIS.
Syllabus

Class Schedule

**Lecture:** Monday / Wednesday 12:00 – 12:50 pm

Two in-class assignments
- class map project
- final project
- Two exams: Midterm & Final
- Questions from lecture & some lab
- True/False

**Exam 1:** Monday October 12 12:00 – 12:50 pm

**Exam 2:** Monday December 7 10:30 am
This course is about Geographic Information Systems.

GIS are computer systems designed to manage & analyze spatial data, where spatial data can be any data that are tied to places or geographic coordinates.

In this course we will develop a basic understanding of geographic information systems using ArcGIS, a very powerful and widely-used desktop GIS.
Final course grade based on possible total of 350 points
- Class Map Project - 50 pts
- Final Map Project - 100 pts
- Exam 1 - 100 pts
- Exam 2 – 100 pts

A – 90% - Advancement / Promotion
B – 80% - Bonus/Merit Raise
C – 70% - Competent/Keep Job
D – 60% - Demotion
Course Labs

Attendance is mandatory – 5 pts deducted for missed
Will need a 2 GB (or larger) USB

You are required to complete each lab
- not graded but count toward completion grade
- they will be subjectively graded for completeness

You are required to complete homework assignments
- you will turn in a certificate of completion for each
- 5 pts deducted for incomplete
Course Labs

Attendance is mandatory – 5 pts deducted for missed
Will need a 2 GB (or larger) USB

You are required to complete each lab
- not graded but count toward completion grade
- they will be subjectively graded for completeness
- due before lab the following week at the latest

You are required to complete homework assignments
- you will turn in a certificate of completion for each
- 5 pts deducted for incomplete
Syllabus

Policies

Arrive to class on time
Cell phones & personal technology
Don’t leave early

The idea is to minimize disruptions in class and maintain a civil class environment.
If you have a scheduling problem (unavoidable because of long distances between classes or to work – let your instructors know)
Academic Honesty

Complete honesty is expected and required in the preparation and presentation of any and all phases of course work and exams.

All other requirements and University are on the syllabus
What is Geospatial Technology?

Geospatial technology is a collective term used to describe the integrated use of:

- Geographic Information Systems (GIS)
- Remote Sensing (both satellite and airborne)
- Global Navigation Satellite Systems (e.g. GPS)
- Digital Cartography and Internet Mapping
What is a GIS?

Definition:

A Geographic Information System (GIS) is a computer system* designed to manage and analyze spatial data, where spatial data can be any data that are tied to places or geographic coordinates.

* 1) hardware, 2) software, 3) data, 4) people, 5) applications, methods or procedures
What is a GIS?

GIS Functions:

To manage and analyze spatial data, a GIS has 6 majors functions. GIS software must provide the user with the ability to:

- Capture,
  - Store,
  - Edit or Manipulate,
  - Query,
  - Analyze,
  - and Display
  ... spatial data
Origins of GIS

- the **Canadian Geographic Information System** (CGIS) was the first operational GIS

- developed in the early 1960’s (era of large mainframe computer systems)

- the system was designed to inventory land use and assist in the management of natural resources in Canada

-Roger Tomlinson is considered the “Father of GIS” for his role in the development of the CGIS
Origins of GIS

- the **Canadian Geographic Information System (CGIS)** was the first operational GIS

- developed in the early 1960’s (era of large mainframe computer systems)

- the system was designed to inventory land use and assist in the management of natural resources in Canada

-Roger Tomlinson is considered the “Father of GIS” for his role in the development of the CGIS
Origins of GIS

Brian’s World

“The Way to My DQ”

Esri International User Conference
San Diego, California
2005
GIS Software

- we use GIS software products developed by Esri
  - original name: Environmental Systems Research Institute
  - then became known as ESRI – now Esri

- Esri is a privately held software company
  - owned by Jack and Laura Dangermond

- headquarters located in Redlands, California
  - regional offices throughout the U.S. and the world
Esri Software History

- prior to the summer of 2001 ESRI had two main software products

1) ARC/INFO

- a professional GIS originally developed in the 1970’s

- command-line software package (used DOS) – difficult to use
Esri Software History

2) ArcView

- a desktop GIS using Windows - developed in the 1990’s
- original version was developed as a viewer for data analyzed in ARC/INFO
- throughout the 1990’s ArcView evolved into a powerful desktop GIS

- easy to use
- graphic user interface
Esri Software History

Summer 2001

- ESRI introduced **ArcGIS** (a suite of GIS software programs)

- main advantage is one user interface with all functionality

- ArcGIS 10 consists of two main application programs:
  - *ArcMap* and *ArcCatalog*

- can be licensed at three levels with increasing functionality:
  Basic, Standard, and Advanced

- there are also many extensions available to the core ArcGIS software including:
  - Spatial Analyst
  - 3D Analyst
  - Network Analyst
  - Business Analyst, etc
Summary:

1970s to 2000 Two Separate Programs

- ARC/INFO - professional GIS
- ArcView - desktop GIS

summer 2001

ArcGIS - suite of software
- two main application programs inside ArcGIS

- ArcMap - mapping and analysis
- ArcCatalog - file management

versions of ArcGIS with increasing functionality

- Advanced X
- Standard X
- Basic X