

Geology 137: Geologic Applications of GPS and GIS Mapping Midterm Exam Outline

This document is meant as an outline, and is by no means indicative of the actual scope of material covered so far. This study guide highlights the most significant topics in hopes of directing your review of course materials.

<p>Lecture 1: Review of the green sheet; What is a GIS? C The content of this lecture was covered in greater depth during later classes.</p>	<p>Lecture 2: History and Development of GIS C Can you identify different types of maps and their uses? C What are some limitations of paper maps? C In what way is Dr. Snow's cholera map a GIS? C How is a GIS different from a computer graphics software package?</p>
<p>Lecture 3: Introduction to ArcView GIS. C How is ArcView different from Arc/Info? C Describe the functionality of document types within ArcView (i.e., Views, Graphs, Layouts, etc.) C Which type of geographic features would be stored as points?...as lines?...as areas?... How would scale affect this?</p>	<p>Lecture 4: Map and Attribute Information, Map Projections, Coordinate Systems C How did Eratosthenes derive Earth's size? C How can Earth's shape be described? C What is a datum? Why use one over another? C What is a map projection? Why choose one over another? C Can you describe several types of coordinate systems? C Why does the north arrow vary with coordinate system?...with the publishing date of the map? C What is a large scale map? What is a small scale map? Can you calculate vertical exaggeration?</p>
<p>Lecture 5: Representing Maps as Numbers, Vector and Raster Data Structures C How are attribute data stored by a GIS? C Describe the two types of spatial data structures used by GIS. C Can you describe arc/node data structure? (See also "Lecture 1") C What is topology? C What is a TIN?</p>	<p>Lecture 6: Spatial Data Sources C What is a DRG? A DOQ? A DEM? A DLG? Which one(s) is/are raster structures? Which is/are vector? C What is SDTS? Do we have to know about it? C How can GIS data be converted from analog sources?</p>

<p>Lecture 7: Database Management</p> <p>C What is a hierarchical database, and why is it an inefficient structure for spatial data?</p> <p>C What is a relational data base?</p> <p>C Can you devise a query that would satisfy a set of conditions?</p> <p>C How are spatial searches different from attribute queries? How are spatial searches conducted?</p> <p>C Can you translate a Venn diagram of a spatial overlay?</p>	<p>Lecture 8: Introduction to Grid Data, Compression Schemes</p> <p>C How is resolution related to file size?</p> <p>C How can raster files be compressed?</p> <p>C Can you translate (or create) a Morton sequence for a raster file using a Quad-tree?</p> <p>C What are some limitations of grids?</p> <p>C How does a TIN compare to a grid structure? Why would you use a TIN?</p>
<p>Lecture 9: Introduction to ArcView Spatial Analyst</p> <p>C What type of data can be read by Spatial Analyst?</p> <p>C In what projection are USGS DEMs saved?</p> <p>C Why are there elongated triangles of missing data along the edges of a DEM?</p> <p>C What is a slope map? An aspect map? A hillshaded relief map?</p>	<p>Lecture 10: Introduction to Terrain Analysis, Grids vs. TINs</p> <p>C How is geomorphometry different from geomorphology?</p> <p>C How can GIS assist in the study of land forms?</p> <p>C How can points be interpolated into grids?</p> <p>C How can we define <i>neighborhoods</i>?</p> <p>C How is slope calculated? How is aspect calculated? Can you compute the slope/aspect of a central pixel from a 3x3 array?</p>
<p>Lecture 11: Statistical Analysis of Spatial Attributes</p> <p>C How are attribute data described?</p> <p>C How are attribute data analyzed?</p> <p>C What does a bell curve tell us about sampled data?</p> <p>C How is variance calculated?</p> <p>C How is the <i>mean center</i> (spatial data) different from the <i>mean</i> (attribute data)?</p>	<p>Lecture 12: Making Maps with a GIS</p> <p>C Can you describe the appearance and function of cartographic elements?</p> <p>C How should elements be placed on a map? (What are some common cartographic conventions?)</p> <p>C How are <i>scale</i> and <i>map generalization</i> related?</p>
<p>Lecture 13: The Future of GIS</p> <p>C What can we do now that we couldn't do five years ago?...What may we be able to do five years from now that we can't do now?</p>	<p>Lecture 14: Review for Midterm Exam</p> <p>C Bring <i>specific</i> questions to class.</p> <p>C Be prepared to answer questions as they arise.</p>