GEOG 360: Exam I Study Guide

We will be holding Exam 1 during class on Monday, February 11. You will have the entire class period **(50 minutes) to complete the test.**

Format: The exam will be **open book/notes** and **on paper**. The exam will include **multiple choice questions and short/long answers**. No electronic devices are allowed e.g. laptops, tables, cell phones. You need to bring a pen for writing the exam.

Scope: The test will cover all material that we have covered through lecture 5.1. (Friday, February 08). You are responsible for all material covered during this quarter in any form, but a bulk of the test questions will come from lectures and readings. I believe that the best approach for studying is to make sure that you understand all the concepts. In-class participation and discussions that we had during lectures should help you with that.

Here are some of the topics/concepts that I think you should be able to answers, in particular, for the exam:

Lec 1.2:
1. What is GIS (G? I? S?)?
2. Data, Information, Evidence, Knowledge, Wisdom?
3. Components of GIS?
4. History of GIS?
5. GIS Applications and Areas (5M's)?
6. Careers in GIS?

Lec 2.1:
1. Introduction (Phenomena to Data)?
2. Digital representation?
3. The fundamental problem?
4. GIS data model, layer cakes, concept of layers in GIS?
5. Spatial and attribute data?
6. Discrete objects and continuous fields?
7. Rasters and Vectors?
8. The paper map ?
9. Generalization?
10. Key properties of spatial data (projection, scale, accuracy, resolution)?
11. Data Sources ?

Lec 2.3:
1. Georeferencing (unique, shared, persistent)?
2. Place-names and points of interest?
3. Postal addresses and postal codes?
4. IP addresses?
5. Linear referencing systems?
6. Cadasters and the US Public Land Survey System?

7. Measuring the Earth: (Earth's shape, Geoid, Ellipsoids, Datum, NAD, WGS 84) ?
8. Latitude and longitude?
9. Coordinates Systems?

Lec 3.1:
1. Map Projections (3D to 2D)?
2. Projections classified by what's preserved? Distortions (Distance, shape, area, direction)?
3. Projections classified by developable surfaces (Planar, cylindrical, conical, touch/tangent, intersect/secant)?
4. Standard Parallels?
5. No flat map can preserve both?
6. Mercator projection?
7. Universal Transverse Mercator (UTM)?
8. UTM Coordinates?
9. Implications of the Zone System
10. Local Systems: State Plane Coordinates (SPC)
11. How Do I Choose?
12. Projections and GIS?
13. Georeferences as Measurements?

Lec 4.1:
1. Representing Geographic Features: Spatial and Attribute data?
2. Spatial Data Types?
3. Attribute Data Types/Levels of measurement – Categorical, Numerical (nominal, ordinal, interval, and ratio)?
4. Attribute Data?
5. Data Base Management Systems (DBMS)?
6. Relational DBMS?
7. Spatial Data Structures (Discrete Objects, Continuous fields, association with vectors and rasters)?
8. Representing Data?
9. Representing Data using Raster Model and Raster Data structure?
10. File Formats for Raster Data?

Lec 4.2:
1. Vector Data Model (Point, Line, Polygon)?
2. Topology?
3. File Formats for Vector Spatial Data
4. GIS Data Models: Raster vs. Vector
5. Representing Surfaces (Triangulated Irregular Networks (TIN), Contour Lines, Digital Elevation Model (DEM))?

Lec 4.3:
1. Data Quality (garbage in garbage out)?
2. Sources of error (data collection, data input, data storage, data manipulation, data output, use of results)?
3. Accuracy vs Precision?
4. Types of Error in Geospatial Data (Attribute error, Positional error (x, y, z), Topological (geometric) error, Temporal error, Interpretation error due to ecological fallacy, Error due to the modifiable areal unit problem)?
5. Metadata?

Lec 5.1:
1. Data Collection (Primary and secondary data sources)?
2. Raster Data Collection (Remote sensing, Vector to raster conversion, Raster data capture using scanners, Interpolation)?
3. Remote Sensing: Passive and Active Sensors?
4. Resolution is the key consideration (Spatial, Temporal, Spectral)?
5. Trade-Off Between Spatial and Temporal Resolution?
6. Spectral resolution – Multispectral, Hyperspectral?
7. Point vector to raster conversion, Line vector to raster conversion, polygon vector to raster conversion?
8. Raster Secondary Data Capture?
9. Interpolation?