

**Graduate School of Public Health  
San Diego State University  
PH700G: *Public Health Application of Geographic Information Systems***

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### **Purpose of the Course**

Geographic Information Systems (GIS) enable individuals in a multitude of arenas to make effective local, regional and global decisions by evaluating the composition of the environment (demographic, biological, topographic, etc). GIS provides a cognitive, spatial representation of data that is absent in tabular reports. This course will introduce students to the theoretical concepts of GIS as well as applications of Geographic Information Systems in Public Health. This course will incorporate a series of lectures and lab exercises, using ArcGIS 9 software, to illustrate the capabilities of GIS.

### **Course Learning Objectives**

At the end of this course students should be able to

- Explain basics of theory and concepts of GIS
- Apply ArcGIS software to solve public health problems

### **Required Texts**

Longley et al. (2005) *Geographic Information Systems and Science*. Wiley.

Kurland, Kristen S. and Gorr, W.L. (2006) *GIS Tutorial for Health*. ESRI Press.

### **Student Evaluation**

One mid-term examination worth 35%. One Final Project worth 35%. A series of lab assignments worth 30%. Lab exercises handed in within one week of their due date will be assessed a 25% penalty. Exercises will not be accepted after one week of their assigned due date.

### **Course Topics**

<b>Week 1 – Course Introduction</b>	<b>Lab Exercise 1 – ESRI Virtual Campus – Learning ArcGIS 9, Module 1</b>  <b>Reading Assignment – Chapters 1 &amp; 2 of Longley et al.</b>  <b>Email Assignment</b>
<b>Week 2 - Introduction to GIS: The Theory</b> <ul style="list-style-type: none"><li>● Brief History of GIS</li><li>● Applications of GIS</li></ul>	<b>Lab Exercise 2 – Web Resources</b> <ul style="list-style-type: none"><li>● Local Resources</li><li>● GIS Resources</li><li>● Public Health Resources</li></ul> <b>Reading Assignment – Chapter 3 and 4 of Longley et al.</b>

	Email Assignment
<b>Week 3 – Representing Geography</b> <ul style="list-style-type: none"> <li>● Raster vs Vector</li> <li>● Tobler's Law</li> <li>● Scale</li> </ul>	<b>Lab Exercise 3 – Visualizing Health Data</b> <b>Tutorial 2 in Workbook</b>  <i>Reading Assignment – Chapter 12 and 13 of Longley</i>
<b>Week 4 – Cartography and Geovisualization</b>	<b>Lab Exercise 4 – Designing Maps for a Health Care Study</b> <b>Tutorial 3 in Workbook</b>  <i>Reading Assignment – Chapter 8 in Longley</i>
<b>Week 5 – Geographic Data Modeling</b>	<b>Lab Exercise 5 – Projecting and Using Spatial Data</b> <b>Tutorial 4 in Workbook</b>  <i>Reading Assignment – Chapter 9 in Longley</i>  <b>FINAL PROJECTS ABSTRACTS DUE</b>
<b>Work 6 – GIS Data Collection</b>	<b>Lab Exercise 6 – Geocoding Tabular Data</b> <b>Tutorial 6 in Workbook</b>
<b>Week 7 – Creating Shapefiles</b> <ul style="list-style-type: none"> <li>● Creating Features</li> <li>● Editing Features</li> </ul>	<b>Lab Exercise 7 – Preparing spatial data to study environmental hazards</b> <b>Tutorial 5 in Workbook</b>
<b>Week 8 – <i>Midterm</i></b>	<b>Lab Exercise 8 - Working with Tables</b>  <i>Reading Assignment – Chapter 16 in Longley et al.</i>
<b>Week 9 – Spatial Analysis</b>	<b>Lab Exercise 9 – Analyzing Youth Pedestrian Injuries</b> <b>Tutorial 7 in Workbook</b>
<b>Week 10 – Analysis I</b>	<b>Lab Exercise 10 – Approximate Methods for Transferring Data</b> <b>Tutorial 8 in Workbook</b>  <i>Reading Assignment – GIS Tutorial 9 Instructions in Work Book</i>
<b>Week 11 – Analysis II</b>	<b>Lab Exercise 11 – Studying food-borne disease outbreaks</b>
<b>Week 12 – Introduction to ArcGIS extensions</b>	<b>Lab 12 – Cont'd Studying Food-Borne Disease Outbreaks</b>
<b>Week 13 – Work on Final Projects</b>	
<b>Week 14 – Final Project Presentations</b>	
<b>Week 15 – Final Project Presentations</b>	