

THE UNIVERSITY OF  
**MEMPHIS**



## ***ONLINE GI-YES and Human Health!***

**ESCI 7613-8613**

[GIS and Human Health - 18280 - ESCI 7613 - 410](#)

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**GIS and Human Health**

**Spring 2019- Jan 19 – May 2**

**Class Schedule: Available 24 hrs/day**

**Class Location: Online**

Professor	Esra Ozdenerol, PhD, MLA
Title	Professor of Geography and Director of Graduate Certificate in GIS
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Office Hours	Please email me to set up an appointment

### **Course Description**

This ONLINE graduate level course is for geographers, environmental geologists, public health practitioners, pediatricians, medical doctors and clinicians, health economists, health administrators, medical entomologists, biologists, epidemiologists, medical anthropologists, nurses, geneticists, and community members interested in applying Geographic Information Systems (GIS) to the study of human health problems. UT Medical School students are welcome to this class!

This class is also one of the elective courses counted towards the Graduate Certificate in GIS at UM Department of Earth Sciences. It is also one of the concentration course electives for Environmental Health Curriculum for Master of Public Health.

The purpose of this course is to provide a broad introduction to the use of GIS in analyzing and addressing health problems. GIS are computer based systems for integrating and analyzing spatial data. This course is designed to help students become conversant with some fundamental concepts in how GIS can be used to map and analyze the geographical distributions of populations at risk, health outcomes, and risk factors; to explore associations between risk factors and health outcomes; and to address health problems. Arc GIS 10.5 is the GIS software provided by the university and will be heavily used in the class.

### **GIS overview**

Geographic information systems (GIS) are computerized systems designed for the storage, retrieval, and analysis of geographically referenced data. GIS is used to map all sorts of physical, biological, cultural, demographic, and economic data. The roots of GIS are in cartography and go back hundreds of years. GIS, as we know it today, began in the 1950s and 1960s and for many years was used primarily by government agencies and engineers.

Why are so many health-care executives and public health professionals now seeing the benefits of managing their organizations through the use of GIS? The answer is quite simple: Managing health-care costs by efficiently meeting patients' needs with available resources is an activity that is central to every health-care organization. GIS provides an effective way to visualize, organize, and manage a wide variety of information, including

administrative and medical data, social services, and patient data. Public health and medical-research agencies are also using GIS to map health-related events, identify disease clusters, investigate environmental health problems, and understand the spread of communicable and infectious disease.

This course uses a unique approach to teach the use of GIS in health care. It imbeds learning how to use GIS software in the context of carrying out projects for visualizing and analyzing health-related data. Each week incorporates an online lecture and a computer lab that focuses on a health-care issue and uses ArcGIS 10 software to analyze data or solve a problem. Through weekly assignments and project case studies, students will learn not only about the software and how to use it, but also about the many distinct advantages of using GIS for health-care policy making and planning.

By the end of the course, students will have sufficient background to become expert users of GIS in building, managing, and using GIS maps and health-related data for health-care organizations.

The GIS exercises covers the following topics:

- A world or national health-care project using a WHO or CDC example (public health), an elderly population study (public policy),
- An obesity study (medical research),
- A childhood lead poison study (public health),
- A hospital clinic location study (hospital administration),
- A neighborhood walkability study (public health/medical research),
- An advanced analysis for comparing disease patterns and demographic data (public health/health policy/medical research),
- An American College of HealthCare Executives territory analysis (managed care), and terrorism/disaster management/emergency preparedness in public health.

### **Course materials**

*GIS Tutorial for Health*, fifth edition (K. S. Kurland and W. L. Gorr)

*GIS Tutorial for Health* data installed from ESRI website

Microsoft PowerPoint lecture slides and course notes

Thumb drive or other backup device needed to copy GIS data to and from computer labs to your personal computers

ArcGIS 10.5 software

Microsoft Word, Excel, and PowerPoint needed for answers to some assignments

Web browser for access to course's ecourseware website and supplemental files

### **Assignments**

GIS assignments build on each other, so it is important to be up-to-date on your assignments.

### **Course Prerequisites**

Computer literacy and an introductory GIS and database classes are recommended.

Be familiar with **ecourseware**. Ecourseware is the University of Memphis's latest online course management system. This web-based platform provides students to view and download course material, upload exams and exercises and contribute to online class discussions.

Login to eCourseware at <http://elearn.memphis.edu> or through the Spectrum portal using your UUID and password.

First and foremost every student should get **ESRI Global account**. <https://webaccounts.esri.com/CAS/index.cfm>

Do not forget your login and password. You will need to activate the software authorization code using your Esri Global Account. You will make use of your Global account in order to access to [arcgis.com](http://arcgis.com) and create web maps.

### Course Structure Approach

This is an online lab course. There will be a moderate amount of reading assigned every week and a lab assignment that you must complete every week. GIS is a field/discipline that changes constantly, therefore it is important to stay on top of current changes and developments.

### GIS Software

Every assignment we have in this class requires you to use ESRI Arc GIS 10.5 software. Students can install 1-year term student license for ArcGIS Desktop and Extensions on their personal PCs. Each student will receive a unique authorization code from the instructor. Each authorization code is valid for one user on one computer. Students have the option to download the ArcGIS for Desktop ISO to their individual computers. The download file sizes are 3.76 Gb for ArcGIS for Desktop 10.5 and 1.87 Gb for the optional tutorial data. You will be given a unique authorization code with software installation instructions by the instructor. The software installation instructions are provided in the ecourseware course content and online from [esri.com/evalhelp](http://esri.com/evalhelp).

Caution! The software cannot be installed on a computer that has a previous version of ArcGIS Desktop or ArcGIS Server installed; if necessary, uninstall previous versions of ArcGIS Desktop or Server on your personal PCs.

If you don't want to go through the hassle of installing software on your personal PCs and/or want to use the lab resources in addition to your personal computer use, each student has the option of using the software in TAF lab. All the computers are equipped with ArcGIS 10.5 software and also *GIS Tutorial for Health* data. Each student has a folder with their UoM account name under the class folder. The hands-on work can be performed at home or TAF laboratories on campus including the GIS teaching lab (Johnson Hall TAF 219), or any other computer with an Arc GIS 10.5 install. University of Memphis has the Arc GIS 10.5 software available under UM software. TAF Lab located in Room 219- Johnson Hall has Arc GIS 10.5 locally installed on each computer. TAF 219 Lab in Johnson Hall has 22 computers and will be monitored during semester. You will receive lab schedule from the instructor by the first week of classes.

Below are some useful links regarding the Arc GIS 10.5 software.

Esri's WWW homepage	<a href="http://www.esri.com">http://www.esri.com</a>
Esri Global Account	<a href="http://www.esri.com/create_a_new_account">create a new account</a>
Esri Evaluation Copy help	<a href="http://esri.com/evalhelp">esri.com/evalhelp</a> .
Esri Education Edition	<a href="http://www.esri.com/EducationEdition">http://www.esri.com/EducationEdition</a>
Online Support Center	<a href="http://support.esri.com">http://support.esri.com</a>
My Support	<a href="http://support.esri.com/en/login">http://support.esri.com/en/login</a>
Support Center News Blog	<a href="http://blogs.esri.com/Support/blogs/supportcenter/">http://blogs.esri.com/Support/blogs/supportcenter/</a>
Arc GIS Resource Centers	<a href="http://resources.arcgis.com">http://resources.arcgis.com</a>
Discussion Forums	<a href="http://forums.arcgis.com">http://forums.arcgis.com</a>
Ideas	<a href="http://ideas.arcgis.com">http://ideas.arcgis.com</a>

### Required materials

Internet access, access to a windows computer with Arc GIS 10, or with installation capabilities.

**CPU Speed** 1.6 GHz recommended or higher

**Processor** Intel Core Duo, Pentium 4 or Xeon Processors

**Memory/RAM** 1 GB minimum, 2 GB recommended or higher

**Display Properties** 24 bit color depth

**Screen Resolution** 1024 x 768 recommended or higher at Normal size (96dpi)

### Required Text/Tutorial

*GIS Tutorial for Health*, fifth edition (K. S. Kurland and W. L. Gorr), ESRI Press, Redlands, California

ISBN: 9781589483729 eISBN: 9781589483736 2014 \$79.99

This tutorial is *required* for this course. All online course material follows the chapters in this tutorial and homework exercises are from this book. Students can order this tutorial by calling 800-447-9778 or shop online [esri.com/esripress](https://esripress.esri.com/). Please make sure to purchase 5<sup>th</sup> edition. You can order it through below link.

<https://esripress.esri.com/display/index.cfm?fuseaction=display&websiteID=262&moduleID=0>

This tutorial comes with data, available to download on the ESRI Press “Book resources: webpage, [esripress.esri.com/bookresources](https://esripress.esri.com/bookresources/), downloadable from esri’s website, including comprehensive tutorials in every chapter to learn the skills, with a set of exercises, map documents, and data for practicing skills independently.

<https://esripress.esri.com/bookResources/index.cfm?event=catalog.book&id=7>

### Required Text(s)/Readings

*Spatial Health Inequalities*, by Esra Ozdenerol. 2016. CRC Press ISBN 9781498701501 - You can purchase this book online.

<https://www.crcpress.com/Spatial-Health-Inequalities-Adapting-GIS-Tools-and-Data-Analysis/Ozdenerol/p/book/9781498701501>

### Assessment of Student Learning Outcomes

#### Methods of Assessment

The student success will be assessed through their performance:

1. Performance on tutorial assignments
2. Literature Review – This will be literature review based off of course readings, peer-reviewed research articles through students’ own library and internet search. At the beginning of the semester, each student will pick a health topic and conduct literature review on GIS applications to that health topic. Instructor will provide a list of health topics at the beginning of the semester. At least 10 articles will be covered by the literature review.
3. Project - Project will be a case study. Students will apply the case studies they learned from the tutorial to use their own work/thesis work/ or any other health data on a topic of their interest

### Grading System

Assignment	#	Pts. Each	Total Points
Assignments	10 (100 points per chapter)	100	1000
Case Study Report	4000	4000	4000
Literature Review	5000	5000	5000
<b>Total Points</b>			<b>10000</b>

**Timing of Assessment**

Due dates will be listed on the ecourseware class calendar.

Computers crash, systems go down, networks become disconnected, files get lost, printers often don't work, but these challenges are all part of the real-world experience of working with computers. Allow yourself enough time to complete assignments by their due date.

Email me if you think there is a problem beyond your control, and I will try to help come up with a solution. Also use the college systems administrative staff and the university IT help desk. Precise documentation of problems and attempted solutions may help reduce the number of points subtracted from a late project.

**Technical Support**

For technical support you may call ITD at 901.678.8888 or access their web site: <https://umhelpdesk.memphis.edu>. Please *do not* contact ITD help desk for questions related to course material. You are always welcome to e-mail me via the Course Web Site or call during office hours.

**Grading:**

Grades will be based on the following scheme:

A: 90-100

B: 80-89

C: 70-79

D: 60-69

F: 59 and below

**Course Policies**

You are free to discuss and interact with other students on how to approach to the software problems and also help each other with tips if you run into a software "how to" problem. So I encourage a certain amount of collaboration among students. However, all students are required to perform their own work on homework exercises and submit their own work. Plagiarism will result in a failing grade.

**This section is for students who do not have access to a personal computer and prefer to use the on campus lab resources.** Arc GIS 10.5 software and tutorial data are installed on computers of TAF Lab 219 Johnson Hall. This lab is monitored during semester . After hours and while lab is not monitored, you can access through a punch code. If you are interested in using the lab, please email me to receive the punch code to access the lab. Do NOT distribute the punch code!

You can log in through your UoM account to those computers in the lab. Under H: drive, there is a folder named Online GIS and Human Health ESCI7613. Each of you has a folder with your UoM account name( the first section of your email address such as mine [eozenr@memphis.edu](mailto:eozenr@memphis.edu)) under that class folder. You can work and save your exercises to that folder. You still need to use eacourseware to upload your assignments. Save your exercises and export as jpgs, insert them into MS word and upload it to eacourseware via dropbox.