Fundamentals of GIS (GUS/ES 3062/5062) Spring 2016

**Instructor:** Dr. Ryan Burns Office hours: Tues/Thurs 12:30-2, by appt.

Email: ryan.burns@temple.edu Office: 333 Gladfelter Hall

**Meets:** T 5:30-8:00, 336 Gladfelter Hall

***Information on this course, including general information, lecture slides, lab assignments, and other information is available on Blackboard.***

# General Information

1. **Purpose of the Course**

The purpose of this course is to teach the theory and practical use of Geographic Information Systems (GIS).  Major components of the course include computer representation of geographic information, the construction of GIS databases, spatial analysis with GIS, application areas of GIS, and social and management issues that concern GIS.  At the end of the course the student is expected to have an understanding of elementary GIS theory, working knowledge of ArcGIS, and the ability to develop GIS-based solutions to geographic modeling and analysis tasks.

Note that this is not 'just' a software training course! You will indeed finish the course with advanced skills in a specific GIS software package.  However, broader learning objectives for this course include general scientific literacy and graphicacy (the understanding and creation of maps and other graphic representations), as well as developing critical thinking skills.

1. **Prerequisites**

There are no course prerequisites; however a working knowledge of Windows and basic file management is expected.

1. **Attendance**

Students tend to work at their own pace on assignments – some need a lot of attention from the instructor and some prefer to work by themselves. I am here to support you and help you learn GIS whatever type of learner you are. Note, however, that the labs are sometimes written without detailed instructions purposefully so that students are required to solve analytical GIS problems using their own knowledge. It is nearly impossible to complete the lab assignments without guidance from the instructor. Thus, prolonged absence from class will likely affect your grade, inhibit your understanding of the lecture material, and prevent you from receiving help on the lab assignments.

1. **Text**

There is no required text for the course.  There are a series of occasional required readings that will be posted on Blackboard.

There is also a **recommended** text for the course: *Fundamentals of Geographic Information Systems, Third Edition* (2005) by Michael M. DeMers, published by John Wiley and Sons, New York.  This text describes much of the material covered in the course, and more.

1. **Grading**

Undergraduates Graduate Students

Midterm Exam 25% Midterm Exam 20%

Final Exam 25% Final Exam 20%

Lab Exercises 50% Lab Exercises 35%

Term Paper 25%

The Final Exam will ***not*** be comprehensive, and both exams will include information covered in the lecture, lab, and all other portions of the course up to the time of the exam.  Make-up exams will be given only for documented medical emergencies.

1. **Lecture**

The first half or so of each class will be devoted to lecture.   The lecture is intended to be an interactive environment, and the “success” of each meeting will be largely dependent on your participation! My lecturing style is highly conversational, so please be ready to contribute.

1. **Lab**

The remainder of each class following the lecture will be devoted to lab.  During lab, students work on lab assignments that provide practical experience in applying the concepts learned in lecture.  The lab portion of the course will use the commercial GIS software package ArcGIS, created by Environmental Systems Research Institute, Inc. (ESRI).  ArcGIS is common in academic, government, and industry settings.

1. **Disabilities**

Any student who has a need for accommodation based on the impact of a disability should contact Disability Resources and Services at 215-204-1280 in 100 Ritter Annex to coordinate reasonable accommodations for students with documented disabilities. Their office will convey your needs to me, but please feel welcome to speak with me privately, as well – my door is (metaphorically) open.

1. **Well-being**

College can be stressful, and your mental well-being is important. If you are a student of Temple University, Tuttleman Counseling Services offers you support for your emotional, educational or vocational concerns. Assistance is *confidential* and free of charge. They provide an atmosphere that is informal and professional, where you can feel safe and comfortable seeking help. Find them at 1810 Liacouras Walk (5th floor) or call them at (215) 204-7276.

Your academic advisors can be great advocates for you. While I expect that you will all make an effort to keep me informed if you will be absent, or ask for help if you are struggling, your advisor also can help you find the people at the university that you need to talk to if you have an unexpected life event.

1. **Academic Dishonesty**

Academic dishonesty (i.e. cheating on tests, copying another student's assignments, plagiarism, etc.) will not be tolerated. Please refer to this statement for more information on Temple University's Academic Honesty policy: <http://www.temple.edu/pharmacy_qara/plagiarism.htm>. Please feel free to talk with me if such policies are unfamiliar to you.

1. C**lassroom Environment**

All persons participating in the course should be respectful of other students and the instructor in order to facilitate a civil learning environment.  All persons participating in the course have a right to expect respectful treatment in the classroom.

1. **Statement on Academic Freedom**

Freedom to teach and freedom to learn are inseparable facets of academic freedom. The University has adopted a policy on Student and Faculty Academic Rights and Responsibilities (Policy # 03.70.02) which can be accessed through the following link: <http://policies.temple.edu/getdoc.asp?policy_no=03.70.02>

# Lab Information

1. **Introduction**

The latter portion of each class will be devoted to 'lab' where you will be expected to complete a lab assignment.  You may work on these assignments within class or outside of class.  All computer labs administered by the College of Liberal Arts (see **http://www.temple.edu/clait/labs/index.html** for CLA labs), offer access to the GIS software and data used for the course, including the large drop-in lab located in the lobby of Anderson Hall. The TECH center also hosts GIS software.

1. **Lab Reports**

Each lab contains an assignment which you are expected to complete.  This assignment will be focused on an analysis task.

For each lab assignment you must hand in a brief report as a Microsoft Word file via Blackboard – click on the assignment in Blackboard and upload your file. ***Do not email me your report.*** I will grade and make comments on your report where applicable, and you can access the commented report via Blackboard.

**This report must be approximately 1-2 pages in length (of text), single spaced, 12 point TIMES NEW ROMAN\* FONT, with one inch margins, and indented paragraphs.  It should have your name, date, and lab assignment number (e.g. Lab 1) at the top of the page.**

\*=other acceptable fonts: Garamond 12-point, Cambria 11-point.

Points will be deducted for not formatting your lab report correctly.

The report must contain the following five sections:

1. Introduction
2. Methods
3. Results
4. Conclusion
5. Tables and Figures

The name of the section must appear in bold at the top of each section.

The **introduction** section should state the objective - what you are trying to accomplish in your assignment.  Here, your objective is the goal of your analysis, not the learning objective.  *The introduction should NOT (NOT) state that your objective is 'to learn GIS' or something similar!*

The **methods** section should state how you did the analysis, what analytical steps you took to complete the assignment.  This section does not need to state every drop down menu item you selected or every button you pushed, but should summarize what analytical operations you used. For this you should use the GIS jargon we learn in class, e.g. buffer, overlay, and the parameters employed. Be precise in your terminology!

The **results** section should report the results of your analysis. This section is often very brief, as it should be devoid of substantial commentary – just the facts.

The **conclusion** section should offer some interpretation of your results as well as report on any assumptions and limitations of your analysis and what other steps could be taken to improve the analysis.

In addition, the lab may require the creation of maps, tables, and/or charts, as specified in the lab assignment.  These graphics should be appended onto the end of the written report and referred to in the text.

For help with writing visit the *Temple University Writing Center*.  For information visit them on the web at [**http://www.temple.edu/writingctr/**](http://www.temple.edu/writingctr/).

1. **Due Dates**

Due dates are indicated at the top of the lab assignment.

1. **Working with Other Students**

I encourage students to work together on lab assignments and assist each other in understanding the course material.  However,

**all contents of each student's lab reports (text and graphics) must be authored solely by that student.**

1. **Grading**

Each lab will be graded out of 20 points.

Labs will be graded based not only on whether you ‘get the right answer’, but also on your ability to express yourself in a coherent fashion through both writing and graphics (i.e. maps).

***If a lab report is turned in late, 4 points will be deducted from that lab grade.  No labs will be accepted more than two weeks after their due date.***

1. **Data**

Each lab assignment will indicate how to access data for that lab assignment.  Labs will typically take longer than one or two lab session to complete, so you will need to save incomplete labs so that you may continue to work on them at another time.  **It is the student's responsibility to understand how data and projects are saved, and to manage and back up their own data and assignments.**  **I suggest purchasing a USB port-based data storage device, with a 1 GB capacity or greater. I might also suggest looking into cloud-based storage, like Temple’s OwlBox, Google Drive, or Dropbox.** For each assignment, I suggest you copy all relevant data files to that device in a folder (e.g. named “Lab\_01”) and then perform the lab assignments by working off the device.

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# Course Schedule

(Note: This is a general plan. The day-to-day topics and lab dates may change as we proceed through the semester).

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| Date | **Topic** | **Lab** |
| January 12 | Introduction, What is a GIS? | Lab 1 |
| Jan 19 | Principles of Mapping and Representation |
| Jan 26 | Cartographic Principles | Lab 2 |
| February 2 | Projections and Coordinate Systems |
| Feb 9 | Projections, Relational Data Model | Lab 3 |
| Feb 16 | Relational Databases, Vector Data Model |
| Feb 23 | **MIDTERM**, Vector operations | Lab 4 |
| March 1 | Spring break; no classes |
| Mar 8 | Vector Operations, Review |
| Mar 15 | Global Positioning Systems (GPS) | Lab 5 |
| Mar 22 | Raster Data Model |
| Mar 29 | AAG; no classes | Lab 6 |
| April 5 | Raster Data Model, Operations |
| Apr 12 | Web-based GIS |
| Apr 19 | GIS and Ethics, Grad student presentations, review | Lab 7 |
| Apr 26 | Study week; no class |
| Apr 28 | **FINAL EXAM: 5:45-7:45 PM** |