**GEOG 190 / IDCE 310- Spring 2018**

**INTRODUCTION TO GIS**

**Lectures**: **Monday - Thursday**  1:25- 2:40

**Location**: JC103

**Labs**: **Friday**  2:50 – 4:50

**Location**: JC103

**Instructor:**

Dr. Florencia Sangermano

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**Office Hours: Tuesday 2:00 – 4:00 pm**

Make appointment here: https://calendly.com/fsangermano/oh

If you have class at that time other times may be available- please email in advance.

**Teaching Assistants**

Jackie Guz

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**Office Hours: TBD**

Melissa Bollman

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**Office Hours: TBD**

**Course Objectives**

This course will introduce you to the fast-growing discipline of Geographic Information Science (GIS), an information technology that is irrevocably changing the way we store, query, and analyze spatial data. Students will gain knowledge of the theory and applications of raster and vector based GIS. Meetings will be a combination of lecture material, demonstrations and laboratory exercises, making extensive use of the TerrSet software developed by Clark Labs and the ArcGIS software developed by Environmental Systems Research Institute (ESRI). Lectures are technical in nature and designed to provide you with an understanding of how data are created, stored and manipulated. A strong component of the course are lab sessions which are intended to apply the concepts learned during lectures, using different GIS software to create maps, organize, visualize, query and analyze spatial data. Weekly laboratory exercises and a final independent project will provide intensive hands-on exposure to GIS software. At the conclusion of this course, students will have the ability to independently develop, manage, and complete a GIS project.

While students will gain a working knowledge of GIS software, the focus of the course is on analytical concepts that are fundamental for any spatial analysis using any GIS software. After the successful completion of the course, students should:

1. Understand basic theoretical concepts of GIS and spatial analysis
2. Be knowledgeable in the operation of two GIS software packages (e.g. students will be able to use these GIS software packages to organize, query, manipulate, analyze, and present spatial data)
3. Be able to formulate research question, lay out and implement analytical steps required in GIS environment
4. Know how to find and use various spatial data to research a topic and how to make maps

**Course Materials**

**Required Texts:**

Eastman, J. R. (2012), *Terrset Tutorial*. Worcester, Massachusetts: Clark Labs, 284 pp. (included with TerrSet software)

Eastman, J. R. (2012), *Terrset Manual*. Worcester, Massachusetts: Clark Labs, 327 pp. (included with TerrSet software)

Price, M. Mastering ArcGIS.8th edition. (From Spring break on)

Bolstad, P. *GIS Fundamentals: A First Text on Geographic Information Systems* (4th Edition). White Bear Lake, Minnesota: Eider Press (You will need this book to revise concepts learned in class. Copies will be put on reserve)

**Software**

Both software (Terrset and ArcGIS 10.4) used in this class are installed in different computer labs around campus (the ITS website has an updated list of these labs). You can order your own copy of Terrset from Clark Labs (www.clarklabs.org) free of charge. Each student enrolled in this class will also receive a free one-year student license of the ArcGIS 10.4

**Data Storage**

It is extremely important that you consistently back up your work. If files were to somehow become lost or corrupted on the servers or computers in the lab, this will provide a means for you to have a backup copy of your work. This will also enable you to transport your work if you tend to work in different labs and on different machines. I recommend that you bring a small portable USB Drive to class with you – a 5GB drive or larger should be sufficient to save your work.

We also have a class share that each of you can access form any computer on campus. Class file shares are considered temporary file shares and will be removed (deleting all content in the file share) 20 days after completion of the course. Information on how to access your personal class share will be provided in class.

**Course Website and communication:**

Assignments, announcements, and other documents will be placed on the Moodle course website. You can access this site from <https://moodle.clarku.edu/>.

I will contact you using your official CLARKU account.

You should check Moodle and your email daily for updates regarding the class.

**Lab Availability:**

The lab assignments and final project in this course will require you to spend a substantial amount of time using the Idrisi and ArcGIS software packages outside of class. In addition, Idrisi and ArcGIS are installed in many computers around campus. Check the ITS website for the latest list of computer lab resources (<http://www.clarku.edu/offices/its/computerlabs/>), available hours for those labs should be posted online.

**Student Responsibilities**

As a student in this course, it is your responsibility to attend class meetings, read the assigned materials, and complete the assigned laboratory exercises.

It is your responsibility to check the class Moodle site frequently for updates on class materials and assignments.

We will have quizzes during lectures about the material we are covering or assigned readings. As final project for the course, you will be required to conduct an independent project utilizing your newly developed GIS skills.

**Attendance:**

**Lab Attendance**: It is required. If you can’t come to the lab you will have to do the work on your own either getting the software on your computer or working on the available computers distributed around the campus (see Lab Availability).

The TA will give an introduction to each lab, with explanation of methods, outcomes etc. Office hours are not replacement for missed labs. During office hours, are not replacement for labs. Office hours and Help Desk are to ask questions about specific problems not to catch up on missed classes, or as extra lab time.

**Lecture attendance**: Lectures are important because I will teach concepts, give examples, and demonstrations. Participation in class is a strong component of your grade and the midterm will be based on both lectures and labs. Keep in mind that some topics or applications mentioned during lectures may not be in books.

**Engaged academic time**

All courses at Clark are equivalent to four credit hours. Four credit hours correspond to **at least** 180 hr of engaged academic time per semester (15 weeks). This means that you need to spend **at least** 10 hours per week  engaged in the course, being on lectures, labs, reading or working on finishing the labs. **Labs and assignments reflect the engaged academic time required by the University.** **Students spend an average of 6 hours outside the lab to finish assignments.**

**Working with Other Students**

Students are encouraged to consult classmates on labs and other assignments and to assist each other in understanding the exercises. **However, all contents of each student's assignments (text and graphics) must be authored solely by that student (unless a group work is approved by the faculty), otherwise it will be considered Academic Dishonesty. Plagiarism IS reported to the college board and remains in your files.**

**Late or Un-submitted assignments**

Assignments are due by the beginning of lab time on each of the due dates. You will be granted **three “late passes”** during the semester to turn in lab assignments. Once you have utilized your three late passes for the semester, no late assignments will be accepted (Lab will automatically have a grade of zero). Moreover, for **each late day**, the grade of the assignment will be **decreased by 10%**, that means that if your assignment is 5 days late, you will use one of your late passes and you will receive half the grade- **NO EXCEPTIONS.**

**Un-submitted labs, or labs received more than 5 days late will receive a grade of 0.** See note below for un-submitted labs.

**IMPORTANT: Since the majority of the class grade comes from labs, all labs and final projects need to be submitted to pass the course. You will allow only 1 missed lab. The missing lab CANNOT be Lab 5 or Lab 10. If you miss more than 1 assignment, your grade will be C- or your average grade whichever is lower. If you don’t submit 3 or more assignments, you will automatically receive an F even if your calculated grade is higher.**

**Etiquette**

Please avoid coming late to class. If you have to arrive late please enter quietly so that it does not disrupt the class.

To foster a comfortable learning environment for all students, please refrain from the following:

- Checking email or surfing the web

- Texting or using your cell phone (unless there is an emergency)

- Engaging in a private conversation in class (note that participation in class discussions is fully encouraged)

- Leaving the classroom during lecture and lab sessions (unless there is an emergency)

**Academic Dishonesty**

University’s policies on academic integrity will be strictly enforced. Go to [www.clarku.edu/offices/aac/integrity.cfm](http://www.clarku.edu/offices/aac/integrity.cfm) to learn more about this policy and what it entails. Plagiarism, cheating, lying, stealing, or falsification will not be tolerated and will be referred to the University Administration.

**Disability Statement**

This course is open to all students who met the academic requirements for participation.  Any student who has a need for accommodation based on the impact of a disability should contact the instructor privately to discuss the specific situation as soon as possible. Contact the Accessibility Services office <http://www2.clarku.edu/offices/aac/ada/> to coordinate reasonable accommodations.

**Grading**

Your performance in the course will be evaluated from four components:

1. **Class Participation (5%)**

Attendance and participation reflects your effort in the course and your contributions to the class. You may take two unexcused absences from class or labs during the semester. Any additional absences will result in a 60% deduction from your participation grade (Attendance grade = 40/100). Active participation in this course will reflect positively on your participation grade. Participation grade also includes the grade of class quizzes and optional assignments).

1. **Laboratory Assignments (GEOG190: 50% IDCE310:45%)**

Laboratory assignments will be given during the semester. Each assignment and the due date will be announced during lab and posted on Moodle. The first page for each assignment should have the following information: course number, your name, and exercise title/number. All exercise answers should be typewritten and numbered when appropriate.

Many of the concepts needed to complete these exercises will be learned by working through your *Terrset Tutorial* and Mastering ArcGIS text. These assignments lie at the heart of the hands-on component of this class and will give you the necessary skills to manipulate and utilize a GIS, skills you will take with you long after this course comes to an end.

1. **Exam (GEOG190: 20% + 10% = 30% IDCE310: 25% + 10% = 35%)**

There will be two in-class exams. Exam questions will draw on material covered in lectures, readings, and lab assignments. There will be no make-up exams.

1. **Final Independent Project (15%)**

The final project is a unique opportunity to utilize your newly honed GIS skills. The topic may address a particular applied or methodological problem of interest to you. You have two options:

1. Select a research problem and study area and submit a final project proposal for instructor’s approval. You will collect spatial and non-spatial data, and, drawing from the concepts and techniques learned in class, complete relevant data analysis, and present the results. Similar to a lab but you formulate it. Instructor will provide a set of GIS databases that you can use as basis for your final project. Final project will be presented orally the last week of classes. And a written report will be due the first day of Finals. You can work in groups of no more than 2 people. If so, the report should specify who did what.

**How grades will be translated into final grade:**

|  |  |  |
| --- | --- | --- |
| Grade | Letter Grade GEOG 190 | Letter Grade IDCE310 |
| 100 | A+ | A+ |
| 95-99.9 | A | A |
| 90-94.9 | A- | A- |
| 87-89.9 | B+ | B+ |
| 83-86.9 | B | B |
| 80-82.9 | B- | B- |
| 77-79.9 | C+ | C+ |
| 73-76.9 | C | C |
| 70-72.9 | C- | C- |
| 67-69.9 | D+ | F |
| 60-66.9 | D | F |
| 0-59.9 | F | F |

**Class schedule**

# This schedule is not final, please check for updates frequently. This course schedule is subject to change as necessary; advance notice will be provided to the extent possible.

**Final project due date: May 1**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **W** |  | **Date** | **Topic** | **Friday lab** | **Reading** |
| 1 | 1 | 01/14 (M) | Course Overview and Intro to GIS |  | Bo: Ch1 |
| 2 | 01/17 (R) | GIS data models, Raster Data models and intro to Terrset / Idrisi | Prelab 0 | **Bo:** Ch.2 |
| 2 |  | 01/21 (M) | MLK No classes |  |  |
| 3 | 01/24 (R) | Map Projections | Lab 1  Intro IDRISI | **Bo:** Ch.3 |
| 3 | 4 | 01/28(M) | Cartographic modeling and Raster query |  | **Bo:** Ch.9, Ch 10 |
| 3 | 5 | 01/31 (R) | Map Algebra: Basic Algebra | Lab 2  Pre-processing and projecting | **Bo:** Ch.9, Ch 10 |
| 4 | 6 | 02/04 (M) | Map Algebra local functions |  | **Bo:** Ch.9, Ch 10 |
| 7 | 02/07 (R) | Map Algebra: Global and Neighborhood | Lab 3  Raster Cart. modeling | **Bo:** Ch.9, Ch 10 |
| 5 | 8 | 02/11 (M) | Map Algebra: Distance Functions |  | **Bo:** Ch.9, Ch 10 |
| 9 | 02/14 (R) | Spatial Modeling and Models I: constraint mapping | Lab 4  Distance and Map algebra | **Bo:** Ch.13 |
| 6 | 10 | 02/18 (M) | Spatial Modeling and Models II: Fuzzy multi criteria evaluation |  | **Bo:** Ch.13 |
| 11 | 02/21 (R) | Spatial Modeling and Models II: Fuzzy multi criteria evaluation | Lab 5:  MCE | **Bo:** Ch.13 |
| 7 | 12 | 02/25 (M) | Vector data models |  | Bo: Ch 1, 2 |
|  | 02/28 (R) | EXAM 1: Raster analysis | Lab 6  Intro to ArcGIS |  |
| 8 |  | 03/04 (M) | Spring Break |  |  |
|  | 03/07 (R) | Spring Break | No Lab |  |
| 9 | 13 | 03/11 (M) | Data representation and mapping |  | Bo ch 4, 5 |
| 14 | 03/14 (R) | Working with attribute data part 1 | Lab 7  Presenting GIS data | **Bo:** Ch.7, Ch 8 |
| 10 | 15 | 03/18 (M) | Working with attribute data part 2 |  | **Bo:** Ch.7, Ch 8 |
| 16 | 03/21 (R) | Database Query: selection by attribute and location | Lab 8 Working with tables | **Bo:** Ch.7, Ch 8 |
| 11 | 17 | 03/25 (M) | Database Query: selection by attribute and location |  | **Bo:** Ch.7, Ch 8 |
| 18 | 03/28 (R) | Geoprocessing in Vector: Overlay Clip and buffer tools | Lab 9  Spatial Query | **Bo:** Ch.7, Ch 8, Ch 9 |
| 12 | 19 | 04/01 (M) | Geoprocessing in Vector: Overlay Clip and buffer tools |  | **Bo:** Ch.7, Ch 8, Ch 9 |
| 20 | 04/04 (R) | Home exercise Digitizing | **No formal class due to AAG Recommend starting working on Lab 10** | Bo ch 4, 5 |
| 13 | 21 | 04/08 (M) | **TBD** |  |  |
| 22 | 04/11 (R) | Aerial and satellite Images  Terrain Analysis | Lab 10  Vector Overlay and Geoprocessing |  |
| 14 |  | 04/15 (M) | EXAM 2 |  |  |
|  | 04/18 (R) | Work on projects | Work on projects |  |
|  |  | 04/22 (M) | Work on projects |  |  |
|  |  | 04/25 (R) | Presentations | 04/26 Presentations |  |
|  |  | 04/29 (M) | Presentations |  |  |
|  |  | 05/01 | Final project report DUE |  |  |