Spring 2-1-2021

GPHY 284.R00L Introduction to GIS and Cartography

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The University of Montana
GPHY 284 - Introduction to GIS and Cartography
Spring Semester 2021 Syllabus
(Syllabus is subject to change.)

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INSTRUCTOR AND COURSE INFORMATION

GPHY 284, Lecture Section 00, Rm SH 304
Tuesday and Thursday, 12:30-1:50 PM

GPHY 284, Laboratory Section 02, Room SH 107
Friday, 12:00-1:50 PM

GPHY 284, Laboratory Section 04, Rm SH 107
Friday, 2:00-3:50 PM

Instructor: Kevin McManigal
Office: Room 439, Clapp (CHCB)
Office Telephone: (406) 243-6691
Office Hours: Tues 3:00-4:00, Thursday 11:00-12:00 or by appointment
Email: kevin.mcmanigal@mso.umt.edu

TA: TBA
Office: Room 448, Clapp (CHCB), Lab Hrs. TBA
Office Hrs. 2-4 Tues.
Email: TA1@umontana.edu

TA: TBA
Office: Room 206, Stone Hall, Lab Hrs. TBA
Office Hrs. 9-11 Weds.
Email: TA2@umontana.edu

COURSE DESCRIPTION

This course is designed as a practical introduction to the use of Geographic Information Systems (GIS) for storing, retrieving, analyzing and displaying spatial data. It will also cover the history of cartography as an art form and the cartographic conventions of the modern map making process.

The course will discuss all the major concepts and theories behind the use of GIS and put these skills into practice with laboratory exercises using GIS software. We will closely examine the proper use of data, both from its appropriate choice given a desired outcome, and to inform a deeper understanding of data manipulation within the "Black Box." Secondly, the course will address the concepts of proper map design so that our maps more effectively convey the information we intend to impart.

OBJECTIVES

- To learn the foundations of GIS in order to properly and truthfully display spatial data in a cartographic context.
- To understand the structure of spatial data including file associations, attribute tables, metadata, coordinate systems, and projections.
- To become proficient in the construction of geodatabases (GDB) as the fundamental data storage format within all GIS Science.
- To learn basic GIS analysis for answering rudimentary spatial questions using the scientific method.
- To develop software skills in programs used for map production in the modern cartographic workflow.

LEARNING OUTCOMES - BY THE END OF THIS COURSE YOU WILL:

1. Understand the core concepts and functions of geographic information systems.
2. Be able to discriminate among different characterizations of the Earth's surface and choose projections that are suitable for specific forestry, geography, and natural resources applications.
3. Recognize and acquire different forms of spatial data, normalize its spatial reference systems, and organize it into a GDB in preparation for GIS analysis.
4. Be familiar with techniques of spatial analysis applied in forestry, geography, and natural resource management.
5. Be able to produce maps that appropriately display the outcomes of spatial analysis and communicate the results using proper cartographic conventions.

COURSE FORMAT

The general program for each week will be Tuesday and Thursday lectures, followed by Friday lab sections. However, this schedule is subject to change, and will vary with the needs of the class, workload, or in special circumstances. This is especially true towards the end of the semester.

Lecture days will start with announcements and then be followed by a presentation on the principles of GIS and cartography. Some lectures will be supplemented by hands-on demonstrations or group exercises. New labs will be introduced on Thursdays followed by short on-screen demonstrations of valuable software techniques needed to complete that week's assignment. Don't miss lectures if you want to succeed in the labs.

Required Texts
Campbell, J. and M. Shin (2013). *Essentials of Geographic Information Systems* (https://students.flatworldknowledge.com/course/2586404 If the link won't work, search under Kevin McManigal or FORS 250 \GPHY 284; Make sure the book is version 1.0.7. Purchase the pass the first week!

Sobel, D. (1995). *Longitude: The True Story of a Lone Genius Who Solved the Greatest Scientific Problem of His Time.* New York: Penguin Books.

Jennings, Ken. (2011). *Maphead: Charting the Wide, Weird World of Geography Wonks*. New York: Scribner.

*Note: The two narrative books can be purchased inexpensively online. Used copies are fine.

Required Storage
A thumb-drive or external hard drive with at least 4 GB of space.

Server Address
R:\Classes\Spring2018\Intro_GIS

POLICIES AND PROCEDURES

The following policies are the minimum standards for which all students are responsible. They set the ground rules so that class can move forward in an efficient and productive manner. Please review and put into practice:

- Please consult the Class Schedule for relevant dates.

- All assignments will require submission on the due date specified in the Class Schedule unless otherwise noted.

- Required Class Attendance: Class will include theory, discussion, map critiques, and exercises

– all of which are important to the overall understanding of GIS and Cartography. Much of this information will only be available in class. If you must miss a class, **YOU ARE RESPONSIBLE** for the material covered. Ask another student for their notes, as I don't take any while lecturing. There will be occasional in-class assignments that reward students with extra credit for regular attendance. If you are not in class, you **CANNOT** receive the extra credit.

- Participation: This class is interactive and requires student participation in hands-on exercises and group discussions. You will also partner-up for some labs. Students that do not participate will not do well in the class. It is important to work with your fellow students and share ideas. They will be your best resource for missed material, design advice, technique tips, and moral support.

- Please don't do disrupt class with personal conversations. If you are disturbing the lecture, I may ask that you exit the classroom.

- **BE ON TIME!** I expect everyone to be on time for class in order to not disturb the lecture. Chronic tardiness will result in a grade reduction. If for some reason you are late, I ask that you be extremely quiet and not disturb anyone as you enter and sit down. Do not leave the class early. If you have a special reason for leaving early please contact me before class begins and sit close to the door in order to exit quietly.

- No **CELL PHONES ON** in class! Please make sure your cell phone is off before lecture begins.

- **NO LAPTOPS** on in class! Please pay attention to each lecture. Those caught surfing the web will be asked to leave. Numerous studies suggest that digital note taking is ineffective as multi-tasking with other computer distractions impairs cognitive work retention (Read: [Clay Shirky: Why I Just Asked My Students To Put Their Laptops Away](#)). Take written notes, and if you must transpose them to a computer, it will be a valuable second exposure to the material.

- For assistance with writing, please consult the on-line resources of the [UM Writing Center](#), Liberal Arts 144.

- [Student Conduct Code](#) – Carefully review the sections on plagiarism. Cheating and plagiarism are not tolerated and will be dealt with as outlined in the Code. This includes copying text verbatim from the internet or books (Please paraphrase and cite), texting during an exam, or taking a picture of an exam, etc. Integrity matters, your academic career depends on it!

- This course is accessible to and usable by otherwise qualified students with disabilities. To request reasonable program modifications, please consult with the instructor. [Disability Services for Students](#)will assist the instructor and student in the modification process.

MOODLE

Class materials will be available on **Moodle** the week they are covered in class. This syllabus will be posted in the header for the entire semester. Refer to it often for due dates and reading assignments. Each lab will be submitted to its own digital drop box on **Moodle** that closes at **11:00 AM** on the **Friday** that the lab is due. This is so you come to Friday labs prepared to work on the new material. **All** labs should be submitted as **Microsoft Word documents**. They will be graded with comments and returned digitally within the Moodle grade book. The mid-term and final exam will also be administered on Moodle. See details below.

LAB SERVER

The address for the class server is - R:\Classes\Spring2016\Intro_GIS. Data needed for the labs will be stored in the MASTER_LABS parent folder that can only be accessed in the labs on campus. Under the STUDENTS parent folder, each student will find their private folder where all materials for the class should be stored. To start a new lab, navigate to the MASTER_LABS folder, copy the newest lab folder, then navigate to your student workspace and paste it into your student Labs folder. Work on your labs from this folder. All data will be backed-up; however, you will want to copy your student folder to an external memory device if you work at home and as a course back-up at the end of the semester.

CLASS ASSIGNMENTS

Lab Exercises

Labs will consist of exercises that provide a means to put theory as presented through the lectures and reading material into practice. The labs are software intensive utilizing ESRI ArcGIS and Microsoft Excel. There will be instructions for each lab that outline the learning objectives and the steps that should be taken to complete the project. The first labs will simply require questions to be answered about the software and data, and perhaps include a final map. As the labs become more intensive, the "button-by-button" instructions will taper off. For example, I will not write out steps for procedures that have been covered in previous labs; you must memorize these techniques or refer back to your completed work. Some techniques required to finish the labs will only be demonstrated on screen during lecture. You will be expected to take notes of the steps and use them to complete the lab. If you miss a lecture, **YOU ARE RESPONSIBLE FOR THE MISSED MATERIAL.** Ask another student for a copy of their notes. A Report Template will be provided and must be used to write-up the lab work or points will be deducted. All labs will be submitted into separate Moodle drop-boxes in **MS Word** format only. The drop-boxes for standard labs will have a due-by-time of 11:00 AM on the **Friday** that the lab is due. However, the drop-box remains open until the final cut-off exactly one week later (11:00 AM, the next Friday). Moodle timestamps submissions automatically, so we are alerted to all late Labs. There will be a **10%** deduction for labs submitted in the grace period. **NO LABS WILL BE ACCEPTED AFTER THE FINAL DROP-BOX CUT OFF!**

Digital Resource Notebook

Each student is required to put together a digital notebook filled with the content featured in the class. The purpose of this notebook is to give the student a "take-away" resource of GIS and cartography techniques for future mapping projects. Do not wait until the last minute to put together the notebook. Start adding content the first week and continue to keep it organized throughout the semester. It will be your one-stop reference for the theory and techniques covered in class. **In your student folder on the server, create two folders labeled "Labs" and "Lectures".** You will work on your labs directly in your **Labs** folder. You need to download the .pdf documents of lectures from Moodle and store them in your **Lectures** folder. Feel free to make additional course material folders if you wish. This extra material can include chapters from the online text if you purchase that option, or study sheets and notes from class. The digital notebook should be backed up onto your thumbdrive or external hard-drive occasionally and a complete copy should be taken with you at the end of the semester. The notebook will be checked by the instructor or a TA during the final lab. There are only three possible grades: 0 for no notebook at all, 25 points for a partial notebook, and 50 points for a complete notebook. They are the easiest 50 points in the class; don't throw them away!

Midterm and Final Exams

You are responsible for **knowing everything read or said** in this class. Exams will be administered on Moodle. Test questions will be generated from the online text, the two required narrative books, in-class exercises, and labs. The exams will be available online for multiple days and are randomized by the computer to prevent side-by-side sharing.
No two students will have the questions in the same order. Once you start the exam, you will have a specified amount of time to finish. Make sure that you allow enough time and have a good internet connection before you start. Campus computers would be the most reliable in this respect. Avoid complications like dead laptop batteries or streaming data limits. The final exam **IS Comprehensive**, with questions not used on the midterm being "fair-game." However, the final will mostly consist of material covered in the second half of the semester. The Final Exam is longer and will be worth more than the Midterm. See the Points Table below for details.

The assignments and exams administered throughout the semester cover the topics that we discuss in class and are related your readings. The purpose of these assignments is to ensure that each student understands the concepts being discussed, practices and improves their software skills, completes the required readings, and attends each lecture. These assignments will be all that determines your final grade. Make sure to turn them in complete and on time.

If you are having trouble with a project, come and see me or a TA well before it is due. If you have an emergency, illness, or crisis; send an email, call, or stop by my office before the assignment is due. Once the due date and time have passed, **NO EXCUSES** will be entertained.

GRADING

This 3 unit class will be graded in the traditional letter grade (T) format. Various in-class assignments will be for extra credit and reward students for regular attendance. The tables below break down the point values for all assignments. Grades are evaluated on the completeness and organization of the project, as well as the use of the theory and techniques taught in class. Maps will not be graded purely on a subjective assessment of aesthetic appeal; however, a poorly executed map is certainly worth less than a professional one. Not everyone is an artist, but the student should demonstrate progress toward GIS and cartographic competency. All assignments, as well as the final grade, are evaluated on the following grading scale:

A   95 – 100%
A-   90 – 94.99%
B+ 87 – 89.99%
B   83 – 86.99%
B-   80 – 82.99%
C+ 77 – 79.99%
C   73 – 76.99%
C-   70 – 72.99%
D   60 – 69.99%
F   59.99% and below

*Please note that in order to be fair to all students, grades will not be rounded up. For example, if you earn 79.99%, you will receive a 'C +' in the course. Since there are no "A+" marks, an "A" grade requires 95% or higher and is reserved for students with the highest work ethic.

Points Table:

Assignments	Points
Lab 1	50 pts.
Lab 2	50 pts.
Lab 3	100 pts.
Lab 4	100 pts.
Lab 5	100 pts.
Lab 6	100 pts.
Lab 7	150 pts.
Lab 8	150 pts.
Lab 9	150 pts.
Lab 10	150 pts.
Resource Notebook	50 pts.
Midterm Exam	200 pts.
Final Exam	250 pts.
Total	1600 pts.