Purpose:
This course begins with the fundamentals of GIS and evolves to include intensive instruction in GIS analysis and cartography, advanced GIS applications and tools, and GIS integration with other applications and technologies. We will cover Geographic Information System (GIS) science and technology and how it is being applied in such diverse fields as planning, marketing, health, criminal justice, political science, natural resources, and engineering. Students will learn how reality is modeled in a GIS environment and the processes to collect, organize, analyze, and display geographic data obtained from diverse sources. We will introduce you to methods and practical applications of digital mapping and GIS in the context of planning, policy and design processes, and will use of the latest version of professional GIS software (ArcGIS 10.2.2). You will learn the basics of the application of GIS to planning and design processes, and after completing this course we will have met the following objectives:

Course Objectives:
• have a basic understanding of the principles and science that underpin GIS technology
• understand the characteristics, advantages and disadvantages of GIS data models
• be familiar with geographic and projected coordinate systems
• have a working knowledge of spatial data (vector and raster), organization, and analysis
• be able to present GIS results in a variety of professional formats
• know the steps involved in implementing a GIS project, including major pitfalls to avoid
• be prepared to take advanced urban and environmental modeling courses
• design and present professional maps
• import, project, and overlay GIS data
• manipulate GIS data and map layers
• collect and edit geographic data
• site selection and alternatives comparison
• development of spatial models
• evaluation of road and transit networks
• use of image and 3-D data in a mapping environment.
• complete a semester-long personal GIS project, and share the results in a variety of formats
Material Covered
Week 01  GIS Data
Week 02  Managing GIS Data
Week 03  Coordinate Systems
Week 04  Mapping GIS Data
Week 05  Presenting GIS Data
Week 06  Attribute Data
Week 07  Basic Editing
Week 08  Queries
Week 09  Spatial Joins
Week 10  Map Overlay and Geoprocessing
Week 11  Raster Analysis
Week 12  Network Analysis
Week 13  Editing and Topology
Week 14  Geodatabases
Week 15  Metadata

At the end of class, students will be proficient not only in the basics of GIS data collection, processing and mapping, but in the steps of GIS-supported project design, analysis, presentation and spatial decision-making.

Course Structure and Philosophy
Course offerings will consist of lectures covering the material, and instructor-led exercises. Students will apply the material using urban and natural resource datasets and maps. Students will work independently on individual short assignments and a final project applying GIS tools to a relevant planning process. These weekly assignments parallel the chapters the required texts.

Weekly assignments will consist of readings, exercises from the text, lab assignments and questions from the readings. Required homework and deadlines are detailed in the course plan and on Canvas. All map products are expected to be of professional print-quality unless otherwise noted.

Teaching philosophy:

1. Students play a key role in determining the coursework covered in the class. Suggestions about how the course is taught are most welcome and I will provide opportunities for you to give feedback. Your feedback guides how we teach the class, as well as what material to emphasize, when possible.

2. People tend to retain a much higher percentage of information in active learning environments and that people learn many different ways (e.g. by seeing, listening, speaking, and doing!). I strive to provide a variety of learning environments and will ask you to engage in activities in which you will teach your peers: where a person may only retain 5% of information as the recipient of a lecture, they will remember 90% if they teach that same material to others.

3. It is my experience that in-person or face-to-face experience offers far more learning potential, particularly in a subject such as GIS. You will be responsible for reading material and classroom time will be used to engage and reinforce that material, focus on key concepts, and guide you through exercises. You will succeed if you come prepared and participation helps everyone learn.
4. GIS is an intriguing and unique science through which we communicate and organize information about the world. I look forward to us (you, me, we) making this class a success and hope you are inspired by this topic as I am.

**Texts and Software**

**Required Texts:**
This text is absolutely essential to this course and you need your own copy as it is a workbook that we will use extensively every week throughout the course.


You are responsible for obtaining, reading and understanding the material in this text, which is available at the Auraria Bookstore and can be obtained on-line at a good price.

I will also post material on Canvas or assign Internet-based material, which you will be responsible for reading and learning.

**Optional and Related Texts:**
These are texts that I have required in the past, but have decided to make optional. I do my best to cover the material in an easy-to-understand format, but these texts cover much of the same material in different ways. I recommend both of these as good supplemental texts to augment your understanding of the material I will cover in lecture.


**Software Used in This Course:**
ArcGIS 10.1, Internet Explorer (Microsoft), WinZIP, and Microsoft Office, Adobe Illustrator, among others, are required. All are available on the FAST server and you will receive a student license to use ArcGIS on your personal computer (Windows PC recommended).

We will use Canvas for a variety of purposes, including posting course announcements, assignments, reading material, your grades, possibly on-line discussions, among others. I recommend checking Canvas frequently.

[https://ucdenver.instructure.com](https://ucdenver.instructure.com)
You will also have a FAST GIS account for this semester and use your student login for access. You will use this account to work on GIS exercises, access data, access course documents, and GIS software to complete assignments. The FAST website is an invaluable resource (http://fast.cudenver.edu). You can also use the FAST lab remotely (i.e. from home or other internet-connected computer) and instructions are on the website. If you have trouble with the FAST lab or your FAST account, contact me.

**Grading Policies**
Your grade will be calculated from **exams, exercises, presentations, final project, and participation.** Students requiring extra time for assignments due to medical or other conditions are responsible for seeing me at the beginning of the semester.

**Late Work Policy**
The policy for late work is simply that **I will not accept late work.** The assignments are due at the beginning of class on the day indicated. If you’re going to be more than ten or fifteen minutes late, send me the assigned work ahead of time. Please note the very unambiguous nature of this policy: **assignments are due on time.** After that time it will be considered late and you will not receive credit for it.

**Pre-emptive rant about excuses and the inflexible Late Work policy**
Not following this policy results in students taking advantage of me and other members of the class who submit work on time. The assignment due date is specified when it the assignment is given – at least a week in advance. The only excuses I will accept for late assignments are university-sanctioned excuses for absence, which must be accompanied by documentation. Be aware of the standard complement of unacceptable excuses—it may help you avoid situations in which you might be inclined to use them. In rough order of popularity:

1) I had trouble with the server
2) I had trouble with the software
3) I had trouble with the data
4) I missed class and I don’t understand the assignment
5) I had trouble with my computer
6) I had trouble with the printer or my printer
7) I have too much going on / I have taken too much coursework
8) I had a flat tire / my girlfriend is moving to Atlanta tomorrow / the pipes burst in my apartment / my cat is sick / it’s cold / I missed my bus

I am happy to help you sort through problems 1 – 6 and there are other staff here to help as well, but the night before the assignment is due is not the appropriate time to ask for help! Working with GIS can be extremely frustrating (though the rewards far outweigh the frustration!). The trick to dealing with the frustrating part is to **stay ahead of the work.**

I also recognize that life happens and encourage everyone to keep their priorities straight... take care of yourself and those who are important in your life. I understand. I have a life too! One of the best parts of my job is getting to know students and relish a good chat; however, please don’t tell me your story if the report is tied to an implicit or explicit request for leniency!
Make-up Work; Late Labs
If you must miss an exam or other due date, please make arrangements with me prior to that date. **Assignments that are turned in late will not receive credit.**

Curving and Extra Credit
I reserve the right to reward extra credit for truly exceptional work and I may curve the grade if I believe there is sufficient reason—if, for example, I feel like some exam questions were unreasonable—I generally try to avoid both.

Returned Work
Uncollected assignments will be kept for one semester.

Citing and Credit
The work you submit for this class must be your own and submitted for this class alone. You may not submit the same paper or project for this class and another class. Work on a similar theme is encouraged, but the work for this class must stand on its own and meet the assignment requirements for this class. If you have a question about this, please speak to me.

Additionally, you must acknowledge the work of others by appropriately citing your sources; this includes Internet sites! Again, if you have questions, please ask. Please note: Wikipedia and some other Internet sources are not an acceptable peer-reviewed, reputable source. It can be a wonderful place to start when you know nothing or little about a subject in order to find other sources or to begin exploring a topic, but it is not an end point or a primary reference. Citing Wikipedia will cost credit. Again, if you have questions, just ask. Cheating, copying, and/or plagiarism will result in a zero for the applicable assignment or exam (also see Student Code of Conduct).

Attendance Policy
You need to attend class to do well. Some graded activities take place and are collected in class, and if you miss these, you cannot make them up. Additionally, information from the lectures, which may appear in quizzes are not necessarily covered reading assignments. If you miss class for any reason, you are responsible for obtaining notes and updates from classmates. Although I do post lecture notes on-line, you will find that lecture slides are not a substitute for the material covered in class.

Classroom Conduct
Classroom time is designed entirely to help you succeed in the class and to enhance learning. Cell phone use in class is unacceptable and I ask that you leave the room if you must make a phone call or send text messages. I will not tolerate any activities that are disruptive to other students; disruptive activity will result in dismissal. Please do not browse the Internet when someone (including myself!) is speaking. Adherence to the Student Conduct Code is expected.

Time Commitment
For many, the fact that much of this class is software-based will be challenging. While there is no way to adequately judge the specific amount of time a student will spend on each assignment due to varying technical and computer capabilities, some students will need to devote a significant amount of time outside of class to learn software, and complete exercises and projects. In the past, some students have spent as much as 10+ hours each week outside of class working with software (myself included!). Others, particularly students with previous GIS coursework, will find some of the hands-on material to be review, but valuable practice work.
Computer Work:
PLEASE do not try to complete computer assignments at the last minute, as the hardware / software will inevitably crash just when you have an assignment due. In addition, be sure to back up your data and work. I am not likely to respond to e-mail questions for help within 24 hours before an assignment is due.

In my experience teaching computer lab-based classes, the greatest general causes for failure are 1) not doing the work in a timely manner and 2) falling behind.

Grading Breakdown
This course uses the following grading scheme (1000 points total):

<table>
<thead>
<tr>
<th>Grade</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>950 - 1000</td>
</tr>
<tr>
<td>A-</td>
<td>900 - 949</td>
</tr>
<tr>
<td>B</td>
<td>834 - 866</td>
</tr>
<tr>
<td>B-</td>
<td>800 - 833</td>
</tr>
<tr>
<td>C</td>
<td>734 - 766</td>
</tr>
<tr>
<td>C-</td>
<td>700 - 733</td>
</tr>
<tr>
<td>D</td>
<td>634 - 666</td>
</tr>
<tr>
<td>D-</td>
<td>600 - 633</td>
</tr>
<tr>
<td>F</td>
<td>&lt;599</td>
</tr>
</tbody>
</table>

Please note: I am very careful to make sure that all the grading throughout the course of the semester is fair. Consequently, I have decided that I will no longer entertain pleas for “bumping” the grade up a few points at the end of the semester. If you want a particular grade, make sure that you earn all the points you need and think about that from the first day of class! I reserve the right to shift up to 10% of the points between categories as the needs of the course dictate.

Exams (200 points):
There will be several exams based on material covered in class and the readings assigned throughout the semester. The exams will include a mixture of short answer, matching, essay, and problem-solving questions. I plan to provide some study guide material to help you, and will spend a little class time reviewing the material before the exams.

Participation (200 points):
Credit from the participation category will be awarded from occasional spot-checks of the material in class, for coming to class (especially when we have a guest speaker), and for completing in-class assignments. Reviews of your peers’ work will fall into this category. Please note that I often do not announce ahead of time when graded activities occur in class. There is NO substitute for being present in class and covering the material in-person along with me and your peers.

Exercises (400 points):
Throughout the class, I will assign activities to help you learn the material, prepare you for the exams, and teach you the software. Much of this will involve producing maps with ArcGIS. As we progress through the course, I will expect you to utilize progressively more sophisticated techniques. It is therefore important that you stay on top of this work. I recommend keeping the assignments you have completed, as these can serve to help you with the following ones. I will almost always leave time in class to deal with rough patches in the exercises and I recommend taking advantage of that.

Final Project: (200 points):
The “final project” will be worth about 20% of the class grade and should require about 20% of the total effort and time expected for the class. This project will require you to produce a detailed description of your GIS process, flow charts, analysis results, conclusions, and a series of maps. I will discuss the project with you in the first few weeks and provide detailed instructions at that time.
Other Policies and Guidelines

Professor Availability:
I hold office hours during the week. You are invited to walk in without a prior appointment for those times, but I strongly encourage you to schedule an appointment as I often have other obligations and may be in and out of the office or be assisting other students. I will notify you ahead of time if I will be unavailable. I am happy to schedule an appointment with you outside of my office hours if I am available.

I welcome students to contact me outside of class time; in person or by e-mail. If you are struggling with material or simply want more information about a topic, please come see me. Please be cognizant of the fact that I also work full-time elsewhere, and may not be available at a moment’s notice. While I will do my best to answer email messages promptly, you may not hear from me immediately.

E-mail:
E-mail is the best way to get in contact with me and I will make every effort to respond to e-mail within 48 hours during the work week. I request that you write me from your university account. Check your university e-mail regularly or arrange to have it automatically forwarded to your e-mail address of choice; you’re responsible for the information that is sent there. Please write formally when using e-mail; i.e., use punctuation, capitalization, and sign your e-mail with your name.

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Important Dates
http://www.ucdenver.edu/student-services/resources/CostsAndFinancing/billing/dates/Pages/default.aspx