

**GES 4070/5070: Geovisualization**

Fall 2024

Dept. of Geography &amp; Environmental Studies

University of Colorado – Colorado Springs

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Instructor:	Dr. Fuzhen Yin (She/Hers)
Office location:	Columbine Hall 2022
Email:	fyin@uccs.edu
Office hour:	Wednesday 3-4pm & Thursday 10-11am; or by appointment
Learning mode:	In-person
Class days/time:	Wednesday 9:25 am – 12:45 pm
Classroom:	Columbine Hall 329 (door code: 13524)
Additional lab space:	Columbine Hall 331 (door code: 241)
Credit Units:	4

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**Course Description:**

Mapping and geo-visualization are powerful and critical for understanding geographical issues, and thus driving knowledge discovery and decision-making in interdisciplinary settings. This course discusses and explores geo-visualization across different fields including geography, urban planning, graphic communication, and computer science. It aims to provide students with a foundation in the concepts, principles, techniques and tools for geo-visualization. Projects in this course will introduce students to the systematic skills used to professionally and effectively communicate and present your ideas. More importantly, it aims to expose students to real-world issues and open different career paths associated with geo-visualization.

This course introduces a programming approach for geo-visualization (based on R and RStudio). We will explore how to visualize non-spatial data, spatial data, flow and network information etc. Students will also learn methods to identify patterns, trends, differences and relationships using visualizations. Through this course, students will produce a set of graphics and reports that can be wrapped up into a portfolio for their job/graduate school applications.

**Recommended Books & Materials (Not Required):**

- Cotton, R. (2013). *Learning R: A step-by-step function guide to data analysis*. O'Reilly Media
- Munzner, T. (2014). *Visualization analysis and design*. CRC press.
- Monmonier, M. (2018). *How to lie with maps*. University of Chicago Press.
- Wilke, C. O. (2019). *Fundamentals of data visualization: a primer on making informative and compelling figures*. O'Reilly Media.
- Slocum, T. A., McMaster, R. B., Kessler, F. C., & Howard, H. H. (2022). *Thematic cartography and geovisualization*. CRC Press.
- Yau, N. (2024). *Visualize this: the FlowingData guide to design, visualization, and statistics*. John Wiley & Sons.

**Online Sources:**

Canvas will be the main hub for learning materials including lecture slides, reading chapters, lab assignments, mid-term, final project, and additions/modifications to the class schedule. In addition, a set of digital platforms such as Miro and Vevox will be leveraged during classes to promote learning experiences.

**Grading Policies:**

Your participation in this course will consist of attending and participating in all class meetings and completing readings and assignments. Under no circumstance will late assignments or late projects be accepted. No credit is given for work submitted after the due date. If you are ill or will miss class, please ensure that your work is submitted before the beginning of the class you plan to miss. In such a case, you are better to hand in a partially completed project early than to hand in a “perfect” project late.

Learning assessments will be weighted according to the following break-down:

Weight	Project
10%	Class attendance and participation
40%	Labs (n=10); 4% each
15%	Assignment (n=3); 5% each
20%	Projects (n=2); 10% each
15%	Final portfolio

The Final Letter Grade will be determined as follows:

Grade	Percentage
A	93.0% - 100.0%
A-	90.0% - 92.9%
B+	87.0% - 89.9%
B	83.0% - 86.9%
B-	80.0% - 82.9%
C+	77.0% - 79.9%
C	73.0% - 76.9%
C-	70.0% - 72.9%
D+	67.0% - 69.9%
D	60.0% - 66.9%
F	59.9% or below

**Reasonable Accommodation:**

If you are a student with a disability and believe you will need accommodations for this class, it is your responsibility to register with Disability Services and provide them with documentation of your disability. They will work with you to determine what accommodations are appropriate for your situation. To avoid any delay, you should contact Disability Services as soon as possible. Please note that accommodations are not retroactive, and disability accommodations cannot be provided until a Faculty Accommodation Letter has been given to me. Please contact Disability Services for more information at Main Hall, 3rd floor, Room 324, (719) 255-3354, or [dservice@uccs.edu](mailto:dservice@uccs.edu).

If due to religious obligations you plan to request adjustments with scheduled exams, assignments, or required attendance in this class, please contact me as soon as possible. I will work with you and university counsel's office to ensure a reasonable accommodation is made.

### **Veteran and Military Affairs**

Students who have the potential to participate in military activities that will conflict with the course schedule, including training and deployment, should consult with faculty prior to registration for any course, but no later than the end of the first week of the term. At this time, the student should provide the instructor with a schedule of planned absences in order to allow the instructor to evaluate and advise the student on the possible impact of the absences. In the event military activities are not known until after the first week of classes, the student should consult with faculty as early as possible and provide the same information as outlined above.

In this course, the instructor will consider absences due to participation in military activities, verified by official orders or a letter from the student's commander, to be excused absences. If, however, it appears that military obligations will impact the student's ability to succeed in the course, the instructor may consult with Veteran and Military Affairs (<https://military.uccs.edu/>) for additional assistance or advise the student to register for the course at another time, when they are more likely to be successful.

### **Mental Health and Wellbeing**

Mental health challenges can interfere with academic performance. The source of symptoms might be related to your course work; if so, please speak with me. However, problems with other parts of your life can also contribute to decreased academic performance. If you are unsure if you need assistance, free online mental health screenings can be found [here](#).

**If you are experiencing a mental health emergency (*i.e.*, you do not feel physically safe), please immediately contact one of the resources listed below:**

- **Call UCCS Public Safety at 719-255-3111, call or text the National Suicide & Crisis Lifeline at 988, call 911, or go to the nearest emergency room.**

Remember, we care about your wellbeing, so if you are struggling (even if this is *not* an emergency) please reach out for help. For confidential mental health services, visit the Wellness Center located inside the [Gallogly Recreation and Wellness Center](#). The first 3 visits are free! Phone: 719-255-4444. Hours: Monday–Friday, 8a.m.–5p.m. You can also contact Telus Health Student Support for free, confidential 24/7 mental health and wellbeing support through the Telus Health app or visit our free mental health and resilience digital platform. Resource information can be found at 24/7 Mental Health Resources | [Gallogly Recreation and Wellness Center](#). If you are in need of a community resource, [Diversus Health Lighthouse](#) has a Walk-In Crisis Center at 115 S. Parkside Drive, Colorado Springs, CO 80910, Hotline: 844-493-8255, Office: 719-572-6100. Other community resources can be found at Resources in the Colorado Springs Community | [Gallogly Recreation and Wellness Center](#).

### **Responsible Reporting: Institutional Equity / Title IX**

The Office of Institutional Equity (OIE), administers the University of Colorado (CU) Sexual Misconduct policy (including Title IX), the UCCS Discrimination and Harassment Policy, and the CU Conflict of Interest in Cases of Amorous Relationships Policy. All UCCS faculty and staff, including student employees, are considered “responsible employees” and *must* report any suspected or known conduct that may be in violation of these policies (“prohibited conduct”) directly to the OIE. This reporting requirement exists to support the safety of our campus community, and there is no statute of limitations.

Prohibited conduct includes unwanted verbal or physical conduct that is sexual in nature, or based on a protected class (such as, gender, race, veteran status, disability, etc.). You may review the Applicable Policies and OIE's Resolution Procedures [here](#). While reporting prohibited conduct to the OIE is required by UCCS employees, participation in an OIE resolution process though the OIE is voluntary. Confidential reporting, and access to medical and mental health services, are available to students through the UCCS Wellness Center at 719-255-4444.

**Disclaimer:**

The instructor reserves the right to change this syllabus as the semester progresses and as the need arises to improve learning experiences. The instructor will notify updates to students via email or on Canvas.

**Grading Rubrics:**

<b>Course Objective</b>	<b>Outstanding (100%)</b>	<b>Excellent (80%)</b>	<b>Satisfactory (60%)</b>	<b>Unsatisfactory (40%)</b>	<b>Fail (20%)</b>
<b><u>Preparedness</u></b> Ability to manage time, show professionalism and engage within the course while gaining knowledge.	Always on time, outstanding level of class participation, achieved advancement and consistent workload management.	Considerable attempt toward advancement, excellent class participation and effort to manage workload.	Unsure of professional abilities, and inconsistent workload management.	This learning outcome was not met.	Work was not completed as assigned.
<b><u>Research</u></b> Ability to gather pertinent information, tailored to the task at hand, which will enlighten the topic.	Demonstrated outstanding initiative and resourcefulness in utilizing a broad range of research sources.	Some research beyond immediate was evident, and topic was realized.	Used only information readily available, therefore topic was not fully realized.	This learning outcome was not met.	Work was not completed as assigned.
<b><u>Thought</u></b> Ability to generate ideas, concepts and positions at a collegiate level and in an articulate manner.	Consistently generated extensive range of ideas with an excellent understanding of process and focus.	Generated a range of ideas and attempt at exercising judgement in selection.	Generated a limited range of thoughts and reluctant to examine other possibilities.	This learning outcome was not met.	Work was not completed as assigned.
<b><u>Product</u></b> Ability to deliver a wholistic product, polished and void of technical flaw or error.	Incorporates a full complement of professional skills, materials, media and technology with appropriate consideration.	Showed thought in presenting work and recognizes the potential of professional skills, material, media and technology.	Demonstrated a complete product, though lacking professional quality.	This learning outcome was not met.	Work was not completed as assigned.
<b><u>Visualization</u></b> Ability to produce high-quality visualization that is legible, consistent, and with the good use of color palette.	Strong initiative and extensive efforts to look for external sources for visualization tasks. Excellent legibility, clarity, and includes all necessary elements. Right scale and good use of color/patterns/textures.	Showed ability to adapt the skills learnt in class or labs to complete visualization tasks. Demonstrated attempt to produce good visualization but need more skills or practice.	Completed the visualization tasks but the graphics needs substantial improvement in terms of clarity, consistency, and design.	This learning outcome was not met.	Work was not completed as assigned.

**Course Schedule (Please follow updates on Canvas):**

Week	Date	Topics	Submission deadlines (by 5:00 pm)
<b>Part I: Fundamentals of Information Visualization</b>			
1	8/28	<i>Course overview, logistics and syllabus review</i> <u>Work assigned:</u> Lab 1 <u>Work assigned:</u> Assignment 1	
2	9/4	<i>Intro to information visualization– part 1</i> <u>Work assigned:</u> Lab 2	Lab 1 due (9/3)
3	9/11	<i>Intro to information visualization – part 2</i> <u>Work assigned:</u> Lab 3 <u>Work assigned:</u> Assignment 2	Lab 2 due (9/10) Assignment 1 due (9/10)
<b>Part II: Geo-visualization &amp; Mapping</b>			
4	9/18	<i>Special topics: spatial visualization – part 1</i> <u>Work assigned:</u> Lab 4	Lab 3 due (9/17)
5	9/25	<i>Special topics: spatial visualization – part 2</i> <u>Work assigned:</u> Lab 5 <u>Work assigned:</u> Project 1	Lab 4 due (9/24) Assignment 2 due (9/24)
6	10/2	<i>Good design: symbol, color &amp; hierarchy</i> <u>Work assigned:</u> Lab 6	Lab 5 due (10/1)
7	10/9	<i>Presentations on Project 1</i>	Lab 6 due (10/8) Project 1 due (10/8)
8	10/16	<i>Flow, movement and networks</i> <u>Work assigned:</u> Lab 7 <u>Work assigned:</u> Assignment 3	
<b>Part III: Spatial Data Science and Analysis</b>			
9	10/23	<i>From data to knowledge: analyzing trends, patterns and relationships – part 1</i> <u>Work assigned:</u> Lab 8	Lab 7 due (10/22)
10	10/30	<i>Guest Lecture: Meet with practitioners – Atlanta City GIS Analyst: <a href="#">Wei Liu</a></i> <u>Work assigned:</u> Lab 9 <u>Work assigned:</u> Project 2	Lab 8 due (10/29) Assignment 3 due (10/29)
11	11/6	<i>From data to knowledge: analyzing trends, patterns and relationships – part 2</i> <u>Work assigned:</u> Lab 10	Lab 9 due (11/5)
<b>Part IV: Wrap-up</b>			
12	11/13	<i>Visualizations for branding GIS professions in the digital era</i> <u>Work assigned:</u> Digital portfolio	Lab 10 due (11/12)
13	11/20	<i>Presentations on Project 2</i>	Project 2 due (11/19)
14	11/27	Fall Break No Class	
15	12/4	<i>Guest Lecture: Meet with map-making award winner – <a href="#">Atlas (Chenxiao) Guo</a></i>	
16	12/11	<i>Working session on Digital portfolio</i>	Digital portfolio due (12/11)