Introduction to Geographic Information Systems
(LDAR 5540)
Mapping and Spatial Analysis for Landscape Architects
University of Colorado Denver / Department of Landscape Architecture / Fall 2015

3 Credit Hours; Restrictions: None.
Schedule: Tuesdays 12:30pm – 3:15pm in North Classroom Room 5033 (FAST Lab)

Instructor: Scott Carman (scott.carman@ucdenver.edu)
Office hours: Tuesdays 11:30am – 12:30pm in North Classroom Room 5033 (FAST Lab)

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Office Hours: TBA

“Let us ask the land where are the best sites. Let us establish criteria for
many different types of excellence responding to a wide range of choice.”
- Ian McHarg, Design with Nature

Overview
For as long as humans have been designing the environments in which they live, they have been seeking to
better understand those environments. For thousands of years, the tools available to measure and record
the landscape have been limited to those that are used to document a site through direct observation: the
measuring tape, the plumb bob, sighting instruments. These crude tools were used to create plans and
maps, the first organized drawings that allowed for a rudimentary form of site analysis. Even in these
earliest depictions of the land, the basic elements of the most advanced maps were there: points, lines,
shapes, information. All subsequent advances in mapping technology have incrementally built upon this
simple and intuitive foundation, providing the basis for georeferencing and interpretation of a wide array of
data.

Today, geographic information systems (GIS) stand at the forefront of mapping and spatial analysis,
employing relatively simple concepts to make sense of a multitude of complex data. Scientists, policy
makers, designers and the general public are now leveraging the information gleaned from GIS technology
in increasingly sophisticated ways to gain insights and make decisions, affecting nearly every endeavor
known to mankind.

Course Goals + Outcomes
The intent of this course is to familiarize students with both the conceptual and practical foundations of GIS
technology. The historical development of mapping technologies and remote-sensing data collection will be
explored to establish a foundation for more advanced spatial analysis work. Multiple public and proprietary
GIS platforms will be employed, though students will primarily gain experience in use of the most dominant
contemporary GIS software, ESRI’s ArcGIS. Most importantly, students will learn how to collect, arrange,
interpret and present GIS data in a wide range of scenarios common to the practice of landscape
architecture today. This course is a required core MLA class and is a prerequisite to be fully prepared for
LDAR 5200.
**Organization**

This class is organized as a ‘lecture/lab’ course, with the majority of the weekly class time devoted to lectures, demonstrations and discussions, and the remaining time dedicated to hands-on practice with the software. During the ‘lab’ segment of the class, the instructor may lead everyone through a tutorial, or alternatively, the instructor and teaching assistant will offer one-on-one assistance to the students as they work through that week’s in-class assignments. In addition, the teaching assistant will hold optional weekly workshops to assist students with the week’s work as needed. The instructor is available for office hours by appointment and any time via email. The course schedule will be kept fairly fluid within the allotted time, with lectures, labs and discussions scheduled as needed. For this reason, it is critical for all students to attend all class sessions.

*Please note that this course assumes no previous training in the software to be covered, but does assume proficiency in general computing and file management. Students are additionally required to own a laptop or have access to a computer with current versions of the following software installed: ESRI ArcGIS Desktop and Autodesk AutoCAD.*

**Communication**

All course-critical communications, including announcements, assignments, class presentations, etc., will be conducted through the course Canvas site (https://ucdenver.instructure.com). Students who wish to receive automatic email notifications from Canvas whenever new material or information is posted should set up their profile accordingly (click on student name in the upper right of the screen, then click the 'Notifications' link in the menu on the left; students may also change their preferred email address through the ‘Settings’ link). It is the student’s responsibility to stay up-to-date with course developments through Canvas.

**Evaluation**

Students will be expected to complete periodic assignments that will reinforce the topics covered in seminar. Completion of these assignments is critical to the successful completion of this course, as the best way to learn the software and become comfortable with the media is to use it on a regular basis. Assignments will be graded and will be reflected in the final grade for the course. Completion of all assignments in a timely manner is critical to success in this course, as the subject matter and assignments are cumulative. Assignments that are submitted late will be penalized one point for each day of tardiness. Deductions will be taken even if work has been lost due to computer malfunction. Students are expected to back up their work incrementally and complete their assignments in a timely manner so as to avoid potential computing problems.

All requested hardcopy materials from digital files are to be printed prior to the start of class. Unless instructed otherwise, all digital assignments are to be submitted via Canvas. All files shall be clearly labeled with your name and the assignment number (i.e. Carman_Assignment01.pdf). Please plan your schedule accordingly to allow for needed production work.

There will be a final project assigned in the 12th week of the course, the subject and requirements of which will be announced at that time. The final project will account for 25% of each student’s final grade, and will be expected to reflect the full complement of techniques, skills and insights developed during the course of the semester. The remaining 75% of the final grade will be the average of the grades earned on the weekly assignments. Each student’s final numerical grade will be converted into a letter grade at the end of the semester as follows:

- 95 – 100............ A
- 90 – 94............ A-
- 87 – 89............ B+
- 84 – 86............ B
- 80 – 83............ B-
- 77 – 79............ C+
- 74 – 76............ C
- 70 – 73............ C-
- 60 – 70............ D
- < 60 ............... F
**Attendance**
Consistent and prompt attendance during course meeting time is essential to students’ success in learning the software and completing this course. Attendance and class participation will be considered by the instructor when assigning grades. Course policy is that for each unexcused absence from the class during the semester, the student’s final grade will be reduced by one step (e.g., from a B to a B-). With few exceptions, accepted reasons for class absence will be limited to illness and family emergencies. Students who are ill and may be contagious are encouraged to notify the instructor and stay out of class. Any students having difficulties in class due to personal or physical challenges should consult with the instructor prior to the beginning of the semester in order to develop alternative strategies for progressing through the course. The instructor should be informed via email (scott.carman@ucdenver.edu) of any unavoidable absences as soon as possible so that alternate arrangements for the missed class or classes can be made.

**Schedule**

Week 1  (08.22)  Course Introduction / History, Philosophy and Technology of GIS
Week 2:  (08.29)  Cartography; History and Conventions of Mapping
Week 3:  (09.05)  ArcGIS Explorer Online / Interactive Map Tour
Week 4:  (09.12)  GIS Data Types / Raster vs. Vector Data
Week 5:  (09.19)  GIS Data Sources / GIS Data Search
Week 6:  (09.26)  ArcGIS Data Management / Geodatabase Creation
Week 7:  (10.03)  Feature Classes / Feature Creation and Editing
Week 8:  (10.10)  Identifying and Querying Features / Query Statements and Execution
Week 9:  (10.17)  Advanced Symbology / Analytical Mapping
Week 10: (10.24)  Map Layout and Design / Data Presentation
Week 11: (10.31)  Introduction of Final Project / Raster Symbolization and Geo-referencing
Week 12: (11.07)  Geoprocessing Tools / ArcToolbox / Terrain and Hydrological Analysis
Week 13: (11.14)  Spatial Analysis / Network Analysis
Week 14: (11.21)  Mid-Review of Final Project Progress
Week 15: (11.28)  Fall Break
Week 16: (12.05)  ArcScene / 3D Data Visualization
Week 17: (12.12)  Final Projects Due

*Note: This schedule is tentative and subject to change based upon the instructor’s judgment and progress of the students*

**Reading List**


Note: Bulleted texts are specific to the software covered in this course and are recommended as general references.

Disability Accommodations

The University of Colorado system has both a legal and moral obligation to provide reasonable accommodations to students with disabilities. To be eligible for accommodations, students MUST be registered with the UC Denver Office of Disability Resources and Services (DRS) - North Classroom 2514; 303-556-3450, 303-556-4766 TDD. The DRS staff will work with the instructor to determine reasonable accommodations and to coordinate these accommodations. If a student is given accommodations, they must be followed by both the instructor and the student. If a student chooses not to accept the accommodations set forth by the DRS, they MUST complete all assignments and do all course work in the same manner as all other students. No exceptions or alternate forms of evaluation can be used except those mandated by the DRS. The course instructor is prohibited from arbitrarily deciding to give a student extra time, extra assistance or other forms of aid unless it is formally mandated by the DRS.

Academic Integrity, Ethics + Conduct

A university’s reputation is built on a standing tradition of excellence and scholastic integrity. As members of the University of Colorado Denver academic community, faculty and students accept the responsibility to maintain the highest standards of intellectual honesty and ethical conduct in completing all forms of academic work at the university.

Students are expected to know, understand, and comply with the ethical standards of the university, including rules against plagiarism, cheating, fabrication and falsification, multiple submissions, misuse of academic materials, and complicity in academic dishonesty. In addition, students have an obligation to inform the appropriate official of any acts of academic dishonesty by other students of the university. Academic dishonesty is defined as a student’s use of unauthorized assistance with intent to deceive an instructor or other such person who may be assigned to evaluate the student’s work in meeting course and degree requirements.

We strive to learn from one another in an educational environment that holds mutual respect for individuals and self-responsibility for behavior in high regard. Students who engage in behavior that conflicts with established standards, laws, policies, and guidelines may be referred for conduct proceedings.

Every member of the student community must assume responsibility for becoming educated about the various University and housing standards, policies, and guidelines. It is against the basic nature of this community for anyone to demean or discriminate against another human being. A caring, educational community does not tolerate physical or psychological threats, harassment, intimidation, or violence directed against a person. Students engaging in such behavior are subject to the University conduct processes.