

Geography 433: Geodesign for Sustainability and Resiliency

Fall 2019 (Section 1)

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Course Dates/Times:	Tuesday and Thursday, 12:30pm to 1:45pm in Science B308
Office Hours:	Wednesday 11am to 12pm. Please email me to schedule office hours by appointment
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Course Overview

This course applies Geodesign frameworks and methods to develop and communicate sustainable and resilient community solutions. The course is segmented into three parts.

Part 1 establishes the **FOUNDATIONS AND CONTEXTS** for Geodesign and Geographic Information Systems for addressing issues in sustainability and resiliency. Students will develop a language for communicating Geodesign frameworks.

Part 2 applies a **GEODESIGN FRAMEWORK FOR DESIGNING THE METHODOLOGIES**. The Steinitz framework will first be applied to quickly scope out a Geodesign project. Once the issues of project area are better understood, the Geodesign Team will learn to apply the framework to design the project methods for each set of Geodesign models (DECISION-IMPACT-CHANGE-EVALUATION-PROCESS-REPRESENTATION).

In Part 3 you will apply a Geodesign Framework and GIS techniques to **IMPLEMENT THE GEODESIGN STUDY**. Various case studies will continue to be shared, but the majority of the time you will work in the Geodesign Studio to work on your final project, starting with Representation Models and Ending with Decision Models.

Target Audience

This course is intended for students interested in applying Geographic Information Systems and a Geodesign approach toward S/R planning. This course is applicable to those seeking careers in GIS, planning, conservation, sustainability, resiliency, land trusts, and environmental consulting.

Learning Outcomes

After taking this course, students will be able to:

- Apply a planning/design framework to consider complex Geodesign projects.
- Apply various measurement formats to analyze and evaluate S/R success or failure.
- Consider human interests in arriving at decisions.
- Apply GIS techniques to create a S/R plan.
- Communicate S/R solutions to professionals and members of the public.

Course Format

This course is conducted synchronously (in real-time) in a face-to-face format. Attendance and active student engagement are mandatory. A portion of your grade is based upon attendance and participation. Students must attend the classroom in person (Science B308) each scheduled class period.

Course content is delivered using a combination of lectures, discussions, and lab exercises. At the instructor's discretion, course materials may be made available on the UWSP internet portal, Canvas. Canvas may also be used disseminate grades and to conduct some learning assessments. **Contact your instructor if you need assistance logging in to Canvas.**

Geodesign Team Format

The Geodesign Team Format engages professionals from the design professions, geographic sciences and information sciences, as well as community stakeholders, including the general public. The Geodesign Team works together utilizing the strengths of each team member and the values and preferences from the stakeholders to design solutions. This course will emulate the Geodesign Team Format. For this class, the teams will consist of:

Geodesign Principal: The course instructor will perform in the capacity of the Geodesign Principal. The Geodesign Principal oversees the entirety of operations and is responsible for setting organizational directions and providing support to Geodesign Team members.

Project Managers: Students at the graduate level will perform in the capacity of Project Managers. They are responsible to lead small teams to work on Geodesign projects. They will provide leadership and support to their team and they will work with the principal and other project managers to pollinate and mature Geodesign concepts for implementation.

Geodesign Associates: Students at the undergraduate level will perform in the capacity as Geodesign Associates. They will bring a variety of professional skills to each team. Teams will be organized based upon individual levels of expertise in design, sciences, and information sciences. Students will, however, need to participate on all aspects of Geodesign problem solving, even those areas outside their present professional area.

Community Stakeholders: Periodically community stakeholders and clients will (may) be invited to the Geodesign Studio to share their values and preferences for the design solution. The Geodesign Team is expected to ask a range of questions to help inform the design process.

Subject Experts: Often the Geodesign Team, including the Principal will not be in a position to provide subject area expertise. The Geodesign Team is responsible for contacting subject experts to offer testimony and acquire knowledge. Literature searches, conducted by the Geodesign Team, are a significant component of the Geodesign approach.

Lectures

Lectures will cover a range of materials from Geodesign frameworks, Geodesign methods, using GIS to fulfill Geodesign requirements. Various case studies will also be shared in a lecture format.

Expectations

- Engage with lecture by asking questions.
- Take your own personal notes.
- Apply knowledge gleaned from lectures in Geodesign and GIS lab work.

Discussions and Project Design

The Geodesign Team will engage in regular discussions concerning lecture topics and project design. Students will be selected to lead discussions. Discussion leaders are expected to fully and completely engage with course materials prior to the discussion, summarize lessons, and lead discussion. All students are required to participate in discussions, including reading or viewing all content and sharing in discussion. The Geodesign Principal will lead and facilitate project design discussions. Geodesign Team members will be required to actively participate in the project design. Students will be required to take their own notes during project design

discussions. The majority of course participation points are awarded by participation in discussion.

Learning Resources

Learning resources, including readings and videos are assigned each week to complement materials shared in lecture and to stimulate discussions among the Geodesign Team. Learning resources will be made available on the D2L learning portal. No manual or book is required for purchase during this course.

Expectations

- Engage with Learning Resources prior to attending lecture and take personal notes.

Geodesign Studio Projects and Problem Solving

Learners will complete five Geodesign projects throughout the semester. Each Geodesign project is worth 50 points each for a total of 250 points. Each Geodesign team member will complete each exercise individually, but is expected to consult the Geodesign team on a regular basis for ideas and critique. Students will have the opportunity to share projects for critique among the team, managers, and principal prior to turning them in for a final grade. The principal will issue the final grade based on a rubric. Assessments include:

1. Environmental Corridors. Conduct an Environmental Corridors analysis for a county.
2. OPTIONS
 - a) Option1. Prioritize farmlands for preservation.
 - b) Option2. Analyze UWSP rooftop solar energy potential.
3. Growth Management. Identify suitable land for future residential, commercial, and industrial growth for the next 25 years.
4. Create an operations dashboard.
5. Create a storymap.

Expectations

1. **Projects:** Project descriptions and rubrics will be handed out to the Geodesign Team. There are six projects. Complete 5 of the 6 projects.
2. **Supplemental Resources:** Supplemental resources are offered to help you complete project workflows. There are no explicit instructions for Geodesign Projects. You are expected to apply skills gleaned from previous GIS coursework and research new skills from other resources, including the Geodesign Team and literature searches.
3. **Due Dates:** Two due dates are offered for each of five exercises. The first due date represents when a project must be ready for presentation and critique by the Geodesign Team. The second due date represents when the project is due to the principal for grading. If a project is not ready for critique by the Geodesign Team a deduction of 10% will be assessed. Projects turned in late to the Principal will be deducted 25% for each day after the second due date.
4. **Geodesign Team Critique:** By the first due date you should be ready to share your project with the Geodesign Team for critique. Please present your work using the rubric as a guide. The Geodesign Team should be ready to offer advice for improvement.
5. **Grading Rubrics:** Rubrics are explicitly outlined with each exercise handout.
6. **Class Server:** Data, projects, and completed exercises are stored in a student class server subdirectory. Each student has a subdirectory located within the following server location (**z:\\uwsp.edu\\files\\CLS\\GEO\\classes2**). All Geodesign Projects should be saved to your folder workspaces. You are responsible for collecting, creating and managing data, projects and outputs in your workspaces.

7. **Computing and Software Requirements:** Exercises require the use of campus computers and ArcGIS Pro 2.x. Learners are expected to have a working knowledge of Windows 10. Moreover, students are expected to have a solid understanding of GIS database editing, analysis, and map making with ArcGIS. With the instructor's consent, students may be allowed to use ArcGIS 10.x, but it is highly recommended that students spend time learning how to use ESRI's new software paradigm. ArcGIS software is available in all general-purpose campus labs.

Final Geodesign Project

In Part 2 of the course, the Geodesign Team will engage in seven assessments related to the final project, designing courses of action for a project of students' choice. These seven assessments will prepare you for implementing the design methods to create a design for improving sustainability and resiliency. Assessments will be conducted collaboratively by each Geodesign Team. Each team member will receive the grade assigned to the team. The project scoping and design assessments are worth 300 course points.

The assessments include:

1. Scoping out the Geodesign Study
2. Decision-Models – completing a stakeholder analysis
3. Impact Models – Select and design the metrics and indicators that inform the decision-makers.
4. Change Models – Select and design the means to change the existing conditions.
5. Evaluation Models – Assess the existing conditions of the project area.
6. Process Models – Determine which issues/functions/systems in the project area are of concern.
7. Representation Models – Determine which data, at what scale, are necessary to fulfill the needs of the project.

In Part 3 of the course, the Geodesign Team will implement their design methods starting with the representation models and ending with the decision models. 350 course points are awarded for perfect implementation of the Geodesign framework.

1. Representation Models – Collect the appropriate data to implement the study.
2. Process Models – Conduct analyses that indicate how the project area functions.
3. Evaluation Models – Indicate how well the project area is functioning in its present condition.
4. Change Models – Implement models that determine how the project area should change to function more sustainably and resiliently.
5. Impact Models – Showcase the metrics that indicate improvement.
6. Decision Models – Create a presentation for the decision-makers that share your methodology and persuade them to act.

Geodesign Projects will be evaluated for: (consult individual rubrics for more information).

- Program research and design
- Database management
- Valid analytical techniques and outputs
- Communication elegance and effectiveness

Evaluation and Grading

Class Attendance and Participation = 100

Geodesign Projects = 250
 5, 50 Points Each

Final Geodesign Project = 650
 Project Scoping 100 Points
 Project Design 200 Points
 Project Implementation 350 Points

Total 1000 Points

Ranges of percentages, course points and their equivalent letter grades are shown below. By referring to this table you can determine your letter-grade standing at any point in the course.

<u>Percent</u>	<u>100 Points</u>	<u>150 Points</u>	<u>50 Points</u>	<u>Course Pts.</u>	<u>Letter Grade</u>
93-100	93.0	140	46.5	930	A
90	90	135	45	900	A-
87	87	131	43.5	870	B+
83	83	125	41.5	830	B
80	80	120	40	800	B-
77	77	116	38.5	770	C+
73	73	110	36.5	730	C
70	70	105	35	700	C-
67	67	101	33.5	670	D+
63	63	95	31.5	630	D
<63	<63	<95	<31.5	<630	F