GEOG 2500
INTRODUCTION TO GIS

Course Description

The course introduces students to the knowledge and skill sets needed to apply geographic information systems (GIS) technology for location-based analysis and decision-making. Topics include datums, coordinate systems and projections, vector and raster models, data acquisition, accuracy, and uncertainty, geodatabases, cartography, data sources, geocoding and geoprocessing, and ethical issues.

- OER Textbook | Geographic Information Systems and Cartography
- Semester: Fall
- Additional Course Fee Required
- No Prerequisites

Course Student Learning Outcomes

- Describe geospatial technology's fundamental concepts, theories, and applications, including the problems and challenges for spatially representing the earth over time.
- Create and change representations of Earth through datums, coordinate systems, and map projections.
- Control spatial data through digitizing, editing, georeferencing, and geocoding data
- Apply data acquisitions, structures and management, and geodatabase application to spatial data.
- Apply cartographic and map design principles to maps.
- Perform a variety of geoprocessing applications to real-world problems.
- Perform quantitative analysis techniques, including great arc distances, straight line distances, point-in-polygon, Ramer-Doughlas-Puecker algorithms, map algebra, and raster calculations.
- Describe the legal, economic, and ethical issues of using personal and geographic information.

Communication Plan

I will respond to your emails within 48 hours and offer feedback on major assignments within one week of the due date. The best way to contact me is via the Canvas inbox, as I will prioritize this email over other modes of communication.

Additionally, I will participate in the discussion forums with you to share my perspective within the discipline and offer some nuances of interpretation that may not be present in your textbook.

Lastly, we'll hold small group Q&A sessions to learn from our peers (and faculty) on some of the more difficult units within the course.

Keys for Success

This syllabus represents an "agreement" between you and the instructor. It is designed to ensure course integrity and fairness and provides students with a clear understanding of course expectations. The instructor and students are expected to use the syllabus and schedule as a guide for the semester. Any deviation from the syllabus or schedule will be discussed and agreed upon by the instructor and students.

The course will take the entire Fall semester. Each week, you will have several assignments. These will include reading and answering quizzes on the readings, earning several ESRI Virtual Campus Certificates, learning map interpretation skills, creating or critiquing maps, participating in online discussions, and doing some professional career development.

It is designed to teach the information and skills required by discipline and to develop vital workplace skills, strategies, and lifelong learning skills. Education is more than acquiring facts; it uses information meaningfully to enrich one's life.

While each course's subject is essential and valuable, we become genuinely educated by connecting such varied information with the different methods of organizing human experience practiced by different disciplines. Therefore, combined with other courses, this course will enable you to develop broader perspectives and deeper understandings of your community, and the world and challenge previously held assumptions about the world and its inhabitants.

Course Procedure

Active participation in activities is expected. You will be expected to interact with others during class and participate in group discussions. Most of the assignments you complete for the course will be submitted online using Canvas LMS. There are also Canvas apps available.

All of the mapping assignments will be done electronically using Esri’s ArcGIS platform. The classroom has a computer lab if you want to use it, or students are encouraged to bring their laptops. All students will gain access to ArcGIS to download on a personal computer.

It is HIGHLY recommended you set up Canvas so it can send you messages to your email, cell phone, Facebook, or Twitter accounts. When your instructor sends out announcements, messages, and information on Canvas, you will be notified in the media you designate

Assignment Description

GIS Assignments

Each module will have a series of mapping activities to build your knowledge, and skill sets in applying geographic information systems (GIS). The assignments will range in length and difficulty level, which will also determine the point structure for each assignment.

Module Quizzes

Each module will also have a quiz focusing on the learning objectives listed in that module. The open-book quizzes consist of ten randomly selected questions from an assessment database, and each quiz is worth ten points.

Professional Portfolio

GIS has always been a portfolio discipline where you provide potential employers with your best work. As GIS has become more web-based, you will learn how to create an electronic professional portfolio to link your web maps, ArcGIS Insights, and ArcGIS StoryMaps within this portfolio. The total points for the professional portfolio is 100 points.

Grading Scale

GRADE	SCORE RANGE
A	100-94 percent
A-	93-90 percent66
B+	89-87 percent
B	86-84 percent
B-	83-80 percent
C+	79-77 percent
C	76-74 percent
C-	73-70 percent
D+	69-67 percent
D	66-64 percent
D-	63-60 percent
E	Less than 60 percent

Incomplete Grade Policy

If circumstances make you unable to complete the course in the regular time frame, you may work with the instructor to take an incomplete. Students must be pass and have completed 75% of the coursework to be granted an incomplete. Students are responsible for planning for successful course completion.

Assignment Schedule

Module 1 | Introduction to GIS

- 1.1 Assignment | ArcGIS Accounts
- 1.2 Assignment | Geospatial Technology Gap Analysis
- 1.3 Assignment | Getting Started with ArcGIS Online
- 1.4 Assignment | Getting Started with ArcGIS Pro
- 1.5 Assignment | GIS Basics
- 1.6 Quiz | Module 1

Module 2 | Map Scale and Spatial Reference Systems

- 2.1 Assignment | Choose the Right Projection
- 2.2 Assignment | Basics of Coordinate Systems
- 2.3 Assignment | Introduction to Coordinate Systems
- 2.4 Assignment | Displaying Coordinate Data on a Map
- 2.5 Quiz | Module 2

Module 3 | Mapping Data

- 3.1 Assignment | Select and Extract a Subset of Features
- 3.2 Assignment | Clip Features to a Region
- 3.3 Assignment | Join Tabular Data to a Spatial Layer
- 3.4 Assignment | Merge Multiple Data Layers into One
- 3.5 Assignment | Manage a Layer with Too Many Fields
- 3.6 Assignment | Convert Text Data to Numeric Data
- 3.7 Assignment | Fix Data When It Appears Geographically in the Wrong Place
- 3.8 Assignment | Copy Features Between Layers
- 3.9 Assignment | Summarize Data Inside of Polygons
- 3.10 Assignment | Borrow Attributes with a Spatial Join
- 3.11 Assignment | Get Started with ArcGIS Living Atlas of the World
- 3.12 Assignment | Explore Spatial Data
- 3.13 Assignment | Getting Information from a GIS Map
- 3.14 Assignment | Weather Prediction using GIS
- 3.15 Quiz | Module 3

Module 4 | Geospatial Data Management

- 4.1 Assignment | Introduction to Spatial Data
- 4.2 Assignment | Getting Started with Data Management
- 4.3 Assignment | Build a Geodatabase to Support Salzburg Tourism
- 4.4 Assignment | Join a Table to a Feature Layer in ArcGIS Online
- 4.5 Quiz | Module 4

Module 5 | Data Characteristics and Visualizations

- 5.1 Assignment | Editing Basics in ArcGIS Pro
- 5.2 Assignment | Querying Data Using ArcGIS Pro
- 5.3 Assignment | Create a Workbook in ArcGIS Insights
- 5.4 Assignment | Analyze Aggregated Data in ArcGIS Insights
- 5.5 Assignment | Filter and Join Data in ArcGIS Insights
- 5.6 Assignment | Understanding Spatial Relationships
- 5.7 Assignment | Essential Demographic Data Skillsets
- 5.8 Assignment | Make a Demographic Map
- 5.9 Assignment | Get Started with U.S. Census Data
- 5.10 Quiz | Module 5

Module 6 | Vector Data Models and Analysis

- 6.1 Assignment | Compare Sites for a Retail Bookstore
- 6.2 Assignment | Getting Started with Spatial Analysis using ArcGIS Online
- 6.3 Assignment | Getting Started with Spatial Analysis using ArcGIS Pro
- 6.4 Assignment | Location-Enabled Data using ArcGIS Online
- 6.5 Assignment | Location-Enabled Data using ArcGIS Pro
- 6.6 Assignment | Mapping Addresses and Places
- 6.7 Quiz | Module 6

Module 7 | Raster Data Models and Imagery Analysis

- 7.1 Assignment | Get Started with Imagery
- 7.2 Assignment | Depict Land Use Change with Time Animation
- 7.3 Assignment | Explore Dynamic Imagery of a Volcanic Eruption
- 7.4 Assignment | Download Imagery from an Online Database
- 7.5 Assignment | Georeference Historical Imagery in ArcGIS Pro
- 7.6 Assignment | Map the Effects of Climate Change on the Ocean
- 7.7 Assignment | Predict Deforestation in the Amazon Rainforest
- 7.8 Assignment Displaying Raster Data in ArcGIS
- 7.9 Assignment | Managing Raster Data Using ArcGIS
- 7.10 Assignment | Get Started with Scene Viewer
- 7.11 Assignment | Processing Raster Data Using ArcGIS Pro
- 7.12 Assignment | Introduction to Image Classification
- 7.13 Quiz Z| Module 7

Module 8 | Cartographic Principles

- 8.1 Assignment | Critiquing Map Design
- 8.2 Assignment | Presenting GIS Data
- 8.3 Assignment | Critical Cartography
- 8.4 Quiz | Module 8

Module 9 | Sharing GIS

- 9.1 Assignment | Getting Started with Data Dashboards for ArcGIS
- 9.2 Assignment | Make a Data Dashboard to Monitor Wildfires
- 9.3 Assignment | Sharing Maps and Map Layers with ArcGIS Pro
- 9.4 Assignment | Sharing a Living Atlas Map
- 9.10 Assignment | Creating and Building a Professional GIS Portfolio
- 9.5 Quiz | Module 9

Transfer/Certification/Licensure/Employment Information

This course is required for those interested in the Earth and Environmental Science AS degree. The AS degree directly transfers to most four-year higher education institutions within Utah.

The Earth and Environmental Science Department also offers the following programs of study: GIS and Drones AAS, a GIS Certificate of Proficiency, and a Drones Certificate of Proficiency.

Institutional Policies

As members of our academic community, we would like to invite you to review the Institutional Syllabus, which covers important policies and procedures. This document contains important links for students on the code of student rights and responsibilities, academic integrity, grading policies, Title IX, and other important acknowledgments. By familiarizing yourself with this information, you can help us create a safe and respectful environment for everyone.

You can access the document by clicking on the following link: Institutional Syllabus

Learning Support and Tutoring Services

We are pleased to offer a range of tutoring and learning support services to help you achieve your academic goals. Whether you need assistance with a specific subject or want to improve your study skills, you have many options for tutoring or other support.

To learn more about the services we offer and how to access them, please visit the Institutional Syllabus under the Tutoring and Learning Support tab: Institutional Syllabus

We encourage you to use these resources to help you succeed in your studies. If you have any questions or would like to schedule a tutoring session, please don't hesitate to contact us. We are here to support you in any way we can.

Advising and Counseling Support Services

Our institution is committed to supporting your academic and personal growth. That's why we offer a range of advice and counseling services to help you navigate the challenges of college life. To learn more about the resources available to you and how to access them, please visit the Institutional Syllabus under the Advising and Counseling Support Services tab: Institutional Syllabus

Our advising team and the support centers across campus are here to help you achieve your goals and overcome any obstacles you may face.

Student Academic Calendar

As students, you should be aware of all important dates in the semester, such as the day that courses begin and end, as well as the drop date and the last day to withdraw. To learn more about those dates, navigate to the Student Academic Calendar: SLCC Student Academic Calendar