# WEB MAPPING AND VISUALIZATION

URP 6278

3 CREDITS

SUMMER C/2024

CLASS IS AVAILABLE ONLINE THROUGH E-LEARNING @ UF

**INSTRUCTOR:** *Erik Finlay*

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*erik3621@ufl.edu*

**OFFICE HOURS:** By appointment.

**COURSE WEBSITE:** [http://elearning.ufl.edu/](http://elearning.ufl.edu/)

**COURSE COMMUNICATIONS:**

All communication with course faculty will take place within Canvas. All emails will be sent and received within Canvas. You should NOT be emailing the course instructor outside of the system. The instructor is also available for phone calls or video chat by appointment. Please contact the instructor by email to arrange a call or chat.

**RECOMMENDED TEXT:**

*Getting to Know Web GIS, Fifth Edition by Pinde Fu*

**COURSE DESCRIPTION:**

Web Mapping and Visualization is intended to introduce graduate students to the realities of sharing and displaying geographic information on the web. The course presents the concepts and principles of what makes communication on the web possible, the function and importance of web services, and provides practical experience creating web maps using a variety of web mapping solutions. Free and Open Source web mapping technologies are discussed and contrasted with proprietary options, however because this course is geared towards non-programmers, mainly commercial web mapping applications will be used for hands on experience. By the end of the course a student should be able to identify the components necessary to create a web application for various use case scenarios dependent on real world constraints such as budget, audience, and scalability. They should also be able to create attractive, feature rich, web maps and applications that work on any device including desktops, mobile phones or tablets.

**PREREQUISITE KNOWLEDGE AND SKILLS:**

Completion of URP 6270, Introduction to Planning Information Systems.

**PURPOSE OF COURSE:**

The purpose of this course is to introduce students to the concepts, software, and skills needed to share and display geographic information on the web.

**COURSE GOALS AND/OR OBJECTIVES:**

Upon successful completion of the course, students will be able to:

- Name and describe the hardware, software, and protocols that make web communication possible.
- Distinguish the differences between open and proprietary web services and describe their functions and capabilities.
- Identify the basic elements of a web map.
- Create a web map design plan based on mapping objectives, design best practices, and available technology.
- Prepare GIS data and map services for web map optimization.
- Symbolize and share geographic data on the web.
- Design and create web maps using a variety of web mapping solutions.
- Design web map sharing plans that account for the characteristics and needs of unique audiences.
- Create mobile GIS applications for field data collection and editing.
- Create dashboard applications and data visualization tools.

**HOW THIS COURSE RELATES TO THE STUDENT LEARNING OUTCOMES IN THE URBAN AND REGIONAL PLANNING ONLINE MASTER'S PROGRAM:**

Students taking this course will: through lectures, reading assignments, homework, class participation, and a final project, develop practical skills necessary for support of research and professional practice. Students are also required to think critically about web map design concepts, tools, and techniques. Each student's work will be reviewed based upon the department's student learning outcomes as they relate to displaying urban spatial analysis on the internet.

**TEACHING PHILOSOPHY:**

I expect all graduate students should be able to accomplish the basic requirements for the course and attain a minimum "B" grade. I will mark lower when a student does not meet that expectation and adequately display an understanding of the materials

presented. Attaining an "A" grade requires performance that displays quality work, depth of knowledge, and the ability to synthesize ideas into actions or solutions.

I will be happy to meet individually with any student during office hours or by appointment for additional discussion on concepts, techniques, or methodology presented in this course.

**INSTRUCTIONAL METHODS:**

The concepts and techniques will be covered in lectures, readings, and hands-on class assignments. Students will learn the concepts, software, and skills needed to share and display geographic information on the web.

## COURSE POLICIES:

**ATTENDANCE POLICY:**

Students are responsible for satisfying all academic objectives as defined by the instructor. Absences count from the first class meeting. In general, acceptable reasons for absence from or failure to participate in class include illness, serious family emergencies, special curricular requirements (e.g., judging trips, field trips, and professional conferences), military obligation, severe weather conditions, religious holidays, and participation in official university activities such as music performances, athletic competition, or debate. Absences from class for court-imposed legal obligations (e.g., jury duty or subpoena) must be excused. Other reasons also may be approved.

Students shall be permitted a reasonable amount of time to make up the material or activities covered in their absence.

Students cannot participate in classes unless they are registered officially or approved to audit with evidence of having paid audit fees. The Office of the University Registrar provides official class rolls to instructors.

If a student does not participate in at least one of the first two class meetings of a course or laboratory in which they are registered, and he or she has not contacted the department to indicate his or her intent, the student can be dropped from the course. Students must not assume that they will be dropped, however. The department will notify students if they have been dropped from a course or laboratory.

The university recognizes the right of the individual professor to make attendance mandatory. After due warning, professors can prohibit further attendance and subsequently assign a failing grade for excessive absences.

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at:

https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

## QUIZ/EXAM POLICY:

Quizzes will be given to test student knowledge on course material. Quizzes draw primarily from lectures and readings.

## MAKE-UP POLICY:

Students shall be permitted a reasonable amount of time to make up the material or activities covered in their absence, if the absence is due to one of the accepted reasons listed in the Attendance Policy.

If you are unable to turn in an assignment on time, please contact me before the due date to discuss your options. A grade reduction of 5% per day will occur unless there is an acceptable excuse for the late submittal.

Computer problems that arise during submission will not be accepted as an excuse for late work. If you have technical difficulties with e-Learning, please contact the UF Help Desk. If technical difficulties cause you to miss a due date, you MUST report the problem to Help Desk. Include the ticket number and an explanation of the issue based on consult with Help Desk in an e-mail to the instructor to explain the late assignment/exam. The course faculty reserves the right to accept or decline tickets from the UF Help Desk based on individual circumstances.

## ASSIGNMENT POLICY:

Homework assignments, exercises, discussions, and quizzes are typically due on Monday (by 11:59 pm) of each week. Please refer to the course schedule in Canvas for exact dates and deadlines for individual assignments.

## COURSE EVALUATIONS:

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available

at [https://gatorevals.aa.ufl.edu/students/](https://gatorevals.aa.ufl.edu/students/). Students will be notified when the evaluation period opens and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via [https://ufl.bluera.com/ufl/](https://ufl.bluera.com/ufl/). Summaries of course evaluation results are available to students at [https://gatorevals.aa.ufl.edu/public-results/](https://gatorevals.aa.ufl.edu/public-results/).

**COURSE TECHNOLOGY:**

This course will be using ArcGIS Online and ArcGIS Pro software. You can choose to download and run ArcGIS Pro on your personal computer or via UFApps.

Acquiring Desktop software license for ArcGIS

Students can acquire the latest version of ArcGIS Pro software and a student license from the GeoPlan Center.
[https://www.geoplan.ufl.edu/software/arcgis-pro/](https://www.geoplan.ufl.edu/software/arcgis-pro/)

Accessing ArcGIS via UFApps

The ArcGIS software is available on UFApps. UFApps provides access to software applications from any computing device--laptops, tablets, desktops, and smartphones--from any location, at any time.
[http://info.apps.ufl.edu/](http://info.apps.ufl.edu/)

**COMPUTER REQUIREMENTS:**

Students will need a computer that meets or exceeds the specifications below.

| Components | Supported and recommended Specifications |
|---|---|
| CPU | Minimum: 2 cores, simultaneous multithreading<br>Recommended: 4 cores<br>Optimal: 10 cores |
| Platform | x64 |
| Storage | Minimum: 32 GB of free space<br>Recommended: 32 GB or more of free space on a solid-state drive (SSD) |
| Memory/RAM | Minimum: 8 GB<br>Recommended: 32 GB<br>Optimal: 64 GB or more |

| | |
|---|---|
| **Dedicated (not shared) graphics memory** | Recommended: 4 GB or more<br>If you're using a notebook computer with an integrated GPU, consider increasing the system RAM to compensate for the use of shared memory. |
| **Visualization cache** | The temporary visualization cache can consume up to 32 GB of space, if available, in the user-selected location. By default, the visualization cache is written to the user profile's \Local subfolder, so it does not roam with the user profile if roaming profiles are enabled by your system administrator. |
| **DirectX*** | Minimum: DirectX 11, feature level 11.0, Shader Model 5.0<br>Recommended: DirectX 12, feature level 12.0, Shader Model 6.0 |
| **OpenGL*** | Minimum: OpenGL 4.3 with the ARB_clip_control and EXT_texture_compression_s3tc extensions<br>Recommended: OpenGL 4.5 with the ARB_shader_draw_parameters, EXT_swap_control, EXT_texture_compression_s3tc, and EXT_texture_filter_anisotropic extensions |
| **Screen resolution** | Minimum: 1024x768<br>Recommended: 1080p or higher |

More information on supported platforms is available at:
https://pro.arcgis.com/en/pro-app/latest/get-started/arcgis-pro-system-requirements.htm

## UF POLICIES:

**UNIVERSITY POLICY ON ACCOMMODATING STUDENTS WITH DISABILITIES:** Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center. Click here to get started with the Disability Resource Center. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

**UNIVERSITY POLICY ON ACADEMIC MISCONDUCT:**  Academic honesty and integrity are fundamental values of the University community. Students should be sure that they understand the UF Student Honor Code (Links to an external site).

**NETIQUETTE: COMMUNICATION COURTESY:**  All members of the class are expected to follow rules of common courtesy in all email messages, threaded discussions, and chats. https://teach.ufl.edu/wp-content/uploads/2020/04/NetiquetteGuideforOnlineCourses.docx

**UNIVERSITY STUDENT HONOR CODE:**

In adopting this Honor Code, the students of the University of Florida recognize that academic honesty and integrity are fundamental values of the University community. Students who enroll at the University commit to holding themselves and their peers to the high standard of honor required by the Honor Code. Any individual who becomes aware of a violation of the Honor Code is bound by honor to take corrective action.

Student and faculty support are crucial to the success of the Honor Code. The quality of a University of Florida education is dependent upon the community acceptance and enforcement of the Honor Code (Links to an external site).

> **The Honor Pledge:** We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity by abiding by the Honor Code.

On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment."

## GETTING HELP:

**Campus Resources:**

Health and Wellness

- *U Matter, We Care*: If you or someone you know is in distress, please contact umatter@ufl.edu, 352-392-1575, or visit U Matter, We Care website to refer or report a concern and a team member will reach out to the student in distress.

- *Counseling and Wellness Center*: Visit the Counseling and Wellness Center website or call 352-392-1575 for information on crisis services as well as non-crisis services.
- *Student Health Care Center*: Call 352-392-1161 for 24/7 information to help you find the care you need, or visit the Student Health Care Center website.
- *University Police Department*: Visit UF Police Department website or call 352-392-1111 (or 9-1-1 for emergencies).
- *UF Health Shands Emergency Room / Trauma Center*: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608;
- *GatorWell Health Promotion Services*: For prevention services focused on optimal wellbeing, including Wellness Coaching for Academic Success, visit the GatorWell website or call 352-273-4450.

**Academic Resources:**

- *E-learning technical support*: Contact the UF Computing Help Desk at 352-392-4357 or via e-mail at [helpdesk@ufl.edu](mailto:helpdesk@ufl.edu).
- *Career Connections Center*: Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling services.
- *Library Support*: Various ways to receive assistance with respect to using the libraries or finding resources.
- *Teaching Center*: Broward Hall, 352-392-2010 or to make an appointment 352-392-6420. General study skills and tutoring. Writing Studio: 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing papers.
- *Student Complaints On-Campus*: Visit the Student Honor Code and Student Conduct Code webpage for more information.
- *On-Line Students Complaints*: View the Distance Learning Student Complaint Process.

## GRADING POLICIES:

### COURSE GRADING SUMMARY:

| Component | Percent of Grade |
|---|---|
| Assignments | 50% |
| Discussions | 15% |
| Quizzes | 15% |
| Final Project | 20% |

| Total | 100% |
|-------|------|

**GRADING SCALE:**

| Letter Grade | Percentage | Grade Points |
|--------------|------------|--------------|
| A | 93-100% | 4.00 |
| A- | 90-92% | 3.67 |
| B+ | 88-89% | 3.33 |
| B | 83-87% | 3.00 |
| B- | 80-82% | 2.67 |
| C+ | 78-79% | 2.33 |
| C | 73-77% | 2.00 |
| C- | 70-72% | 1.67 |
| D+ | 68-69% | 1.33 |
| D | 58-67% | 1.00 |
| D- | 55-57% | 0.67 |
| E | Below 55% | 0.00 |

For more detail, see the Grades section of the Graduate Catalog for the University of Florida (Links to an external site). It also contains the policies and procedures, course descriptions, colleges, departments, and program information for UF.

## COURSE SCHEDULE:

| Week | Module | Topics Covered |
|------|--------|----------------|
| 1 | Welcome to Web Mapping and Visualization | Lesson 1: History of Web GIS<br>Lesson 2: Web Communication<br>Lesson 3: OGC Web Services<br>Lesson 4: ArcGIS Web Services<br>Lesson 5: A Framework for Web Map Design |
| 2 | Define Your Web Map Objectives | Lesson 1: Defining the Objectives of a Web Map<br>Lesson 2: Basic Elements of a Web Map<br>Lesson 3: Web Mapping in ArcGIS Online<br>Lesson 4: Troubleshooting Software Issues |
| 3 | Create a Web Map Desing Plan | Lesson 1: Create a Web Map Design Plan<br>Lesson 2: Acquiring Data for Mapping<br>Lesson 3: Creating Meaningful Maps<br>Lesson 4: Adding Interactive Elements |

| | | Lesson 5: Layers, Maps, and Apps in ArcGIS Online |
|---|---|---|
| 4 | Choose a Web Map Technology Solution | Lesson 1: Choosing Technology for Web Mapping<br>Lesson 2: The Web Mapping Technology Stack<br>Lesson 3: Commercial Software for Web Mapping<br>Lesson 4: Choosing a Web Mapping Solution<br>Lesson 5: ArcGIS Online Hosted Feature Layers |
| 5 & 6 | Sharing and Collaboration | Lesson 1: Sharing and Collaboration<br>Lesson 2: ArcGIS Online Sharing Options<br>Lesson 3: ArcGIS Online Hosted Feature Layer Views |
| 7 & 8 | Field Mobility and Monitoring | Lesson 1: Mobile GIS<br>Lesson 2: Monitoring and Real-Time GIS |
| 9 & 10 | Going Beyond the Map | Lesson 1: Web Mapping for Decision Support<br>Lesson 2: Data Visualization and Interpretation |
| 11 & 12 | Final Project and Web Mapping Resources | Lesson 1: A Recipe for a Successful Web Mapping Project |

Disclaimer: This syllabus represents current plans and objectives.  As we go through the semester, those plans may need to change to enhance learning opportunities. Such changes will be communicated clearly, are not unusual, and should be expected.