

Geography 485L/585L - Internet Mapping Syllabus

Course Instructor

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Office hours prior to the class session on Wednesday afternoons (4:00-5:00 pm), and by appointment

Course Description and Objectives

Internet mapping technologies are an important component of geospatial data capture, sharing, visualization, and delivery. This course provides a survey of current and emerging internet and geospatial interoperability standards, technologies, and capabilities. The emphasis of the work in this class will be hands-on experience in four critical aspects of Internet-enabled mapping:

- The basic concepts behind web development and web mapping technologies that enable the delivery of maps and mapped data through web browsers
- The Open Standards that facilitate the exchange of map images and geospatial data over the internet
- The use of published standards-based services in desktop mapping applications that implement those standards
- The deployment of standards-based geospatial map and data services that other systems and users may make use of

The specific class objectives that relate to these activities and departmental learning outcomes for undergraduate and [graduate students](#) in the Geography & Environmental Studies Department include the following:

- Students will understand the concepts geospatial data and service interoperability
- Students will be able to define the specific requirements of a particular analysis or project and identify the interoperability standards that are capable of meeting those requirements
- Students will be knowledgeable in the core technologies that they may use to produce their own internet-enabled mapping capabilities
- Students will understand the strengths and limitations of current internet mapping technologies for generating cartographically effective map products.

Course Format

The class is structured around a combination of readings; video tutorials, lectures and demonstration; in-class demonstrations; and in-class lab work in which students will have an opportunity to work on their milestone, deep-dive assignments, and on collaborative problem solving around those assignments.

The class will consist of the following components:

Lectures/Video Tutorials In-person and recorded presentations and demonstrations that provide an overview of high-level concepts, technical strategies and reference information

Portfolio Milestones (weekly) Hands-on experiences with the technologies and capabilities covered in the course. The milestones will be exploratory, in that in many instances the work will be problem based with an emphasis on creative and effective use of concepts and reference materials in answering questions and solving practical problems.

Deep Dives (4 over the course of the semester) Activities based upon small projects that reinforce the hands-on activities undertaken in the milestones.

Peer Review of Developing Portfolio Provision of substantive feedback and discussion around products generated by peers in the class.

Mid-term & Final Examinations Take-home examinations that cover materials introduced in class.

Readings Background and reference materials that should be reviewed in conjunction with each week's materials.

Course Readings and Other Materials

Readings for the class are derived from a combination of designated course texts (available in digital form through the library) and online resources. While the specific readings for each week will be provided as part of the information about each class module, they will fall into two broad categories:

Required Readings that cover core knowledge required for success in the course's activities.

Reference Readings that should be reviewed so that they may be effectively used as reference materials when working on lab and homework assignments and exams. These materials typically include specific syntax for web development and other information that you are not expected to memorize but instead know how to find and use when working on a particular problem.

The reading materials for the course are based primarily on online reference materials for the multiple technologies that we will be using throughout the course. An additional reference book (also available online through the Library's ebook collection) is the following:

In addition to the reading materials for the course, some course content is also provided through a selection of tutorials in *Safari Books Online*. Access to *Safari Books Online* is free to all UNM students (through the creation of an account on their system) and the tutorials that will be used in the class will be linked from the weekly goals and objectives outline.

Evaluation and Grading

Class grades will be based upon the number of points acquired throughout the semester. The grade breakdown will be as follows:

- A 90-100% of points
- B 80-89.9% of points
- C 70-79.9% of points
- D 60-69.9% of points

F < 60% of points

Points for the class will be earned through a combination of portfolio review (for milestones and deep dives), peer-review, and exams.

As an ongoing exercise in working with the web-based technologies upon which the course is based, milestone and deep dive activities will be completed through a combination of Learn assignments and as individual web pages within your web portfolio developed in the class.

You will use a public GitHub <https://github.com> repository to share your portfolio with members of the class for our peer review assignments and for submission of your portfolio for grading. We will review the process for setting up your GitHub account and working repository during the first class session.

Portfolio Milestones There will be 13 weekly milestones. While there are no weekly due dates for the milestones, you *must keep up* if you expect to successfully complete the course. You must also have your preliminary materials ready for peer review on the dates specified in the course calendar below. *If you fall behind it will be very difficult to catch up.* I will evaluate your portfolio of milestones and deep-dive materials at mid-term (40 points) and at the end of the term (40 points) for completeness, functionality, creativity and accuracy (i.e. correct answers for milestone questions when asked).

Deep Dives There will be 4 deep dive assignments during the semester. These will be small project-focussed activities that will be added to your portfolio and will reinforce the hands-on activities undertaken as part of the portfolio milestones. Each deep dive assignment will be worth an additional 25 points (100 points total). Evaluation of the deep dive assignments will also take place at mid-term and at the end of the class as part of the portfolio review.

Peer Review There will be 4 points during the semester that you will be asked to submit your materials for and perform a peer review of specific components within the portfolios of your peers. Each peer review will contribute up to 5-points to your overall score for the course. The peer-review points you earn will be based upon the timelines of your submission and the *substantive* feedback that you provide to other students as part of the assignment. I will review the peer-review procedures in more detail when we have our first peer-review activity.

Exams There will be two exams: a midterm and final. The midterm will be a take-home exam that will be released on Monday March 5 and due on Friday March 9 at 5:00 pm. The final exam will be a take-home exam which will be released on Monday May 7 and due on Thursday May 10 by 5:00 pm. Each exam will be worth 100 points (200 points total).

While students are encouraged to collaborate in their work on their portfolio milestone and deep dive assignments, submitted work must be original and written and submitted by each individual student. Both exams will be individual - each student must complete their exam individually. All assignments and exams are open book and online resources may also be used in completion of the assignments and exams. BUT, again, all submitted work must be original and created by each student.

Please refer to the [Pathfinder](#) for detailed student conduct policies, and in particular the following [Policy on Academic Dishonesty](#).

POLICY ON ACADEMIC DISHONESTY ALSO SEE FACULTY HANDBOOK D100 Adopted by the President June 15, 1992

Each student is expected to maintain the highest standards of honesty and integrity in academic and professional matters. The University reserves the right to take disciplinary action, up to and including dismissal, against any student who is found guilty of academic dishonesty or otherwise fails to meet the standards. Any student judged to have engaged in academic dishonesty in course work may receive a reduced or failing grade for the work in question and/or for the course.

Academic dishonesty includes, but is not limited to, dishonesty in quizzes, tests, or assignments; claiming credit for work not done or done by others; hindering the academic work of other students; misrepresenting academic or professional qualifications within or without the University; and nondisclosure or misrepresentation in filling out applications or other University records.

Technical Requirements

As an hybrid in-person/online course that is focused on the integration of online resources with desktop tools there are some specific computer hardware and software requirements for successful completion of the class.

Computer Hardware Requirements

- At least 4 GB RAM
- At least 20 GB of available disk space
- Internet Connection (broadband [>5 Mb/sec] recommended)

Software Requirements

Operating System (one of the following)

- Recent releases of Windows or Mac OS
- Linux (*speak to Dr. Benedict*)

Geographic Information System (GIS) (one or both)

- Quantum GIS (platform specific [download](#))
- ArcGIS

You will need the following types of software, check with Dr. Benedict if you would like to use an alternative to the ones suggested below.

Text Editor

- Notepad (*Windows* - included with operating system)
- Notepad++ (*Windows* - [free download](#))
- TextEdit (*Mac* - included with operating system)
- TextWrangler (*Mac* - [free download](#))

Secure File Transfer Protocol Client

- WinSCP (*Windows* - [free download](#))
- CyberDuck (*Mac & Windows*- [free download - with voluntary contribution](#))

Secure Shell (SSH) Client

- PuTTY (*Windows* - [free download](#))
- Terminal (*Mac* - included with operating system)

Web Browser (at least one of the following)

- Firefox (*All Operating Systems* - [free download](#))
- Chrome (*All Operating Systems* - [free download](#))

A desktop Git/GitHub client for your operating system of choice

- A current version of Git for your operating system <https://git-scm.com/downloads>
- SourceTree <http://www.sourcetreeapp.com>
- Github Desktop <https://desktop.github.com>

Course Outline

Module 1 - *Introduction and Outline. Github introduction.*

- Week 1 - January 16-19.

Module 2a - *Web-based Mapping Clients*

- Week 2 - January 22-28. Introduction to HTML, CSS, and Javascript (Peer Review)
- Weeks 3, 4 - January 29 - February 11. Google Maps API (Peer Review)

Module 3 - *GIS and Services Oriented Architectures (SOA)*

- Week 5 - February 12-18.

Module 4a - *Interoperability Standards*

- Week 6 - February 19-25. WMS, KML, and XML (Virtual class session - no regular office hours)
- Week 7 - February 26 - March 4. WFS & WCS (Recorded demonstration - no regular office hours)

Mid-term Exam and Portfolio Review - Portfolio must be submitted for review by 5:00 pm on Friday March 9

- Week 8 - March 5-11 (*Exam Due by 5:00 pm on March 9*)

Spring Break - No Class - March 12-18

Module 2b - *Web-based Mapping Clients*

- Week 10, 11 - March 19 - April 1. OpenLayers Javascript Framework (Peer Review)(Virtual Class session on March 21 - no regular office hours)

Module 4b - *Interoperability Standards*

- Week 12 - April 2-8. Desktop GIS Integration

Module 5 - *Developing and Hosting OGC Services*

- Week 13 - April 9-15. Platforms and GeoServer Introduction (Virtual Class session on April 11 - no regular office hours)
- Week 14 - April 16-22. OGC services and styling in GeoServer (Peer Review)

- Week 15 - April 23-29. OGC services and styling in GeoServer - Integration into an OpenLayers Client

Course Review and Emerging Technologies

- Week 16 - April 30 - May 6

Final Exam and Portfolio Review - Portfolio must be submitted for review before 5:00 pm on Friday, May 4

- Week 17 - May 7-12 (*Exam due by 5:00 pm May 10*)

Additional Information

Accommodation Accessibility Services (Mesa Vista Hall 2021, 277-3506) provides academic support to students who have disabilities. If you think you need alternative accessible formats for undertaking and completing coursework, you should contact this service right away to assure your needs are met in a timely manner. If you need local assistance in contacting Accessibility Services, see the Bachelor and Graduate Programs office.

Undergraduate Course Fee Information The Department of Geography & Environmental Studies assesses a curriculum fee of \$50 on every undergraduate class (excluding independent study and internship credits). Because you have enrolled in this course and have paid a curriculum fee, you are entitled to access a variety of departmental resources and facilities, as detailed on our website: <http://geography.unm.edu/resources/for-students/how-are-course-fees-spent.html>

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