

## 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 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 curriculum objectives for undergraduate and graduate students in the Geography 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 general weekly structure of the class will consist of the following schedule:

**Monday (by 8:00 am)** Release of the week's class module, including the recorded lecture, any required reading, portfolio milestone information, and any associated peer-review assignments.

**Wednesday (5:00 - 6:15 pm)** *Collaboratory* with Dr. Benedict - in-class session for demonstrations and problem-solving.

**Friday (by 5:00 pm)** *Due date for peer-review submissions*

The class will consist of the following components:

**Lecture (weekly)** A recorded presentation that provides an overview of high-level concepts and reference information

**Portfolio Milestones (weekly)** Hands-on experiences with the technologies and capabilities described in the lectures and readings. The milestones will be exploratory, in that in many instances the work will be problem based with an emphasis on creative 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 comprehensively cover materials introduced in class.

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

## Course Readings

Readings for the class are derived from a combination of designated course texts 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.

There are three texts that are being used in the course as core resources and are therefore listed as *required* texts.

*HTML Manual of Style: A Clear, Concise Reference for Hypertext Markup Language (including HTML5), Fourth Edition (4th Edition)*. Larry Aronson. Addison-Wesley Professional. 2010. AKA *HTML Manual of Style* in class reading assignments. Available at the UNM Bookstore and on *1-day reserve* at Centennial Science and Engineering Library.

*Beginning Google Maps API 3*. Gabriel Svennerberg. Apress. 2010. AKA *Google Maps API* in reading assignments. Available through the [Books 24x7 Library Database](#) and on *1-day reserve* at Centennial Science and Engineering Library.

*OpenLayers 2.10 Beginner's Guide..* Erik Hazzard. Packt Publishing. 2011. AKA *OpenLayers Beginner's Guide* in reading assignments. Available as an ebook through the [University Libraries](#), and on *1-day reserve* at Centennial Science and Engineering Library.

In addition, there is an additional text that has been ordered for the class as a *recommended* text as it provides useful background and descriptive information about web site development and strategies for building more effective online resources.

*Designing with Web Standards (3rd Edition)*. Jeffrey Zeldman & Ethan Marcotte. New Riders Press. 2009. AKA *Designing with Web Standards* in reading assignments. Available at the UNM Bookstore and on *1-day reserve* at Centennial Science and Engineering Library.

## 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 360 - 400 points
- B 320 - 359.9 points
- C 280 - 319.9 points
- D 240 - 279.9 points
- F < 240 points

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

As an ongoing exercise in working with the web-based technologies upon which the course is based, all milestone and deep dive activities (*after the first week's exercise*) will be completed as individual web pages within your web portfolio developed in the class.

You will use the GitHub <https://github.com> as the collaborative platform for developing and hosting your portfolio as you develop it over the term. We will review the process for setting up your GitHub accounts during the first class session.

**Portfolio Milestones** There will be 13 weekly milestones. While there are no formal weekly due dates for the milestones, you must keep up if you expect to successfully complete the course. *If you fall behind it will be very difficult to catch up.* I will evaluate your portfolio milestones 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 homework assignment will be worth an additional 25 points (100 points total). Evaluation of the deep dive assignments will also take place a 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 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 *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 10 and due on Wednesday March 12 by the end of the class session. The final exam will be a take-home exam which will be released on Monday May 12 and due on Wednesday May 14 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 hardware and software requirements for successful completion of the class.

### Hardware Requirements

- At least 2 GB RAM
- At least 20 GB of available disk space
- Internet Connection (broadband [ $>728$  Kb/sec] recommended)

### Software Requirements

**Operating System (one of the following)** Microsoft Windows Vista or above

Mac OS 10.6 or above

Linux (*speak to Dr. Benedict*)

**Geographic Information System (GIS)** Quantum GIS (platform specific [download](#))

ArcGIS 10 (*optional* - request free student version installation code from Dr. Benedict - *Windows Only*)

**Geographic Data Processing/Analysis (one of the following)** FWTools (*Windows & Linux* - [free download](#))

GDAL and related frameworks (*Mac* - the current “GDAL Complete” convenience package available [here](#))

You will need the following classes 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](#))

Fugu (*Mac* - [free download](#))

**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 GitHub client for your operating system of choice** The “Official” GitHub client <https://github.com>

SourceTree <http://www.sourcetreeapp.com>

## Course Outline

**Module 1 - *Introduction and Outline*** Week 1 - January 21-24.

**Module 2a - *Web-based Mapping Clients*** Week 2 - January 27-31. Introduction to HTML, CSS, and Javascript

Weeks 3, 4 - February 3-14. Google Maps API

**Module 3 - *GIS and Services Oriented Architectures (SOA)*** Week 5 - February 17-21.

**Module 4a - *Interoperability Standards*** Week 6 - February 24-28. WMS, KML, and XML

Week 7 - March 3-7. WFS & WCS

***Mid-term Exam and Portfolio Review*** Week 8 - March 10-12 (*Exam Due by end of class on March 12*)

***Spring Break - No Class*** Week 9 - March 17-21.

**Module 2b - *Web-based Mapping Clients*** Weeks 10, 11 - March 24 - April 4. OpenLayers Javascript Framework

**Module 4b - *Interoperability Standards*** Week 12 - April 7-11. Desktop GIS Integration

**Module 5 - *Developing and Hosting OGC Services*** Week 13 - April 14-18. Platforms and GeoServer Introduction

Week 14, 15 - April 21 - May 2. OGC services and styling in GeoServer

**Module 6 - *Integrating OGC Services into Web Mapping Clients*** Week 16 - May 5-9.

***Final Exam and Portfolio Review*** Week 17 - May 12-14 (Exam due by 5:00 pm May 14)

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