GEOG 571: Web Mapping

Instructor:	Bo Zhao, zhao2@oregonstate.edu
Office Hour:	TBD or by appointment @ Strand Ag. Hall 347A
Web site:	https://github.com/jakobzhao/geog571
Text:	Required readings will be available on the course website.
Credits:	4
Meeting:	Lecture: MWF 0900 - 0950 @Wilkinson 210; Lab: T 1200 - 1350 @ Wilkinson 210.
Prerequisites:	GEOG 201 [C-]
Grades:	Letter grading (A to F)

Catalog course description: GEOG 571. WEB MAPPING (4).

Concepts and techniques of web programming, digital storytelling, online project management, and web-based cartographic principles for developing, evaluating, and using web maps. Lec/lab. **PREREQS:** GEOG 201

Baccalaureate Core (BC) Syllabus Requirements: http://oregonstate.edu/main/baccalaureate-core/learning-outcomes

Course description:

This course introduces concepts and techniques of web programming, digital storytelling, online project management, and web-based cartographic principles for developing, evaluating, and using web maps. To promote the equal access to web mapping technology, we ensure all the web mapping applications from course materials can be opened, debugged or further developed in either Windows or Mac OSX operating systems, and all the relevant software or services are either open source or free. This course is comprised of two major components, including lectures and lab exercises. The lectures focus on the theories and principles behind web mapping, including system architecture, responsive user graphic design, map design and geo-narrative. The lab exercises focus on practical skills for web programming, 2d and 3d web mapping, web mapping services, and digital storytelling. In addition, there will be random quizzes focusing on prior lecture materials, a mid-term focusing on basic concepts and web programming techniques. Although there is no final exam, but each student is expected to design a web map and deploy it to an openly accessible server (e.g., GitHub). From this course, students can learn both the principles of web-based cartography and the practical skills for web mapping, and develop the capabilities of map aesthetics and critique. If you have any question about this course, feel free to contact Dr. Bo Zhao for more information.

Course Content:

Week	Lecture (M)	Lecture (W)	Lab (M)	Lecture (F)	Reading
Wk 00	Intro to the Course	Internet Fundamentals	Lab 1: Project Management for Web Mapping	Intro to Web Mapping	Markdown, Links and Command Lines
Wk 01	Web Programming Basics I: HTML 5 and CSS	System Architecture for Web Mapping	Lab 2: Web Programming Basics II: Javascript	Web Programming Basics III: JQuery	HTML, CSS and Javascript
Wk 02	*MLK Day*	Web Programming Basics III: Debugging	Lab 3: Web Map Design	Spatial Data for Web Mapping	Leaflet and GeoJson
Wk 03	Map Client I: Basics and Geographic Features	Map Client II: Map Events and Mashup	Lab 3: Cont'd	Map Client III: Web Map Interaction	GeoServer Documentation
Wk 04	Map Server I: Intro to GeoServer	Map Server II: Styling	Lab 4: Web Map Services and Basemap	Map Server III: Web Map Services	Bing Map Tile, WFS and WMS
Wk 05	Map Server IV: Base Map Design using Mapbox	Map Server V: Map Tiles	Lab 4: Cont'd	Midterm Exam	Bootstrap Documentation
Wk 06	Map Design I: Web Template and Framework	Map Design II: Bootstrap	Lab 5: Story Map	Storytelling with Web Map I	Web Map Design Principles
Wk 07	Storytelling with Web Map II, cont'd with the last lecture	Map Design III: User Friendly Design Principles	Lab 5: Cont'd	Real-Time Mapping: TweetMap	Server-Side JavaScript

Wk 08	HeatMap	Map Design IV: Map Critiques	Lab 6: Thematic Map on a Virtual Globe	3D Web Mapping I: Basics	Cesium Document ation
Wk 09	3D Web Mapping II: Build a Virtual Environment	3D Web Mapping III: Thematic Map on a Virtual Globe	Final Project Discussion and Preparation	Emerging Topics on Web Mapping	Elwood et al. (2012), Sui and Zhao (2015)
Wk 10	Final Project Discussion and Preparation	Final Project Discussion and Preparation	Final Project Discussion and Preparation	Final Project Presentation - *Strand Ag Hall (GAZE) TBD*	*N/A*

Learning Outcomes: By the end of this class, the student will:

Learning Outcomes	Assessment Method
Consistent with geospatial science (G1 to G3) learning outcomes of the BS degree in Geography and Geospatial Science. Elements specific to this course are shown in learning outcomes 4 to 7.	
1. G1. Recognize and use basic spatial and cartographic concepts (e.g. scale, projection, and coordinate systems), as well as statistical and surveying principles.	Quizzes, midterm
2. G2. Demonstrate facility in the classification and analysis of geospatial data (e.g. satellite images, digital maps and their associated tabular datasets) and the ability to use geographic information science technology (software, data collection instruments and devices).	Labs
3. G3. Develop and integrate spatial thinking and the capacity to create visualizations (e.g. images, maps, diagrams, charts, 3D views) of spatial phenomena, including those illustrating natural and human systems and their interactions.	Labs, project
4. Describe and interpret basic concepts of geovisual programming: variables, loops, conditionals, functions, arrays, objects, event handling.	Midterm, quizzes, labs
5. Construct and compose advanced tools and skills used by geospatial scientists: develop geovisualizations that are dynamic and interactive	Labs, project
6. Demonstrate a working knowledge of programming for web or mobile devices, including interactive mapping frameworks, e.g., Leaflet.	Labs, midterm, project
7. Describe and interpret research in interactive cartographic visualization drawing from research and practice on human-computer interaction, information visualization, usability engineering, and geovisual analytics.	Labs, midterm

Grading:

Item	Description	% of final grade
Attendance and Quizzes	Attendance; and 3-6 in-class and/or take-home quizzes covering topics from lecture and reading assignments.	12
Lab Assignments	6 lab assignments (9% each). We understand that many of the programming techniques discussed early in the course will be relatively new. Recognizing this, the first few assignments will contain more detailed instructions.	54
Mid-term	Evaluating your understanding about the basic concepts of web mapping programming. It is a closed book exam and will cover material presented before the midterm.	14
Final Project	Each student is required to design a web map and deploy it to a dedicated server (e.g., GitHub Page). Each student will make a presentation to demonstrate their work. This final project is mainly evaluated by both the presentation and the quality of the web map.	20
TOTAL		100

Grades are based on the percentage of maximum points accumulated and assigned according to this table:

A	92 – 100%	B-	80 – 81%	D+	68 – 69%
A-	90 – 91%	C+	78 – 79%	D	62 – 67%
B+	88 – 89 %	C	72 – 77%	D-	60 – 61%
B	82 – 87%	C-	70 – 71%	F	< 60%

Other Information:

Statement Regarding Students with Disabilities: Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval please contact DAS immediately at 541-737-4098 or at http://ds.oregonstate.edu. DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations.

Statement of Expectations for Student Conduct: please refer to the following link http://studentlife.oregonstate.edu/code.

Diversity Statement: This course strives to create an affirming climate for all students including underrepresented and marginalized individuals and groups. Diversity encompasses differences in age, color, ethnicity, national origin, gender, physical or mental ability, religion, socioeconomic background, veteran status, sexual orientation, and marginalized groups. We believe diversity is the synergy, connection, acceptance, and mutual learning fostered by the interaction of different human characteristics.

Religious Holiday Statement: Oregon State University strives to respect all religious practices. If you have religious holidays that conflict with any of the requirements of this class, please see me immediately so that we can make alternative arrangements.

Student Evaluation of Courses: The online Student Evaluation of Teaching system opens to students the Monday of dead week and closes the Monday following the end of finals. Students will receive notification, instructions and the link through their ONID. They may also log into the system via Online Services. Course evaluation results are extremely important and used to help improve courses and the learning experience of future students. Responses are anonymous (unless a student chooses to "sign" their comments agreeing to relinquish anonymity) and unavailable to instructors until after grades have been posted. The results of scaled questions and signed comments go to both the instructor and their unit head/supervisor. Anonymous (unsigned) comments go to the instructor only.