ENGR 524: Geospatial Web Technologies for Engineers

Credits: 3

Term(s) to be offered: Starting Fall 2013

Catalog Description: Web-based, service-oriented, distributed GIS system development; geospatial implementation, data preparation, map authoring, application development

Prerequisites: CIVE 576, or consent of the instructor

Textbook: none


Software: ArcGIS Server, ArcIMS, and ArcGIS Explorer SDK, and the ArcGIS Application Development Environment; Eclipse, Tomcat, and Google Earth

Instructor: Gregory L. Gunther, Geospatial Web Engineer, U.S. Geological Survey

Course Coordinator: John W. Labadie, Professor of Civil and Environmental Engineering

Course objectives: This course is designed for students familiar with desktop GIS and GIS database concepts to expand their knowledge and skill-set in the dynamic domain of web-based, service-oriented, distributed GIS systems. The Geospatial Web Technology spectrum is emphasized throughout the course, ranging from more traditional web enabled GIS systems to the rapidly advancing world of the Geoweb and Web 2.0. Students will explore the entire lifecycle of geospatial web technology, implementation including data preparation, map authoring, and application development. The specifications and platforms available from commercial vendors as well as open-source projects, and how they have been implemented, will be leveraged to build custom applications in engineering. Students successfully completing this course will be able to apply advanced geospatial web technologies in the design and development of custom GIS applications for engineers.

Schedule:
wk 1 Internet mapping history and basic technology definitions; basic networking
wk 2 General web technology, client-server architectures, http, server side processing (CGI, Java Servlets), client side processing, and geospatial information on the Web.
wk 3 XML and XHTML; markup overview and basic concepts; XML namespace and schema
wk 4 Javascript, DOM manipulation, and AJAX toolkits such as SPRY and DOJO
wk 5 Service oriented architectures, Web service technologies (REST and SOAP), geoprocessing services, and interoperability
wk 6 OGC specifications, including WMS, WFS, WCS, and Catalog; strategic importance of GML, details and data modeling
wk 7 Additional geospatial Web service standards, specifications, and encodings; KML, GeoRSS, and JSON
wk 8 Authoring geospatial Web services in ArcIMS™; virtual and spatial servers; image and feature services
wk 9 Authoring geospatial Web services in ArcGIS Server; service types, caching, service optimization, and REST API
wk 10 ArcGIS Server™ Javascript API and DOJO; ArcGIS online services; API introduction and selected mashups
wk.11 Introduction to Google Maps™; Google Maps API
wk.12. Introduction to Google Earth™, how it works, customization; KML advanced techniques; 3D models
wk.13. Selected platforms; ArcIMS™ HTML Viewer, ArcGIS Web ADF, ArcGIS Explorer™; custom tasks
wk.14. Selected platforms (cont.)
wk.15. Student project presentations
wk.16. Final Exam

**Mode of Delivery:** Three hours of class lectures per week

**Methods of Evaluation:** Term grades for this course will use the +/- grading system as described in the CSU catalog. The following scale will generally be used: A ≥ 95; A- ≥ 90; B+ ≥ 85; B ≥ 80; B- ≥ 75; C+ ≥ 70; C ≥ 60; D ≥ 50; F < 50. The course grade will be based on approximately the following distribution; however, the instructor may adjust these weights as necessary:

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<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Midterm Exam</td>
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<tr>
<td>Final Exam</td>
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<tr>
<td>Homework/Labs</td>
<td>30%</td>
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<tr>
<td>Term Project</td>
<td>20%</td>
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<tr>
<td>Participation</td>
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