

Asian Institute of Technology
School of Engineering and Technology

AT76.22 Web GIS Technology 2(1-3)

Semester: August

Course Objective: The objective of this course aims at providing students with knowledge and understanding about Web GIS technology. The client and server architecture of Web GIS will be taught as well.

Learning Outcomes :

It is expected that student will be able to (during and at the end of this course):

1. Classify the Web GIS architecture
2. Design the Web GIS application based-on the data specification, functionalities requirement and client platform
3. Publish vector, raster data and spatial analysis as the standard OGC Web Services and develop Web GIS application
4. Comprehend and apply OGC Web Services for integrated framework

Prerequisite: None

Course Outline:

- I. Introduction
 1. Overview and History of Web GIS
 2. Concepts and Examples of Web GIS Application

- II. The Internet and World Wide Web
 1. Concepts of Network and Internet Connection
 2. Concepts of World Wide Web (WWW)
 3. Hypertext Markup Language (HTML)
 4. Web Page and Web Browser

- III. Web GIS
 1. Concepts of Web GIS
 2. Web GIS components
 3. Desktop GIS and Web GIS
 4. Client and Server architecture
 5. Image Map

- IV. Web GIS Architecture
 1. Concept and framework of Web Map Server

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2. Thin Client Architecture
 3. Thick Client Architecture
 4. Medium Client Architecture
- V. Web Map Server functions and Optimization
1. On-the-fly projection
 2. Tile-cache
- VI. Web Services for Web GIS
1. Concepts of Web Service
 2. OGC Web Services
 3. Uses and benefits
 4. Example Applications

Laboratory Session(s):

1. Introduction of OSGeoLive and WWW
2. Introduction of Web GIS application
3. Web GIS Architecture
4. ArcGIS.com Service
5. Publish data as Web Map Service (WMS)
6. Publish data as Web Feature Service (WFS) and Web Coverage Service (WCS)
7. Develop Web GIS Application using Open Layers
8. Perform Analysis function with Web Processing Service (WPS)
9. Mini Project

Learning Resources:

Textbooks: No assigned textbook, but class notes and handouts will be provided.

Reference Books:

E. Hazzards:

OpenLayers 2.10 Beginner's Guide, Packt Publishing, U.K. ,2011.

P. Fu and J. Sun:

Web GIS: Principles and Application, ESRI Press, USA, 2011.

M. Neteler and H. Mitasova:

Open Source GIS: A GRASS Approach, Third Edition, Springer, USA, 2009.

S. Davis:

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GIS for Web Developers: Adding 'Where' to Your Web Application, Pragmatic Bookself, USA, 2007.

T. Mitchell:

Web Mapping Illustrated, O'Reilly, USA, 2005.

Journals and Magazines:

International Journal of Digital Earth, Taylor & Francis
Journal of Geographic Information System, Scientific Research
OSGeo Journal, Creative Commons By Attribution

Others: None

Teaching and Learning Methods:

1. **Lectures and class discussion:** Students will received the lecture notes and the weekly lecture schedule at the beginning of the course, and requested them to read the lecture notes before coming to the class.
2. **Laboratory sessions:** The laboratory instruction will be provided to the students. Additionally, the software and example data will be provided in the Virtual Machine so that student will perform in the same environment. Lab instruction will provide a basic guideline for student to learn and be familiar in each lab objective. Students are request to apply the knowledge of each lab and submit the home assignments.
3. **Mini project:** Students (as the group project) are asked to propose a Web GIS application with its functionalities, design suitable Web GIS architecture, present a User Interface and produce simple application with all necessary data and Services.

Time Distribution and Study Load:

Lecture: 15 Hrs
Laboratory: 30 Hrs
Miniproject: 15 Hrs
Self-study: 60 Hrs

Evaluation Scheme:

Laboratory report: 10%
Mini project: 30%
Mid-semester exam (closed book): 30%
Final exam (closed book): 30%

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In the examination, an “A” would be awarded if a student can elaborate the knowledge and technique learned in the class by giving his/her own skills to design and develop innovative application of Web GIS in the case studies conducted in this course and from journal articles. “B+” would be awarded if a student shows an overall understanding of all give topics and able to understand the core technology of Web GIS Technology and able to select appropriate architecture for difference applications. A “B” would be awarded if a student shows an understanding of all give topics and able to publish geospatial data to the public, a “C” would be given if a student meets below average expectation on both knowledge acquired and adaptation skills. A “D” would be given if a student does not meet basis expectations in understanding the topics and issues presented in course.

Instructor(s): Dr. Sarawut Ninsawat

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