JADAVPUR UNIVERSITY

COMPUTER AIDED DESIGN CENTRE

Faculty Council of Engineering & Technology

Kolkata - 700 032

Live, online, interactive Certificate course on

WebGIS Development using OpenLayers

Prior to the advent of the Internet, GIS technology, like other software technologies, was limited to the domain of desktop, workstation; and in limited cases, server-based computing platforms. The physical restrictions of these computing platforms confined GIS to only supporting the evolution of project and departmental GIS and limited impact to the public. Over the last ten years the GIS community has become increasingly focused on the dissemination of GIS data and functionalities within, as well as outside of, organizations. An important breakthrough in this research was the deployment of GIS data, functionality in the Internet, World Wide Web, and private intranets; and is sometimes termed as WebGIS or Web Mapping Application.

OpenLayers is a powerful, community-driven, open-source, JavaScript-based web mapping library, which allows us to develop web mapping applications using a variety of geospatial data sources, data formats, and open geospatial standards implemented by Open Geospatial Consortium (OGC).

This course focuses on the latest version of the OpenLayers 6. It starts with very basics and goes all the way to advanced concepts. Once we master all the OpenLayers concepts, we build a complete OpenLayers project in the last section. At the end of this course, one would be able to build amazing web mapping applications using OpenLayers.

The CAD Centre is the pioneer institute in the field of Geoinformatics. It maintains a state-of-the-art infrastructure for its courses. The Centre has engaged highly experienced faculty members from academic sector as well as industry. Some of our faculty members are well known figures in the field of Geoinformatics and have published huge number of books, monographs, and research articles internationally.

Course Duration	**:**	60 hrs. (Total no. of classes 30 x each class duration 2 hrs.)
Class timing	**:**	Tuesday, Wednesday and Friday (from 7pm to 9 pm)
Platform	**:**	Google Meet (Participants must have laptop/desktop computer with Windows operating system; and stable internet connectivity.)
Eligibility	**:**	Graduate/undergraduate students of any discipline with adequate knowledge in GIS (Geographical Information System).

Topic	No. of Hours	No. of Classes
Introduction and Setting up Environment Introduction to WebGIS and its applications, Anatomy of WebGIS application, web mapping technologies (HTML, CSS, JavaScript), common types of web mapping library. • Download and install code editor for web application, setup the necessary environment and data structure for the web application. Test a sample web application.	2	1
Learning HTML, CSS & JavaScript Introduction to webpage structure, Basics of HTML, list and Tables, images hyperlinks, div and span, add styling, form types and fields, HTML5 structuring, bringing it all together as a template. • What is CSS and how to you use it, Create CSS code, external CSS, Divs Spans and colors, working with Text and wording, CSS Box model, How the box model works, working with Backgrounds, CSS display property, CSS Pseudo Elements, Use CSS with HTML to create a web template. • Javascript introduction, how to work with JavaScript, Javascript and HTML user interaction, declaring variables, working with functions, conditional statements, switch statements, Loops.	10	5
Key Concepts in OpenLayers Brief introduction about OpenLayers, API docs, key components, download and setting up the environment. • Create a simple web map and explore its properties • Control the map view and explore its properties and methods • Restricting the map's extent • Animating the map view	6	3
Working with Raster Layers OpenLayers work with almost all third-party web-map APIs like Google, Open street map etc.; as a tile base raster layer. Although you can also add static raster image on the map. • Add third-party tiled web map as raster layer • Add static raster as layer • Create your own tiled raster layer and add on the map • Change raster layer transparency, zoom effect	6	3
Working with Vector Layers In OpenLayers, the vector layer is used to display vector data on top of a map and allow real-time interaction with the data. We can load raw geographical data from a variety of sources, including geospatial file formats such as KML and GeoJSON, and display that data on a map, styling the features and interact with them. • Adding a KML layer • Adding a GeoJSON layer • Using point features as markers • Reading and creating features from a WKT (well known text) • Styling features • Labeling attribute data of features as text	12	6

Working with Events Events are fundamental in JavaScript. They are the impulses that allow us to produce a reaction. As programmers of a mapping application, we are interested in reacting when the map zoom changes, when a layer is loaded, or when a feature is added to a layer. • Create a side-by-side map comparator • Showing the mouse location on the map • Styling vector features under the mouse pointer • Listening for the vector layer feature's events	6	3
Map Controls and Interactions Controls allow us to interact with our map. They also allow us to display extra information, such as displaying a scale bar, overview map etc. Interactions are components that manage relations between mouse or keyboard actions and the map. • Playing with map controls • Managing interactions on the map • Selecting features • Measuring distances and areas • Create a basic overlay from a HTML element • Using overlays as markers	8	4
Advanced Concept • Adding third-party libraries • Add Geolocation API • Small project	10	5
Theory test	1	1
Lab Test	1	