This week, we will focus on the integration of geographic information systems (GIS) with web technologies. Web-based GIS (WebGIS) is an approach for accessing, viewing and analyzing geographic data over the internet. In this course, the WebGIS concept, WebGIS technologies and tools, web mapping services and web-based GIS application development will be discussed.

1. Web Based GIS (WebGIS) Concept

WebGIS is an approach that enables geographic information systems to be accessed over the internet. WebGIS allows users to view, analyze and share geographic data through their web browser.

What is WebGIS?

Description: Web-based geographic information systems enable geographical data and maps to be presented and accessed interactively over the web.

Features: Access via internet browsers, user interaction, data updating and sharing capabilities.

Benefits: Accessibility, user-friendly interfaces, geographic data sharing and collaboration.

Basic Components of WebGIS

Server Side: Servers where geographical data and map services are hosted.

Client Side: Interfaces that users access via web browsers.

Data Layers: Components in which map and data layers are presented and displayed interactively.

2. WebGIS Technologies and Tools

Various technologies and tools are used to develop and manage WebGIS applications. These tools enable the processing and presentation of geographic data on the web.

WebGIS Technologies

Map Servers: Server software that serves geographic data over the web (for example, ArcGIS Server, GeoServer).

Web Services: Services that provide geographic data on the web (for example, WMS - Web Map Service, WFS - Web Feature Service).

JavaScript Libraries: Libraries used to develop web-based mapping applications (e.g., Leaflet, OpenLayers).

WebGIS Tools

ArcGIS Online: Cloud-based WebGIS platform offered by Esri.

QGIS Web Client: Open source tool used to display QGIS data on the web.

Mapbox: Web-based map creation and customization tool.

3. Web Mapping Services: Google Maps, OpenStreetMap

Web mapping services enable geographical data to be presented and used interactively over the internet. These services allow users to navigate the map, search for places, and view various geographic features.

Google Maps

Features: Satellite images, street view, directions, location markings.

API Usage: Embed maps, add custom markers and create interactive maps with the Google Maps API.

Uses: Business locations, navigation, data analysis.

OpenStreetMap

Features: Open source user-generated maps, detailed geographic data.

API Usage: Accessing map data and creating customized maps with OSM API.

Uses: Community-supported projects, open data applications.

4. Developing Web-Based GIS Applications

Web-based GIS applications are applications that share geographic data and maps interactively with users over the web. Specific steps and tools are used to develop these applications.

Development Process

Needs Analysis: Determining the goals and requirements of the application.

Design and Planning: User interface design, data structures and workflows planning.

Application Development: Coding the application using map services and APIs.

Testing and Release: Testing, debugging and publishing the application to the web.

Development Tools and Platforms

Web Development Frameworks: Creating user interface using HTML, CSS, JavaScript.

Map APIs: Integrating map functions using Google Maps API, Leaflet, Mapbox API.

Data Management Tools: Geographic data management with databases such as PostgreSQL/PostGIS, MongoDB.