



**TITLE OF THE
Curricula/Module**

**WEB TECHNOLOGIES FOR GEOPORTAL AND
GEOSERVICES**

TUIT/Uzbekistan

June, 2020

Curriculum/Module DESCRIPTION

TUIT/Uzbekistan 25 (June/2020)	
TITLE OF THE Curricula/Module	Code
WEB TECHNOLOGIES FOR GEOPORTAL AND GEOSERVICES	2.04

Teacher(s)	Department
Coordinating: <ul style="list-style-type: none"> • Temurbek Kuchkorov Others: <ul style="list-style-type: none"> • Рахимов М.Ф. • Очиллов М.М. 	Computer systems, Computer engineering faculty

Study cycle	Level of the module	Type of the module
BA/ <u>MA</u> /PhD	Master	

Form of delivery	Duration	Language(s)
offline	15 weeks	UZ/EN

Prerequisites	
Prerequisites: To know: <ul style="list-style-type: none"> – Basics of web technologies – Basics of programming skills (C/C++, Javascript or Python) Possess: <ul style="list-style-type: none"> – Basics of Geo-information systems and platforms such as WebGIS, 	Co-requisites (if necessary):

ECTS (Credits of the module)	Total student workload hours	Contact hours	Individual work hours
6	180	45	135

Aim of the module (course unit): competences foreseen by the study programme		
<p>Development of geo-services based on web technologies and programming tools, the basics of creating user-friendly web applications for geo-information systems and applications, the basics of web programming, geo-services and geoportals development methods, various libraries for creating interactive web maps (WebGIS platform, Leaflet JS library) to develop knowledge and skills such as working with open source electronic maps.</p> <p>The aim of subject is to teach students ability to solve practical problems on the basis of theoretical knowledge, practical skills, the use of web-based geo-services and modern methods and tools of geoportals development.</p>		
Learning outcomes of module (course unit)	Teaching/learning methods	Assessment methods
To know: <ul style="list-style-type: none"> – Forming interactive maps using Leaflet JS – Formation of raster and vector layers for interactive maps – Leaflet JS Library. Learn the basic functions for creating interactive maps. – OpenLayers library. Learn the basic functions for creating interactive maps. 	Lectures, independent study of the material	Quiz

<p>To be able to:</p> <ul style="list-style-type: none"> - To understand of the methods, approaches, basics and tools of web programming based on web programming technologies to solve problems in geographic information systems; - Be able to use open source libraries to create interactive electronic maps - Development of geo-services based on web technologies and programming tools, methods of creating convenient web applications for geo-information systems and applications - Be able to work with different libraries (WebGIS platform, Leaflet JS library), create and use open source electronic maps to create web maps; 	<p>Implementation of the training project</p>	<p>Presentation of an educational project</p>
<p>Possess:</p> <ul style="list-style-type: none"> - Creation of user-friendly web applications and geo-databases for geographic information systems and applications, geospatial design (PostGIS); - Have the skills to integrate geo-spatial data based on the geographic information model of the region, to implement interactive web services. 	<p>Implementation of the training project</p>	<p>Presentation of an educational project</p>

Themes	Contact work hours							Time and tasks for individual work	
	Lectures	Consultations	Seminars	Practical work	Laboratory work	Placements	Total contact work	Individual work	Tasks
<p>Introduction to main concepts of web technologies, Geoportals and Geoservices</p>	6	0	0	3	0	0	9	27	<p>Introduction to "Web technologies for geoportals and geo-services". WebGIS platform.</p> <p>The components of Web-GIS platform. Geoportal and geo Services</p> <p>Web programming technologies and tools</p>

<p>Open source web-based interactive map creating libraries</p>	12	0	0	6	0	0	18	54	<p>Javascript libraries for creating web-based interactive maps.</p> <p>OpenLayers library. Creating interactive maps. Main functions.</p> <p>Leaflet JS Library. Creating interactive maps. Main functions.</p> <p>Basic classes in the Leaflet JS library and their applications.</p> <p>Using additional utilities from the Leaflet JS library.</p> <p>Open source electronic mapping service and use.</p>
<p>Special applications and platforms for Geoportals and Geoservices</p>	12	0	0	6	0	0	18	54	<p>Creating raster and vector layers for an interactive map</p> <p>Database for geoportal and geo Services. PostGIS</p> <p>ArcGIS online service. Working with the Web GIS platform.</p> <p>Open source systems. QGIS and Geoserver user interface.</p> <p>Creating geo-services in open source systems.</p> <p>Web GIS-based applications and their prospects.</p>
<p>Total</p>	30	0	0	15	0	0	45	135	

Assessment strategy	Weight in %	Deadlines	Assessment criteria
Running control	50	10 week	preliminary presentation of the project
Final exam	50	15 week	Final quiz

Compulsory literature/ Author	Year of issue	Title	No of periodical or volume	Place of printing. Printing house or internet link
Paul Crickard III	2014	LeafletJs Essentials Handbook		Packt publishing
Contractor Bidder	2017	Web-Gis-Tool Manual D.T.2.2.2, Version-1		Consortium
Additional literature				
Cherece Wallace.	2016	GIS Training manual		MDPI – Journal of Remote sensing
SUHET, ESA Standard Document	2015	Sentinel-2 User Handbook		https://sentinel.esa.int/documents/247904/685211/Sentinel-2_User_Handbook
Internet links				
Remote Sensing and Digital Image Processing of Satellite Data (https://www.youtube.com/watch?v=EclPYfiin_A)				
https://leafletjs.com/reference-1.7.1.html				
https://www.qgistutorials.com/en/				
https://leafletjs.com/examples.html				
https://geopandas.org/				
https://www.twilio.com/blog/2017/08/geospatial-analysis-python-geojson-geopandas.html				
https://pypi.org/project/geojson/				
https://www.interreg-central.eu/Content.Node/ReSites/CE394-GreenerSites-D.T2.2.2-WPT1-Tool-Training-Material.pdf				
https://www.youtube.com/watch?v=8rfux8qjh78				
https://mangomap.com/web-gis				
https://enterprise.arcgis.com/ru/server/latest/create-web-apps/windows/gp-service-example-basic-high-quality-webmap-printing.htm				
https://www.interreg-central.eu/Content.Node/ReSites/CE394-GreenerSites-D.T2.2.2-WPT1-Tool-Training-Material.pdf				
https://www.youtube.com/watch?v=8rfux8qjh78				
https://mangomap.com/web-gis				

ANOTATION /course summary

This course forms the skills for selecting and applying various methods of using open source libraries to create interactive electronic maps. The knowledge obtained as a result of mastering the discipline is necessary for solving practical problems in the field of formation of interactive maps, Geo-portals and Geo-services. Have the skills to integrate geo-spatial data based on the geo-information model of the region.

List of **themes and short description**

Themes	Contact work hours
<p>Introduction to main concepts of web technologies, Geoportals and Geoservices</p> <p>Introduction to "Web technologies for geoportals and geo-services". WebGIS platform. The components of Web-GIS platform. Geoportal and geo Services. Web programming technologies and tools. Web programming technologies. HTML, CSS markup languages and Javascript programming language options. Using web technology to create web services.</p>	9
<p>Open source web-based interactive map creating libraries</p> <p>Javascript libraries for creating web-based interactive maps. OpenLayers library. Creating interactive maps. Main functions. Provide point, line, and area objects on a map. Leaflet JS Library. Creating interactive maps. Main functions. Basic classes in the Leaflet JS library and their applications. The main classes in the Leaflet JS library and their functions are to assign designs to the objects depicted on the map. Additional utilities of the Leaflet JS library. RoutMap, Geolocation, LeafletDraw, MarkerCluster. Open source electronic mapping service and use. Open source electronic maps. Openstreetmap, GoogleStreet, GoogleTerrian, YaxdexMap</p>	18
<p>Special applications and platforms for Geoportals and Geoservices</p> <p>Creating raster and vector layers. Working with GeoTiff, geojon, ESRI shapefile, geopackage files. Database. Storing vector data and raster data in a database. PostGIS database. ArcGIS server. Creating web-based interactive maps on an ArcGIS server. Open source systems. QGIS and Geoserver user interface. Map visualization using Web GIS. Open source systems. QGIS, Geoserver, Mapserver. Creating geo-services in open source systems. Web Map Service (WMS) service. Web Feature Service (WFS). Configuring WMS and WFS services on a geoserver. Applications developed on the basis of Web GIS. Modern interactive maps. Yandex navigator, 2GIS.</p>	18
Total	45