TITLE OF THE
Curricula/Module

GEOINFORMATION
SYSTEMS AND
TECHNOLOGIES
(TEXTBOOK)

TIIAME/Uzbekistan

March, 2020

Template of the Curriculum/Module Description

Short Name of the University/Country code Date (Month/Year)	TIIAME/UZ 03/2020
TITLE OF THE Curricula/Module	**Code**
Geoinformation systems and technologies (textbook)	

Teacher(s)	Department
Coordinating: **Aziz Inamov** **Others:** Sarvar Abdurakhmanov Uzbekhon Mukhtorov Otabek Abdisamatov Abdulla Juraev	Department of Geodesy and Geoinformatics

Study cycle	Level of the module	Type of the module
BA/MA/PhD	Bachelor's degree	

Form of delivery	Duration	Langage(s)
offline	36 weeks	uzbek

Prerequisites	
Prerequisites: To know: Geodesy; Cartography; Photogrammetry; Computer technologies	**Co-requisites (if necessary):**

ECTS (Credits of the module)	Total student work load hours	Contact hours	Individual work hours
8	238	126	112
Aim of the module (course unit): competences foreseen by the study program			

The purpose of the course is to form students' theoretical knowledge of geographic information systems and

technologies, the formation of knowledge about the development of geographic information systems and scientific directions of modern geographic information systems. At the same time, they will gain skills in data collection sources for geographic information systems, its methods, database formation, the basics of digital cartography and the application of geographic information systems.

Learning outcomes of module (course unit)	Teaching/learning methods	Assessment methods
To know: Application of geographic information systems in geodesy and cartography based on digital technologies To point: • fields of application of geographic information systems and technologies; To explain: • describe and analyses image data from satellites using image processing methods; To numerate: • use of different digitization methods for geoinformation databases To recognize: • the importance of geographic information systems in geodesy and cartography To give examples of: • examples of applications: creation of plans, maps, data analysis, creation of databases in agriculture and other sectors of the national economy on the basis of geodetic values and creation of a single cadastral system To describe: • data processing and analysis using modern digital technologies To formulate: • image Classification and Analysis, concept of image classification: Unsupervised, Supervised, Pixel-based classification, Segmentation, Object-based classification (OBIA).	Lecture Lectures, independent study of the material	Quiz
To be able to: • data gathering; • explain the principles of geodetic and cartographic data processing; • data quality assessment; • identify specific applications where geoinformation systems may be used as a tool for monitoring and research, collect systematically, understand, analyses critically and apply the results of a significant field of science; • evaluate existing theories and technologies and identify the needs for improvement • recognize in analyzing, integrating and managing spatial data	Implementation of the training project	Presentation of an educational project
Possess:	Implementation of the training	Presentation of an educational

	project	project
• drawing up maps and plans based on geodetic values; • analyses on obtained data; • classifying by Supervised and Unsupervised and Object based classification methods.		

Chapters	Contact work hours							Time and tasks for individual work	
	Lectures	Consultations	Seminars	Practical work	Laboratory work	Placements	Total contact work	Individual work	Tasks
Introduction to geoinformation systems	4	0	0	6	6	0	**16**	**14**	Preliminary data preparation for GIS Raster images; Map creation in ArcGIS ways to get started
Fundamentals of digital cartography	4	0	0	6	6	0	**16**	**14**	Create Shape files Geodetic bases of GIS; Cartographic basis of GIS
Spatial data models	4	0	0	8	6	0	**18**	**14**	Working with data in ArcMap; spatial binding of data Controlled digitization and vectorization
Spatial data visualization	4	0	0	8	6	0	**18**	**14**	Raster vectorization Using the connecting function in linear geometric representation. Adding the same overlapping objects (Merge) Object buffering. Trim various overlapping objects. Tracing
Spatial data analysis	4	0	0	6	6	0	**16**	**14**	Geographical and attribute information.

									Placement of attributes in tables and their inclusion in tables
Technologies for creating vector maps	4	0	0	6	4	0	**14**	**14**	map placement and preparation for publication
GIS software	4	0	0	6	2	0	**12**	**14**	Geocodding, Coordinate Systems and GIS Data Formats
GIS application	4	0	0	6	6	0	**16**	**14**	Create a new project and manage data in ARCGIS Creating vector elements and creating a database Establishment and monitoring of underground observation wells. Geostatic analysis
Total	**32**	**0**	**0**	**52**	**42**	**0**	**126**	**112**	

Assessment strategy	Weight in %	Deadlines	Assessment criteria
Running control 1	35	8 week	preliminary presentation of the project
Running control 2	35	14 week	Presentation of an educational project
Final exam	30	16 week	Final quiz
Running control 1	35	24 week	preliminary presentation of the project
Running control 2	35	30 week	Presentation of an educational project
Final exam	30	36 week	Final quiz

Compulsory literature/Author	Year of issue	Title	No of periodical or volume	Place of printing. Printing house or internet link
Michael N . De Mers	1999	Fundamentals of	ISBN 0-471-	https://www.amazon.com/Fu

		geoinformation systems	14284-0 (англ.)	ndamentals-Geographic-Information-Systems-Michael/dp/0470129069
Jonathan Campbell and Michael Shin	2006	Essentials to Geographic Information Systems		Flat World Knowledge, Inc. One Bridge Street Irvington, NY 10533
Ian Heywood Sarah Cornelius Steve Carver	2006	An introduction to geographical information systems	ISBN: 978-0-13-129317-5	Typeset in 11/13pt Spectrum by 30 Printed and bound by Mateu-Cromo, Artes Graficas, Spain
A.S.Samardak	2005	Geoinformation systems		https://www.twirpx.com/file/114026/
Additional literature				
R.V.Kovin, N.G.Markov	2008	Geoinformation systems	ISBN 5-98298-199-0	https://kpfu.ru/portal/docs/F1502929774/GIS.pdf

ANOTATION /course summery

The purpose of the course is to form students' theoretical knowledge of geographic information systems and technologies, the formation of knowledge about the development of geographic information systems and scientific directions of modern geographic information systems. At the same time, they will gain skills in data collection sources for geographic information systems, its methods, database formation, the basics of digital cartography and the application of geographic information systems.

List of themes and short description

Chapters/Themes	Contact work hours
Introduction to geoinformation systems Geoinformatics is the theoretical basis for the creation of geoinformation systems. History of the development of GIS. Ancestors of modern GIS. Classification of GIS. Scheme of implementation of GIS. The structure of universal GIS. GIS hardware and software.	**16**
Fundamentals of digital cartography The shape and dimensions of the land, the models used. Coordinate systems used in geodesy and cartography. Cartographic projections. Errors in cartographic projections. Classification of cartographic projections. Gauss-Kruger equilateral transverse-cylindrical projection. Mapping	**16**

of topographic maps and plans and their nomenclature.	
Spatial data models Types of spatial objects in GIS. The concept of spatial data models. Raster data models. Regular-cell representation of data. Quadrotomic data model. Vector data models. Vector-raster and raster-vector changes. Surface (geospatial) models.	**18**
Spatial data visualization General principles of spatial data visualization. Visualization of vector data. Thematic maps. Raster data visualization. The generalization issue. Visualization of geospatial areas.	**18**
Spatial data analysis Measurement operations. Analysis of spatial object relationships. Spatial queries. Overley operations. Cutting and shearing operations. Aggregation and disaggregation of object attributes. Buffer zones. Proximity zones. Analysis of engineering networks. Geodetic analysis. Restoration of geospatial areas.	**16**
Technologies of vector maps creation Getting digital maps based on the primary paper maps. Obtaining maps based on Earth remote sensing data. Obtaining maps based on ground measurement data and satellite system data.	**14**
GIS software Universal vector GIS software. Universal raster GIS software. Internet-GIS systems. Cartographic software modules.	**12**
Areas of GIS application GIS in industry. GIS in state and municipal governments.	**16**