



**TITLE OF THE
Curricula/Module**

**PHOTOGRAMMETRY
AND REMOTE
SENSING**

TAI/Turkmenistan

May, 2020

Template of the Curriculum/Module DESCRIPTION

Short Name of the University/Country code Date (Month / Year)	TAI-TKM 05/2020
TITLE OF THE Curricula/Module	Code
PHOTOGRAMMETRY AND REMOTE SENSING	

Teacher(s)	Department
Coordinating: Babageldi Kurbanov Others: Shatlyk Pygamov	Agricultural land reclamation

Study cycle	Level of the module	Type of the Module
BA/MA/PhD	Specialist	

Form of delivery	Duration	Language(s)
offline	16 week	Turkmen

Prerequisites	
Prerequisites: To know: Modern computer technologies Geodesy Geology Soil science Geoinformation systems	Co-requisites (if necessary):

ECTS (Credits of the module)	Total student workload hours	Contact hours	Individual work hours
-	136	112	24

Aim of the module (course unit): competences foreseen by the study module		
Course objectives: to develop students' skills in using modern photogrammetric equipment and methods of photogrammetry and stereophotogrammetry, computer technology using modern plans and maps. This is to create an opportunity for students to cope with production problems.		
Learning outcomes of module (course unit)	Teaching/learning methods	Assessment methods
To know: – have access to information about industry systems and know the terms.	General trainings, presentations, seminars, practical trainings, self-employment	Annual work, software management, test questions, summaries, account, examination
To be able to: – should be knowledgeable about remote sensing database management programs and be able to think about mapping photogrammetric database sources.	Execution of the annual work	Presentation of the implementation of the curriculum
Possess: – Should know about photogrammetry and remote sensing programs and find ways to create thematic maps using them in various ways, should know how photogrammetry and remote sensing relate to other subjects, should know how to collect and enter data for industry systems.	Execution of the annual work	Presentation of the implementation of the curriculum

Themes	Contact work hours						Time and tasks for individual work		
	Lectures	Consultations	Seminars	Practical work	Laboratory work	Placements	Total contact work	Individual work	Tasks
General basics of photogrammetry and remote sensing	4			4			8		
Understanding imagery and center projection	4			6			10		
Coordinate systems and orientation elements used in photogrammetry	6			8			14	8	
The concept of phototriangulation and electromagnetic radiation	6			8			14		
The use of remote sensing data in various areas of the national economy	4			6			10		
Digital photogrammetry and photoplane	6			8			14	8	
Analysis of information on key components	6			8			14		
Vegetation indexes and thermography	6			10			16	8	
Spectroscopy. Studying objects at a remote sensing in soil science	6			6			12		
Total	48			64			112	24	

Assessment strategy	Weight in %	Deadlines	Assessment criteria
Running control 1	10	Week 4	Computerized test
Running control 2	15	Week 8	Computerized test
Running control 3	15	Week 12	Computerized test
Running control 4	10	Week 15	Annual work protection
Final exam	50		Final exam

Compulsory literature/ Author	Year of issue	Title	No of periodical or volume	Place of printing. Printing house or internet link
Gurbanguly Berdimuhamedow	2015	Ösüşin täze belentliklerine tarap. Saýlanan eserler. 8-nji tom		Aşgabat: Türkmen döwlet neşirýat gullugy
	2019	Türkmenistanyň Prezidentiniň ýurdumyzy 2019-2025-nji ýyllarda durmuş-ykdysady taýdan ösdürmegiň Maksatnamasy		Aşgabat: Türkmen döwlet neşirýat gullugy
D.Nurmammedow, N.Özbekow	2010	Fotogrammetriýa		
Pail R., Krisp J.M., Meng L., Stilla U.	2013	Earth observation and global changes		Springer-Verlag Berlin Heidelberg
Weng Q.	2017	Remote sensing for sustainability		Indian State University

Additional literature				
П.Н.Бруевич	1990	Фотограмметрия. Учеб. для вузов		М.: Недра
А.И.Обиралов, А.Н.Лимонов, Л.А.Гаврилова	2006	Фотограмметрия и дистанционное зондирование		М.: КолосС
И.Н.Гурский, С.С.Струсь, С.К.Пшидаток	2016	Фотограмметрия и дистанционное зондирование: лаб. практикум		Краснодар: КубГАУ
А.С. Назаров	2006	Фотограмметрия. Учеб. для вузов		М.: ТетраСистемс
1. www.turkmenistan.gov.tm 2. www.nicopa.eu 3. www.fotogram.ru 4. www.bolshe.ru 5. www.colibri.ru 6. www.geo-informatie.nl/courses				

ANOTATION /course summery

Course objectives: to develop students' skills in using modern photogrammetric equipment and methods of photogrammetry and stereophotogrammetry, computer technology using modern plans and maps. This is to create an opportunity for students to cope with production problems.

List of themes and short description

Themes	Contact work hours
General basics of photogrammetry and remote sensing The concept of photogrammetry and remote sensing. Correlation of photogrammetry and remote sensing with other subjects. The concept of aerial photography. Calculation of aerodynamic parameters. The concept of aerial cameras. Types and characteristics of aerial camera lenses. The concept of a digital aerial camera.	8
Understanding imagery and center projection The concept of space imagery. Classification of space images. Non-photographic imaging systems. Framed imaging system. Optical and electronic imaging system. Laser imaging system. Radiophysical imaging system. The concept of central projection. Elements of central projection.	10
Coordinate systems and orientation elements used in photogrammetry Geocentric coordinate system. Gaussian coordinate system. Aerial coordinate system. Internal and external orientation elements of aerosur. Errors in aerial photography. The concept of photoshop. Surface stereotopographic imaging. The concept of universal photogrammetric tools.	14
The concept of phototriangulation and electromagnetic radiation The concept of phototriangulation. Linking pictures. The concept of monocular, binocular, stereoscopic. Geometric model of the Earth. Elements of image orientation. The concept of remote sensing of the earth. History of remote sensing. Remote sensing processes. The concept of electromagnetic radiation. Waves and photons. Electromagnetic energy source. Electromagnetic spectrum. Long-range probing in space.	14
The use of remote sensing data in various areas of the national economy Processing of remote sensing data. Digital Image Processing Techniques. Radiometric correction of data. Geometric correction of images. Use of remote sensing data in agriculture. Use of remote sensing data in climatology. Use of remote sensing data in forestry. The use of remote sensing data in geology. The use of remote sensing data in hydrogeology. The concept of decoding aerial photographs. Decryption objects. Visual decryption. Decryption symbols.	10
Digital photogrammetry and photoplane The concept of digital photogrammetric stations. Requirements for modern photogrammetric stations. PHOTOMOD and its main function. The concept of a color photogrammetric Delta Scan scanner. Geometric view of the image. The ability to view the image radiometrically. Creating a digital photoplane. Creating a digital card. TIN model. The concept of a digital model of relief.	14

<p>Analysis of information on key components Control vector concept. Phases of data analysis in key components. Special vector. Influence of atmosphere on data. The need to sharpen the image from the effects of the atmosphere. Richards model. Verxuf model. A method of sharpening the image using black pixels. Comparing and evaluating models.</p>	14
<p>Plant indexes and thermography Spectrum recordings, benchmarks. Plant indexes and their correlation. Prediction of yield based on indices. Plant monitoring. Introduction to Thermography. Thermo-energy theory and physics. Total evaporation. Use of thermography in remote sensing.</p>	16
<p>Spectroscopy. Studying objects at a remote sensing in soil science History of Spectroscopy. To study the ability of the materials to absorb and reflect the radiation spectrum of various materials. The main factors that affect the shape of the soil. Ways of measuring the shape of the soil. Attaching images. Methods and stages of combining images. Microwaves in earth sensing. Methods of calculating energy balance.</p>	12