Course title :

Course Basic Information	
Academic Unit:	Faculty of Civil Engineering
Course title:	Three Dimensional Laser Scanning in Geodesy and Geoinformatics
Level:	Bachelor
Course Status:	Elective
Year of Study:	Year 3, Semester 6
Number of Classes per Week:	2+1
ECTS Credits:	3
Time /Location:	According to the Timetable
Teacher:	Prof.Asoc.Dr. Perparim Ameti
Contact Details:	perparim.ameti@uni-pr.edu + 383 44 244 748
Course Description:	Theoretical and practical knowledge of basic spatial data collection methods using lasers practiced in geodesy and geoinformatics.
Course Goals:	• Understand the role of geodesy, geoinformatics and spatial data in modern world; demonstrate competences in measuring systems, methods and technologies of measurement and spatial data collection. • Demonstrate competences in theoretical principles, procedures of computing and visualising the surveying data. • Understand mathematical methods and physical laws applied in geodesy and geoinformatics. • Handle geodetic instruments and appropriate measuring equipment properly, and perform geodetic measurements. • Prepare geodetic documents needed to establish and maintain cadastral records and land registry, as well as the documents for engineering works. • Make plans, maps and related presentations using modern methods and technologies on the basis of measured data and other sources. • Determine and interpret the size, properties and relations of objects in space on the basis of measured data, spatial databases, plans and maps. • Use information technology in solving geodetic and geoinformation tasks. • Recognise problems and tasks in the application of geodetic and geoinformation principles and

	methods, and select proper procedures for their solution.
	• Communicate the results obtained by means of geodesy and geoinformation to clients and experts of geodetic and other related professions
	• Take responsibility for continuing academic development in the field of geodesy and geoinformatics, or related disciplines, and for the development of interest in lifelong learning and further professional education
Expected Learning Outcomes:	• Knowing the basis of laser technology and describing the types of laser systems
	• Defining accuracy and precision of different LiDAR systems and explaining sources of errors when measuring using laser scanners
	• Mastering the use of terrestrial laser scanners
	• Applying methods of point cloud georeferencing and registration
	• Utilizing spatial data collected using terrestrial laser scanning for visualisation purposes
	• Utilizing spatial data collected using space and airborne laser scanning for digital terrain model, surface and digital relief model

Student Workload (should be in compliance with student's Learning Outcomes)

Activity	Hours	Day/ Week	Total
Lectures	2	15	30
Theory/ Lab Work/Exercises	1	15	15
Practical Work			
Study for intermediate test	2	2	4
Consultations with the teaher			
Field Work			
Test, seminar paper	1	5	5
Homework	1	3	3
Self-study (library or home)	1	3	3
Preparation for final exam	2	2	4
Assessment time (test, quiz, final exam)			
Projects, presentations, etc.	1	15	15
Total			**79**

Teaching Methods:	- Lecture - Discussion during lectures - Exercises - Work in group
Assessment Methods:	In evaluation, the percentage of the attendance of each partial evaluation in the final evaluation must be

	determined. One of the ways of evaluation would be: First Evaluation: 15% Second Evaluation: 15% Homework or other engagement: 10% Attendance 5% Final Exam 55% Total 100%
Primary Literature:	??
Additional Literature:	

Designed teaching plan	
Week	**Title of the Lecture**
Week 1:	Introduction
Week 2:	Laser technology in geodesy and geoinformatics
Week 3:	Laser scanning principles of operation
Week 4:	Development of laser scanning
Week 5:	Categorisation of laser scanners
Week 6:	Accuracy and precision of LiDAR systems
Week 7:	Point cloud georeferencing and registration
Week 8:	Point cloud filtering First valuation
Week 9:	Terrestrial laser systems
Week 10:	Terrestrial stationary laser scanning
Week 11:	Terrestrial mobile laser scanning (road, railway, water)
Week 12:	Space and airborne laser systems
Week 13:	Laser scanning from airplane/helicopter
Week 14:	Laser scanning from space
Week 15:	Laser scanning using unmanned aerial vehicle Second valuation

Academic Policies and Code of Conduct

-The teacher sets the criteria for regular attendance at lectures and exercises and rules of etiquette as: quieting in the lesson, disconnection of mobile phone, entrance in lesson in time, mutual respect, and application of the principle one speaks everyone listens etc.

Note | If a student has more than 3 class assignements evaluated below 50% he/she loses the right on taking the final exam. Evaluation is done from 0-100 %.