

SYLLABUS

1. Data about the program of study

1.1	Institution	The Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Construction
1.3	Department	Land Surveying and Cadastre
1.4	Field of study	Civil Engineering
1.5	Cycle of study	Research masters
1.6	Program of study/Qualification	ARTIFICIAL INTELLIGENCE IN CIVIL ENGINEERING AND CONSTRUCTION MANAGEMENT
1.7	Form of education	Full time
1.8	Subject code	5.00

2. Data about the subject

2.1	Subject name	Photogrammetric and topographic scanning techniques in BIM process				
2.2	Course responsible/lecturer	Conf.dr.ing. BONDREA MIRCEA– mircea.bondrea@mtc.utcluj.ro				
2.3	Teachers in charge of seminars	Conf.dr.ing. BONDREA MIRCEA– mircea.bondrea@mtc.utcluj.ro				
2.4 Year of study	I	2.5 Semester	1	2.6 Assessment	Colloquium	
2.7 Subject category	Formative category					DS/DI
	Optionality					

3. Estimated total time

3.1 Number of hours per week	28	of which	3.2 Course	1	3.3 Seminar		3.3 Laboratory	1	3.3 Project	
3.4 Total hours in the curriculum	100	of which	3.5 Course	14	3.6 Seminar		3.6 Laboratory	14	3.6 Project	
3.7 Individual study:										
(a) Manual, lecture material and notes, bibliography										26
(b) Supplementary study in the library, online and in the field										20
(c) Preparation for seminars/laboratory works, homework, reports, portfolios, essays										20
(d) Tutoring										2
(e) Exams and tests										4
(f) Other activities										
3.8 Total hours of individual study (summ (3.7(a)...3.7(f)))				72						
3.9 Total hours per semester (3.4+3.8)				100						
3.10 Number of credit points				4						

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competence	

5. Requirements (where appropriate)

5.1	For the course	Room equipped with blackboard and video projector
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5.2	For the applications seminarului / laboratorului / proiectului	Laboratory/seminar classroom equipped with specific apparatus and software.
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6. Specific competences

Professional competences	Knowledge of the principles of building geospatial data infrastructure Geospatial modelling 2D, 3D representation and information analysis Geospatial data dissemination Updating the built heritage
Cross competences	CT.1 - Effectively solve problem situations of medium difficulty, respecting the principles and rules of professional ethics and promoting a responsible attitude towards the field of geodetic engineering; CT.2 - Effective application of communication and interpersonal techniques at organizational or professional group level while assuming specific roles at different hierarchical levels;

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	Provide concepts related to the involvement of Geodesic Engineering in the development of the BIM process.
7.2	Specific objectives	Preparing students from the AICEM study programs to be able to understand and integrate specific surveying methods into the BIM process. The practical work completes and enhances the theoretical knowledge with practical methods of measurement and digital processing in BIM implementation.

8. Contents

8.1. Lecture (syllabus)	Number of hours	Teaching methods	Notes
Photogrammetric and topographic techniques - General concepts and principles	2	Participatory lecture, debate, dialogue, exposition, problematization , demonstration, exemplification	
Terrestrial laser scanning technology - Features	2		
Methods of collecting and processing terrestrial laser scanning data	2		
UAV technology - characteristics	2		
Data collection and analysis methods using UAV technology	2		
3D solutions applied in the BIM process	2		
Spatial information management and analysis	2		
Bibliography			
Kasser M. Egels Y (2002) -Digital Photogrammetry, editura Taylor & Francis			
Linder W. (2003) -Digital Photogrammetry, Theory and Applications, Editura Springer			
G. Vosselman si Hans-Gerd Maas (2010)-Airborne and terrestrial laser scanning			
Jie Shan si Charles Toth (2009) -Topographic laser ranging and scanning			

Dragos Badea, Modelare digitala in fotogrammetrie, Editura CONSPRESS, Bucuresti, 2009			
8.2. Seminars /Laboratory/Project	Number of hours	Teaching methods	Notes
Study of terrestrial laser scanning system	2	Exercise, demonstration, exemplification, debate, case study.	
Practical applications of the terrestrial laser scanning system	2		
Creating a 3D model of the object	2		
UAV system study	2		
Practical applications using UAV system	2		
Realization of the 3D model of the object	2		
Integration of the 3D model into the BIM process	2		
Bibliography Kasser M. Egels Y (2002) -Digital Photogrammetry, editura Taylor & Francis Linder W. (2003) -Digital Photogrammetry, Theory and Applications, Editura Springer G. Vosselman si Hans-Gerd Maas (2010)-Airborne and terrestrial laser scanning Jie Shan si Charles Toth (2009) -Topographic laser ranging and scanning Dragos Badea, Modelare digitala in fotogrammetrie, Editura CONSPRESS, Bucuresti, 2009			

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The content of the subject is updated and improved following repeated participation of teachers in working meetings with production specialists and employers, workshops or exchange of best practices with colleagues from other university institutions.

The content of the subject is in line with the structure of similar courses at other universities and covers the fundamental aspects needed by civil engineers.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	Correctness of knowledge Completeness of knowledge Degree of assimilation of specialist language	A test that verifies theoretical knowledge. The test also contains exercises.	80%
10.5 Seminars /Laboratory/Project	Ability to apply acquired knowledge in practice Ability to use the computer to solve problems.	Practical test	20%
10.6 Minimum standard of performance			
<ul style="list-style-type: none"> knowledge of specific terms; the acquisition of theoretical knowledge from the course; Participation in the coursework is a condition for entry to the examination. Theory (grade T); Colloquium (grade A); Papers (grade L) $N=0,80T+0,20L$; 			

- - Credit condition: T≥5, A≥5, L≥5.

Date of filling in: 07.06.2024		Title Surname Name	Signature
	Lecturer	Conf.dr.ing. BONDREA MIRCEA	
	Teachers in charge of application	Conf.dr.ing. BONDREA MIRCEA	

Date of approval in the department MTC 25.06.2024	Head of department Conf.dr.ing. Nas Sanda
Date of approval in the Faculty of Construction 12.07.2024	Dean Prof.dr.ing. Manea Daniela Lucia