

FIȘA DISCIPLINEI

1. Date despre program

1.1 Instituția de învățământ superior	Universitatea Tehnică din Cluj Napoca
1.2 Facultatea	Constructii
1.3 Departamentul	Structuri
1.4 Domeniul de studii	Inginerie civila
1.5 Ciclul de studii	Master
1.6 Programul de studii / Calificarea	Inteligența artificială în ing.civilă și manag.construcțiilor (AICIV)/inginer
1.7 Forma de învățământ	IF – învățământ cu frecvență
1.8 Codul disciplinei	1.0

2. Date despre disciplină

2.1 Denumirea disciplinei	Matematica pentru Machine Learning și Pattern Recognition						
2.2 Titularul de curs	Conf.Dr.Ing. Heghes Bogdan - Horea-Bogdan.Heghes@dst.utcluj.ro						
2.3 Titularul activităților de laborator	Conf.Dr.Ing. Heghes Bogdan - Horea-Bogdan.Heghes@dst.utcluj.ro						
2.4 Anul de studiu	1	2.5 Semestrul	1	2.6 Tipul de evaluare	E	2.7 Regimul disciplinei	DS/DI

3. Timpul total estimat

3.1 Număr de ore pe săptămână	3	din care:	3.2 Curs	2	3.3 Seminar	-	3.3 Laborator	1	3.3 Proiect	-
3.4 Număr de ore pe semestru	42	din care:	3.5 Curs	28	3.6 Seminar	-	3.6 Laborator	14	3.6 Proiect	-
Distribuția fondului de timp (ore pe semestru) pentru:										ore
(a) Studiul după manual, suport de curs, bibliografie și notițe										32
(b) Documentare suplimentară în bibliotecă, pe platforme electronice de specialitate și pe teren										20
(c) Pregătire seminarii / laboratoare, teme, referate, portofolii și eseuri										17
(d) Tutoriat										1
(e) Examinări										16
(f) Alte activități:										0
3.7 Total ore studiu individual (suma (3.7(a)...3.7(f)))					58					
3.8 Total ore pe semestru (3.4+3.8)					100					
3.9 Numărul de credite					4					

4. Precondiții (acolo unde este cazul)

4.1 de curriculum	Reinforced and prestressed concrete I, II
4.2 de competențe	Not applicable

5. Condiții (acolo unde este cazul)

5.1. de desfășurare a cursului	Not applicable
5.2. de desfășurare a laborator	Not applicable

6. Competențele specifice acumulate

Competențe profesionale	<p>Knowledge about:</p> <ul style="list-style-type: none"> -- To know the concept of monitoring and evaluating the safety of concrete structures -- To know methods of structural systems, types of actions, methods of static and dynamic testing, determination of material qualities -- To know methods of visual inspection and in-situ testing of materials -- To know measurement methods: analog and digital equipment -- To be able to apply the implementation of measurement systems and data acquisitions as well as their statistical evaluation and implementation -- To use the digital infrastructure in the implementation of the previous paragraph <p>After completing the course, students will be able to:</p> <ul style="list-style-type: none"> -- To monitor, evaluate and destructively and non-destructively test reinforced concrete or prestressed concrete elements and structures subjected to different types of stress. -- To know how to determine the objectives of construction tests. Characteristic parameters. Measuring methods and devices in the load test of constructions - in static and dynamic mode. Methods and devices for destructive and non-destructive tests non-destructive. -- To organize and design in-situ tests, to monitor their behavior over time -- To create digital systems for transmitting monitoring information <p>After completing the course, students will have the ability to:</p> <ul style="list-style-type: none"> -- To determine the bearing capacity of reinforced concrete elements after fire using non-destructive methods.
Competențe transversale	<ul style="list-style-type: none"> -- Drafting and presentation of a trial project and a technical report containing the organizational brief, test stages and the test report

7. Obiectivele disciplinei (reieșind din grila competențelor specifice acumulate)

7.1 Obiectivul general al disciplinei	The development of competences regarding the monitoring and evaluation of the safety of existing and new concrete structures using the digital infrastructure, testing by loading of constructions - in static and dynamic mode, methods and devices for testing, the use of the digital infrastructure for monitoring
7.2 Obiectivele specifice	Assimilation of theoretical and practical knowledge for the organization and design of trials. Testing of reinforced and prestressed concrete elements and constructions. Non-destructive testing

8. Conținuturi

8.1 Curs	Metode de predare	Observații
General considerations . Introduction to the concept of monitoring and the necessity of tests. The objectives of construction tests. The methodology of the experimental study of constructions, technical and performance concepts - course 1 and 2	Video projector - on site pptx presentation, Exposure, applications, assignments, specific tables, onsite or online laboratory work on the Microsoft Teams platform	Power Point Presentations
Structures and materials: structural systems, types of actions, static and dynamic test methods - course 3 and 4		
Methods and measuring devices in construction testing: visual inspections and in-situ testing of materials. Non-destructive testing of materials - course 5 and 6		
Measuring methods and devices: measurement of geometries, deformations, efforts, forces, dynamic parameters, durability monitoring - course 7 and 8		

Problems in the implementation of measuring devices and data acquisition: types and characteristics of sensors, measuring chain, data organization. - course 9 and 10		
Optical methods for measuring deformations and the evaluation and statistical interpretation of data - course 11 and 12		
The design/use of digital monitoring information transmission systems - course 13 and 14		
Bibliography		
-- Z. Kiss, T. Oneț – Proiectarea structurilor de beton după SR – EN 1992-1, Abel 2010		
-- C. Măgureanu și colectivul – Beton Armat – Îndrumător de laborator, UT Press, 2007		
-- C. Măgureanu, T. Oneț – Betonul, UTPres, 1996		
-- S. Balan , M. Arcan – Incercarea constructiilor.Ed Tehnica. Bucuresti 1965.		
-- I. Terteza, T. Onet – Verificarea calitatii constructiilor		
-- I. Buchman , C. Bob , E. Jebeleanu , C. Badea , L. Iures – Controlul calitatii liantilor , mortarelor si betoanelor.		
-- SR EN 12504, NP137-2014, C26-85		
-- P130-1999 Normativ privind comportarea in timp a constructiilor in forma actualizata		
-- GE 035 – 1999 Ghidul si programul de calcul cadru al responsabilului cu urmarirea in exploatare a constructiilor		
-- MP 031-2003 Metodologia privind programul de urmarire in timp a comportarii constructiilor din punct de vedere al cerintelor functionale		
-- fib bulletin 22 – Monitoring and safety evaluation of existing concrete structures		
8.2 laborator	Metode de predare	Observații
Non-destructive determination of compressive strength: ultrasonic methods, mechanical methods of surface hardness. – 2 laboratories	-	Video projector -on site pptx presentation, Exposure, applications, assignments, specific tables, onsite or online laboratory work on the Microsoft Teams platform
Non-destructive determination of compressive strength: on cylinder cores. Determination of static and dynamic modulus of elasticity. – 2 laboratories		
Establishing the position and diameter of the reinforcements. Checking the quality of the grooves injected into the prestressed concrete elements. Determination of internal defects of concrete with the help of ultrasound methods. – 2 laboratories		
Determining the state of deformation by optical methods of the structures. – 2 laboratories		
Preparation of measurement chains, data acquisition systems and monitoring during testing of the deformation parameters of elements and structures. – 2 laboratories		
Numerical acquisition problems: filters, physical limitations in data acquisition. Statistical interpretation of data – 2 laboratories		
The use of digital monitoring information transmission systems - 2 laboratories		

Power Point Presentations		

9. Coroborarea conținuturilor disciplinei cu așteptările reprezentanților comunității epistemice, asociațiilor profesionale și angajatorilor reprezentativi din domeniul aferent programului

The skills acquired will be necessary for employees working in design firms and those in the field of execution (site and supply)

10. Evaluare

Tip activitate	10.1 Criterii de evaluare	10.2 Metode de evaluare	10.3 Pondere din nota finală
10.4 Curs	Solving at least 2 theory questions	Oral test - 10min/student (note T)	50%
10.5 laborator	The average of the partial marks for Homework	Continuous assessment during the semester; (note Ho)	50%
10.6 Standard minim de performanță			
(a) Eligibility condition for appearing in the exam: presence in the laboratory according to the ECTS regulation and the delivery of the papers (assignments) on time.			
(b) Grade for the project (Homework): min. 5 (five); Homework – Will be registered in the electronic catalog			
(c) Theory grade (T): min. 5 (five)			
E= 0.50*(T) + 0.50*(Homework); E- Registers in the electronic catalog			
The condition for passing/obtaining credits: $E \geq 5$, if $T \geq 5$ and Homework ≥ 5			
NOTE: When determining the final grade, the student's involvement during the semester will also be considered: participation in debates, scientific sessions, attendance, etc.			

Data completării:	Titulari	Titlu Prenume NUME	Semnătura
	Curs	Conf.Dr.Ing. Heghes Bogdan - Horea	
	laborator	Conf.Dr.Ing. Heghes Bogdan - Horea	

Data avizării în Consiliul Departamentului
18/06/2025

Director Departament
conf.dr.ing. Attila Puskas

Data aprobării în Consiliul Facultății Construcții
25/06/2025

Decan
prof.dr.ing Daniela MANEA