COURSE SYLLABUS

Academic year 2025-2026

1. Programme information

1.1 Higher Education Institution	"Gheorghe Asachi" Technical University of Iaşi
1.2 Faculty	Faculty of Civil Engineering and Building Services
1.3 Department	Civil and Industrial Engineering
1.4 Field of study	Civil Engineering
1.5 Level of study[1]	Bachelor's degree
1.6. Study programme	Inginerie civilă (în limba engleză)/ Civil Engineering - ICE

2. Course information

2.1.1 Course title	Statica şi stabilitatea construcţiilor 1 **Structural Statics and Stability 1**				
2.1.2. Course code	CE201				
2.2 Lecture instructor	Lecturer Oana-Mihaela BANU, PhD				
2.3 Seminar instructors	Lecturer Oana-Mihaela BANU, PhD Lecturer Ioana OLTEANU, PhD				
2.4 Year of study[2]	2	2.5 Semester[3]	3	2.6 Assessment method[4] E	2.7 Course type[5] DI

3. Estimated total time (hours per semester)

3.1 Number of hours per week	5	3.2 lecture	3	3.3a seminar	2	3.3b laboratory		3.3c project		3.3.d practical sessions	
3.4 Total number of hours in the curriculum[6]	70	3.5 lecture	42	3.6a seminar	28	3.6b laboratory		3.6c project		3.6.d	

Workload distribution [7]	No. of hours
Study based on textbook, course material, reading list and notes	17
Additional research in the library, on specialised electronic platforms, and in the field	10
Preparation for seminar/laboratory/project session, assignments, papers, and portfolios	28
Assessment[8]	3
Other activities:	

3.7 Total number of individual study hours[9]	55	
3.8 Total number of hours per semester[10]	125	
3.9 Number of ECTS credits	5	

4. Prerequisites (if applicable)

4.1 Curriculum prerequisites[11]	
4.2 Learning outcomes prerequisites	CE103 Mechanics 1; CE112 Mechanics 2; CE116 Strength of Materials 1

5. Requirements

5.1 for the lecture[12]	- blackboard, computer/ laptop, video projector, specific teaching materials;
5.2 for the seminar[13]	- blackboard/ whiteboard, computer/ laptop, video projector, specific teaching materials; - the deadlines for handing in the assignments are established by the seminar instructors and the students are informed about them from the beginning of the semester.

6. General objective of the course

*The course **Statics and Stability of Structures 1** has the general objective of providing a solid foundation of theoretical and practical knowledge necessary for the analysis of statically determinate structures, with an emphasis on understanding the fundamental principles that govern their behaviour under static loads.*

The course aims to familiarize students with the essential methods of structural analysis, enabling them to correctly and efficiently apply procedures for determining reactions, internal forces, and displacements.

By completing this course, students acquire essential competencies for their future professional activity, developing a coherent, applied, and rigorous understanding of the behaviour of statically determinate structures, thereby preparing them for more advanced stages of structural analysis and design.

7. Learning outcomes [14]

Knowledge	The student/ graduate: - has knowledge of the common types of structural systems (beams, frames, arches, truss systems) and their components, and understands their role in the static behaviour of structures; - understands the fundamental principles of statics, the conditions of equilibrium, and the theoretical concepts of structural analysis methods applied to statically determinate structures; - is familiar with the analytical, graphical, and energy-based methods used to determine internal forces and displacements in statically loaded structures; - understands the behaviour of structural elements under different types of loading and how these influence the stress and deformation state; - has knowledge of the principles of structural modelling and the general criteria for selecting an appropriate static model for a construction project.
Skills	The student/ graduate: - identifies and selects the appropriate structural model for the analysis of a statically determinate structure, justifying the assumptions adopted; - correctly applies the equilibrium equations and fundamental analytical methods to determine reactions, internal forces, and displacements; - constructs and interprets internal force diagrams, identifying critical sections and evaluating the structural behaviour in relation to the specific type of loading; - uses calculation methods to analyse practical situations, solving specific problems and providing a coherent evaluation of the obtained results; - analyses the influence of static actions on the structure; - lays the foundation for the analysis of more complex structures, using the acquired knowledge as a basis for employing computation software and advanced methods in his future works.
Responsibility and autonomy	The student/ graduate: - complies with ethical principles, norms, and values in completing the students' tasks correctly and on time, by adopting a rigorous, efficient, and responsible work strategy in decision-making and problem-solving; - integrates into workgroups and applies effective relationship-building and teamwork techniques in multidisciplinary teams across different hierarchical levels; - continually seeks information and updates knowledge in their field of activity by using appropriate and effective lifelong learning methods and techniques; - manages his own learning process independently, developing the skills necessary for studying statically determinate structures and for using specialized software tools; - develops professional projects in the field of Civil Engineering.

8. Teaching strategies

The teaching activities will combine participatory lectures with practical applications, supported by PowerPoint presentations made available to students. These materials provide the theoretical framework for the static analysis of various types of structures, along with images and graphic representations that facilitate understanding and link concepts to real structural behaviour.

Each lecture will begin with a brief review of previous content and, when needed, will include connections to concepts from prerequisite or parallel courses to strengthen and contextualize the material.

Lectures are complemented by examples, solved exercises, and practical problem-solving, helping students to develop analytical skills and to apply theoretical concepts to Civil Engineering–specific situations.

9. Content

9. 1. Lecture[15]	Teaching strategies	Time allocation
9.1.1. **INTRODUCTION TO STRUCTURAL STATICS AND STABILITY:** Basic notions of Statics of Constructions; Objectives; Hypotheses; Structural systems; structural elements; Types of plane structures and loads. Examples.		3 hours
9.1.2. **ANALYSIS OF STATICALLY DETERMINATE PLANE STRUCTURES:** Free-body diagram (FBD); Types of supports and restraints for plane structures; Equations of equilibrium; Stability and static determinacy; Critical forms; Static analysis of plane structures. Examples.		3 hours
9.1.3. **BEAMS AND FRAMES. INTERNAL FORCES**: Classification of plane frame structures; External vs. internal forces; Internal forces at a specified point in a structural member; Sign convention; Internal forces diagrams; Differential relationships between loads and internal forces; Loading states - particular cases. Procedure of analysis. Examples.		9 hours
9.1.4. **PRINCIPLE OF VIRTUAL WORK**: The principle of virtual displacements; Kinematic analysis of the mechanisms; Virtual displacement diagrams; Virtual work equilibrium equation; Computation of reactions and internal forces using the virtual work principle. Procedure of analysis. Examples.	Interactive lecture, debates, explanations	6 hours
9.1.5. **ARCHES:** Basic notions; Nomenclature; Structural analysis - degree of redundancy; Equation of the parabolic arch; Differential relationships between loads and internal forces; Internal forces diagrams. Procedure of analysis. Example - the three hinged arch.		3 hours
9.1.6. **STATICALLY DETERMINATE TRUSSES**: Common types of trusses; Assumptions for the analysis of trusses; Equations of equilibrium; Stability and static determinacy; The method of sections; The method of joints. Procedures of analysis. Examples.		6 hours
9.1.7. **COMPUTATION OF POINT ELASTIC DISPLACEMENTS USING ENERGY METHODS**: External work; Theorems of reciprocal displacements; Internal work; Computation of point elastic displacements; Mohr-Maxwell Relationship. Procedures of analysis. Examples – frames and trusses.		6 hours
9.1.8. **INFLUENCE LINES FOR STATICALLY DETERMINATE STRUCTURES:** Mobile loads; Methods for the construction of the influence lines (the analytic method; the kinematic method); Applications of influence lines for the computation of reactions and internal forces. Procedure of analysis. Examples.		6 hours

Reading list for the lecture:

1. Banu O.M., *Statics of Constructions 1.* Manuscris curs publicabil – format .pdf pe Google Classroom, 2025
2. Banu O.M., *Statics of Constructions 1.* Note de curs – format .ppt pe platformă educațională TUIAȘI, https://edu.tuiasi.ro/course/modedit.php?add=resource&type=&course=1833&section=1&return=0&sr=0, 2020
3. Hibbeler, R.C., *Structural Analysis.* 10ht ed. in SI Units, Pearson Higher Education, London, UK, 2019
4. Banu O.M., *Statics of Constructions 1.* Note de curs – format .ppt, https://learning.tuiasi.ro/enrol/index.php?id=867, 2017
5. Kassimali, A., *Structural Analysis.* 5ht ed. Cengage Learning, Stamford, USA, 2015
6. Gere J.M., Goodno B.J., *Mechanics of Materials.* 8th ed. Cengage Learning, Stamford, USA, 2013
7. Hibbeler, R.C., *Statics.* 13ht ed. Pearson Prentice Hall, New Jersey, USA, 2013
8. Allen E., Zalewski W., *Form and Forces: Designing Efficient, Expressive Structures.* John Wiley & Sons, Inc., 2009
9. Amariei C., Budescu M., Ciupală A., *Statica construcțiilor/ Structural Analysis.* Ed. Soc. Acad. "Matei-Teiu Botez", Iași, 2006
10. Dumitraș Al., Florea V., *Statica construcțiilor. Teorie și aplicații. Structuri static determinate.* Ed. Cermi, Iași, 2005
11. Strat L., Aanicăi C., *Structural Statics.* Ed. „Gh. Asachi", Iași, 1995
12. Chajes A., *Structural Analysis.* 2nd ed. Prentice Hall, New Jersey, USA, 1990

9.2 Seminar	Work methods[16]	Observation, allotted time
9.2.1. Statically Determinate Frames – the static analysis and the plotting of the internal forces' diagrams; joints equilibrium checking. Principle of Virtual Work - the computation of reactions and internal forces by means of the virtual work principle. **Test no. 1:** Computation, plotting and checking of the internal forces' diagrams for plane statically determinate frames		12 hours
9.2.2. Statically Determinate Arches - the static analysis and the plot of the internal forces' diagrams.	Discussions, exercises, and problem solving, checking of the students' assignments	2 hours
9.2.3. Statically Determinate Trusses - the static analysis and the computation of the axial forces.		4 hours
9.2.4. Computation of Point Elastic Displacements - Möhr-Maxwell Relationship. **Test no. 2:** Computation of elastic displacements for frame structures using Möhr-Maxwell relationship		6 hours
9.2.5. Influence Lines for Statically Determinate Structures - The computation of the maximum bending moment at a section and of the absolute maximum bending moment due to a convoy of moving loads.		4 hours

Reading list for the seminar:
1. Banu O.M., *Statics of Constructions 1.* Suport de lucru aplicații – format .ppt pe platformă educațională TUIAȘI,
https://edu.tuiasi.ro/course/modedit.php?add=resource&type=&course=1833&section=2&return=0&sr=0, 2025
2. Banu O.M., Movilă M., Olteanu-Donțov I., *Statics of Constructions.* Aplicații (teme propuse pt lucrări) - format .pdf pe platformă educațională TUIAȘI,
https://edu.tuiasi.ro/course/modedit.php?add=resource&type=&course=1833&section=3&return=0&sr=0, 2020
3. Hibbeler, R.C., *Structural Analysis.* 10ht ed. in SI Units, Pearson Higher Education, London, UK, 2019
4. Kassimali, A., *Structural Analysis.* 5ht ed. Cengage Learning, Stamford, USA, 2015
5. Banu O.M., Movilă M., Olteanu I. - Statica construcțiilor. Structuri static determinate. Aplicații. Ed. Soc. Acad. "Matei -Teiu
6. Botez", Iași, ISBN 978-606-582-059-3, 191 pp., 2014
7. Hibbeler, R.C., *Statics.* 13ht ed. Pearson Prentice Hall, New Jersey, USA, 2013
8. Hibbeler, R.C., *Structural Analysis.* 8ht ed. Pearson Prentice Hall, New Jersey, USA, 2012
9. Amariei C., Budescu M., Ciupală A., *Statica construcțiilor/ Structural Analysis.* Ed. Soc. Acad. "Matei-Teiu Botez", Iași, 2006
10. Dumitraș Al., Florea V., *Statica construcțiilor. Teorie și aplicații. Structuri static determinate.* Ed. Cermi, Iași, 2005
11. Bănuț V.,Teodorescu M., *Statica construcțiilor. Aplicații. Structuri static determinate.* Editura MatrixRom, București, 2003
12. Strat L., Aanicăi C., *Structural Statics.* Ed. „Gh. Asachi", Iași, 1995
13. Chajes A., *Structural Analysis.* 2nd ed. Prentice Hall, New Jersey, USA, 1990

10. Assessment

Assessment category	10.1 Assessment criteria	10.2 Assessment method		10.3 Percentage of final grade
10.4 Final exam	Completeness and accuracy of knowledge Level of command of specialised terminology and communication skills Ability to apply acquired skills Ability to process data and solve the problems presented	- summative assessment test (final assessment).	100%	50%
10.5 Seminar	Ability to apply acquired knowledge Capacity for analysis, personal interpretation, originality, creativity.	- systematic observation of students (individual assignments – which must be completed during the week between lectures and during the seminar).	60%	50%
		- formative assessment test (tests during the semester: in the 6th and 13th weeks).	40%	

10.6 Passing requirements
(a) From the perspective of learning outcomes, the minimum required level implies that the student must:
- be able to identify and classify common types of structural systems;
- use the fundamental methods of structural analysis in solving statically determinate plane structures: determining internal forces and elastic displacements;
- understand the mechanical phenomena occurring in the structural systems, analyse different loading scenarios and the corresponding stress states, draw the appropriate internal force diagrams, and interpret the results in relation to the technical and functional requirements of buildings;
- correctly assess the structural behaviour under various types of static actions and identify possible modelling errors;
- have the ability to select appropriate structural models for different types of constructions.
(b) Submission of fully solved assignments by the deadlines established by the seminar instructor at the beginning of the semester. The assignments will be partially solved during seminar classes, and students will be graded for this activity. The passing requirement is obtaining a minimum grade 5 (five).
(c) The average grade of the tests during the semester must be at least 5 (five).
(d) Passing the final exam: minimum grade 5 (five).

The final grade for a course is determined by taking into account the scores and weightings assigned to each course activity. Whole-number grades from 10 to 1 will be awarded, with a grade of 5 certifying the achievement of the minimum learning outcomes required for the course and the awarding of the corresponding ECTS credits.

Date of completion: September 2025

Lecture instructor: Lecturer Oana-Mihaela BANU, PhD

Seminar instructors: Lecturer Oana-Mihaela BANU, PhD

                                                       Lecturer Ioana OLTEANU, PhD

Date of departmental approval: Head of Department,
September 2025   Lecturer Mircea - Vasile VENGHIAC, PhD

Date of faculty council approval: Dean,
September 2025   Professor Andrei BURLACU, PhD

COURSE SYLLABUS

Academic year 2025-2026

1. Programme information

1.1 Higher Education Institution	"Gheorghe Asachi" Technical University of Iași
1.2 Faculty	Faculty of Civil Engineering and Building Services
1.3 Department	Civil and Industrial Engineering
1.4 Field of study	Civil Engineering
1.5 Level of study[1]	Bachelor's degree
1.6. Study programme	Inginerie civilă (în limba engleză)/ Civil Engineering - ICE

2. Course information

2.1.1 Course title	**Desen tehnic și Infografică 2** **Technical Drawing and Infographics 2**				
2.1.2. Course code	CE202				
2.2 Lecture instructor	Lecturer Ana - Maria TOMA, PhD				
2.3 Seminar instructor	Lecturer Ana - Maria TOMA, PhD Lecturer Irina IGNĂTESCU - MANEA, PhD				
2.4 Year of study[2]	2	2.5 Semester[3]	3	2.6 Assessment method[4] E	2.7 Course type[5] DI

3. Estimated total time (hours per semester)

3.1 Number of hours per week	4	3.2 lecture	1	3.3a seminar	3	3.3b laboratory	-	3.3c project	-	3.3.d practical sessions	
3.4 Total number of hours in the curriculum[6]	56	3.5 lecture	14	3.6a seminar	42	3.6b laboratory	-	3.6c project	-	3.6.d	

Workload distribution [7]	No. of hours
Study based on textbook, course material, reading list and notes	10
Additional research in the library, on specialised electronic platforms, and in the field	8
Preparation for seminar/laboratory/project session, assignments, papers, and portfolios	25
Assessment[8]	4
Other activities:	1

3.7 Total number of individual study hours[9]	44
3.8 Total number of hours per semester[10]	100
3.9 Number of ECTS credits	4

4. Prerequisites (if applicable)

4.1 Curriculum prerequisites[11]	
4.2 Learning outcomes prerequisites	English, Technical Drawing, Descriptive Geometry Use of the computer, English language, special view

5. Requirements

5.1 for the lecture[12]	- teaching activities in physical format at the faculty: blackboard, Video projector, specific didactic materials, etc.; - teaching activities in a synchronous online format (on an educational platform such as Google Meet, Microsoft Teams, Zoom with academic subscriptions), with equipment necessary to run a video conference: computer/laptop, video camera, microphone, speakers/headphones, connection to internet
5.2 for the seminar[13]	- application activities in physical format, at the faculty: blackboard, computing technique, software packages, etc.; - the deadlines for handing in the papers are set by the holder and are sent to the students at the beginning of the semester; - forbidden access to the laboratory with food

6. General objective of the course

This course is meant to provide the students with information on Computer Graphics fundamental concepts under AutoCAD program graphical interface.

7. Learning outcomes

Knowl edge	The student/ graduate: - knowledge of the specific methods of engineering graphics necessary to understand the basic concepts, theories and methods of the field and area of specialization; - the use of engineering graphics in the realization of a portfolio of works under coordination, to solve specific problems in the field, with the correct assessment of the volume of work, the available resources and the time required for completion, under conditions of application of the deontological norms and professional ethics in the field; - efficient solution of graphical representation problems; - criteria regarding the qualities, limits and efficiency of some programs used in engineering graphics
Skills	The student/ graduate: - specific methods of engineering graphics for the responsible realization of the individual theme; - availability for continuous professional development, using various sources of information in Romanian/ foreign languages regarding engineering graphics
Respon sibility and autono my	The student/ graduate: - the use of engineering graphics in the realization of a portfolio of works under coordination, to solve specific problems in the field, with the correct assessment of the volume of work, the available resources and the time required for completion, under conditions of application of the deontological norms and professional ethics in the field

8. Teaching strategies

The teaching activities will include interactive lectures based on AutoCAD presentations that will be made available to students. The presentations contain images and the solving in AutoCAD the drawings that the students will have to solve in the laboratory, so that the information could be easily understood and assimilated.

The teaching approach uses modelling as well as action-based methods, such as exercises, practical activities and problem-solving.

9. Content

9. 1. Lecture[15]	**Teaching strategies**	**Time allocation**
9.1.1. **Basic elements** Presentation of the graphical interface; Creating the first drawing; Configuring and using the sketching tools; Organizing objects using blocks and groups; Managing layers, blocks, and files	Interactive lecture, explanations	2 hours
9.1.2. **Introductory notions regarding the creation of technical drawings** Using the AutoCAD working environment; Plane geometric drawings; Creating 2D sketches and drawings		2 hours
9.1.3. Dimensioning drawings, connections, writing		2 hours
9.1.4. Object views, drawing the 6 views of an object with polygonal shape		2 hours
9.1.5. Object views, drawing the 6 views of an object with circular shape		2 hours
9.1.6. Introduction to three-dimensional representation Visualizing objects in 3D space; Creating edge and surface models		2 hours
9.1.7. Solid modeling. Editing and rendering solids in 3D; Layout of printer output		2 hours
Reading list for the lecture: Materials listed on Google classroom for each lecture by the lecture instructor		
9.2a Seminar	Work methods[16]	Observation, allotted time
1. Mastering and correct use of the graphic work environment; Presentation of graphic interfaces Basic notions of technical drawing.	Computer aided design	3 hours
2. Creating flat geometric drawings; Configuring the drawing environment; Organizing and managing layers and files.		3 hours

3. Creating technical drawings from sketches. Exploring the drawing process - specific commands.		3 hours
4. Creating technical drawings from sketches. Exploring the drawing process - specific commands. Annotating drawings.		3 hours
5. Arranging projections. Representations in triple orthogonal projection. Simple Applications	Computer aided design	3 hours
6. Arranging projections. Representations in triple orthogonal projection. Complex Applications		3 hours
7. Partial 1		3 hours
8. General considerations for 3D modelling.		3 hours
9. Creating solid models. Editing solid models 3D visualization.		3 hours
10. Obtaining 2D drawings from 3D models. Applications.		3 hours
11. 3D Model Rendering & Layout for Printer Output – simple solids		3 hours
12. 3D Model Rendering & Layout for Printer Output – complex solids		3 hours
13. 3D Model Rendering & Layout for Printer Output – sections		3 hours
14. 3D Model Rendering & Layout for Printer Output – complex solids sections		3 hours
Reading list for the seminar: Materials listed on Google classroom for each laboratory by the seminar instructor		

10. Assessment

Assessment category	10.1 Assessment criteria	10.2 Assessment method		10.3 Percentage of final grade
10.4 Final exam/ /test	Completeness and accuracy of knowledge Logical coherence, fluency, and strength of argumentation Capacity for analysis, personal interpretation, originality, and creativity	- systematic observation of students (individual or group assignments – which must be completed during the week between lectures, preparation of a report, case study)		80%
	Level of command of specialised terminology and communication skills Ability to apply acquired skills	- formative assessment test (tests during the semester)	50%	
	Ability to process data and solve the problems presented	- summative assessment test (final assessment)	50%	
10.5a Seminar	Ability to apply acquired knowledge Capacity for analysis, personal interpretation, originality, creativity	- active participation in the activities - assessment test		20%
10.6 Passing requirements Acquiring the drawing and editing commands necessary to represent views, sections, breaks, dimension elements, hatching, marking technical drawings and plotting specialized engineering representations in digital format, by using specialized software. Partial 1 and the exam to have minimum grade 5.				
The final grade for a course is determined by taking into account the scores and weightings assigned to each course activity. Whole-number grades from 10 to 1 will be awarded, with a grade of 5 certifying the achievement of the minimum learning outcomes required for the course and the awarding of the corresponding ECTS credits.				

Date of completion: September 2025

Lecture instructor: Lecturer Ana - Maria TOMA, PhD

Seminar instructors: Lecturer Ana - Maria TOMA, PhD

                                                       Lecturer Irina IGNĂTESCU - MANEA, PhD

Date of departmental approval: Lecturer Liviu PRUNĂ, PhD
September 2025

Date of faculty council approval: Dean,
September 2025   Professor Andrei BURLACU, PhD

Bachelor's/ Master's degree.

[2] 1-4 for bachelor's degree, 1-2 for master's degree.

[3] 1-8 for bachelor's degree, 1-4 for master's degree.

[4] Exam (E), test (T) – from the curriculum.

[5] DOB – compulsory course, DOP– elective course, DFA– optional course;

[6] It is equal to 14 weeks x the number of hours indicated in section 3.1 (similarly for 3.5, 3.6abc).

[7] The lines below refer to individual study; the total is indicated in section 3.7.

[8] Between 2 and 6 hours. These represent teaching hours and are not included in individual study.

[9] Sum of the values from the previous lines, referring to individual study.

[10] Sum of direct contact hours (3.4) and individual study hours (3.7); this must equal the number of credits allocated to the course (section 3.9) × 25 hours per credit.

[11] Courses that must be completed beforehand or equivalent courses.

[12] Blackboard, projector, flipchart, specific teaching materials, etc.

[13] Computing equipment, software packages, experimental setups, etc.

[14] Learning outcomes presented as knowledge, skills, responsibility, and autonomy specific to the course. These should be correlated with the learning outcomes in fundamental and bachelor's degree fields (Annex 2 of ARACIS Specific Standards, www.aracis.ro/wp-content/uploads/2025/04/Standarde-specifice-programe-de-studii-universitare-de-licenta_aprilie-2025.pdf). For master's programmes, learning outcomes correspond to level 7 of the National Qualifications Framework (CNC).

[15] Chapter and paragraph titles.

[16] Discussions, debates, presentation and/or analysis of works, exercises and problem solving.

[17] Practical demonstration, exercise, experiment.

[18] Case study, demonstration, exercise, error analysis, etc.

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Academic year 2025-2026

1. Programme information

1.1 Higher Education Institution	"Gheorghe Asachi" Technical University of Iași
1.2 Faculty	Faculty of Civil Engineering and Building Services
1.3 Department	Civil and Industrial Engineering
1.4 Field of study	Civil Engineering
1.5 Level of study[1]	Bachelor's degree
1.6. Study programme	Inginerie civilă (în limba engleză)/ Civil Engineering - ICE

2. Course information

2.1.1 Course title	**Geologie inginerească** **Engineering Geology**				
2.1.2. Course code	CE203				
2.2 Lecture instructor	Professor Ancuța ROTARU, PhD				
2.3 Laboratory instructor	Professor Ancuța ROTARU, PhD				
2.4 Year of study[2]	2	2.5 Semester[3]	3	2.6 Assessment method[4] E	2.7 Course type[5] DI

3. Estimated total time

3.1 Number of hours per week	2	3.2 lecture	1	3.3a seminar		3.3b laboratory		3.3c project		3.3.d practical sessions
3.4 Total number of hours in the curriculum[6]	28	3.5 lecture	14	3.6a seminar		3.6b laboratory	14	3.6c project	3.6.d	

Workload distribution [7]	No. of hours
Study based on textbook, course material, reading list and notes	26
Additional research in the library, on specialised electronic platforms, and in the field	5
Preparation for seminar/laboratory/project session, assignments, papers, and portfolios	12
Assessment[8]	7
Other activities:	4

3.7 Total number of individual study hours[9]	47
3.8 Total number of hours per semester[10]	75
3.9 Number of ECTS credits	3

4. Prerequisites

4.1 Curriculum prerequisites[11]	
4.2 Learning outcomes prerequisites	

5. Requirements

5.1 for the lecture[12]	- Computer, video projector, whiteboard, or blackboard
5.2 for the laboratory[13]	- Blackboard

6. General objective of the course

In this course, you will acquire in-depth knowledge and practical skills essential for the evaluation, selection, and effective utilization of a diverse range of minerals and rocks. These materials serve critical roles as foundation soils and as high-quality construction materials, ensuring the stability and safety of various structures. You will delve into the characteristics and properties of different geological materials, learning how to assess their suitability for specific construction applications. Additionally, the course will provide a thorough exploration of geological risk factors, such

as soil stability, seismic activity, and the presence of harmful materials, which are vital for ensuring construction safety. By the end of this course, you will be equipped with the expertise needed to make informed decisions in the field of construction materials and geological assessments.

7. Learning outcomes[14]

Knowledge	The student/ graduate: - synthesises and interprets information regarding the composition of the Earth's crust; - understands the formation methods, as well as the physical and mechanical properties of rocks; - analyses the impact of geological processes on construction projects; - examines how different types of rocks behave as supports for various constructions; - assesses the effects of internal and external geodynamics on the design of infrastructure and superstructures in buildings; - identifies rock properties using both in situ and laboratory methods.
Skills	The student/ graduate: - uses digital tools to present chemical analysis reports; - plans sample collection and understands the use of different sampling methods and instrumental analytical techniques; - operates laboratory equipment used for the structural and physicochemical characterisation of chemical, petrochemical, and carbo-chemical products; - critically evaluates processes, equipment, procedures, and products in the chemical industry using specific evaluation instruments and methods.
Responsibility and autonomy	The student/ graduate: - complies with ethical principles, norms, and values in completing professional tasks correctly and on time, by adopting a rigorous, efficient, and responsible work strategy in decision-making and problem-solving; - integrates into workgroups and applies effective relationship-building and teamwork techniques in multidisciplinary teams across different hierarchical levels; - continually seeks information and updates knowledge in their field of activity by using appropriate and effective lifelong learning methods and techniques; - develops professional projects in the field of engineering.

8. Teaching strategies

The teaching activities will include interactive lectures and debates based on PowerPoint presentations that will be made available to students. The presentations contain images and diagrams, so that the information could be easily understood and assimilated. Each lecture will begin with a brief review of the concepts covered in the previous class.

The teaching approach uses discovery-based learning models, facilitated by direct and indirect exploration of reality (experiments, demonstrations, modelling), as well as action-based methods, such as exercises, practical activities, problem-solving).

9. Content

9. 1. Lecture[15]	Teaching strategies	Time allocation
9.1.1. **What is Engineering Geology?** Introduction and terminology. Physical Geology and Historical Geology. The geologic time. The geologic time scale: eras, periods, epochs. The theory of uniformitarianism versus the theory of catastrophism		2 hours
9.1.2. **Planetary Geology**: The Universe. The Milky Way. Our Solar System. The nine planets of the Solar System. **The Earth:** Dimensions, shape, structure. Physical properties of the Earth. The Earth's interior: the crust, the mantle and the core. The Earth's movements	Interactive lecture, debates, explanations	2 hours
9.1.3. **Basic of Mineralogy:** Forming, structure, classification, and physical properties of minerals. **Basic of Petrology:** Forming and rock classification. Rocks: igneous, sedimentary, and metamorphic		2 hours
9.1.4. **Volcanoes:** Structure, types of volcanoes, types of eruptions. Danger, advantages and prediction of volcanic eruptions. Products of volcanoes. Geographic distribution of volcanoes		2 hours
9.1.5. **Earthquakes:** Causes, elements. Seismic waves. Magnitude – Richter Scale. Damage caused by earthquakes – Mercalli Scale. Seism-tectonic models of Romania		2 hours
9.1.6. **Plate tectonics:** Continental drift and sea-floor spreading theories. Isostasia		2 hours

9.1.7. **Engineering Geology and Environment:** Groundwater, landslides. The role of Engineering Geology in Civil Engineering		2 hours

Reading list for the lecture:
1. Ancuța Rotaru, Paulică Răileanu – Elemente de geologie, Editura Societății Academice "Matei-Teiu Botez" Iași, 281 pg, 2004
2. Vasile Mușat, Nicolae Boțu – Geologie, Editura "Matei Teiu Botez", Iași, 2005
3. A. Balog – Geologie inginerească, Editura UT Press, Cluj-Napoca, 2010
4. Olariu L., Ionesi V., Țabără D., 2004 – Geologie fizică - Editura Universității „Al.I.Cuza", Iași
5. Luis Gonzalez de Vallejo, Mercedes Ferrer – Geological Engineering, Published by CRC Press, 700 pg, 2011
6. xxx - Engineering Geology for Infrastructure Planning in Europe: A European Perspective (Lecture Notes in Earth Sciences), Springer, 823 pg, 2004
7. K.V.G.K. Gokhale - Principles of Engineering Geology, BS Publications, 2015

9.2b Laboratory	Work methods[16]	Observation, allotted time
9.2.1. **Research of the foundation soil.** Test borings. Geotechnical studies.	Discussions, explanations, case studies, interpretations of results	2 hours
9.2.2. **Minerals.** Forming and physical properties of minerals.		2 hours
9.2.3. **Rocks.** Forming and rock classification.		2 hours
9.2.4. **Igneous rocks**. **Sedimentary rocks. Metamorphic rocks.** Structural and textural properties, classification and engineering properties.		2 hours
9.2.5. **Geophysical methods. Seismic methods. Radiometric dating methods. Direct and indirect methods of the foundation soil investigation.**		2 hours
9.2.6. **Geological maps.** Elements, legends, classification and use.		2 hours
9.2.7. **Emplacement selection for engineering structures.** Geological, hydro-geological and morphological factors.		2 hours

Reading list for the laboratory:
1. A. Balog – Geologie inginerească – Îndrumător pentru lucrări de laborator-DVD, Editura UT Press, Cluj- Napoca, 2011
2. Cristian Mrunțeanu – Geologie inginerească: aplicații practice, Editura Universității din București, 1999

10. Assessment

Assessment category	10.1 Assessment criteria	10.2 Assessment method		10.3 Percentage of final grade
10.4 Final exam	Completeness and accuracy of knowledge. Logical coherence, fluency, and strength of argumentation. Capacity for analysis, personal interpretation, originality, and creativity. Level of command of specialised terminology and communication skills. Ability to apply acquired skills. Ability to process data and solve the problems presented	- systematic observation of students (individual or group assignments – which must be completed during the week between lectures, preparation of a report, case study)	15%	60%
		- formative assessment test (tests during the semester)	25%	
		- summative assessment test (final assessment)	60%	
10.5b Laboratory	Ability to work in a team. Ability to apply acquired knowledge in practice in different contexts. Capacity for analysis, personal interpretation, originality, and creativity	- completion of laboratory worksheets (all laboratory sessions must be completed, with only one missed session allowed to be retaken) - assessment test (laboratory colloquium)		40%

10.6 Passing requirements
The final exam evaluates students' problem-solving abilities and their capacity to synthesize knowledge from various sources. Students will be required to accurately respond to questions concerning theoretical concepts related to the identification and classification of minerals and rocks. This includes understanding key characteristics, such as hardness, luster, and mineral composition, which are essential for proper identification. In addition, students must demonstrate a comprehensive understanding of natural hazards, including seismic events like earthquakes, volcanic phenomena, and landslides. This entails explaining the mechanisms behind these events, their geological implications, and their impact on human activities and the environment. Furthermore, students should exhibit proficiency in utilizing and interpreting pertinent technical literature relevant to engineering geology. This includes the ability to analyse research papers, geological maps, and case studies to draw informed conclusions and apply theoretical

knowledge to real-world scenarios. Successful completion of the exam will reflect a thorough understanding of these critical aspects of engineering geology.

The final grade for a course is determined by taking into account the scores and weightings assigned to each course activity. Whole-number grades from 10 to 1 will be awarded, with a grade of 5 certifying the achievement of the minimum learning outcomes required for the course and the awarding of the corresponding ECTS credits.

Date of completion: September 2025

Lecture instructor: Professor Ancuța ROTARU, PhD

laboratory instructor: Professor Ancuța ROTARU, PhD

Date of departmental approval: Head of Department,
September 2025   Lecturer Oana Elena COLȚ, PhD

Date of faculty council approval: Dean,
September 2025   Professor Andrei BURLACU, PhD

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[1] Bachelor's/ Master's degree.

[2] 1-4 for bachelor's degree, 1-2 for master's degree.

[3] 1-8 for bachelor's degree, 1-4 for master's degree.

[4] Exam (E), test (T) – from the curriculum.

[5] DOB – compulsory course, DOP– elective course, DFA– optional course;

[6] It is equal to 14 weeks x the number of hours indicated in section 3.1 (similarly for 3.5, 3.6abc).

[7] The lines below refer to individual study; the total is indicated in section 3.7.

[8] Between 2 and 6 hours. These represent teaching hours and are not included in individual study.

[9] Sum of the values from the previous lines, referring to individual study.

[10] Sum of direct contact hours (3.4) and individual study hours (3.7); this must equal the number of credits allocated to the course (section 3.9) × 25 hours per credit.

[11] Courses that must be completed beforehand or equivalent courses.

[12] Blackboard, projector, flipchart, specific teaching materials, etc.

[13] Computing equipment, software packages, experimental setups, etc.

[14] Learning outcomes presented as knowledge, skills, responsibility, and autonomy specific to the course. These should be correlated with the learning outcomes in fundamental and bachelor's degree fields (Annex 2 of ARACIS Specific Standards, www.aracis.ro/wp-content/uploads/2025/04/Standarde-specifice-programe-de-studii-universitare-de-licenta_aprilie-2025.pdf). For master's programmes, learning outcomes correspond to level 7 of the National Qualifications Framework (CNC).

[15] Chapter and paragraph titles.

[16] Discussions, debates, presentation and/or analysis of works, exercises and problem solving.

[17] Practical demonstration, exercise, experiment.

[18] Case study, demonstration, exercise, error analysis, etc.

COURSE SYLLABUS

Academic year 2025-2026

1. Programme information

1.1 Higher Education Institution	"Gheorghe Asachi" Technical University of Iași
1.2 Faculty	Faculty of Civil Engineering and Building Services
1.3 Department	Civil and Industrial Engineering
1.4 Field of study	Civil Engineering
1.5 Level of study[1]	Bachelor's degree
1.6. Study programme	Inginerie civilă (în limba engleză)/ Civil Engineering - ICE

2. Course information

2.1.1 Course title			**Fizică 1** **Physics 1**			
2.1.2. Course code			CE204			
2.2 Lecture instructor			Lecturer Cristina - Marcela RUSU, PhD			
2.3 Laboratory instructor			Lecturer Cristina - Marcela RUSU, PhD			
2.4 Year of study[2]	2	2.5 Semester[3]	3	2.6 Assessment method[4] E	2.7 Course type[5]	DI

3. Estimated total time (hours per semester)

3.1 Number of hours per week	2	3.2 lecture	1	3.3a seminar		3.3b laboratory	1	3.3c project		3.3.d practical sessions	
3.4 Total number of hours in the curriculum[6]	28	3.5 lecture	14	3.6a seminar		3.6b laboratory	14	3.6c project		3.6. d	

Workload distribution [7]	No. of hours
Study based on textbook, course material, reading list and notes	22
Additional research in the library, on specialised electronic platforms, and in the field	11
Preparation for seminar/laboratory/project session, assignments, papers, and portfolios	12
Assessment[8]	6
Other activities:	2

3.7 Total number of individual study hours[9]	47
3.8 Total number of hours per semester[10]	75
3.9 Number of ECTS credits	3

4. Prerequisites (if applicable)

4.1 Curriculum prerequisites[11]	
4.2 Learning outcomes prerequisites	Knowledge recommended: basics of Mathematics and Physics from high school curricula; Special Mathematics; Description of basic concepts, theories and methods of mathematics, physics, chemistry, appropriate for the field of engineering

5. Requirements

5.1 for the lecture[12]	- The classroom will be endowed with video projector, blackboard, and specific materials. - The students will respect the Students Rights and Obligations Code and the regulations set out in the Charter of the "Gheorghe Asachi" Technical University of Iasi.
5.2 for the laboratory[13]	- The classroom will be endowed with video projector, blackboard, and specific materials. - Time limits for tests are set by the course organizer.

6. General objective of the course

The general objective is for students to acquire a set of physics knowledge strictly necessary for the successful completion and understanding of other fundamental or specialized disciplines. In parallel, the aim is to develop logical

thinking and improve computational skills, creating a clear picture of the importance and role of the discipline in the training of future specialists. The goal is to acquire knowledge of vector calculus, to identify equations and systems of differential equations that describe different types of body movements in two-dimensional and three-dimensional cases, to identify the types of forces with which bodies interact with each other, elements of complex analysis necessary for the understanding of other fundamental or specialized disciplines and the application of this knowledge of physics in explaining natural phenomena.

7. Learning outcomes [14]

Knowledge	The student/ graduate: - applies the criteria and evaluation methods to identify, simulation, quality and quantity analysing of the process and phenomena specific to the fundamental aria using the digital technologies; - is able to perform the experimental data and interpretate the theoretical and experimental results; - is able to know the basic concepts of the Classical Mechanics: inertial references (frames), the principles of Classical Dynamics; - is able to solve the problems by using the terms of force, work, kinetic energy, potential energy, angular momentum, torque; - is able to explain and to solve the complex electronics problems by using of the math instruments (real functions of several variables, complex functions, differential math operators);
Skills	The student/ graduate: - states the principles of Classical Mechanics, to solve the problems related to uniform and accelerated motions of the bodies; solves the problems which studies the motion of the body under the action of different types of forces: gravitational, normal, tension, friction forces; to solves the problems related to the work done by a constant or variable force; to calculate the kinetic energy, potential energy, total energy of a body; - explains the wave phenomenon, to know the basic physical quantities which describes any wave; - explains the overlapping of the waves, reflection, and refraction of mechanical waves, to know the concept of waves group (waves packet) and significance of the wave energies; - provides examples of the use of basic theoretical concepts and results when solving exercises and problems formulated in relation to the topics covered in the curriculum disciplines; - is familiarized with the equipment and putting into practice the knowledge acquired in the course; - solves the problems by using the knowledge from Physics; - draws the graph/ map, to obtain from graph the line equation which describe the phenomenon; - uses physical models as practical instruments to approach complex problems; - identifies and describes the essential elements in the construction of demonstrations of mathematical assertions (lemmas, propositions, theorems), recognizes reasoning errors, and corrects them; - answers questions and correctly and rigorously formulates statements, theorems, and principles of Physics in curricular subjects; - has technical creative thinking by handling the basic concepts of the classical physics and abilities to use the university math instruments (real functions of several variables, complex functions, differential operators, etc.); - identifies and applies appropriate techniques for solving exercises and problems in the major disciplines of Physics; - identifies and applies appropriate techniques for solving problems in advanced disciplines of Physics; - describes real-world problems in Physics terms, identifies working hypotheses, constructs appropriate physical models and explains the limitations of the models thus obtained;
	The student/ graduate: - is able to work both independently and in multidisciplinary teams, respecting professional standards and ethics specific to the field; - demonstrates that he/she can continue professional development through lifelong learning, participating in advanced training courses, certifications, or research; - is able to communicate effectively with specialists and non-specialists, arguing technical solutions and decisions; - shows a spirit of initiative and action to update professional, economic and organizational culture knowledge;

Responsibility and autonomy	- extends the techniques for solving common problems to problems that arise in new situations and with a progressive degree of difficulty; - searches for other methods of solving them and formulates consequences and conclusions that arise from a set of hypotheses. - analyzes solution methods, establishes the uniqueness of solutions, recognizes reasoning errors in solving a problem, finds a way to eliminate them and obtain the correct version of the demonstration/ solution method; - verifies, on cases or by constructing examples or counterexamples, the validity of Physics statements; - translates a practical situation from Physics, solves the problem obtained and interprets the results obtained; identifies and correlates connections between apparently unrelated concepts from the major disciplines of Physics; - summarizes, classifies, and presents the conclusions of given problems using various types of representations and clearly and efficiently communicates physical concepts and reasoning to specialists and non-specialists through written reports and oral presentations; - solves using analytical and/ or numerical methods and uses dedicated software packages or writes codes developed in order to solve practical problems and physical models constructed using differential and partial derivative equations or other tools from the curricula covered; - uses independent information and documentation methods, which provide openness to continuous learning, develops scientific communications or scientific reports and makes complete bibliographic references by respecting ethical norms when citing the documentation sources used; - approaches problem solving from different angles and directions, including based on non-traditional methodologies, in order to use them in computer science and other applications of Physics.

8. Teaching strategies

The teaching activity will use participatory lectures and debates based on presentations (beamer) that will be made available to students. The presentations contain the main concepts and results, images, and sketches, so that the information is easy to understand and assimilate. Each course will begin with a brief recapitulation of the concepts covered in the previous course. The full courses and seminars will be made available on the moodle platform as pdf files.

The teaching method is also based on discovery learning models facilitated by direct and indirect exploration of reality (experimentation, demonstration, modelling), but also on action-based methods, such as exercise, practical activities and problem solving).

9. Content

9. 1. Lecture[15]	**Teaching strategies**	**Time allocation**
9.1.1. Basic elements of Classical Mechanics. Scalar and vector physics quantities. Mathematical operations with vectors	Presentation with video projector. Presentation on the board, interactive lecture. Discussions, Explanations, Solving	2 hours
9.1.2. Inertial Frames. The Principles of Mechanics. Different types of forces. The Work done by a constant Force. Work done by Variable Force. Kinetic Energy. Mechanical Power. Problems.		2 hours
9.1.3. Conservative Fields Force. Work-Kinetic Energy Variation Theorem; Potential Energy. Mechanical Energy Conservation Theorem. Linear Momentum. Angular Momentum. Torque. The conservation theorems of Linear Momentum, Angular Momentum	Presentation with video projector. Presentation on the board, interactive lecture. Discussions, Explanations	2 hours
9.1.4. Mechanical Oscillations: Oscillatory motion. Simple Harmonic Motion. The energy of a body in SHM. Damped Simple Harmonic Motion. Forced Oscillations		2 hours
9.1.5. Overlapping of two oscillations of the same frequency and the same direction; Overlapping of two oscillations of the same frequency and perpendicular directions. Problems.		2 hours
9.1.6. Waves. Planar wave. The characteristic physical quantities of the planar wave. Waves Differential Equation. Wave Dispersion Phenomenon		2 hours
9.1.7. Interferences of planar waves. Reflection and Refraction of mechanical waves. Waves Group. The Rayleigh's Equation. Waves Energy. Waves Absorption. Problems.	Presentation with video projector. Presentation on the board, interactive lecture. Discussions, Explanations, Solving	2 hours
Reading list for the lecture: 1. Halliday Resnick &Jearl Walker, PRINCIPLES OF PHYSICS-NINTH EDITION, www.wileyplus.com		

9.2b Laboratory	Work methods[16]	Observation, allotted time
9.2.1. Work safety training. Errors calculations. Drawing graph in Excel.	Discussions, explanations, observation, experiment, analog correlation, simulation - modeling, discovery	2 hours
9.2.2. Harmonic Oscillations. Study of the mechanical waves through gases		2 hours
9.2.3. Damped Oscillations in RLC circuits		2 hours
9.2.4. Natural modes of vibration under the action of Laplace Force		2 hours
9.2.5. Determining of the specific charge of the electron by studying the movement in the uniform magnetic field		2 hours
9.2.6. Study of the Transformer Device		2 hours
9.2.7. Test/Recovery works	Written test Results and discussions	2 hours
Reading list for the laboratory: 1. Halliday Resnick &Jearl Walker, PRINCIPLES OF PHYSICS-NINTH EDITION, www.wileyplus.com		

10. Assessment

Assessment category	10.1 Assessment criteria	10.2 Assessment method	10.3 Percentage of final grade
10.4 Exam	Theoretical knowledge acquired (quantity, correctness, accuracy) Completeness and correctness of knowledge. Problem solving capabilities	Written exam	60%
10.5b Laboratory	Knowledge of devices, how to use specific instruments; the evaluation of some tools, the processing and interpretation of results	Continuous evaluation: Final Test Exam attending is conditioned by going through the laboratory	40%
10.6 Passing requirements			
The final assessment result for Physics 1 results from considering the scores and weights assigned to each activity within the discipline. Whole marks from 10 to 1 will be awarded, with a mark of 5 certifying the acquisition of the minimum learning outcomes: - statements of the Principles of Newtonian Principles; - formulas of the work done by a constant and a variable force and measure units; - Kinetic and potential (gravitational and elastic) energy formulas and total energy of a body and measure units; - the differential equation of the harmonic simple oscillation; - Plane wave. The differential equation of waves; Wave Group			

Date of completion: September 2025

Lecture instructor: Lecturer Cristina - Marcela RUSU, PhD

Laboratory instructor: Lecturer Cristina - Marcela RUSU, PhD

Date of departmental approval: Head of Department,
September 2025   Professor Petru - Edward NICA, PhD

Date of faculty council approval: Dean,
September 2025   Professor Andrei BURLACU, PhD

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[1] *Bachelor's/ Master's degree.*

[2] *1-4 for bachelor's degree, 1-2 for master's degree.*

[3] *1-8 for bachelor's degree, 1-4 for master's degree.*

[4] *Exam (E), test (T) – from the curriculum.*

[5] *DOB – compulsory course, DOP– elective course, DFA– optional course;*

[6] *It is equal to 14 weeks x the number of hours indicated in section 3.1 (similarly for 3.5, 3.6abc).*

[7] *The lines below refer to individual study; the total is indicated in section 3.7.*

[8] *Between 2 and 6 hours. These represent teaching hours and are not included in individual study.*

[9] *Sum of the values from the previous lines, referring to individual study.*

[10] *Sum of direct contact hours (3.4) and individual study hours (3.7); this must equal the number of credits allocated to the course (section 3.9) × 25 hours per credit.*

[11] *Courses that must be completed beforehand or equivalent courses.*

[12] *Blackboard, projector, flipchart, specific teaching materials, etc.*

[13] Computing equipment, software packages, experimental setups, etc.

[14] Learning outcomes presented as knowledge, skills, responsibility, and autonomy specific to the course. These should be correlated with the learning outcomes in fundamental and bachelor's degree fields (Annex 2 of ARACIS Specific Standards, www.aracis.ro/wp-content/uploads/2025/04/Standarde-specifice-programe-de-studii-universitare-de-licenta_aprilie-2025.pdf). For master's programmes, learning outcomes correspond to level 7 of the National Qualifications Framework (CNC).

[15] Chapter and paragraph titles.

[16] Discussions, debates, presentation and/or analysis of works, exercises and problem solving.

[17] Practical demonstration, exercise, experiment.

[18] Case study, demonstration, exercise, error analysis, etc.

COURSE SYLLABUS

Academic year 2025-2026

1. Programme information

1.1 Higher Education Institution	"Gheorghe Asachi" Technical University of Iași
1.2 Faculty	Faculty of Civil Engineering and Building Services
1.3 Department	Civil and Industrial Engineering
1.4 Field of study	Civil Engineering
1.5 Level of study[1]	Bachelor's degree
1.6. Study programme	Inginerie civilă (în limba engleză)/ Civil Engineering - ICE

2. Course information

2.1.1 Course title				Rezistența Materialelor 2 Strength of Materials 2			
2.1.2. Course code				CE205			
2.2 Lecture instructor				Associate Professor Ionuț - Ovidiu TOMA, PhD			
2.3 Seminar instructors				Associate Professor Ionuț - Ovidiu TOMA, PhD Lecturer Georgiana BUNEA, PhD Lecturer Sergiu - Mihai ALEXA - STRATULAT, PhD			
2.4 Year of study[2]	2	2.5 Semester[3]	3	2.6 Assessment method[4]	E	2.7 Course type[5]	DI

3. Estimated total time (hours per semester)

3.1 Number of hours per week	5	3.2 lecture	3	3.3a seminar	2	3.3b laboratory		3.3c project		3.3.d practical sessions	
3.4 Total number of hours in the curriculum[6]	70	3.5 lecture	42	3.6a seminar	28	3.6b laboratory		3.6c project		3.6.d	

Workload distribution [7]	No. of hours
Study based on textbook, course material, reading list and notes	40
Additional research in the library, on specialised electronic platforms, and in the field40	20
Preparation for seminar/laboratory/project session, assignments, papers, and portfolios20	20
Assessment[8]20	5
Other activities:	

3.7 Total number of individual study hours[9]	80
3.8 Total number of hours per semester[10]	150
3.9 Number of ECTS credits	6

4. Prerequisites (if applicable)

4.1 Curriculum prerequisites[11]	CE116/ Strength of Materials 1
4.2 Learning outcomes prerequisites	Plot the diagrams of internal forces on statically determined linear elements for simple states of loading Use the strength and stiffness conditions for checking, sizing and calculating the load-bearing capacity of linear elements (first-order analysis in the linear elastic domain) Appropriately identify simple states of loading

5. Requirements

5.1 for the lecture[12]	- Blackboard, video projector, previously printed teaching materials/ electronic format; - Students will comply with the Code of Student Rights and Obligations and the regulations provided by the Charter of the "Gheorghe Asachi" Technical University of Iasi.
5.2 for the seminar [13]	- Blackboard, video projector, pocket calculator, specific apparatus, and devices for experimental tests;

6. General objective of the course

Students will acquire the theoretical background needed to identify combined stress states such as bending with shear, eccentric tension/compression, and oblique bending. They will also develop skills in calculating bending deflections and will be able to check, design, and determine the load-carrying capacity of elements using stiffness criteria. Students will further gain knowledge and computational skills for eccentrically loaded elements, with applications in assessing stress states in vertical members (columns) and in pressures transmitted through foundation footings. The course will distinguish between elements made of materials capable of resisting both tension and compression and those made of brittle materials. In addition, students will be introduced to concepts of calculation in the elastic-plastic range and to the evaluation of stability loss in heavily compressed members.

7. Learning outcomes[14]

Knowledge	The student / graduate: - identifies the composite stress state (bending with shear force, skew bending, axial stresses with bending in one or two directions); - evaluates the distribution of normal and shear stresses on the cross-section of a linear element subjected to bending with shear force; - identifies the appropriate method for calculating linear displacements due to bending (deflections); - describes the spatial state of stress/strain, the internal forces related to each composite stress state (linear elastic domain and elastic-plastic domain); - identifies elements susceptible to loss of stability (buckling)
Skills	The student / graduate: - plots diagrams of internal forces on statically determined linear elements subjected to composite stress states (bending with shear force, skew bending, axial stresses with bending in one or two directions); - uses the strength and stiffness conditions for checking, sizing, and calculating the load-bearing capacity of linear elements; - selects the appropriate failure theory corresponding to the stress state to which a construction element is subjected as well as the type of material from which it is made; - selects and applies the appropriate support conditions for the stability calculation.
Responsibility and autonomy	The student / graduate: - complies with ethical principles, norms, and values in completing professional tasks correctly and on time, by adopting a rigorous, efficient, and responsible work strategy in decision-making and problem-solving; - integrates into workgroups and applies effective relationship-building and teamwork techniques in multidisciplinary teams across different hierarchical levels; - continually seeks information and updates knowledge in their field of activity by using appropriate and effective lifelong learning methods and techniques.

8. Teaching strategies

The teaching activities will combine participatory lectures and debates supported by PowerPoint presentations made available to students, together with demonstrations carried out on the traditional blackboard. Through this format, students actively participate in the step-by-step derivation of calculation formulas, which supports active learning grounded in mathematical logic. The presentations include images and sketches to make the material easier to understand and assimilate, and each class session will begin with a brief review of the concepts covered previously. The instructional approach also incorporates discovery learning, enabled by direct and indirect exploration of real phenomena (demonstrations), as well as action-oriented methods such as exercises, practical activities, and problem-solving tasks.

9. Content

9. 1. Lecture[15]	Teaching strategies	Time allocation
9.1.1. **Deflections of Elastic Beams:** General considerations. Direct Integration Method. Moment Area Method. Conjugate Beam Method. Step Functions. Finite Differences Method. Design According to the Stiffness Requirement.	Interactive lecture, debates, explanations	9 hours

9.1.2. **Skew Bending:** General considerations. Stress state. Neutral axis equation, extreme stresses, particular cases. Displacements. Strain Energy. Design according to strength requirement.		3 hours
9.1.3. **Eccentric Tension or Compression:** General considerations. Stress state. Neutral axis equation. Relations between neutral axis and load point of application. Extreme stresses. Particular cases. Strain state. Displacements. Strain energy. Design according to the strength requirement. Central core. Active area.		6 hours
9.1.4. **Combined Tension/Compression, Skew Bending and Torsion:** General considerations. Stress state: normal and shear stresses. Strain state. Displacements. Strain energy. Design according to the strength requirement.	Interactive lecture, debates, explanations	3 hours
9.1.5. **Plastic Analysis**: Introduction. Assumptions. Axially loaded bars and systems of bars. Torsion of bars with circular cross-section. Pure bending (singly and doubly symmetrical sections).		6 hours
9.1.6. **Buckling Analysis:** General considerations. Buckling of axially loaded bars in the elastic and plastic range. Lateral buckling of beams. Slender beams subjected to combined compression and bending.		6 hours
9.1.7. **Three-Dimensional Stress and Strain. Generalized Hooke's Law:** General considerations. Stresses on an inclined plane passing through the point. Principal stresses and directions. Extreme shear stresses. Lame's ellipsoid. Mohr' Circles. Octahedral stresses. The spherical and deviatoric stress tensors. Strains along different directions. Principal strains. Maximum shear strain. Octahedral strains. Mohr's circles. Generalized Hooke's law.		5 hours
9.1.8. **Failure Theories:** General considerations. Maximum Normal Stress Theory. Maximum Axial Strain Theory. Maximum Shear Stress Theory. The Distortional Strain Energy Theory. Mohr's Theory.		4 hours

Reading list for the lecture:
1. Clyne, T. W., & Campbell, J. E. (2021). Testing of the Plastic Deformation of Metals. Cambridge: Cambridge University Press
2. Vrabie M., Ibănescu M., Toma I.O., Băetu S.A., Chițan V.E. (2018), Rezistența materialelor. Culegere de probleme. Solicitări Compuse. Ediție bilingvă româno-engleză, Ed. Societății Academice "Matei-Teiu Botez "
3. Dupen B., (2016), Applied Strength of Materials in Engineering Technology, Indiana University, Purdue University Fort Wayne
4. Hibbeler R.C., (2016), Mechanics of Materials (10th edition), Publisher: Pearson, (free access).
5. Murărașu V., Venghiac V.M., (2015), Stabiliatea barelor comprimate, Ed. Societății Academice "Matei-Teiu Botez "
6. Ibănescu M., Toma I.O., (2013), Mechanics of Materials. Advanced, Ed. Societății Academice „Matei-Teiu Botez" Iași
7. Murărașu V., (2010), Rezistența materialelor, vol. 1, Ed. Societății Academice „Matei-Teiu Botez", Iași
8. Vrabie M., (2010), Rezistența materialelor II – solicitări compuse, suport de curs în format electronic
9. Precupanu D., (2009), Fundamente de Rezistența construcțiilor, Ed. Politehnium, Iași
10. Precupanu D., Ibănescu M., (2006), Strength of Materials – Theory Synthesis and Engineering Applications, Ed. Ștef, Iași

9.2a Seminar	Work methods[16]	Observations, allotted time
9.2a.1. **Compound Steel Beams Subjected to Combined Shear and Bending:** Design of beams made of steel rolled shapes connected by welding or bolts.		4 hours
9.2a.2. **Deflections of Elastic Beams:** Evaluation of deflections and slopes for beams by using analytical methods (Direct Integration Method, Moment Area Method, Conjugate Beam Method, Step Function, Mohr-Maxwell Method) and numerical methods.		6 hours
9.2a.3. **Skew Bending:** Design of a beam according to strength and stiffness requirements. The loads are located in a single inclined plane; The loads are located in two orthogonal planes.		2 hours
9.2a.4. **Eccentric Compression:** Design of a structural element according to the strength requirement (neutral axis, diagrams of normal stresses, central core assesment, active area extension in case of materials weak in tension).	Solving Exercises, Debates, Explanations	6 hours
9.2a.5. **Plastic Analysis:** a) Analysis of a bar subjected to torsion (elastic load, ultimate load, shape coefficient, residual stresses). b) Analysis of statically determinate and indeterminate beams (elastic load, ultimate load, shape coefficient, residual stresses).		2 hours
9.2a.6. **Buckling Analysis of Axially Loaded Members:** Buckling analysis of a member subjected to concentric compression according to SR EN 1993-1-1 (checking the requirement, selection of required dimensions, assessment of carrying capacity).		6 hours
9.2a.7. **Failure Theories:** Applications of failure theories in the design of structural elements, made of ductile or brittle materials, subjected to combined states of loading.		2 hours

Reading list for the seminar:
1. Vrabie M., Ibănescu M., Toma I.O., Băetu S.A., Chițan V.E., (2018), Rezistența materialelor. Culegere de probleme. Solicitări Compuse. Ediție bilingvă româno-engleză, Ed. Societății Academice "Matei-Teiu Botez "
2. Dupen B., (2016), Applied Strength of Materials in Engineering Technology, Indiana University, Purdue University Fort Wayne
3. Hibbeler R.C., (2016), Mechanics of Materials (10th edition), Publisher: Pearson, (free access)
4. Murărașu V., Venghiac V.M., (2015), Stabiliatea barelor comprimate, Ed. Societății Academice "Matei-Teiu Botez"
5. Ibănescu M., Toma I.O., (2013), Mechanics of Materials. Advanced, Ed. Societății Academice „Matei-Teiu Botez," Iași
6. Precupanu D., Ibănescu M., (2006), Strength of Mat. – Theoretical Synthesis and Engineering Applications, Ed. Ștef, Iași.

10. Assessment

Assessment category	10.1 Assessment criteria	10.2 Assessment method		10.3 Percentage of final grade
10.4 Final exam	Completeness and accuracy of knowledge; Logical coherence, fluency, and strength of argumentation; Capacity for analysis, personal interpretation, originality, and creativity; Level of command of specialised terminology and communication skills Ability to apply acquired skills Ability to process data and solve the problems presented	- systematic observation of students (individual or group assignments – which must be completed during the week between lectures, preparation of a report, case study)		70%
		- formative assessment test (tests during the semester)		
		- summative assessment test (final assessment)	100% (min. 5)	
10.5a Seminar	Ability to apply acquired knowledge Capacity for analysis, personal interpretation, originality, creativity	- active participation in the activities - assessment test		30%

10.6 Passing requirements
- correct identification of the composite stress state and application of appropriate strength / stiffness / stability conditions;
- calculation of elastic displacements in the case of statically determined beams;
- plotting the normal stress diagrams on the section of an element subjected to axial force with bending in one or two directions (eccentric tension / compression);
- calculation of the capable force in the elastic-plastic domain of material behaviour.

The final grade for a course is determined by taking into account the scores and weightings assigned to each course activity. Whole-number grades from 10 to 1 will be awarded, with a grade of 5 certifying the achievement of the minimum learning outcomes required for the course and the awarding of the corresponding ECTS credits.

Date of completion: September 2025

Lecture instructor: Assistant Professor Ionuț - Ovidiu TOMA, PhD

Seminar instructors: Assistant Professor Ionuț - Ovidiu TOMA, PhD

                                                                              Lecturer Georgiana BUNEA, PhD

                                                                              Lecturer Sergiu-Mihai ALEXA-STRATULAT, PhD

Date of departmental approval: Head of Department,
September 2025   Lecturer Mircea - Vasile VENGHIAC, PhD

Date of faculty council approval: Dean,
September 2025   Professor Andrei BURLACU, PhD

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[1] Bachelor's/ Master's degree.
[2] 1-4 for bachelor's degree, 1-2 for master's degree.
[3] 1-8 for bachelor's degree, 1-4 for master's degree.
[4] Exam (E), test (T) – from the curriculum.
[5] DOB – compulsory course, DOP– elective course, DFA– optional course;
[6] It is equal to 14 weeks **x** the number of hours indicated in section 3.1 (similarly for 3.5, 3.6abc).
[7] The lines below refer to individual study; the total is indicated in section 3.7.
[8] Between 2 and 6 hours. These represent teaching hours and are not included in individual study.
[9] Sum of the values from the previous lines, referring to individual study.
[10] Sum of direct contact hours (3.4) and individual study hours (3.7); this must equal the number of credits allocated to the course (section 3.9) × 25 hours per credit.
[11] Courses that must be completed beforehand or equivalent courses.
[12] Blackboard, projector, flipchart, specific teaching materials, etc.
[13] Computing equipment, software packages, experimental setups, etc.
[14] Learning outcomes presented as knowledge, skills, responsibility, and autonomy specific to the course. These should be correlated with the learning outcomes in fundamental and bachelor's degree fields (Annex 2 of ARACIS Specific Standards, www.aracis.ro/wp-content/uploads/2025/04/Standarde-specifice-programe-de-studii-universitare-de-licenta_aprilie-2025.pdf). For master's programmes, learning outcomes correspond to level 7 of the National Qualifications Framework (CNC).
[15] Chapter and paragraph titles.
[16] Discussions, debates, presentation and/or analysis of works, exercises and problem solving.
[17] Practical demonstration, exercise, experiment.
[18] Case study, demonstration, exercise, error analysis, etc.

COURSE SYLLABUS

Academic year 2025-2026

1. Programme information

1.1 Higher Education Institution	"Gheorghe Asachi" Technical University of Iași
1.2 Faculty	Faculty of Civil Engineering and Building Services
1.3 Department	Civil and Industrial Engineering
1.4 Field of study	Civil Engineering
1.5 Level of study[1]	Bachelor's degree
1.6. Study programme	Inginerie civilă (în limba engleză)/ Civil Engineering - ICE

2. Course information

2.1.1 Course title	**Topografie** **Surveying**						
2.1.2. Course code	CE206						
2.2 Lecture instructor	Lecturer Daniel COVATARIU, PhD						
2.3 Laboratory	Lecturer Daniel COVATARIU, PhD						
2.4 Year of study[2]	2	2.5 Semester[3]	3	2.6 Assessment method[4]	E	2.7 Course type[5]	DD

3. Estimated total time (hours per semester)

3.1 Number of hours per week	4	3.2 lecture	2	3.3a seminar	-	3.3b laboratory	2	3.3c project	-	3.3.d practical sessions	
3.4 Total number of hours in the curriculum[6]	56	3.5 lecture	28	3.6a seminar	-	3.6b laboratory	28	3.6c project	-	3.6.d	

Workload distribution [7]	No. of hours
Study based on textbook, course material, reading list and notes	5
Additional research in the library, on specialised electronic platforms, and in the field	5
Preparation for seminar/laboratory/project session, assignments, papers, and portfolios	9
Assessment[8]	3
Other activities:	

3.7 Total number of individual study hours[9]	19
3.8 Total number of hours per semester[10]	75
3.9 Number of ECTS credits	3

4. Prerequisites (if applicable)

4.1 Curriculum prerequisites[11]	
4.2 Learning outcomes prerequisites	Mathematical Analysis, Geometry, Trigonometry, Technical Drawing

5. Requirements

5.1 for the lecture[12]	
5.2 for the laboratory[13]	

6. General objective of the course

SURVEYING is the science of determining the locations of natural and artificial structures on/near the surface of the ground (using the coordinates of the topographic points), using instruments, calculation methods and practical procedures specific to the domain. All of these are presented on site plans or topographic plans produced or used by the civil engineer to position or locate a structure / construction on the ground. This often involves the manipulation and subsequent analysis of data for the design and planning of a variety of engineering works.

SURVEYING involves theoretical and practical knowledge of instruments, devices and methods for measuring angles, distances, areas, in order to obtain (by rigorous calculation) or to plot the spatial position of the characteristic points of an engineering structure. Also, measurements/evaluations of deformations and/or displacements are necessary for monitoring the operational behaviour of the structure.

Upon completion of the course, students will be able to:
- design and organize a surveying process (including estimating the likely errors that may occur);
- perform instrument checks to ensure that it complies with specifications;
- apply basic surveying techniques and area reconnaissance to determine the best possible methods to apply;
- establish the position of a building structure on the ground;
- In-time monitor the behaviour of a building structure, using specific surveying methods.

7. Learning outcomes [14]

Knowledge	The student/ graduate: - identifies and evaluates the constructive composition of different categories of constructions and their locations, for the purpose of drawing up and using specific technical documentation (location plans, alignments topographic profiles, etc.); - formulates and explains the physical and mathematical principles used in determining spatial shapes and positions; explains the principles and functioning of the instruments used in Surveying; - describes graphic representations and explains how to draw up topographic plans.
Skills	The student/ graduate: - collects and manages information regarding the location of the construction, in order to use and understand it within the technical projects, operates with physical and mathematical principles to determine spatial shapes and positions and with reference and projection systems and examines correlations between them. - operates with topo-geodetic instruments to carry out terrestrial measurements in order to measure and check construction elements, to produce the drawings for the technical projects. - carries out specific topographic surveys necessary for the development of the drawings of the technical projects (sketches, surveys, topographic plans / thematic plans, graphics). - carries out topographic layout-ing for the transposition of engineering projects into the field. - selects and applies concepts, principles and methods to carry out the calculations necessary for graphic representations and those specific to the monitoring of engineering structures' behaviour.
Responsibility and autonomy	The student/ graduate: - selects and uses bibliographic sources specific to the field. - demonstrates autonomy in learning on issues specific to the field. - integrates into the work group and applies techniques for effective communication and work in multidisciplinary teams, on various hierarchical levels; - is constantly informed and documented in his/her own field of activity through the appropriate use of bibliographic methods

8. Teaching strategies

The teaching activity will use participatory lectures based on Power Point presentations that will be made available to students. The presentations contain images, multimedia presentations, sketches and drawings, so that the information is easy to understand and assimilate.

The teaching activity is complemented by action-based methods, such as exercise, practical activities and problem solving, as well as bibliographic study in the library.

9. Content

9. 1. Lecture[15]	Teaching strategies	Time allocation
9.1.1. Introduction and course objectives; The importance of Surveying for Civil Engineers and the national economy; Time line of land measurements	Documented presentation, interactive lecture, discussions, additional explanations	2 hours
9.1.2. Fundamental notions: Shape and dimensions of the Earth; Position of a point on the globe's surface; Projection of points in Geodesy and Surveying; Basic on cartographic projections; Topographic elements of the terrain; Grid bearings and reference systems; Axes and coordinates; Plans and maps; Metric scales; Slope of the terrain; Classification and sources of measurement errors; Propagation of errors. Gauss' curve		6 hours
9.1.3 Planimetry: Marking and signalling of topographic points; Measuring angles; Presentation of the components of an digital theodolite; Electronic theodolite - total stations; Measuring horizontal angles; Measuring vertical angles; Direct measurement of distances; Reducing distances to the horizon; Support networks of planimetric surveying; Triangulation networks; Density of points in the support network through intersections: forward and		6 hours

	Work methods[16]	Observations, allotted time
backward (retro-intersection) and combined; Planimetric surveying method; Tachymetric surveying method; Total station surveying method; Drawing-up the topographic plans; Preparation of topographic plans; Surfaces areas determination; Graphical methods; Mechanical methods; Numerical methods.	Documented presentation, interactive lecture, discussions, additional explanations	
9.1.4. Levelling: Types of levelling; Support networks of levelling; Marking of levelling points; Geometric levelling; Geometric levelling traverse's method; Detail points levelling method; Trigonometric levelling surveying method; Relief representation systems; Topographic profile method		4 hours
9.1.5 Surveying's applications applied in Civil Engineering: Main categories of applied topography works; Topographic works for construction design; Topographic documentation required in the study - design phase; Topographic works for the field application of construction projects; Topographic preparation of the project for application on the ground; Support networks for layout; Determination of the topographic elements of the project for their application on the ground; Layout-ing of the of the project topographic elements on the ground; Laying horizontal angles; Field tracing of distances; Field tracing of given slope lines; Building tracing; Geometric levelling method; Trigonometric levelling method; Laying-out the roads curves; Geometric elements of circular curves; Topographic procedures for the monitoring of the constructions in-time behaviour.		10 hours

Reading list for the lecture:
1. Daniel Covatariu, "Surveying", Editura Societății Academice „Matei-Teiu Botez" Iași, ISBN 978-606-582-139-2, 2019;
2. William Irvin, Finlay Maclennan, "Surveying for Construction", ISBN-13: 978-0077111144, Mc Graw Hill, 5th edition, 2006;
3. James M Anderson, Edward M Michail, "Surveying - Theory and Practice", ISBN 0-07-015914-9, 7th edition, 1998;
4. Jan Van Sickle, "1001 Solved Surveying Fundamentals Problems", ISBN 1-888577-12-6, 2nd edition, 1997;
5. Michael Lanzafama, Philip Kissam, Jerry Nathanson, "Surveying Fundamentals and Practices", ISBN-13: 978-0135000373, Pearson Practice Hall Education International, 6th edition, 2011;
6. Barry Kavanagh, "Surveying. Principle and Applications", ISBN -13-978-0-13-814980-2, 8th edition, 2009;
7. Barry Kavanagh, "Surveying with Construction Applications", ISBN 13-978-013-136937-5, 7th edition, 2010
8. W. Schofield, M. Breach, "Engineering Surveying", ISBN 13-978-0-7506-6949, 6th edition, 2007
9. Paul R. Wolf, Charles D. Ghilani, "Elementary Surveying: An Introduction to Geomatics," ISBN 0-13-148189-4, 13th ed., 2006

9.2b Laboratory	Work methods[16]	Observations, allotted time
Labour Protection Rules to be respected on the laboratory and in-situ. Recapitulation of some trigonometrically notions. The topographic circle rules.	Discussions, explanations, Presentation and use of equipment, Case studies, Application solutions, Results interpretations	2 hours
Assignment 1: Topographic basic elements calculus. The relative and absolute spatial coordinates of a topographic point. The ground and horizontal distances calculus.		2 hours
Assignment 2: Planimetric and levelling notions solved on maps / plans.		4 hours
Assignment 3: The theodolite study. Main parts and devices. The setting-up in station point. Aiming the point. Readings and recording of its.		2 hours
Assignment 4: The angle and distances measurement by using the tacheometer		2 hours
Assignment 5: The drawing-up a terrain surface using planimetric traverse methods combined with radiation points. The topographic plan drawing-up and surface calculus.		4 hours
Assignment 6: The study of the levelling instrument. The levelling procedures.		2 hours
Assignment 7: The levelling methods study. The relief representation on the plans. Topographic profile.		4 hours
Assignment 8: Topographic preparation of a Civil Engineering project in order to set-up on the ground (layout)**.** The setting-up of the basic topographic elements (angles, distances, quotas, inclined distances, zero-quota of a building).		4 hours
Final evaluation of the assignments.		2 hours

Reading list for the laboratory:
1. Covatariu Daniel, Roșu Ana Raluca, "*Land Surveying used in Civil Engineering*"; Editura Societății Academice „Matei - Teiu Botez" Iași, ISBN 978-606-582-001-2, 2011
2. Manuela Nicolae-Poșescu, "Topographie (ediție bilingvă) Note de curs, Lucrări practice și dicționar pentru studenți", vol. 1, Editura MatrixRom București, 1999

10. Assessment

Assessment category	10.1 Assessment criteria	10.2 Assessment method	10.3 Percentage of final grade
10.4 Final examination	- Completeness and correctness of knowledge. - Logical coherence, fluency, argumentative force; Capacity for analysis, personal interpretation.	Final evaluation: Solving a written test on the topic of the taught subject (with oral additions, if applicable)	70 %

	- Degree of assimilation of specialized language and communication ability. - Ability to capitalize on acquired skills. - Ability to process data and stated problems.		
10.5b Laboratory	- Evaluation of the activity carried out through the calculation and practical tasks performed - The ability to apply in practice, in different contexts, the knowledge learned. - The ability to analyse, personal interpretation, originality, creativity.	Evaluation of the results of individual assignments (writing, calculations, and graphs) by completing a 10-question quiz; Practical demonstration (use of specific tools); Systematic observation of students during practical applications.	30 %

10.6 Passing requirements
- Identifying, understanding, and correctly interpreting the topics covered in the final examination, as well as approaching their solution in accordance with the regulations and the topics taught in the course/laboratory.
- Correct use of specialized technical terminology specific to the field.
- Compliant solution of individual homework assignments (correctly and completely) according to the requirements imposed by the given assignments and the regulations in force.

The final grade for a course is determined by taking into account the scores and weightings assigned to each course activity. Whole-number grades from 10 to 1 will be awarded, with a grade of 5 certifying the achievement of the minimum learning outcomes required for the course and the awarding of the corresponding ECTS credits.

Date of completion: September 2025

Lecture instructor: Lecturer Daniel COVATARIU, PhD

Seminar instructors: Lecturer Daniel COVATARIU, PhD

Date of departmental approval: Head of Department,
September 2025   Lecturer Ioana - Sorina ENȚUC, PhD

Date of faculty council approval: Dean,
September 2025   Professor Andrei BURLACU, PhD

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[1] Bachelor's/ Master's degree.

[2] 1-4 for bachelor's degree, 1-2 for master's degree.

[3] 1-8 for bachelor's degree, 1-4 for master's degree.

[4] Exam (E), test (T) – from the curriculum.

[5] DOB – compulsory course, DOP– elective course, DFA– optional course;

[6] It is equal to 14 weeks x the number of hours indicated in section 3.1 (similarly for 3.5, 3.6abc).

[7] The lines below refer to individual study; the total is indicated in section 3.7.

[8] Between 2 and 6 hours. These represent teaching hours and are not included in individual study.

[9] Sum of the values from the previous lines, referring to individual study.

[10] Sum of direct contact hours (3.4) and individual study hours (3.7); this must equal the number of credits allocated to the course (section 3.9) × 25 hours per credit.

[11] Courses that must be completed beforehand or equivalent courses.

[12] Blackboard, projector, flipchart, specific teaching materials, etc.

[13] Computing equipment, software packages, experimental setups, etc.

[14] Learning outcomes presented as knowledge, skills, responsibility, and autonomy specific to the course. These should be correlated with the learning outcomes in fundamental and bachelor's degree fields (Annex 2 of ARACIS Specific Standards, www.aracis.ro/wp-content/uploads/2025/04/Standarde-specifice-programe-de-studii-universitare-de-licenta_aprilie-2025.pdf). For master's programmes, learning outcomes correspond to level 7 of the National Qualifications Framework (CNC).

[15] Chapter and paragraph titles.

[16] Discussions, debates, presentation and/or analysis of works, exercises and problem solving.

[17] Practical demonstrations, exercise, experiment.

[18] Case study, demonstration, exercise, error analysis, etc.

COURSE SYLLABUS

Academic year 2025-2026

1. Programme information

1.1 Higher Education Institution	"Gheorghe Asachi" Technical University of Iași
1.2 Faculty	Faculty of Civil Engineering and Building Services
1.3 Department	Department of Civil and Industrial Engineering (CCI)
1.4 Field of study	Civil Engineering
1.5 Level of study[1]	Bachelor's degree
1.6. Study programme	Inginerie civilă (în limba engleză)/ Civil Engineering - ICE

2. Course information

2.1.1 Course title	**Economie generală** **General economics**				
2.1.2. Course code	CE207				
2.2 Lecture instructor	Lecturer Anca BUTNARIU, PhD				
2.3 Laboratory instructor					
2.4 Year of study[2]	2	2.5 Semester[3]	3	2.6 Assessment method[4] C	2.7 Course type[5] DI

3. Estimated total time (hours per semester)

3.1 Number of hours per week	1	3.2 lecture	1	3.3a seminar		3.3b laboratory		3.3c project		3.3.d practical sessions	
3.4 Total number of hours in the curriculum[6]	14	3.5 lecture	14	3.6a seminar		3.6b laboratory		3.6c project		3.6.d	

Workload distribution [7]	No. of hours
Study based on textbook, course material, reading list and notes	16
Additional research in the library, on specialised electronic platforms, and in the field	10
Preparation for seminar/laboratory/project session, assignments, papers, and portfolios	10
Assessment[8]	4
Other activities:	-

3.7 Total number of individual study hours[9]	36
3.8 Total number of hours per semester[10]	50
3.9 Number of ECTS credits	2

4. Prerequisites (if applicable)

4.1 Curriculum prerequisites[11]	
4.2 Learning outcomes prerequisites	

5. Requirements

5.1 for the lecture[12]	Blackboard, projector; Educational platforms as Google Meet, Microsoft Teams, Zoom with academic subscription; computer/ laptop, video camera, microphone, speaker/earbuds, internet connection – for online synchronic lecture, when required; Students will comply with the Student Rights and Obligations Code and with the regulations of the University Charter of the "Gheorghe Asachi" Technical University of Iași.
5.2 for the seminar[13]	

6. General objective of the course

Students will achieve knowledge of basic economic concepts and entrepreneurial competences necessary in their activity as employees or entrepreneurs.

Formular PO.DID.04 L-F2 E3R0

Students will understand the basic economic concepts and theories necessary for carrying out feasibility analysis

Students will understand the concept of market and economic cyclicity, economic, social, and ecologic efficiency, thus being prepared to perform in a business and technical environment

Students will achieve entrepreneurial abilities that will help them transpose business ideas into economic projects

Students will achieve knowledge about the means of reducing costs and increase efficiency at team, project, and company level.

7. Learning outcomes[14]

Knowledge	The student /graduate: - understands the basic economic concepts: the student will be able to explain fundamental economic concepts, as demand and offer, production costs, competitive and non-competitive markets, market equilibrium, inflation, unemployment etc.; - is able to compute costs and profit ratios and the net present value of investments; - understands and explains important economic theories (micro and macroeconomic theory, economic growth, and development); - will achieve knowledge on the instruments of economic policy used by governments and central banks, as fiscal policy, monetary policy etc.; - evaluates the impact of these policies on consumers, companies, and economy.
Skills	The student /graduate: - collects, organizes, and analyzes economic data in order to obtain useful information for running a business or enhancing his technical competences in projecting or execution activities. - will be able to manage economic information flows; - analyses multiple sources and extract relevant data for problem solving; - performs cost-benefit analysis for investment projects; - applies economic theory in practice: the student will be able to apply economic concepts in real life, as establishing prices, market analysis, costs optimization, economic performance assessment; - will be able to make well supported economic decisions, using data and models;
Responsibility and autonomy	The student /graduate: - assumes his own learning process: He will learn to be responsible about his academic progress, to establish clear learning objectives and to organise his time and resources to reach them. This includes active participation at courses, individual reading and studying, doing homework and projects at time; - complies with the time factors for delivering academic papers, research reports, or other activities: This means efficient time management and avoid procrastination. - will comply with the principles, norms, and ethical values in executing professional tasks; - solves economic problems independently by applying economic concepts in an autonomous manner, without depending exclusively on the professor or his colleagues, showing flexibility and adaptability in his activity; - develops independent economic opinions based on research and critical analysis of economic theories. He/she will be able to argue in a rational way about the complex economic problems and will develop his/her own economic view.

8. Teaching strategies

The teaching activities will include interactive lectures and debates based on PowerPoint presentations that will be made available to students.

The presentations contain images and diagrams, so that the information could be easily understood and assimilated. Each lecture will begin with a brief review of the concepts covered in the previous class.

The teaching approach uses discovery-based learning models, facilitated by direct and indirect exploration of reality (demonstrations, modelling), as well as action-based methods, such as exercises, practical activities, problem-solving).

9. Content

9. 1. Lecture[15]	Teaching strategies	Time allocation

9.1.1. Introduction in economic theory. Economic system content and structure. Economic agents in market economy system.	Interactive lecture, debates, explanations	1 hour
9.1.2. Factors of production. Human resources. Natural resources. The circuit of capital in industrial companies.		2 hours
9.1.3. Demand and supply. The market mechanism and its role in regulating economic activity.		2 hours
9.1.4. Production cost. Cost structure for real estate and civil engineering companies.		2 hours
9.1.5. The profit and the company's profitability and break-even point. Productivity – form of economic efficiency.		2 hours
9.1.6. Labor market. Nominal and real salary. Unemployment.		1 hour
9.1.7. Money market. Interest rate. Inflation. Net present value.		2 hours
9.1.8. Macroeconomic indicators. Income, consumption, savings.		1 hour
9.1.9. Macroeconomic policies. Economic growth and development.		1 hour

Reading list for the lecture:
1. Butnariu A., General economics, lecture content, Google Classroom, https//classroom.google.com/c/NDEyNjI1MjM1ODYy 2025
2. Zai, P., Lazăr D., Inceu A., Economics and public finance, ed. Tritonic, Bucureşti, 2013
3. Naqvi, S., Economics of development, Sage Publications, New Delhi, 2015
4. Doltu C., Economics, microeconomics and macroeconomics, ed. ASE, Bucureşti, 2004.

10. Assessment

Assessment category	10.1 Assessment criteria	10.2 Assessment method		10.3 Percentage of final grade
10.4 Final exam	Completeness and accuracy of knowledge; Logical coherence, fluency, and strength of argumentation Capacity for analysis, personal interpretation, originality, and creativity; Level of command of specialised terminology and communication skills; Ability to apply acquired skills; Ability to process data and solve the problems presented	- systematic observation of students (individual or group assignments – which must be completed during the week between lectures, preparation of a report, case study)	40%	100%
		- summative assessment test (final assessment)	60%	
10.6 Passing requirements				
The final grade for a course is determined by taking into account the scores and weightings assigned to each course activity. Whole-number grades from 10 to 1 will be awarded, with a grade of 5 certifying the achievement of the minimum learning outcomes required for the course and the awarding of the corresponding ECTS credits.				

Date of completion: September 2025

Lecture instructor: Lecturer Anca BUTNARIU, PhD

Date of departmental approval: Head of Department,
September 2025   Lecturer Cătălin ONUȚU, PhD

Date of faculty council approval: Dean,
September 2025   Professor Andrei BURLACU, PhD

Bachelor's/ Master's degree.
[2] *1-4 for bachelor's degree, 1-2 for master's degree.*
[3] *1-8 for bachelor's degree, 1-4 for master's degree.*
[4] *Exam (E), test (T) – from the curriculum.*
[5] *DOB – compulsory course, DOP– elective course, DFA– optional course;*
[6] *It is equal to 14 weeks x the number of hours indicated in section 3.1 (similarly for 3.5, 3.6abc).*
[7] *The lines below refer to individual study; the total is indicated in section 3.7.*
[8] *Between 2 and 6 hours. These represent teaching hours and are not included in individual study.*
[9] *Sum of the values from the previous lines, referring to individual study.*
[10] *Sum of direct contact hours (3.4) and individual study hours (3.7); this must equal the number of credits allocated to the course (section 3.9) × 27 hours per credit.*
[11] *Courses that must be completed beforehand or equivalent courses.*
[12] *Blackboard, projector, flipchart, specific teaching materials, etc.*
[13] *Computing equipment, software packages, experimental setups, etc.*
[14] *Learning outcomes presented as knowledge, skills, responsibility, and autonomy specific to the course. These should be correlated with the learning outcomes in fundamental and bachelor's degree fields (Annex 2 of ARACIS Specific Standards, www.aracis.ro/wp-content/uploads/2025/04/Standarde-specifice-programe-de-studii-universitare-de-licenta_aprilie-2025.pdf). For master's programmes, learning outcomes correspond to level 7 of the National Qualifications Framework (CNC).*

[15] *Chapter and paragraph titles.*

[16] *Discussions, debates, presentation and/or analysis of works, exercises and problem solving.*

[17] *Practical demonstration, exercise, experiment.*

[18] *Case study, demonstration, exercise, error analysis, etc.*

COURSE SYLLABUS

Academic year 2025-2026

1. Programme information

1.1 Higher Education Institution	"Gheorghe Asachi" Technical University of Iași
1.2 Faculty	Faculty of Civil Engineering and Building Services
1.3 Department	Civil and Industrial Engineering
1.4 Field of study	Civil Engineering
1.5 Level of study[1]	Bachelor's degree
1.6. Study programme	Inginerie civilă (în limba engleză)/ Civil Engineering - ICE

2. Course information

2.1.1 Course title			**Educație fizică 3** **Physical Training 3**			
2.1.2. Course code			CE208			
2.2 Lecture instructor						
2.3 Seminar instructor			Lecturer Ady-Constantin RANCEA, PhD			
2.4 Year of study[2]	2	2.5 Semester[3]	3	2.6 Assessment method[4]	Vp	2.7 Course type[5]	DI

3. Estimated total time (hours per semester)

3.1 Number of hours per week	1	3.2 lecture		3.3a seminar	1	3.3b laboratory		3.3c project		3.3.d practical sessions	
3.4 Total number of hours in the curriculum[6]	14	3.5 lecture		3.6a seminar	14	3.6b laboratory		3.6c project		3.6.d	

Workload distribution [7]	No. of hours
Study based on textbook, course material, reading list and notes	8
Additional research in the library, on specialised electronic platforms, and in the field	3
Preparation for seminar/laboratory/project session, assignments, papers, and portfolios	
Assessment[8]	2
Other activities:	

3.7 Total number of individual study hours[9]	11
3.8 Total number of hours per semester[10]	25
3.9 Number of ECTS credits	1

4. Prerequisites (if applicable)

4.1 Curriculum prerequisites[11]	
4.2 Learning outcomes prerequisites	

5. Requirements

5.1 for the lecture[12]	
5.2 for the seminar[13]	Synthetic football field, tennis courts, gyms; Fitness rooms, specific materials Students must comply with the Student Rights and Obligations Code and with the regulations of the University Charter of the "Gheorghe Asachi" Technical University of Iași.

6. General objective of the course

*The main objective of the **Physical Training 2** course is to increase the students' physical and intellectual capacity, to stimulate the independent practice of physical exercise and to improve basic motor skills. The aim is to strengthen the health and harmonious development of the young people's body, to acquire and consolidate some basic elements and procedures in athletics, gymnastics, sports games, fitness, their application in bilateral games or individual activities; to learn some basic notions related to the regulations for holding various sports competitions.*

7. Learning outcomes [14]

Knowledge	The student/ graduate: - understands basic concepts regarding the rules and techniques of sports games and gymnastic exercises; - knows the structure and purpose of the main physical exercises and sports practiced within physical education disciplines; - understands the role of physical activity in the physical and mental balance necessary for a demanding engineering career;
Skills	The student/ graduate: - Is able to correctly apply technical and tactical elements from athletics, gymnastics, sports games, or fitness; - Actively participate in exercises and applicative games to develop basic motor skills; - Demonstrates physical skills and coordination in the execution of individual or group exercises; - Adapts physical effort to one's own abilities and contributes to team sports activities
Responsibility and autonomy	The student/ graduate: - Demonstrates responsibility in complying with regulations, safety standards, and teacher instructions; - Demonstrates autonomy in practicing physical exercise outside of class; - Assumes correct and collaborative behaviour in collective sports activities; - Raises awareness of the importance of physical education in long-term personal and professional development.

8. Teaching strategies

The teaching activity is performed through demonstrations and exercises.

9. Content

9. 1. Lecture[15]	Teaching strategies	Time allocation
Reading list for the lecture:		
9.2a Seminar	Work methods[16]	Observations, allotted time
1. Sports games: basketball, handball, football, volleyball, badminton: - fundamental positions, positioning, and movement on the field; - simple kicks, services, exercises for receiving, catching, and passing the ball from a standing position and from running; exercises for completing basic technical and technical-tactical actions, marking, and marking exercises; - overall participation in games on small and normal fields with effective differences	Physical activities Exercises and applicative games	7 hours
2. Improving basic motor skills and those specific to certain sports, through the use of bodybuilding, athletics, and fitness equipment: - increasing strength and muscle mass through the appropriate and individualized use of weights, dumbbells, and barbells; exercises to adjust the forms and transform fat into active mass; improving the forms of speed manifestation (reaction, repetition, movement, execution through specific exercises); - improving general coordination indices and specific skill in different specific branches; - increasing mobility and suppleness at the level of different segments Increasing running endurance		7 hours

Reading list for the seminar:
1. Brata Maria,1996, Metodica educației fizice și sportulu, vol. I, Universitatea Oradea.
2. Cârstea Gh.,1993, Teoria și Metodica Educației fizice și sportulu , Editura Universul, București.
3. Dragnea A. și col.,2006, Eduație fizică și sport – teorie si didactica, Editura FEST, București.
4. Dragnea, A., Bota, A., 1999, Teoria activităților motrice, Editura Didactica și Pedagogica, R.A., București.
5. Gaiță D.,Merghes P.; 2002, Primul pas – Principii practice ale antrenamentului fizic în bolile cardiovasculare; Ed Mirton, Timisoara.
6. Hanțiu I., 2011, Teoria educației fizice și sportului, Editura Universității din Oradea, Oradea.
7. Ionescu, A., Mazilu ,V. 1971, Exercițiul fizic în slujba sănătății, Editura Stadion, Bucuresti.
8. Ionescu I.V.1995, Fotbal, Ed. Helicon, Bucuresti.
9. Maroti, Ș., 2008 Baschet, volumul I, Editura Universității din Oradea, Oradea.
10. Maroti ,Ș., 2009 Baschet. Volumul II, Editura Universității din Oradea, Oradea.
11. Merghes P,Țeghiu A., 2006; Gimnastica medicală pentru prevenirea și corectarea deficiențelor fizice; Ed Mirton, Timisoara.
12. Morun P.;1996, Curs practic de educație fizică și sport. Lito.

13. Preda O.;1995, Volei la studenţi; Ed.Mirton, Timisoara.
14. Siclovan I.,1979, Teoria educaţiei fizice şi sportului, Editura Sport - Turism, Bucureşti.
15. Teghiu A., Merghes P, 2009, Deficientele Fizice-ghid practic" Ed. Eurostampa Timisoara.
16. Teodorescu, Leon, 1973, Terminologia educaţiei fizice şi sportului, Editura Stadion, Bucuresti.
17. Ulmeanu, Constantin ,1966, Noţiuni de fiziologie cu aplicaţii la exerciţiile fizice, Editura UCFS, Bucuresti

10. Assessment

Assessment category	10.1 Assessment criteria	10.2 Assessment method	10.3 Percentage of final grade
10.5a Seminar	Ability to apply acquired knowledge Capacity for analysis, personal interpretation, originality, creativity	- active participation in the activities	100%

10.6 Passing requirements
The student passes the course on Physical Training I if he demonstrates fundamental practical skills in athletics, gymnastics, sports games, and bodybuilding/ fitness, respectively the ability to correctly and efficiently execute specific techniques, to actively participate in sports activities and to improve his basic and specific motor qualities through individualized training.
Whole-number grades from 10 to 1 will be awarded, with a grade of 5 certifying the achievement of the minimum learning outcomes required for the course and the awarding of the corresponding ECTS credits.

Date of completion: September 2025

Lecture instructor: -

Seminar instructors: Lecturer Ady-Constantin RANCEA, PhD

Date of departmental approval: Head of Department,
September 2025   Associate Professor Gabriel ASANDULUI, PhD

Date of faculty council approval: Dean,
September 2025   Professor Andrei BURLACU, PhD

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[1] Bachelor's/ Master's degree.

[2] 1-4 for bachelor's degree, 1-2 for master's degree.

[3] 1-8 for bachelor's degree, 1-4 for master's degree.

[4] Exam (E), test (T) – from the curriculum.

[5] DOB – compulsory course, DOP– elective course, DFA– optional course;

[6] It is equal to 14 weeks x the number of hours indicated in section 3.1 (similarly for 3.5, 3.6abc).

[7] The lines below refer to individual study; the total is indicated in section 3.7.

[8] Between 2 and 6 hours. These represent teaching hours and are not included in individual study.

[9] Sum of the values from the previous lines, referring to individual study.

[10] Sum of direct contact hours (3.4) and individual study hours (3.7); this must equal the number of credits allocated to the course (section 3.9) × 25 hours per credit.

[11] Courses that must be completed beforehand or equivalent courses.

[12] Blackboard, projector, flipchart, specific teaching materials, etc.

[13] Computing equipment, software packages, experimental setups, etc.

[14] Learning outcomes presented as knowledge, skills, responsibility, and autonomy specific to the course. These should be correlated with the learning outcomes in fundamental and bachelor's degree fields (Annex 2 of ARACIS Specific Standards, www.aracis.ro/wp-content/uploads/2025/04/Standarde-specifice-programe-de-studii-universitare-de-licenta_aprilie-2025.pdf). For master's programmes, learning outcomes correspond to level 7 of the National Qualifications Framework (CNC).

[15] Chapter and paragraph titles.

[16] Discussions, debates, presentation and/or analysis of works, exercises and problem solving.

[17] Practical demonstration, exercise, experiment.

[18] Case study, demonstration, exercise, error analysis, etc.

COURSE SYLLABUS

Academic year 2025-2026

1. Programme information

1.1 Higher Education Institution	"Gheorghe Asachi" Technical University of Iași
1.2 Faculty	Faculty of Civil Engineering and Building Services
1.3 Department	Civil and Industrial Engineering
1.4 Field of study	Civil Engineering
1.5 Level of study[1]	Bachelor's degree
1.6. Study programme	Inginerie civilă (în limba engleză)/ Civil Engineering - ICE

2. Course information

2.1.1 Course title				**Fizică 2** **Physics 2**			
2.1.2. Course code				CE209			
2.2 Lecture instructor				Lecturer Cristina - Marcela RUSU, PhD			
2.3 Seminar instructor				Lecturer Cristina - Marcela RUSU, PhD			
2.4 Year of study[2]	2	2.5 Semester[3]	4	2.6 Assessment method[4]	E	2.7 Course type[5]	DI

3. Estimated total time (hours per semester)

3.1 Number of hours per week	4	3.2 lecture	2	3.3a seminar	2	3.3b laboratory		3.3c project		3.3.d practical sessions	
3.4 Total number of hours in the curriculum[6]	56	3.5 lecture	28	3.6a seminar	28	3.6b laboratory		3.6c project		3.6.d	

Workload distribution [7]	No. of hours
Study based on textbook, course material, reading list and notes	7
Additional research in the library, on specialised electronic platforms, and in the field	5
Preparation for seminar/laboratory/project session, assignments, papers, and portfolios	5
Assessment[8]	2
Other activities:	2

3.7 Total number of individual study hours[9]	19
3.8 Total number of hours per semester[10]	75
3.9 Number of ECTS credits	3

4. Prerequisites (if applicable)

4.1 Curriculum prerequisites[11]	Knowledge recommended: basics of Mathematics and Physics from high school curricula; Special Mathematics; Description of basic concepts, theories and methods of mathematics, physics, chemistry, appropriate for the field of engineering
4.2 Learning outcomes prerequisites	CE204/ Physics 1

5. Requirements

5.1 for the lecture[12]	The classroom will be endowed with video projector, blackboard, and specific materials. The students will respect the Students Rights and Obligations Code and the regulations set out in the Charter of the "Gheorghe Asachi" Technical University of Iasi.
5.2 for the seminar[13]	The classroom will be endowed with video projector, blackboard, and specific materials. Time limits for tests are set by the course organizer.

6. General objective of the course

The general objective is for students to acquire a set of physics knowledge strictly necessary for the successful completion and understanding of other fundamental or specialized disciplines. In parallel, the aim is to develop logical thinking and improve computational skills, creating a clear picture of the importance and role of the discipline in the training of future specialists. The goal is to acquire knowledge of vector calculus, to identify equations and systems of differential equations that describe different types of body movements in two-dimensional and three-dimensional cases, to identify the types of forces with which bodies interact with each other, elements of complex analysis necessary for the understanding of other fundamental or specialized disciplines and the application of this knowledge of physics in explaining natural phenomena.

7. Learning outcomes [14]

Knowledge	The student/ graduate: - applies the criteria and evaluation methods to identify, simulation, quality and quantity analysing of the process and phenomena specific to the fundamental aria using the digital technologies; - is able to perform the experimental data and interpretate the theoretical and experimental results; - is able to know the basic concepts of the Classical Mechanics: inertial references (frames), the principles of Classical Dynamics; - is able to solve the problems by using the terms of force, work, kinetic energy, potential energy, angular momentum, torque; - is able to explain and to solve the complex electronics problems by using of the math instruments (real functions of several variables, complex functions, differential math operators);
Skills	The student/ graduate: - states the principles of Classical Mechanics, to solve the problems related to uniform and accelerated motions of the bodies; solves the problems which studies the motion of the body under the action of different types of forces: gravitational, normal, tension, friction forces; to solves the problems related to the work done by a constant or variable force; to calculate the kinetic energy, potential energy, total energy of a body; - explains the wave phenomenon, to know the basic physical quantities which describes any wave; - explains the overlapping of the waves, reflection, and refraction of mechanical waves, to know the concept of waves group (waves packet) and significance of the wave energies; - provides examples of the use of basic theoretical concepts and results when solving exercises and problems formulated in relation to the topics covered in the curriculum disciplines; - is familiarized with the equipment and putting into practice the knowledge acquired in the course; - solves the problems by using the knowledge from Physics; - draws the graph/ map, to obtain from graph the line equation which describe the phenomenon; - uses physical models as practical instruments to approach complex problems; - identifies and describes the essential elements in the construction of demonstrations of mathematical assertions (lemmas, propositions, theorems), recognizes reasoning errors, and corrects them; - answers questions and correctly and rigorously formulates statements, theorems, and principles of Physics in curricular subjects; - has technical creative thinking by handling the basic concepts of the classical physics and abilities to use the university math instruments (real functions of several variables, complex functions, differential operators, etc.); - identifies and applies appropriate techniques for solving exercises and problems in the major disciplines of Physics; - identifies and applies appropriate techniques for solving problems in advanced disciplines of Physics; - describes real-world problems in Physics terms, identifies working hypotheses, constructs appropriate physical models and explains the limitations of the models thus obtained;
	The student/ graduate: - is able to work both independently and in multidisciplinary teams, respecting professional standards and ethics specific to the field; - demonstrates that he/she can continue professional development through lifelong learning, participating in advanced training courses, certifications, or research; - is able to communicate effectively with specialists and non-specialists, arguing technical solutions and decisions; - shows a spirit of initiative and action to update professional, economic and organizational culture knowledge;

	- extends the techniques for solving common problems to problems that arise in new situations and with a progressive degree of difficulty; - searches for other methods of solving them and formulates consequences and conclusions that arise from a set of hypotheses. - analyzes solution methods, establishes the uniqueness of solutions, recognizes reasoning errors in solving a problem, finds a way to eliminate them and obtain the correct version of the demonstration/ solution method; - verifies, on cases or by constructing examples or counterexamples, the validity of Physics statements; - translates a practical situation from Physics, solves the problem obtained and interprets the results obtained; identifies and correlates connections between apparently unrelated concepts from the major disciplines of Physics; - summarizes, classifies, and presents the conclusions of given problems using various types of representations and clearly and efficiently communicates physical concepts and reasoning to specialists and non-specialists through written reports and oral presentations; - solves using analytical and/ or numerical methods and uses dedicated software packages or writes codes developed in order to solve practical problems and physical models constructed using differential and partial derivative equations or other tools from the curricula covered; - uses independent information and documentation methods, which provide openness to continuous learning, develops scientific communications or scientific reports and makes complete bibliographic references by respecting ethical norms when citing the documentation sources used; - approaches problem solving from different angles and directions, including based on non-traditional methodologies, in order to use them in computer science and other applications of Physics.

*(Left column, rotated: **Responsibility and autonomy**)*

8. Teaching strategies

The teaching activity will use participatory lectures and debates based on presentations (beamer) that will be made available to students. The presentations contain the main concepts and results, images, and sketches, so that the information is easy to understand and assimilate. Each course will begin with a brief recapitulation of the concepts covered in the previous course. The full courses and seminars will be made available on the moodle platform as pdf files.

The teaching method is also based on discovery learning models facilitated by direct and indirect exploration of reality (experimentation, demonstration, modelling), but also on action-based methods, such as exercise, practical activities and problem solving).

9. Content

9. 1. Lecture[15]	Teaching strategies	Time allocation
9.1.1. The Principle of Relativity in Classical Mechanics. Gallilei's Transformations. Einstein's Postulates. Consequences of the postulates. Lorentz Transformations	Presentation with video projector. Presentation on the board, interactive lecture. Discussions, Explanations	2 hours
9.1.2. Kinematics and Relativistic Dynamics. Mass-Energy Equation. Energy-Linear Momentum Equation. Heisenberg's Uncertainty Principle. Problems.		2 hours
9.1.3. Quantum Physics Elements. Photons.		2 hours
9.1.4. Thermodynamics. The Ideal Gas Model. Thermal Equation of the ideal gas. The Laws of the Ideal Gas. Calorie Coefficients.		2 hours
9.1.5. The Principles of Thermodynamics. Work, Internal Energy and the Heat Equations in various transformations of the ideal gas		2 hours
9.1.6. Electrostatics. Coulomb's Law. Electric Field. Electric Potential; Electric Flux Density. Gauss's Law for electricity. Local and integral Equations for the Electric Field and Electric Potential		2 hours
9.1.7. Electro-kinetics: electric current, current density, electric voltage, the Ohm's Law for a part and closed circuit. Kirchhoff's Laws. Joule's Effect. The electrical energy and the power of the dc circuit		2 hours
9.1.8. Resistors and Generators Grouping. Short Circuit. Open circuit. Efficiency of the circuit.		2 hours
9.1.9 Magnetism: Magnetostatics. The Magnetic Induction. The action of the magnetic field on the moving charge. Lorentz Force. Magnetic Force. Electrodynamic Force between two parallel currents. Biot-Savart-Laplace Law. Ampere's Law		2 hours

9.1.10. Magnetization of substances. Gauss's law for magnetism. The Electromagnetic Induction Phenomenon. Self-induction Electromagnetic Phenomenon.		2 hours
9.1.11. Maxwell's Equations. The electromagnetic field. The Electromagnetic Waves.		2 hours
9.1.12. Optics. Geometric Optics. Refraction and Reflection of the light. The dispersion phenomenon. Plane and spherical mirrors. Construction of the image in a plane mirror.		2 hours
9.1.13. Lenses. Image construction in thin lenses. The fundamental formula of thin lenses.		2 hours
9.1.14. Wave Optics. The phenomenon of interference of the light. Young's Interference Device. The Diffraction Phenomenon. The phenomenon of polarization of light.		2 hours

Reading list for the lecture:
1. Halliday Resnick &Jearl Walker, PRINCIPLES OF PHYSICS-NINTH EDITION, www.wileyplus.com

9.2a Seminar	Work methods[16]	Observation, allotted time
9.2.1. Solving problems related to Kinematics and Relativistic Dynamics, Mass-Energy Equation, Energy-Linear Momentum Equation	Demonstration. Solving problems	2 hours
9.2.2. Photons-Solving Problems		2 hours
9.2.3. Solving problems related to application of the ideal gas laws		2 hours
9.2.4. Calorie Coefficients. Internal Energy. Work-Problems		2 hours
9.2.5. Recapitulation of the theoretical notions. Test	Discussion. Written test	2 hours
9.2.6. Ohm's and Kirchhoff's Laws - Problems	Demonstration. Solving problems	2 hours
9.2.7. Solving problems to find the equivalent resistor of various grouping of resistors		2 hours
9.2.8. Solving problems to find the equivalent resistor of various grouping of resistors		2 hours
9.2.9. Solving problems to find the voltage in open circuit case and short-current in short - circuit case.		2 hours
9.2.10. Solving problems to find the voltage in open circuit case and short-current in short - circuit case.		2 hours
9.2.11. Recapitulation of theoretical notions. Test	Discussion. Written test	2 hours
9.2.12. Image construction in plane mirror.	Demonstration. Solving problems	2 hours
9.2.13. Image construction in thin lenses		2 hours
9.2.14. Recapitulation of theoretical notions. Test	Discussion. Written test	2 hours

Reading list for the laboratory:
1. Halliday Resnick &Jearl Walker, PRINCIPLES OF PHYSICS-NINTH EDITION, www.wileyplus.com

10. Assessment

Assessment category	10.1 Assessment criteria	10.2 Assessment method	10.3 Percentage of final grade
10.4 Exam Colloquium	Theoretical knowledge acquired (quantity, correctness, accuracy) Completeness and correctness of knowledge. Ability to solve problems	Written exam	60%
10.5a Seminar	Solving the problems related to application of the ideal gas laws; application of formulas for series and parallel grouping of the resistors and generators; Joule Effect; electric voltage and electrical power of a circuit; image construction in plane mirror and thin lenses	Continuous assessment 3 Tests	40%
10.6 Passing requirements			
The final assessment result for Physics 1 results from considering the scores and weights assigned to each activity within the discipline. Whole marks from 10 to 1 will be awarded, with a mark of 5 certifying the acquisition of the minimum learning outcomes: - Gauss's Equation for electricity. Local and integral Equations for the Electric Field and Electric Potential;			

- The isotherms, isobar and isochore laws of the ideal gas;
- The formula for equivalent resistance of series and parallel resistors grouping;
- The formula for equivalent emf of series and parallel generators grouping;
- The formula for electric current in case of series and parallel generators grouping;
- The short-circuit current formula and voltage formula in open-circuit case;
- The formulas for Kirchhoff's 1'st and 2'nd laws;
- Statement of Joule's Effect; the formula for the heat emitted by an electric conductor;
- The formulas for energy and electric power in case of any electric circuit;
- Image construction in thin lenses

Date of completion: September 2025

Lecture instructor: Lecturer Cristina - Marcela RUSU, PhD

Seminar instructors: Lecturer Cristina - Marcela RUSU, PhD

Date of departmental approval: Head of Department,
September 2025   Professor Petru - Edward NICA, PhD

Date of faculty council approval: Dean,
September 2025   Professor Andrei BURLACU, PhD

COURSE SYLLABUS

Academic year 2025-2026

1. Programme information

1.1 Higher Education Institution	"Gheorghe Asachi" Technical University of Iași
1.2 Faculty	Faculty of Civil Engineering and Building Services
1.3 Department	Civil and Industrial Engineering
1.4 Field of study	Civil Engineering
1.5 Level of study[1]	Bachelor's degree
1.6. Study programme	Inginerie civilă (în limba engleză)/ Civil Engineering - ICE

2. Course information

2.1.1 Course title				**Statica și stabilitatea construcțiilor 2** **Structural Statics and Stability 2**			
2.1.2. Course code				CE210			
2.2 Lecture instructor				Lecturer Ioana OLTEANU, PhD			
2.3 Laboratory instructors				Lecturer Ioana OLTEANU, PhD Lecturer Oana-Mihaela BANU, PhD			
2.4 Year of study[2]	2	2.5 Semester[3]	4	2.6 Assessment method[4]	E	2.7 Course type[5]	DI

3. Estimated total time (hours per semester)

3.1 Number of hours per week	5	3.2 lecture	3	3.3a seminar		3.3b laboratory	2	3.3c project		3.3d practical sessions	
3.4 Total number of hours in the curriculum[6]	70	3.5 lecture	42	3.6a seminar		3.6b laboratory	28	3.6c project		3.6.d	

Workload distribution [7]	No. of hours
Study based on textbook, course material, reading list and notes	21
Additional research in the library, on specialised electronic platforms, and in the field	18
Preparation for seminar/laboratory/project session, assignments, papers, and portfolios	16
Assessment[8]	3
Other activities:	-

3.7 Total number of individual study hours[9]	55
3.8 Total number of hours per semester[10]	125
3.9 Number of ECTS credits	5

4. Prerequisites (if applicable)

4.1 Curriculum prerequisites[11]	CE201/ Structural Statics and Stability 1
4.2 Learning outcomes prerequisites	CE103/ Mechanics 1; CE112/ Mechanics 2; CE116/ Strength of Materials 1

5. Requirements

5.1 for the lecture[12]	- Teaching activities are held at the faculty headquarters using: blackboard, whiteboards, video projector, specific teaching materials, etc. - Students will comply with the Code of Student Rights and Obligations and the Regulations provided by the Charter of the "Gheorghe Asachi" Technical University of Iași
5.2 for the laboratory[13]	- Applied activities are held at the faculty headquarters using: computing technology, software packages, experimental stands, etc. - The deadlines for submitting the assignments are established for week 7 and 14 - Students need to pass test 1 and 2 with a minimum grade of 5.

6. General objective of the course

The course aims to develop the fundamental competencies required for the analysis and design of statically indeterminate structures subjected to fixed static loads, through classical calculation methods (the force method and the displacement method), the appropriate selection of structural analysis models, and the effective use of automated analysis software. Students will acquire the ability to apply theoretical concepts to practical problems, to use specialized programs for determining reactions, internal forces, and displacements, and to critically and rigorously interpret the obtained results, thereby preparing them to tackle more complex structures and advanced structural analysis models.

7. Learning outcomes[14]

Knowledge	The student/ graduate: - explains the fundamental principles governing statically indeterminate structures subjected to fixed static loads; - describes the theoretical basis and procedural steps of the force method for evaluating internal forces and deformations in statically indeterminate systems; - defines the concepts and equations underlying the displacement method, including stiffness formulation, compatibility conditions, and equilibrium relations; - identifies and explains the criteria for selecting appropriate static calculation models for different categories of structural systems; - describes the key characteristics, assumptions, and limitations of structural models used for beams, frames, trusses, and other plane statically indeterminate structures; - defines the principles of automated structural analysis and the theoretical basis of matrix methods implemented in specialized software; - interprets the meaning and significance of reactions, internal forces, and displacements obtained through analytical calculations or structural analysis programs; - explains the basic sources of error and approximation in structural modelling and computational analysis.
Skills	The student/ graduate: - applies the force method to determine redundant, internal forces, and displacements for statically indeterminate structures; - applies the displacement method to compute stiffness matrices, assemble global systems of equations, and solve for nodal displacements and internal forces; - constructs and selects appropriate static models for beams, frames, and other plane structures based on geometry, support conditions, material behaviour, and loading; - performs analytical calculations for structural reactions, bending moments, shear forces, axial forces, and deformations; - uses specialized structural analysis software to model 2D structures, define actions, and compute reactions, internal forces, and displacements; - compares results obtained through analytical methods and automated structural analysis to validate consistency and accuracy; - interprets and evaluates the structural response predicted by software tools, identifying potential inconsistencies or modelling errors; - selects and uses digital tools and multiple structural analysis programs to support engineering calculations and decision-making.
Responsibility and autonomy	The student/ graduate: - demonstrates autonomy in identifying suitable calculation methods and modelling approaches for structural analysis tasks; - evaluates the reliability of analytical and numerical results and justifies the chosen analysis approach; - adheres to professional and ethical standards when performing structural analyses and reporting results; - integrates analytical reasoning, engineering judgement, and digital tools to solve structural problems of medium complexity; - communicates clearly the methodology, assumptions, and conclusions of structural analyses to peers and instructors; - reflects and self-evaluates on the accuracy and limitations of the applied methods and models; - engages in continuous learning, including the exploration of advanced modelling techniques and structural analysis software.

8. Teaching strategies

The teaching activities will combine interactive lectures with guided discussions, supported by PowerPoint presentations rich in diagrams, structural models, and graphical interpretations to facilitate conceptual understanding. Each lecture will start with a concise recap of the key concepts from the previous session to reinforce continuity in learning. The course adopts a discovery-based approach, encouraging students to explore structural behaviour through analytical demonstrations, worked examples, and modelling exercises.

9. Content

9. 1. Lecture[15]	Teaching strategies	Time allocation
9.1.1. The Forces Method. Frame Structures: Basic systems and elastic unknowns; the conditions for geometrical compatibility in case of external forces, base settlements, and non-uniform temperature variations; the significance, the calculus and checking of the system coefficients and free terms; plotting of the internal force diagrams. Case-studies.	Interactive lecture, debates, explanations	3 hours
9.1.2. The Forces Method - Frame Structures - Case-studies		3 hours
9.1.3. The Forces Method. Truss structures: Basic systems and elastic unknowns; the conditions for geometrical compatibility in case of external forces; the significance, the calculus and checking of the system coefficients and free terms; the plotting of the internal force diagrams.		3 hours
9.1.4. The Forces Method – Truss structures - Case-studies		3 hours
9.1.5. Computer Aided Design: The presentation of several computer programs for 2D structures. Computational Examples.		3 hours
9.1.6. The Displacement Method. The degree of kinematic-elastic redundancy; basic system and unknowns; stiffness and load characteristics;		3 hours
9.1.7. The Displacement Method. Slope-Deflection Method in case of 2D frames composed of linear elements subjected to constant forces – theoretical approach		3 hours
9.1.8. The Displacement Method. Slope-Deflection Method - practical example		3 hours
9.1.9. The Displacement Method. Moment Distribution Procedure for frames with no side-ways – theoretical approach and practical example		3 hours
9.1.10. The Displacement Method. Moment Distribution Procedure for frames with side-ways – theoretical approach		3 hours
9.1.11. The Displacement Method. Moment Distribution Procedure for frames with side-ways – practical example		3 hours
9.1.12. The Displacement Method. Moment Distribution Procedure; the calculus of the fixed end moments in the case of the base settlements action and uniform temperature variation. Case-studies.		3 hours
9.1.13. The Matrix Approach for the Solution of the Plane Frames: The Slope-Deflection Method in the matrix format; general principles. The element stiffness matrices. General (UCS) and local (LCS) coordinate systems. Geometrical matrices, rotational matrices. The assemblage of the structure stiffness matrix in general coordinates. The assemblage of the external load vector. The algebraic solution of the equation system derived in the method: the displacement vector, the local strain vectors and the force vectors at the bar ends.		3 hours
9.1.14. The Matrix Approach for the Solution of the Plane Frames: Case-study		3 hours

Reading list for the lecture:
1. Olteanu Ioana, suport de curs online, 2024
2. Hibbler, R.C. (2020) Structural Analysis, Ed. Pearson, ISBN 978-1-292-24713-7, Structural Analysis, EBook, SI Edition
3. Olteanu I. (2018) Statics for Indeterminate Structures/Statica structurilor nedeterminate (English and Romanian), Ed. Societății Academice „Matei-Teiu Botez" Iasi, ISBN 978-606-582-119-4.
4. Salah Khalfallah (2018) Structural Analysis 2 – Statically Indeterminate Structures, ed. Wiley, ISBN 978-1-78630-339-4, Structural Analysis 2
5. Amariei C., Budescu M., Ciupală A., Statica construcțiilor (RO-EN), Ed. Soc. Acad. "Matei-Teiu Botez", Iași, 2006.
6. Amariei C., Dumitraș Al., Elemente de analiză matriceală a structurilor, Ed. Soc. Acad. „Matei Teiu Botez", Iași, 2003.
7. Dumitraș Al., Amariei C., Hobjilă V., Florea V., Statica construcțiilor, Teorie și aplicații, Structuri static nedeterminate, Vol. 1; 2 , Ed. PIM, Iași, 2004.

9.2b Laboratory	Work methods [17]	Observations, allotted time
9.2.1. The Forces Method – plotting the internal forces for a statically indeterminate frame structure	Discussions, solving problems, solving, and checking students' individual assignments.	6 hours
9.2.2. The Forces Method – plotting the internal forces for a statically indeterminate truss structure		4 hours
9.2.3. The Forces Method – Test number 1	Intermediary evaluation	2 hours
9.2.4. The Displacement Method – plotting the internal forces for a statically indeterminate frame structure by slope-deflection method.	Discussions, solving problems, solving, and checking students' individual assignments.	4 hours
9.2.5. The Displacement Method – plotting the internal forces for a statically indeterminate for a continuous beam by moment distribution procedure subjected to external loads		2 hours
9.2.6. The Displacement Method – plotting the internal forces for a statically indeterminate frame structure by moment distribution procedure subjected to external loads		6 hours
9.2.7. The Displacement Method – plotting the internal forces for a statically indeterminate frame structure by moment distribution procedure subjected to load variation and different settlements		2 hours
9.2.8. The Displacement Method – Test number 2	Intermediary evaluation	2 hours

Reading list for the seminar / laboratory / project:
1. Olteanu Ioana, solved problems online, 2024
2. Banu O.M., Movilă M., Olteanu I. (2014) Statica construcțiilor. Structuri static nedeterminate. Aplicații (Statics. Statically indeterminate structures. Applications), Ed. Sociatății Academice „Matei-Teiu Botez" Iasi, ISBN 978-606-582-060-9.

10. Assessment

Assessment category	10.1 Assessment criteria	10.2 Assessment method		10.3 Percentage of final grade
10.4 Final exam	Completeness and accuracy of knowledge Logical coherence, fluency, and strength of argumentation Capacity for analysis, personal interpretation, originality, and creativity Level of command of specialised terminology and communication skills Ability to apply acquired skills Ability to process data and solve the problems presented	- summative assessment test (final assessment)	100%	50%
10.5b Laboratory	Ability to work in a team. Ability to apply acquired knowledge in practice in different contexts. Capacity for analysis, personal interpretation, originality, and creativity	- systematic observation of students (individual assignments - assignments must be completed during the week between classes and during the laboratories).	60%	50%
		- formative evaluation test (checks throughout the semester: weeks 6 and 13).	40%	

10.6 Passing requirements
- Obtaining a minimum grade of 5 on the final written exam, which verifies essential knowledge of structural statics and stability 2 (forces method, displacement method). The student understands the basic principles of structural statics and stability 2 (know basic principles of the two methods, can apply them in order to solve statically indeterminate structures)

- Promoting continuous assessment by reaching the minimum established score (Arithmetic average of the grades from the two tests during the semester: min. 5 (five)
- Fulfilling the seminar requirements:
- Correctly evaluates internal forces diagrams by forces method and by displacement method.
- The 2 homework assignments will be partially worked on during classes and students will be graded for this activity. The arithmetic average of the grades must be at least 5. The homework assignments must be completed in full and submitted on time (week 6, respectively 14)

Note: A bonus point will be awarded to the final exam grade for course attendance (min. 12 attendances)

The final grade for a course is determined by taking into account the scores and weightings assigned to each course activity. Whole-number grades from 10 to 1 will be awarded, with a grade of 5 certifying the achievement of the minimum learning outcomes required for the course and the awarding of the corresponding ECTS credits.

Date of completion: September 2025

Lecture instructor: Lecturer Ioana OLTEANU, PhD

Seminar instructors: Lecturer Ioana OLTEANU, PhD

                                                                        Lecturer Oana-Mihaela BANU, PhD

Date of departmental approval: Head of Department,
September 2025   Lecturer Mircea - Vasile VENGHIAC, PhD

Date of faculty council approval: Dean,
September 2025   Professor Andrei BURLACU, PhD

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[1] *Bachelor's/ Master's degree.*
[2] *1-4 for bachelor's degree, 1-2 for master's degree.*
[3] *1-8 for bachelor's degree, 1-4 for master's degree.*
[4] *Exam (E), test (T) – from the curriculum.*
[5] *DOB – compulsory course, DOP– elective course, DFA– optional course;*
[6] *It is equal to 14 weeks x the number of hours indicated in section 3.1 (similarly for 3.5, 3.6abc).*
[7] *The lines below refer to individual study; the total is indicated in section 3.7.*
[8] *Between 2 and 6 hours. These represent teaching hours and are not included in individual study.*
[9] *Sum of the values from the previous lines, referring to individual study.*
[10] *Sum of direct contact hours (3.4) and individual study hours (3.7); this must equal the number of credits allocated to the course (section 3.9) × 25 hours per credit.*
[11] *Courses that must be completed beforehand or equivalent courses.*
[12] *Blackboard, projector, flipchart, specific teaching materials, etc.*
[13] *Computing equipment, software packages, experimental setups, etc.*
[14] *Learning outcomes presented as knowledge, skills, responsibility, and autonomy specific to the course. These should be correlated with the learning outcomes in fundamental and bachelor's degree fields (Annex 2 of ARACIS Specific Standards, www.aracis.ro/wp-content/uploads/2025/04/Standarde-specifice-programe-de-studii-universitare-de-licenta_aprilie-2025.pdf). For master's programmes, learning outcomes correspond to level 7 of the National Qualifications Framework (CNC).*
[15] *Chapter and paragraph titles.*
[16] *Discussions, debates, presentation and/or analysis of works, exercises and problem solving.*
[17] *Practical demonstration, exercise, experiment.*
[18] *Case study, demonstration, exercise, error analysis, etc.*

Academic year 2025-2026

1. Programme information

1.1 Higher Education Institution	"Gheorghe Asachi" Technical University of Iași
1.2 Faculty	Faculty of Civil Engineering and Building Services
1.3 Department	Structural Mechanics (MS)
1.4 Field of study	Civil Engineering
1.5 Level of study[1]	Bachelor's degree
1.6. Study programme	Inginerie civilă (în limba engleză)/ Civil Engineering - ICE

2. Course information

2.1.1 Course title	**Teoria Elasticității și Plasticității** **Theory of Elasticity and Plasticity**					
2.1.2. Course code	CE211					
2.2 Lecture instructor	Lecturer Sergiu-Mihai ALEXA-STRATULAT, PhD					
2.3 Seminar instructor	Lecturer Sergiu-Mihai ALEXA-STRATULAT, PhD					
2.4 Year of study[2]	2	2.5 Semester[3]	4	2.6 Assessment method[4]	E	2.7 Course type[5]	DI

3. Estimated total time (hours per semester)

3.1 Number of hours per week	3	3.2 lecture	2	3.3a seminar	1	3.3b laboratory		3.3c project		3.3.d practical sessions
3.4 Total number of hours in the curriculum[6]	42	3.5 lecture	28	3.6a seminar	14	3.6b laboratory		3.6c project		3.6.d
Workload distribution [7]										No. of hours
Study based on textbook, course material, reading list and notes										14
Additional research in the library, on specialised electronic platforms, and in the field										6
Preparation for seminar/laboratory/project session, assignments, papers, and portfolios										13
Assessment[8]										3
Other activities:										

3.7 Total number of individual study hours[9]	33
3.8 Total number of hours per semester[10]	75
3.9 Number of ECTS credits	3

4. Prerequisites (if applicable)

4.1 Curriculum prerequisites[11]	
4.2 Learning outcomes prerequisites	

5. Requirements

5.1 for the lecture[12]	- blackboard, projector
5.2 for the seminar[13]	- blackboard, projector

6. General objective of the course

This topic presents the theoretical principles needed to analyze the stress and deformation states in construction elements. The lecture introduces the fundamental equations in Cartesian and polar coordinates, together with methods for solving plane problems, evaluating stress functions and interpreting stress and displacement fields in specific situations. These concepts are essential for understanding how structural elements carry loads and how their safety and performance are evaluated.

7. Learning outcomes[14]

Knowledge	The student/ graduate: - identifies the stress and deformation states in two-dimensional and three-dimensional elements; - evaluates the distribution of normal and shear stress on the cross-section of two-dimensional and/or three-dimensional elements subjected to various actions; - identifies the appropriate reference system associated with the analysed element; - describes the internal forces that arise in each type of element (two-dimensional and/or three-dimensional) and the corresponding stress state resulting from different loading conditions; - recognizes the assumptions of the theory of elasticity.
Skills	The student/ graduate: - draws diagrams of internal forces for two-dimensional and three-dimensional elements subjected to external loads; - uses strength and stiffness conditions for verification, design and calculation of the load-bearing capacity of two-dimensional and three-dimensional structural elements; - evaluates the stress state in rectangular plates.
Responsibility and autonomy	The student/ graduate: - complies with ethical principles, norms, and values in completing professional tasks correctly and on time, by adopting a rigorous, efficient, and responsible work strategy in decision-making and problem-solving; - informs themselves and analyses bibliographic sources for both professional and personal development, through continuous training and efficient adaptation to new technical requirements; - demonstrates autonomy in learning through individual study.

8. Teaching strategies

The teaching activities will include interactive lectures and discussions supported by PowerPoint presentations that will be made available to students. The presentations include images and diagrams in order for the information to be easily understood and assimilated. Each of the lectures will begin with a brief overview of the concepts covered in the previous session.

The teaching method is also based on discovery-learning models facilitated by direct and indirect exploration of phenomena, as well as action-based methods such as exercises and problem-solving.

9. Content

9. 1. Lecture[15]	Teaching strategies	Time allocation
9.1.1. **Introductory notions** – The object of Theory of Elasticity and Plasticity. Assumptions of elasticity theory. The problem of spatial elasticity. The problem of plane elasticity. Plane stress state. Plane strain state		1 hour
9.1.2. **Plane Elasticity in Cartesian coordinates** – Equations of static equilibrium and boundary conditions. Geometric equations. Compatibility equations for deformations. Constitutive (physical) equations.		1 hour
9.1.3. **Solving plane elasticity problems with respect to stresses** – Equations of the stress state. Plane strain-stress equations. Analytical solutions in plane elasticity using the stress function. Mechanical interpretation of the stress function.		4 hours
9.1.4. **Solving plane elasticity problems with respect to displacement** – Differential equations and Lamé's equations for the general case. Other expressions and particular cases of Lamé's equations. Boundary conditions. Solving using displacement functions.	Interactive lecture, debates, explanations	2 hours
9.1.5. **Methods for solving plane elasticity problems** – Analytical methods (indirect method; direct method: solutions via algebraic polynomials). Numerical solution using the finite difference method.		2 hours
9.1.6. **Plane elasticity in polar coordinates** – Equations of static equilibrium. Geometric equations. Plane elasticity equations in terms of the stress function. Stress expressions. Physical equations. Symmetric stress states with respect to the pole.		2 hours
9.1.7. **Discs and tubes with thick walls** – Stress state in the general case. Discs and tubes loaded by internal pressure. Discs and tubes loaded by external pressure. Short tubes with closed ends. Displacements. Disc subjected to radial tension. Infinite elastic plane with a circular hole under radial pressure.		3 hours
9.1.8. **The elastic half-plane** – Elastic half-plane loaded by a normal force on the surface. Elastic half-plane loaded by a distributed random normal force.		2 hours

9.1.9. **Thin plates** – Generalities, calculation hypotheses. Deflections, stresses, and strains. Equivalency relations. Section forces. Stresses in terms of internal forces. Differential relations between internal forces and loads. Plate differential equation. Boundary conditions for plates. Solution methods for plates: cylindrical bending, finite differences method, deflection equivalence method. Circular plates: internal forces, stresses, boundary conditions, differential relations between loads and internal forces, plate equation. Axisymmetrical plates: plate equation, solutions, internal forces, stresses.		9 hours
9.1.10. **Introduction to plasticity theory** – General aspects, slip lines. Use of the virtual work principle for determining limit loads. Elastic-plastic bending of thin rectangular plates. Elastic-plastic bending of circular and annular plates.		2 hours

Reading list for the lecture:
1. Boresi A., Chong K., Lee J., *Elasticity in Engineering Mechanics*, Third Edition, 2011, Wiley, ISBN: 978-0-470-40255-9, link
2. Saad M., *Elasticity: Theory, Applications and Numerics*, 2009, Elsevier, ISBN: 978-0-12-374446-3, link

9.2a Seminar	Work methods[16]	Observations, allotted time
9.2.1. **Plane elasticity in Cartesian coordinates** – Verification of Strength of Materials solutions using elasticity theory methods. Expression of boundary conditions in terms of stresses or displacements. Solutions using algebraic polynomials.		2 hours
9.2.2. **Plane elasticity in Cartesian coordinates** – Solving the plane elasticity problem in terms of stresses (calculation of stresses and deformations in a structural wall in plane stress using the finite difference method). Solution in terms of displacements (calculation of stresses by the finite difference method for a washer whose boundary conditions are expressed in terms of displacements). Mixed problem (calculation of stresses in a washer where boundary conditions are expressed in displacements on one portion of the contour and in stresses on the other).	Exercises and problem solving, discussions, analysis	4 hours
9.2.3. **Plane elasticity in polar coordinates** – Design of discs or thick-walled tubes (calculation of stresses, displacements, and strength verification for long tubes loaded by internal or external pressure and for short tubes with closed ends). Analysis of the stress state in semi-infinite elastic media (elastic half-plane).		4 hours
9.2.4. **Thin plates** – Design of rectangular plates subjected to cylindrical bending. Design of rectangular plates using the deflection equivalence method and the finite difference method. Design of thin circular or annular plates.		4 hours

Reading list for the seminar:
1. Saad M., *Elasticity: Theory, Applications and Numerics*, 2009, Elsevier, ISBN: 978-0-12-374446-3, link

10. Assessment

Assessment category	10.1 Assessment criteria	10.2 Assessment method		10.3 Percentage of final grade
10.4 Exam	Completeness and accuracy of knowledge Logical coherence, fluency, and strength of argumentation Capacity for analysis, personal interpretation, originality, and creativity Level of command of specialised terminology and communication skills Ability to apply acquired skills Ability to process data and solve the problems presented	- systematic observation of students (individual or group assignments – which must be completed during the week between lectures, preparation of a report, case study)	30%	80% (min. 5)
		- summative assessment test (final assessment)	70% (min. 5)	
10.5a Seminar	Ability to apply acquired knowledge Capacity for analysis, personal interpretation, originality, creativity	- active participation in the activities - assessment test		20% (min. 5)

10.6 Passing requirements
- correct identification of stress and deformation state and application of the appropriate strength/stiffness conditions for two-dimensional and three-dimensional elements; - plotting normal stress diagrams on the cross-section of a two-dimensional or three-dimensional element subjected to various loading conditions.
The final grade for a course is determined by taking into account the scores and weightings assigned to each course activity. Whole-number grades from 10 to 1 will be awarded, with a grade of 5 certifying the achievement of the minimum learning outcomes required for the course and the awarding of the corresponding ECTS credits.

Date of completion: September 2025

Lecture instructor: Lecturer Sergiu - Mihai ALEXA - STRATULAT, PhD

Seminar instructors: Lecturer Sergiu - Mihai ALEXA - STRATULAT, PhD

Date of departmental approval: Head of Department,
September 2025   Lecturer Mircea - Vasile VENGHIAC, PhD

Date of faculty council approval: Dean,
September 2025   Professor Andrei BURLACU, PhD

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COURSE SYLLABUS

Academic year 2025-2026

1. Programme information

1.1 Higher Education Institution	"Gheorghe Asachi" Technical University of Iași
1.2 Faculty	Faculty of Civil Engineering and Building Services
1.3 Department	Concrete Materials Technology and Management
1.4 Field of study	Civil Engineering
1.5 Level of study[1]	Bachelor's degree
1.6. Study programme	Inginerie civilă (în limba engleză)/ Civil Engineering - ICE

2. Course information

2.1.1 Course title			**Beton armat și precomprimat 1** **Reinforced and Prestressed Concrete 1**			
2.1.2. Course code			CE212			
2.2 Lecture instructor			Lecturer Bogdan ROȘCA, PhD			
2.3 Laboratory instructor			Lecturer Bogdan ROȘCA, PhD			
2.4 Year of study[2]	2	2.5 Semester[3]	4	2.6 Assessment method[4]	E	2.7 Course type[5]	DI

3. Estimated total time (hours per semester)

3.1 Number of hours per week	3	3.2 lecture	2	3.3a seminar		3.3b laboratory	1	3.3c project		3.3.d practical sessions	
3.4 Total number of hours in the curriculum[6]	42	3.5 lecture	28	3.6a seminar		3.6b laboratory	14	3.6c project		3.6.d	

Workload distribution [7]	No. of hours
Study based on textbook, course material, reading list and notes	12
Additional research in the library, on specialised electronic platforms, and in the field	9
Preparation for seminar/laboratory/project session, assignments, papers, and portfolios	9
Assessment[8]	3
Other activities:	3

3.7 Total number of individual study hours[9]	33
3.8 Total number of hours per semester[10]	75
3.9 Number of ECTS credits	3

4. Prerequisites (if applicable)

4.1 Curriculum prerequisites[11]	
4.2 Learning outcomes prerequisites	Basic in Strength of Materials, Statics

5. Requirements

5.1 for the lecture[12]	Table handwriting, video-projector
5.2 for the laboratory[13]	Table handwriting, video-projector

6. General objective of the course

This course aims with presenting area of constructions made of reinforced concrete, mechanical and durability properties of concrete and reinforced concrete based on Eurocodes, the behaviour of reinforced concrete members subjected to bending and the bond between reinforcement and concrete.

7. Learning outcomes [14]

Knowledge	The student/ graduate: - identifies, evaluates, and explains the mechanical and durability properties of concrete and reinforcing steel for the purpose of using these properties to design of the reinforced concrete members; - assesses the behaviour of reinforced concrete members in flexure and bond between reinforcement and concrete.
Skills	The student/ graduate: - determines, uses, and compares the physical and mechanical characteristics of concrete and reinforcing steel in order to use them in the future dimensioning and verification of elements; - it uses and become customized with the European standards and the provided abbreviation within; - become customized with the devices and procedures of testing concrete and reinforcing steel.
Responsibility and autonomy	The student/ graduate: - respects the principles, norms, and values of ethics in the correct execution and on time of the tasks established by the received theme; - approaches a rigorous, efficient, and responsible work strategy in making decisions to solve the received theme; - integrates into the work group and applies effective communication and teamwork techniques; - is informed and documented in the field of activity of the discipline through the appropriate use of effective learning methods and techniques.

8. Teaching strategies

Participatory lectures and debates will be used in the teaching activity based on slide presentations that will be made available to the students accompanied by the explanation of certain concepts through writing demonstrations on the blackboard. The presentations contain images and sketches so that the information is easy to understand and assimilate. Each course will begin with a brief review of the concepts covered in the previous course.

9. Content

9. 1. Lecture[15]	**Teaching strategies**	**Time allocation**
9.1.1. Introduction: Concrete and reinforced concrete as a material for concrete structures. Advantages and drawbacks	Interactive lecture, debates, explanations	2 hours
9.1.2. Structure of concrete. Aggregate, Hardened cement paste, Interface transition zone		2 hours
9.1.3. Strength and strain of concrete. Nature of concrete strength. Strength and strain under compression. Variability of concrete strength.		2 hours
9.1.4. Strength and strain of concrete (continuation). Strength and strain in tension. Multiaxial strength of concrete. The effect of time on strength and strain		2 hours
9.1.5. Time-dependent concrete deformation and effect of temperature: Shrinkage and creep deformation. Temperature deformation		2 hours
9.1.6. Reinforcing steels and reinforcements for reinforced concrete: Reinforcing steel composition. Classification. Manufacturing technologies (hot-rolling, cold-drawing). Performance characteristics required on reinforcing steels		2 hours
9.1.7. Reinforcing steels and reinforcements for reinforced concrete (continuation): Performance characteristics required on reinforcing steels, Reinforcing steel products, Categories of reinforcement embedded into concrete members.		2 hours
9.1.8. Bond between concrete and reinforcement: Adherence (bond) mechanism. Bond behaviour and failure. Factors influencing bond. Bond calculation models for concrete members		2 hours
9.1.9. Bond between concrete and reinforcement (continuation): Adherence between reinforcement and concrete based on the European rules (Bond stress, Anchorage of longitudinal reinforcement, Laps), Spacing of bars for a satisfactory concreting		2 hours
9.1.10. Durability and cover to reinforcement: Requirements for durability, Environmental aggression on concrete, Exposure classes based on environmental conditions (class designation, environment description, examples)		2 hours
9.1.11. Durability and cover to reinforcement (continuation): Concrete cover based on EC2 (definition, minimum cover, allowance in design for deviation)		2 hours
9.1.12. Flexural behaviour stages of the reinforced concrete members: Stage I - Elastic stage, Stage II – Cracking stage, Stage III – Failure stage (Design stage), Load-deflection test diagram to bending.		2 hours

9.1.13. Basic design concepts of concrete members: Limit state method – Level 1 (Semi-probabilistic method), characteristic values for actions and material strengths, partial safety factor for actions and materials, Limit States – Categories, General safety condition for members	Interactive lecture, debates, explanations	2 hours
9.1.14. Design of structural members at ULS: Stress-strain diagrams for design of reinforced concrete section (design diagrams for concrete, steel and confined concrete). Connection between the stress and strain level in concrete and reinforcement corresponding to flexural behavior stages and its corresponding points on the design diagrams.		2 hours s

Reading list for the lecture:
1. B. Roșca, Lecture notes. https://edu.tuiasi.ro/course/view.php?id=2033
2. A.M. Neville, J.J. Brooks, Concrete Technology (second ed.), Pearson Education, Harlow (2010)
3. A.M. Neville, Properties of Concrete (2011 - 5th Edition). Pearson Education Limited, Edinburg Gate, Harlow, Essex CM20 2JE, England.
4. P. Bhatt, T.J. MacGinley and B.S. Choo „Reinforced Concrete Design to Eurocodes, Design Theory and Examples", fourth ed., Ed. CRC PRESS, Taylor & Francis Group, 2014, 978-1-4665-5253-1 (eBook – PDF)

9.2b Laboratory	Work methods [18]	Observations, allotted time
Laboratory work 1: Compressive strength of concrete on specimens. Influencing factors on compressive strength on specimens	Discussion about the subject; Test and results	2 hours
Laboratory work 2: Tensile strength of concrete on specimens. Axial tensile strength, flexural strength, split tensile strength. Influencing factors on tensile strength on specimens.		2 hours
Laboratory work 3: Deformation of concrete under short-term load. Stress-strain diagram in compression of concrete. Deformation moduli of concrete.		2 hours
Laboratory work 4: Reinforcing steel for concrete. Stress-strain diagram in tension		2 hours
Laboratory work 5: Prestressing steel. Stress-strain diagram in tension		2 hours
Laboratory work 6: Bond between concrete and steel. Pull-out test		2 hours
Laboratory work7: Flexural behaviour of reinforced concrete beams. Load-deflection diagram		2 hours

Reading list for the laboratory:
1. B. Roșca – Laboratory works (pdf files)

10. Assessment

Assessment category	10.1 Assessment criteria	10.2 Assessment method		10.3 Percentage of final grade
10.4 Final exam	Completeness and accuracy of knowledge Logical coherence, fluency, and strength of argumentation Capacity for analysis, personal interpretation, originality, and creativity Level of command of specialised terminology and communication skills Ability to apply acquired skills Ability to process data and solve the problems presented	- systematic observation of students (individual or group assignments – which must be completed during the week between lectures, preparation of a report, case study)		60% (min 5)
		- formative assessment test (tests during the semester)		
		- summative assessment test (final assessment)	Final exam (min 5)	
10.5b Laboratory	Ability to work in a team. Ability to apply acquired knowledge in practice in different contexts. Capacity for analysis, personal interpretation, originality, and creativity	- completion of laboratory worksheets (all laboratory sessions must be completed, with only one missed session allowed to be retaken) - assessment test (laboratory colloquium)		40% (min 5)

10.6 Passing requirements:
The exam can be met whether the laboratory activity was passed.

The final grade for a course is determined by taking into account the scores and weightings assigned to each course activity. Whole-number grades from 10 to 1 will be awarded, with a grade of 5 certifying the achievement of the minimum learning outcomes required for the course and the awarding of the corresponding ECTS credits.

Date of completion: September 2025

Lecture instructor: Lecturer Bogdan - Gheorghe ROȘCA, PhD

Laboratory instructor: Lecturer Bogdan - Gheorghe ROȘCA, PhD

Date of departmental approval: Head of Department,
September 2025   Lecturer Cătălin ONUȚU, PhD

Date of faculty council approval: Dean,
September 2025   Professor Andrei BURLACU, PhD

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[1] *Bachelor's/ Master's degree.*

[2] *1-4 for bachelor's degree, 1-2 for master's degree.*

[3] *1-8 for bachelor's degree, 1-4 for master's degree.*

[4] *Exam (E), test (T) – from the curriculum.*

[5] *DOB – compulsory course, DOP– elective course, DFA– optional course;*

[6] *It is equal to 14 weeks x the number of hours indicated in section 3.1 (similarly for 3.5, 3.6abc).*

[7] *The lines below refer to individual study; the total is indicated in section 3.7.*

[8] *Between 2 and 6 hours. These represent teaching hours and are not included in individual study.*

[9] *Sum of the values from the previous lines, referring to individual study.*

[10] *Sum of direct contact hours (3.4) and individual study hours (3.7); this must equal the number of credits allocated to the course (section 3.9) × 25 hours per credit.*

[11] *Courses that must be completed beforehand or equivalent courses.*

[12] *Blackboard, projector, flipchart, specific teaching materials, etc.*

[13] *Computing equipment, software packages, experimental setups, etc.*

[14] *Learning outcomes presented as knowledge, skills, responsibility, and autonomy specific to the course. These should be correlated with the learning outcomes in fundamental and bachelor's degree fields (Annex 2 of ARACIS Specific Standards, www.aracis.ro/wp-content/uploads/2025/04/Standarde-specifice-programe-de-studii-universitare-de-licenta_aprilie-2025.pdf). For master's programmes, learning outcomes correspond to level 7 of the National Qualifications Framework (CNC).*

[15] *Chapter and paragraph titles.*

[16] *Discussions, debates, presentation and/or analysis of works, exercises and problem solving.*

[17] *Practical demonstration, exercise, experiment.*

[18] *Case study, demonstration, exercise, error analysis, etc.*

COURSE SYLLABUS

Academic year 2025-2026

1. Programme information

1.1 Higher Education Institution	"Gheorghe Asachi" Technical University of Iași
1.2 Faculty	Faculty of Civil Engineering and Building Services
1.3 Department	Civil and Industrial Engineering
1.4 Field of study	Civil Engineering
1.5 Level of study[1]	Bachelor's degree
1.6. Study programme	Inginerie civilă (în limba engleză)/ Civil Engineering - ICE

2. Course information

2.1.1 Course title				**Construcții civile** **Civil Buildings**			
2.1.2. Course code				CE213			
2.2 Lecture instructor				Lecturer Ruxandra COZMANCIUC, PhD			
2.3 Project instructors				Lecturer Ruxandra COZMANCIUC, PhD Lecturer Claudiu ROMILA, PhD			
2.4 Year of study[2]	2	2.5 Semester[3]	4	2.6 Assessment method[4]	E	2.7 Course type[5]	DI

3. Estimated total time (hours per semester)

3.1 Number of hours per week	4	3.2 lecture	2	3.3a seminar	-	3.3b laboratory	-	3.3c project	2	3.3.d practical sessions	
3.4 Total number of hours in the curriculum[6]	56	3.5 lecture	28	3.6a seminar	-	3.6b laboratory	-	3.6c project	28	3.6.d	-

Workload distribution [7]	No. of hours
Study based on textbook, course material, reading list and notes	7
Additional research in the library, on specialised electronic platforms, and in the field	4
Preparation for seminar/laboratory/project session, assignments, papers, and portfolios	8
Assessment[8]	2
Other activities:	

3.7 Total number of individual study hours[9]	19
3.8 Total number of hours per semester[10]	75
3.9 Number of ECTS credits	3

4. Prerequisites (if applicable)

4.1 Curriculum prerequisites[11]	
4.2 Learning outcomes prerequisites	Building Materials 1, Elements of Architecture and Urban Planning, Technical Drawing and Infographics 2, Physics 1, Physics 2.

5. Requirements

5.1 for the lecture[12]	- Blackboard, video projector, any specific teaching materials, etc.; - Online platforms (TUIASI, google, etc.) - Students will respect the Code of Students Rights and Obligations and the Regulations provided by the Charter of the "Gheorghe Asachi" Technical University of Iași
5.2 for the project[13]	- Equipment, specific laboratory techniques, dedicated software, video projector, etc.; - The project stages are carried out after the teaching/verifying the theoretical knowledge

6. General objective of the course

The Civil Buildings discipline has as general objective in setting the fundamental knowledge and skills regarding the design of the main construction elements with respect to the mechanical demands and the nature of the

materials used for the construction, execution, exploitation, and maintenance of civil buildings. In the same time, emphasis will be on understanding the principles of classification and performance of buildings in accordance with the technical and legislative requirements applicable in the field of construction.

The course aims to develop the students' ability to understand and apply technical regulations, to analyse and evaluate actions on structures and to understand the behaviour of buildings from the perspective of building physics (heat transfer, ventilation, natural lighting, acoustics), thus helping students in having an integrated vision on the buildings design and in applying essential performance requirements.

7. Learning outcomes[14]

Knowledge	The student/ graduate: - Identifies and defines the main types of buildings and their components; - Recognizes the essential requirements in buildings; - Indicates the main categories of actions on structures and mentions the causes of their occurrence; - Describes and explains the relationship between fundamental requirements and building performance; - Discovers the general principles of building physics (heat transfer, ventilation, natural light, acoustics); - Apply performance concepts and technical requirements in choosing constructive solutions; - Solves simple problems regarding permanent and variable actions on buildings; - Examines the effects of building physics on indoor comfort (thermal, acoustic, light);
Skills	The student/ graduate: - Apply heat transfer formulas and relationships; - Accurately perform basic calculations to evaluate actions; - Associate calculation relationships related to load combinations and track how they are transferred to the foundation level; - Accurately execute plans, sections and construction details
Responsibility and autonomy	The student/ graduate: - Complies with ethical principles, norms, and values in completing professional tasks correctly and on time, by adopting a rigorous, efficient, and responsible work strategy in decision-making and problem-solving; - Participates in discussions and responds constructively to group activities related to the choice of appropriate technical solutions; - Shows interest in the correct application of legislation and regulations; - Proposes ideas for improving constructive solutions and collaborates actively; - Develops professional projects in the field of engineering.

8. Teaching strategies

The teaching activities will include interactive lectures and debates based on PowerPoint presentations that will be made available to students. The presentations contain images and diagrams, so that the information could be easily understood and assimilated. Each lecture will begin with a brief review of the concepts covered in the previous class.

The teaching approach uses discovery-based learning models, facilitated by direct and indirect exploration of reality (experiments, demonstrations, modelling), as well as action-based methods, such as exercises, practical activities, problem-solving).

9. Content

9. 1. Lecture[15]	Teaching strategies	Time allocation
9.1.1 Classification of constructions and buildings. Buildings components	Interactive lecture, debates, explanations	2 hours
9.1.2 Basic requirements for construction works. Performance concept. Technical specifications. Design and construction legislation in Romania.		2 hours
9.1.3. Dimensional coordination and tolerances in constructions		2 hours
9.1.4 Actions on structures. Classification and evaluation of actions		
9.1.4.1. Permanent actions		2 hours
9.1.4.2. Variable actions		2 hours
9.1.4.3. Accidental actions		2 hours
9.1.4.4. Seismic action		2 hours

9.1.4.5. Design situations. Combination of actions.		2 hours
9.1.9. General notions on building engineering physics		
9.1.9.1 Heat transfer	Interactive lecture, debates, explanations	4 hours
9.1.9.2. Mass transfer		4 hours
9.1.9.3. Natural ventilation		2 hours
9.1.9.4. Natural lighting		2 hours

Reading list for the lecture:

1. Ruxandra Cozmanciuc, Civil constructions 1 - Lecture notes, https://edu.tuiasi.ro/course/view.php?id=3735#section-1, 2021
2. Neufert, „Architects' Data. Fifth Edition", Wiley-Blackwell, 2019
3. M. Brosteanu, "Constructions. Philosophy of Design", Cerni Publishing House, Iasi, 1998
4. Velicu, C., Clădiri, Editura Experților Tehnici Iași, 2009
5. Legea nr. 10/1995 privind calitatea în construcții, republicată, cu modificările și completările ulterioare, Monitorul Oficial al României, MO nr. 765 30 sept 2016, modif. si prin legea 204/2020
6. C107-2005, Normativ privind calculul termotehnic al elementelor de construcție ale clădirilor, Indicativ cu modificarile si completarile ulterioare, 2010
7. SR EN 1991-1-1 - Eurocod 1: Acțiuni asupra structurilor. Partea 1-1 Acțiuni generale – Greutăți specifice, greutăți proprii, încărcări utile pentru clădiri
8. CR1-1-3 / 2012 - Cod de proiectare. Evaluarea acțiunii zăpezii asupra construcțiilor
9. CR1-1-4 / 2012 - Cod de proiectare. Evaluarea acțiunii vântului asupra construcțiilor
10. SR EN 1991-1-7: 2007/NB:2017 - Eurocod 1: Acțiuni asupra structurilor. Partea 1-7: Acțiuni generale – Acțiuni accidentale. Anexă națională
11. P 100-1/2025 - Cod de proiectare seismică. Partea I

9.2c Project	Work methods [18]	Observations, allotted time
1. Choosing the functional solution for an Ug + G + 1Fl residential building. Structural and functional design rules	Explanations, discussions, applications, individual work, calculations, verifications, interpretation of results	2 hours
2. Pre-sizing the structural and enclosing elements.		2 hours
3. Ground floor plan. First floor plan. Underground floor plan.		4 hours
4. Roof covering plan. Roof framing system plan.		4 hours
5. Transversal cross section		4 hours
6. Permanent loads evaluation		2 hours
7. Variable loads evaluation		2 hours
8. Evaluation of loads at the foundation level.		2 hours
9. Foundation sizing. Foundation plan.		2 hours
10. Construction details.		2 hours
11. Preparation and writing up the technical report		2 hours

Reading list for the project:

1. Ruxandra Cozmanciuc, Civil constructions 1 - Lecture notes, https://edu.tuiasi.ro/course/view.php?id=3735#section-1, 2021
2. Ruxandra Cozmanciuc, Civil constructions 1 - Support material for applications,
https://edu.tuiasi.ro/course/view.php?id=3735#section-2, 2021
3. Romila, C., Cozmanciuc, R., Îndrumar de proiectare Construcții Civile, Ed. Soc. Acad. „Matei Teiu Botez", 2015.
4. SR EN 1991-1-1 - Eurocod 1: Acțiuni asupra structurilor. Partea 1-1 Acțiuni generale – Greutăți specifice, greutăți proprii, încărcări utile pentru clădiri
5. CR1-1-3 / 2012 - Cod de proiectare. Evaluarea acțiunii zăpezii asupra construcțiilor.
6. CR1-1-4 / 2012 - Cod de proiectare. Evaluarea acțiunii vântului asupra construcțiilor.
7. SR EN 1991-1-7:2007/NB:2017 - Eurocod 1: Acțiuni asupra structurilor. Partea 1-7: Acțiuni generale – Acțiuni accidentale. Anexă națională

10. Assessment

Assessment category	10.1 Assessment criteria	10.2 Assessment method		10.3 Percentage of final grade
10.4 Final exam	Completeness and accuracy of knowledge Logical coherence, fluency, and strength of argumentation Capacity for analysis, personal interpretation, originality, and creativity	- systematic observation of students (individual or group assignments – which must be completed during the week between lectures, preparation of a report, case study)	30%	50% (min 5)
	Level of command of specialised terminology and communication skills Ability to apply acquired skills	- formative assessment test (tests during the semester)	-	

	Ability to process data and solve the problems presented	- summative assessment test (final assessment)	70 %	
10.5c Project	Participation in project activities, ability to conduct research/ documentation, and application of knowledge in project work	- project work - project completion - project viva		50% (min 5)

10.6 Passing requirements
The final grade for a course is determined by taking into account the scores and weightings assigned to each course activity. Whole-number grades from 10 to 1 will be awarded, with a grade of 5 certifying the achievement of the minimum learning outcomes required for the course and the awarding of the corresponding ECTS credits.

Date of completion: September 2025

Lecture instructor: Lecturer Ruxandra COZMANCIUC, PhD

Seminar instructors: Lecturer Ruxandra COZMANCIUC, PhD

                                                                                                Lecturer Claudiu ROMILA, PhD

Date of departmental approval: Head of Department,
September 2025   Lecturer Ioana - Sorina ENȚUC, PhD

Date of faculty council approval: Dean,
September 2025   Professor Andrei BURLACU, PhD

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[1] Bachelor's/ Master's degree.

[2] 1-4 for bachelor's degree, 1-2 for master's degree.

[3] 1-8 for bachelor's degree, 1-4 for master's degree.

[4] Exam (E), test (T) – from the curriculum.

[5] DOB – compulsory course, DOP– elective course, DFA– optional course;

[6] It is equal to 14 weeks x the number of hours indicated in section 3.1 (similarly for 3.5, 3.6abc).

[7] The lines below refer to individual study; the total is indicated in section 3.7.

[8] Between 2 and 6 hours. These represent teaching hours and are not included in individual study.

[9] Sum of the values from the previous lines, referring to individual study.

[10] Sum of direct contact hours (3.4) and individual study hours (3.7); this must equal the number of credits allocated to the course (section 3.9) × 25 hours per credit.

[11] Courses that must be completed beforehand or equivalent courses.

[12] Blackboard, projector, flipchart, specific teaching materials, etc.

[13] Computing equipment, software packages, experimental setups, etc.

[14] Learning outcomes presented as knowledge, skills, responsibility, and autonomy specific to the course. These should be correlated with the learning outcomes in fundamental and bachelor's degree fields (Annex 2 of ARACIS Specific Standards, www.aracis.ro/wp-content/uploads/2025/04/Standarde-specifice-programe-de-studii-universitare-de-licenta_aprilie-2025.pdf). For master's programmes, learning outcomes correspond to level 7 of the National Qualifications Framework (CNC).

[15] Chapter and paragraph titles.

[16] Discussions, debates, presentation and/or analysis of works, exercises and problem solving.

[17] Practical demonstration, exercise, experiment.

[18] Case study, demonstration, exercise, error analysis, etc.

COURSE SYLLABUS

Academic year 2025-2026

1. Programme information

1.1 Higher Education Institution	"Gheorghe Asachi" Technical University of Iași
1.2 Faculty	Faculty of Civil Engineering and Building Services
1.3 Department	Civil and Industrial Engineering
1.4 Field of study	Civil Engineering
1.5 Level of study[1]	Bachelor's degree
1.6. Study programme	Inginerie civilă (în limba engleză)/ Civil Engineering - ICE

2. Course information

2.1.1 Course title	**Căi de comunicații** **Transportation Infrastructure**					
2.1.2. Course code	CE214					
2.2 Lecture instructor	Lecturer Gheorghiță BOACĂ, PhD					
2.3 Seminar instructor	Lecturer Gheorghiță BOACĂ, PhD					
2.4 Year of study[2]	2	2.5 Semester[3]	4	2.6 Assessment method[4]	C	2.7 Course type[5]	DI

3. Estimated total time (hours per semester)

3.1 Number of hours per week	2	3.2 lecture	1	3.3a seminar	1	3.3b laboratory		3.3c project		3.3.d practical sessions
3.4 Total number of hours in the curriculum[6]	28	3.5 lecture	14	3.6a seminar	14	3.6b laboratory		3.6c project	3.6.d	

Workload distribution [7]	No. of hours
Study based on textbook, course material, reading list and notes	8
Additional research in the library, on specialised electronic platforms, and in the field	6
Preparation for seminar/laboratory/project session, assignments, papers, and portfolios	8
Assessment[8]	2
Other activities:	

3.7 Total number of individual study hours[9]	22
3.8 Total number of hours per semester[10]	50
3.9 Number of ECTS credits	2

4. Prerequisites (if applicable)

4.1 Curriculum prerequisites[11]	
4.2 Learning outcomes prerequisites	

5. Requirements

5.1 for the lecture[12]	The course is interactive and therefore requires a classroom equipped with multimedia facilities (including a video projector) as well as a chalkboard to support additional explanations requested by participants during the sessions.
5.2 for the seminar[13]	During the seminar sessions, concise explanatory presentations will be delivered, after which students will engage in exercises and practical applications aimed at reinforcing and applying the relevant theoretical concepts. The seminar room must be equipped with a chalkboard to facilitate explanations, discussions and problem-solving activities.

6. General objective of the course

The course will present elements regarding road and rail transport infrastructure and the connection with buildings. It will specify the elements necessary to be taken into account when designing buildings and transport infrastructure to ensure access to buildings. Within the discipline, 3 main chapters will be addressed: roads and streets,

road and railways bridges, railways. For each chapter, the specific terminology and the main construction elements necessary for a construction engineer will be specified. Each student will need to know the general principles for the design and execution of transportation infrastructure conditioned by the location of buildings and vice versa.

7. Learning outcomes [14]

Knowledge	The student/ graduate: - Dimensions for different categories of roads and streets; - General conditions for the design of roads and streets; - The structure of the layers in the composition of roads and streets depending on road traffic; - Technologies used in the construction of roads and streets; - Elements of road and railway bridges; - Structural elements of concrete and metal bridges; - Structural composition of the railway
Skills	The student/ graduate: - Can differentiate between different categories of roads and streets; - Identify the main geometric elements for the design and execution of roads and streets; - Know and identify the structures of the layers used in the construction of roads and streets; - Know and identify the constructive elements of concrete and metal bridges for design and execution; - Know and identify the main elements in the composition of railways
Responsibility and autonomy	The student/ graduate: - Respects ethical principles, norms of professional responsibility when adapting buildings or communication routes, adopting a rigorous, efficient approach in decision-making and problem-solving; - Integrates effectively into work groups and applies appropriate communication and teamwork techniques in seminar activities and engineering problem-solving tasks; - Continuously seeks information and updates knowledge in the field of transport infrastructure and civil engineering, appropriate and efficient use of learning methods; - Correlates the conditions in the constructive composition for basic engineering projects and technical analyses related to transport infrastructure.

8. Teaching strategies

The teaching activities include interactive lectures supported by PowerPoint presentations, which are made available to students. The presentations contain diagrams and graphical representations of roads, streets, bridges and railways in order to facilitate understanding and assimilation of theoretical concepts.

The instructional approach combines theoretical explanations with problem-solving and practical exercises. Students are actively involved through numerical applications, guided analysis and applied tasks during seminars, encouraging analytical thinking and understanding of transportation infrastructure engineering principles.

9. Content

9. 1. Lecture[15]	**Teaching strategies**	**Time allocation**
9.1.1. Classification of roads and streets	Interactive lecture, debates, explanations	2 hours
9.1.2. General elements for the design of roads and streets		2 hours
9.1.3. General elements for the design of road accesses and platforms		2 hours
9.1.4. Technologies for road and road platform construction		2 hours
9.1.5. General elements regarding the construction of road and railway bridges		4 hours
9.1.6. General elements regarding the composition of railways		2 hours
Reading list for the lecture: 1. B. Cososchi, TRASEE, Editura, Iasi, 2006; 2. D. Popovici, CAI DE COMUNICATII, Editura Venus, Iasi, 1996.		
9.2a Seminar	**Work methods[16]**	**Observations, allotted time**
1. Study of the site plan and establishment of the route in the plan for an access road in a residential neighbourhood	Practical exercises	2 hours
2. Designing the longitudinal profile of the natural terrain		2 hours
3. Designing the red line for the chosen route		2 hours
4. Design of the typical cross-sectional profile on the access road		2 hours

5. Design of characteristic cross sections at 3 points on the route		2 hours
6. Setting the building's elevation to 0.00 (zero)		4 hours

Reading list for the seminar:
1. Popovici D., Boboc V., Găluşcă N.I. - Îndrumător de proiectare pentru căi de comunicații, Editura Societății Academice Matei Teiu Botez, Iași, 2001.

10. Assessment

Assessment category	10.1 Assessment criteria	10.2 Assessment method		10.3 Percentage of final grade
10.4 Colloquium	Completeness and accuracy of knowledge Logical coherence, fluency, and strength of argumentation Capacity for analysis, personal interpretation, originality, and creativity Level of command of specialised terminology and communication skills Ability to apply acquired skills Ability to process data and solve the problems presented	- systematic observation of students (individual or group assignments – which must be completed during the week between lectures, preparation of a report, case study)		50%
		- formative assessment test (tests during the semester)		
		- summative assessment test (final assessment)	100%	
10.5a Seminar	Ability to apply acquired knowledge Capacity for analysis, personal interpretation, originality, creativity	- active participation in the activities - assessment test		50%
10.6 Passing requirements				
The final grade for a course is determined by taking into account the scores and weightings assigned to each course activity. Whole-number grades from 10 to 1 will be awarded, with a grade of 5 certifying the achievement of the minimum learning outcomes required for the course and the awarding of the corresponding ECTS credits.				

Date of completion: September 2025

Lecture instructor: Lecturer Gheorghiță BOACĂ, PhD

Seminar instructor: Lecturer Gheorghiță BOACĂ, PhD

Date of departmental approval: Head of Department,
September 2025   Lecturer Oana - Elena COLȚ, PhD

Date of faculty council approval: Dean,
September 2025   Professor Andrei BURLACU, PhD

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[1] *Bachelor's/ Master's degree.*
[2] *1-4 for bachelor's degree, 1-2 for master's degree.*
[3] *1-8 for bachelor's degree, 1-4 for master's degree.*
[4] *Exam (E), test (T) – from the curriculum.*
[5] *DOB – compulsory course, DOP– elective course, DFA– optional course;*
[6] *It is equal to 14 weeks x the number of hours indicated in section 3.1 (similarly for 3.5, 3.6abc).*
[7] *The lines below refer to individual study; the total is indicated in section 3.7.*
[8] *Between 2 and 6 hours. These represent teaching hours and are not included in individual study.*
[9] *Sum of the values from the previous lines, referring to individual study.*
[10] *Sum of direct contact hours (3.4) and individual study hours (3.7); this must equal the number of credits allocated to the course (section 3.9) × 25 hours per credit.*
[11] *Courses that must be completed beforehand or equivalent courses.*
[12] *Blackboard, projector, flipchart, specific teaching materials, etc.*
[13] *Computing equipment, software packages, experimental setups, etc.*
[14] *Learning outcomes presented as knowledge, skills, responsibility, and autonomy specific to the course. These should be correlated with the learning outcomes in fundamental and bachelor's degree fields (Annex 2 of ARACIS Specific Standards, www.aracis.ro/wp-content/uploads/2025/04/Standarde-specifice-programe-de-studii-universitare-de-licenta_aprilie-2025.pdf). For master's programmes, learning outcomes correspond to level 7 of the National Qualifications Framework (CNC).*
[15] *Chapter and paragraph titles.*
[16] *Discussions, debates, presentation and/or analysis of works, exercises and problem solving.*
[17] *Practical demonstration, exercise, experiment.*
[18] *Case study, demonstration, exercise, error analysis, etc.*

COURSE SYLLABUS

Academic year 2025-2026

1. Programme information

1.1 Higher Education Institution	"Gheorghe Asachi" Technical University of Iași
1.2 Faculty	Faculty of Civil Engineering and Building Services
1.3 Department	Civil and Industrial Engineering
1.4 Field of study	Civil Engineering
1.5 Level of study[1]	Bachelor's degree
1.6. Study programme	Inginerie civilă (în limba engleză)/ Civil Engineering - ICE

2. Course information

2.1.1 Course title			**Hidraulică** **Hydraulics**			
2.1.2. Course code			CE215			
2.2 Lecture instructor			Lecturer Mitroi - Luncanu RALUCA, PhD			
2.3 Seminar instructor			Lecturer Mitroi - Luncanu RALUCA, PhD			
2.4 Year of study[2]	2	2.5 Semester[3]	4	2.6 Assessment method[4]	C	2.7 Course type[5]	DI

3. Estimated total time (hours per semester)

3.1 Number of hours per week	2	3.2 lecture	1	3.3a seminar	1	3.3b laboratory		3.3c project		3.3.d practical sessions	
3.4 Total number of hours in the curriculum[6]	28	3.5 lecture	14	3.6a seminar	14	3.6b laboratory		3.6c project		3.6.d	
Workload distribution [7]										No. of hours	
Study based on textbook, course material, reading list and notes										8	
Additional research in the library, on specialised electronic platforms, and in the field										6	
Preparation for seminar/laboratory/project session, assignments, papers, and portfolios										8	
Assessment[8]										2	
Other activities:											
3.7 Total number of individual study hours[9]	22										
3.8 Total number of hours per semester[10]	50										
3.9 Number of ECTS credits	2										

4. Prerequisites (if applicable)

4.1 Curriculum prerequisites[11]	
4.2 Learning outcomes prerequisites	

5. Requirements

5.1 for the lecture[12]	The course is interactive and therefore requires a classroom equipped with multimedia facilities (including a video projector) as well as a chalkboard to support additional explanations requested by participants during the sessions.
5.2 for the seminar project[13]	During the seminar sessions, concise explanatory presentations will be delivered, after which students will engage in exercises and practical applications aimed at reinforcing and applying the relevant theoretical concepts. The seminar room must be equipped with a chalkboard to facilitate explanations, discussions and problem-solving activities.

6. General objective of the course

In this course you will learn the fundamental principles of fluid behaviour at rest and in motion and their application in civil engineering. These topics are essential for the analysis and design of water supply systems, hydraulic structures, and pressurized flow installations. The course provides an overview of fluid properties, hydrostatic and

hydrodynamic laws, flow regimes, and basic drinking water distribution systems schemes. You will apply these concepts through practical problem-solving activities during seminars, covering all major course topics.

7. Learning outcomes [14]

Knowledge	The student/ graduate: - defines the fundamental physical quantities, units and properties of fluids used in hydraulic engineering; - explains the behaviour of liquids at rest (hydrostatics) and in motion (hydrodynamics); - describes the fundamental laws of hydraulics: hydrostatic pressure law, Pascal's law, Archimedes' principle, continuity equation, and energy equation (Bernoulli); - explains pressure distribution, velocity fields, discharge and energy relationships in fluid flow; - describes flow classification and flow regimes in pipes and open channels; - explains the principles of flow in pressurized pipe systems and basic water distribution networks; - describes the main stages and operating principles of potable water treatment schemes.
Skills	The student/ graduate: - uses hydraulic calculation methods and diagrams to analyze fluid flow in pipes and basic water supply systems; - performs pressure, velocity and discharge calculations using hydrostatic and hydrodynamic principles; - applies the continuity equation and the energy equation (Bernoulli) to solve engineering problems in hydraulics; - determines flow regimes and hydraulic parameters using the Reynolds number and characteristic flow data; - performs basic hydraulic calculations for simple water supply networks;
Responsibility and autonomy	The student/ graduate: - complies with ethical principles, professional norms, and safety regulations when performing hydraulic analyses and engineering tasks, by adopting a rigorous, efficient and responsible approach to decision-making and problem-solving; - integrates effectively into workgroups and applies appropriate communication and teamwork techniques during seminar activities and engineering problem-solving tasks; - continually seeks information and updates knowledge in the field of hydraulics and water supply engineering by using appropriate and effective lifelong learning methods; - develops basic engineering projects and technical analyses related to hydraulic systems.

8. Teaching strategies

The teaching activities include interactive lectures supported by PowerPoint presentations, which are made available to students. The presentations contain diagrams and graphical representations of hydraulic phenomena in order to facilitate understanding and assimilation of theoretical concepts.

The instructional approach combines theoretical explanations with problem-solving and practical exercises. Students are actively involved through numerical applications, guided analysis and applied tasks during seminars, encouraging analytical thinking and understanding of hydraulic engineering principles.

9. Content

9. 1. Lecture[15]	Teaching strategies	Time allocation
9.1.1. Introduction to Hydraulics. Physical Properties of Fluids	Interactive lecture, debates, explanations	2 hours
9.1.2. Hydrostatics		2 hours
9.1.3. Fluid Kinematics and Flow Classification		2 hours
9.1.4. Fundamental Principles of Fluid Flow		2 hours
9.1.5. Pressurized Pipe Flow and Drinking Water Systems		4 hours
9.1.6. Open Channel Flow		2 hours
Reading list for the lecture: 1. Bartha, Josif, Luca, M., Popescu, St., Popia, A., Hidraulica, Culegere de probleme, Rotaprint. 1991 2. Bartha, Josif, Javgureanu, V.,Hidraulica vol. I, Ed. Tehnica Chisinau, 1998 3. Blagoi, O., Mitroi, A., Hidraulica pentru constructii. Compediu. Ed. CERMI Iasi, 2003 4. Blagoi, O., Mitroi A., Hidraulica generala. Compendiu. Ed. Gh. Asachi Iasi, 2003 5. Bartha, Josif, Javgureanu, V., Marcoie, N., Hidraulica vol. 2, Ed. Performantica, Iasi. 2004 6. Blagoi, O., Mitroi A., - Solutii moderne si clasice pentru lucrari de protectie pe cursurile de apa. Editura Performantica, 2013 7. White F., Fluid Mechanics 8th Edition, McGraw-Hill Higher Education, 2015 8. Hossain A., Principles and Practices of Water Resources Development and Management, Nova Science Publishers, 2016 9. Cengel Y., Cimbala J., Fluid Mechanics Fundamentals and Applications, McGraw-Hill College, 2017		

10. I. Bartha, N. Marcoie, D. Toma, Raluca Mitroi, Hydraulics course for civil engineers, Editura Performantica, 2017
11. Bartha, Amalia Maria Bartha, Raluca Mitroi, Ana-Raluca Rosu, Hydraulics for civil engineers. Exercises, Ed. Performantica, 2017
12. McCuen R., Fluid Mechanics for Civil and Environmental Engineers, CRC Press, 2018

9.2a Seminar	Work methods[16]	Observations, allotted time
1. Basic notions in Hydraulics		2 hours
2. Hydrostatics	Practical exercises	2 hours
3. Hydrodynamics		2 hours
4. Flow in Pipes (Branched Networks)		8 hours

Reading list for the seminar:
1. Bartha J., Luca M., Marcoie N., Agafitei M., Hidraulica. Indrumar de laborator, Ed. Politehnium, Iasi, 2006
2. I. Bartha, Amalia Maria Bartha, Raluca Mitroi, Ana-Raluca Rosu, Hydraulics for civil engineers. Exercises, Ed. Performantica, 2017
3. Cengel Y., Cimbala J., Fluid Mechanics Fundamentals and Applications, McGraw-Hill College, 2017
4. Ruggieri P., Visconti G., Fluid Mechanics. Fundementals and Applications, Springer, 2020

10. Assessment

Assessment category	10.1 Assessment criteria	10.2 Assessment method		10.3 Percentage of final grade
10.4 Colloquium	Completeness and accuracy of knowledge Logical coherence, fluency, and strength of argumentation Capacity for analysis, personal interpretation, originality, and creativity	- systematic observation of students (individual or group assignments – which must be completed during the week between lectures, preparation of a report, case study)		50%
	Level of command of specialised terminology and communication skills Ability to apply acquired skills	- formative assessment test (tests during the semester)		
	Ability to process data and solve the problems presented	- summative assessment test (final assessment)	100%	
10.5a Seminar	Ability to apply acquired knowledge Capacity for analysis, personal interpretation, originality, creativity	- active participation in the activities - assessment test		50%
10.6 Passing requirements				
The final grade for a course is determined by taking into account the scores and weightings assigned to each course activity. Whole-number grades from 10 to 1 will be awarded, with a grade of 5 certifying the achievement of the minimum learning outcomes required for the course and the awarding of the corresponding ECTS credits.				

Date of completion: September 2025

Lecture instructor: Lecturer Mitroi - Luncanu RALUCA, PhD

Seminar instructor: Lecturer Mitroi - Luncanu RALUCA, PhD

Date of departmental approval: Head of Department,
September 2025   Associate Professor Petru CERCEL, PhD

Date of faculty council approval: Dean,
September 2025   Professor Andrei BURLACU, PhD

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[1] *Bachelor's/ Master's degree.*
[2] *1-4 for bachelor's degree, 1-2 for master's degree.*
[3] *1-8 for bachelor's degree, 1-4 for master's degree.*
[4] *Exam (E), test (T) – from the curriculum.*
[5] *DOB – compulsory course, DOP– elective course, DFA– optional course;*
[6] *It is equal to 14 weeks x the number of hours indicated in section 3.1 (similarly for 3.5, 3.6abc).*
[7] *The lines below refer to individual study; the total is indicated in section 3.7.*
[8] *Between 2 and 6 hours. These represent teaching hours and are not included in individual study.*
[9] *Sum of the values from the previous lines, referring to individual study.*
[10] *Sum of direct contact hours (3.4) and individual study hours (3.7); this must equal the number of credits allocated to the course (section 3.9) × 25 hours per credit.*
[11] *Courses that must be completed beforehand or equivalent courses.*

[12] *Blackboard, projector, flipchart, specific teaching materials, etc.*

[13] *Computing equipment, software packages, experimental setups, etc.*

[14] *Learning outcomes presented as knowledge, skills, responsibility, and autonomy specific to the course. These should be correlated with the learning outcomes in fundamental and bachelor's degree fields (Annex 2 of ARACIS Specific Standards, www.aracis.ro/wp-content/uploads/2025/04/Standarde-specifice-programe-de-studii-universitare-de-licenta_aprilie-2025.pdf). For master's programmes, learning outcomes correspond to level 7 of the National Qualifications Framework (CNC).*

[15] *Chapter and paragraph titles.*

[16] *Discussions, debates, presentation and/or analysis of works, exercises and problem solving.*

[17] *Practical demonstration, exercise, experiment.*

[18] *Case study, demonstration, exercise, error analysis, etc.*

COURSE SYLLABUS

Academic year 2025-2026

1. Programme information

1.1 Higher Education Institution	"Gheorghe Asachi" Technical University of Iași
1.2 Faculty	Faculty of Civil Engineering and Building Services
1.3 Department	Civil and Industrial Engineering
1.4 Field of study	Civil Engineering
1.5 Level of study[1]	Bachelor's degree
1.6. Study programme	Inginerie civilă (în limba engleză)/ Civil Engineering - ICE

2. Course information

2.1.1 Course title				**Ingineria mediului** **Environmental Engineering**			
2.1.2. Course code				CE216			
2.2 Lecture instructor				Professor Irina BARAN, PhD			
2.3 Project instructor				Lecturer Laura DUMITRESCU, PhD			
2.4 Year of study[2]	2	2.5 Semester[3]	4	2.6 Assessment method[4]	E	2.7 Course type[5]	DI

3. Estimated total time (hours per semester)

3.1 Number of hours per week	3	3.2 lecture	2	3.3a seminar		3.3b laboratory		3.3c project	1	3.3.d practical sessions
3.4 Total number of hours in the curriculum[6]	42	3.5 lecture	28	3.6a seminar		3.6b laboratory		3.6c project	14	3.6.d

Workload distribution [7]	No. of hours
Study based on textbook, course material, reading list and notes	15
Additional research in the library, on specialised electronic platforms, and in the field	8
Preparation for seminar/laboratory/project session, assignments, papers, and portfolios	10
Assessment[8]	3
Other activities:	-

3.7 Total number of individual study hours[9]	33
3.8 Total number of hours per semester[10]	75
3.9 Number of ECTS credits	3

4. Prerequisites (if applicable)

4.1 Curriculum prerequisites[11]	
4.2 Learning outcomes prerequisites	Building Materials, Chemistry

5. Requirements

5.1 for the lecture[12]	Board, video projector, flip chart, specific teaching materials
5.2 for the project[13]	Computer equipment, software packages The deadlines for reviewing the project stages are set by the lecturer instructor in agreement with the students

6. General objective of the course

Within the Environmental Engineering course, you will gain knowledge regarding the sources of environmental pollution and the methods for mitigating the impact generated by the built environment in the context of sustainable development. You will develop a systemic and interdisciplinary understanding of the relationship between human activities, the natural environment, and technical processes, with the purpose of identifying, evaluating, and reducing anthropogenic impacts on ecosystems. Furthermore, you will be able to determine optimal solutions for designing and implementing constructions with a reduced impact on the environment.

7. Learning outcomes [14]

Knowledge	The student/ graduate: - identifies the main sources of environmental pollution and their modes of manifestation in the context of construction and human activities; - distinguishes between types of pollutants (physical, chemical, biological) and their effects on the environment and human health; - defines the principles governing the dispersion of pollutants in air, water, and soil; - identifies methods and technologies for pollution control and reduction, including those applicable in the construction sector; - assimilates concepts related to recycling, reuse, and the circular economy relevant to the field of construction; - defines the principles of energy efficiency in buildings and the characteristics of low-energy constructions (passive buildings, NZEB, etc.).
Skills	The student/ graduate: - identifies and analyzes pollution sources within the built environment and assesses their impact; - proposes pollution control, reduction, and prevention solutions adapted to the specific context of a construction or urban area; - applies principles of material recycling and reuse in design and execution processes; - evaluates a building's energy consumption and identifies measures for improving energy performance; - critically assesses solutions aimed at reducing energy consumption in buildings; - uses analytical tools and environmental regulations to support engineering decision-making.
Responsibility and autonomy	The student/ graduate: - demonstrates professional responsibility toward environmental protection and the sustainable use of resources; - shows interest in implementing non-polluting strategies and sustainable development concepts; - works independently and collaborates effectively within interdisciplinary teams to solve environmental problems; - exhibits ethical conduct and critical thinking in analysing the environmental impact of constructions; - demonstrates interest in continuous self-improvement in the field of sustainable construction and green technologies.

8. Teaching strategies

The teaching process will employ participatory lectures and structured debates supported by PowerPoint presentations made available to students. These presentations integrate images and schematic illustrations to facilitate comprehension and knowledge retention. Each lecture will begin with a brief review of the concepts addressed in the previous session. The instructional approach is further supported by discovery-based learning models, enabled through both direct and indirect exploration of real-world phenomena (experimentation, demonstration, modelling), as well as action-oriented methods, including exercises, practical activities, and problem-solving tasks.

9. Content

9. 1. Lecture[15]	Teaching strategies	Time allocation
9.1.1. **Introduction:** General notions of environment protection and sustainable development. Ecological balance. The laws of evolution of ecological communities. Human role in disrupting the ecological balance		2 hours
9.1.2. **Environmental factors - pollution vectors:** Physical factors: water, air, light, soil. Human population growth, resources and environmental degradation, types, sources and effects of pollutants, pollution control.		2 hours
9.1.3. Pollution **sources and nature of pollutants:** Latent natural sources. Indoor pollution sources. Transportation – pollution source. Agriculture, forestry, livestock breeding. Industrial pollution. Radioactive pollution. Noise pollution. Specific measures to reduce emissions of pollutants.	Interactive lecture, debates, explanations	2 hours
9.1.4. **The dispersion of pollutants:** Pollution dynamics. Circulation of air pollutants. Water pollution - particularities. Soil pollution. Pollution of biological factors		2 hours
9.1.5. **The biological action of pollutants:** Discomfort. Radioactive substances, measuring radiation effects, sources of radiation, the peculiar case of radon gas		2 hours
9.1.6. **Controlling the contamination of the environment**		2 hours

9.1.7. **Environment protection principles:** Reduction of pollutants in human niche. Reduction of pollutants in transport. Reduction of pollutants in agriculture, forestry and livestock breeding. Reduction of pollutants in industry. Reduction of radioactive emissions. Intervention for liquidation of accidental pollution.		2 hours
9.1.8**. Elements of environmental law:** Sources. European Environmental Policy. Implementation of legislation concerning the environment		2 hours
9.1.9. **Changing the environmental conditions in urban areas and their influence on sustainable construction**		2 hours
9.1.10. **Recycling of building materials**		2 hours
9.1.11**. Energy conservation in buildings:** Consumption of energy - thermal comfort, loss and heat gain, energy balance. The use of renewable energy sources. Regulations on energy performance of buildings.		4 hours
9.1.12. **Sustainable Buildings:** Buildings with low energy, passive, active buildings, green buildings, healthy buildings, intelligent buildings. Systems assessment and certification of sustainable buildings. nZEB buildings (nearly zero energy buildings)		4 hours

Reading list for the lecture:

1. Baran I., Dumitrescu L.:Environmental engineering and sustainability in contruction**,** Editura Societăţii Academice "Matei - Teiu Botez", Iași, 2016

2. Baran I.- Environmental Engineering – Ed. Gh. Asachi, Iasi, 2001

3. Baker, Nick - Energy and Environment in Architecture a Technical Design Guide, Routledge, 2016

4. Guzowski, Mary- Towards Zero-energy Architecture, 2012

5. Randall McMullan – Environmental Science in Building, Sixth edition 2007

6. Keith Hall –The Green Building Bible, 4th Edition, Volume 1 and 2, 2009

7. Adeline Guerriat – Maisons passives, L'inedite, 2008

8. Baker-Laporte, Elliot Erica, Banta John -A Healthy House – New Society Publishers, 2008

9. Baran I. : Course notes "Environmental Engineering" https://edu.tuiasi.ro/pluginfile.php/87804/ mod_resource/content/

9.2c Project Name of task and content: Design of a dwelling building with low environmental impact	Work methods [18]	Observations, allocated time
1. Identification of elements and building components, geometric characteristics, steps of life cycle, characteristic for the building		2 hours
2. Energy consumption: embodied energy; energy consumption for building operation (heat losses, heat gains, energy consumption for space heating, hot water, artificial lightening; recycled materials – identification of recycled materials and of waste management strategies	Case study, exercise	8 hours
3. Indoor environment quality: identification of pollution sources and of main pollutants of indoor environment; identification of measures to reduce indoor pollution (reduction measures at sources, natural ventilation, and fresh air sources natural illumination and the visual comfort		2 hours
4. Final discussion and work delivery	Discussion	2 hours

Reading list for the project:

1. Dumitrescu L.: Applications notes: https://edu.tuiasi.ro/pluginfile.php/88191/mod_resource/content/1/EnvEng.pdf

2. C 107-2005(reactualizat 2011) privind calculul termotehnic al elementelor de construcţie ale clădirilor (Părţile 1, 3 şi 4)

3. Ordinul MDRT 2513/2010 pentru modificarea Reglementării tehnice "Normativ privind calculul termotehnic al elementelor de construcţie ale clădirilor", indicativ C 107-2005

4. NP 008-97 - Normativ privind igiena compoziţiei aerului în spaţii cu diverse destinaţii, în funcţie de activităţile desfăşurate, în regim de iarnă-vară

5. Mc 001-2006 Metodologie de calcul a performanţei energetice a clădirilor (cu modificările şi completările ulterioare)

6. Irina Baran, Daniel Covatariu – Environmental Engineering, Student's handbook, Ed. Soc. Acad. Matei-Teiu Botez 2010

10. Assessment

Assessment category	10.1 Assessment criteria	10.2 Assessment method		10.3 Percentage of final grade
10.4 Final exam	Completeness and accuracy of knowledge Logical coherence, fluency, and strength of argumentation Capacity for analysis, personal interpretation, originality, and creativity Level of command of specialised terminology and communication skills Ability to apply acquired skills	- systematic observation of students (individual or group assignments – which must be completed during the week between lectures, preparation of a report, case study)		50%
		- formative assessment test (tests during the semester)		

	Ability to process data and solve the problems presented	- summative assessment test (final assessment)	100%	
10.5c Project	Participation in project activities, ability to conduct research/ documentation, and application of knowledge in project work	- project work - project completion - project viva		50%

10.6 Passing requirements
To explain the fundamental concepts related to the environment and pollution, and to adopt suitable measures and solutions aimed at mitigating the environmental impact of construction works.
The final grade for a course is determined by taking into account the scores and weightings assigned to each course activity. Whole-number grades from 10 to 1 will be awarded, with a grade of 5 certifying the achievement of the minimum learning outcomes required for the course and the awarding of the corresponding ECTS credits.

Date of completion: September 2025

Lecture instructor: Professor Irina BARAN, PhD

Seminar instructor: Lecturer Laura DUMITRESCU, PhD

Date of departmental approval: Head of Department,
September 2025   Lecturer Ioana - Sorina ENȚUC, PhD

Date of faculty council approval: Dean,
September 2025   Professor Andrei BURLACU, PhD

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[1] *Bachelor's/ Master's degree.*

[2] *1-4 for bachelor's degree, 1-2 for master's degree.*

[3] *1-8 for bachelor's degree, 1-4 for master's degree.*

[4] *Exam (E), test (T) – from the curriculum.*

[5] *DOB – compulsory course, DOP– elective course, DFA– optional course;*

[6] *It is equal to 14 weeks x the number of hours indicated in section 3.1 (similarly for 3.5, 3.6abc).*

[7] *The lines below refer to individual study; the total is indicated in section 3.7.*

[8] *Between 2 and 6 hours. These represent teaching hours and are not included in individual study.*

[9] *Sum of the values from the previous lines, referring to individual study.*

[10] *Sum of direct contact hours (3.4) and individual study hours (3.7); this must equal the number of credits allocated to the course (section 3.9) × 25 hours per credit.*

[11] *Courses that must be completed beforehand or equivalent courses.*

[12] *Blackboard, projector, flipchart, specific teaching materials, etc.*

[13] *Computing equipment, software packages, experimental setups, etc.*

[14] *Learning outcomes presented as knowledge, skills, responsibility, and autonomy specific to the course. These should be correlated with the learning outcomes in fundamental and bachelor's degree fields (Annex 2 of ARACIS Specific Standards, www.aracis.ro/wp-content/uploads/2025/04/Standarde-specifice-programe-de-studii-universitare-de-licenta_aprilie-2025.pdf). For master's programmes, learning outcomes correspond to level 7 of the National Qualifications Framework (CNC).*

[15] *Chapter and paragraph titles.*

[16] *Discussions, debates, presentation and/or analysis of works, exercises and problem solving.*

[17] *Practical demonstration, exercise, experiment.*

[18] *Case study, demonstration, exercise, error analysis, etc.*

COURSE SYLLABUS

Academic year 2025-2026

1. Programme information

1.1 Higher Education Institution	"Gheorghe Asachi" Technical University of Iași
1.2 Faculty	Faculty of Civil Engineering and Building Services
1.3 Department	Civil and Industrial Engineering
1.4 Field of study	Civil Engineering
1.5 Level of study[1]	Bachelor's degree
1.6. Study programme	Inginerie civilă (în limba engleză)/ Civil Engineering - ICE

2. Course information

2.1.1 Course title	**Educație fizică 4** **Physical Training 4**						
2.1.2. Course code	CE217						
2.2 Lecture instructor							
2.3 Seminar instructor	Lecturer Ady-Constantin RANCEA, PhD						
2.4 Year of study[2]	2	2.5 Semester[3]	4	2.6 Assessment method[4]	Vp	2.7 Course type[5]	DI

3. Estimated total time (hours per semester)

3.1 Number of hours per week	1	3.2 lecture		3.3a seminar	1	3.3b laboratory		3.3c project		3.3.d practical sessions	
3.4 Total number of hours in the curriculum[6]	14	3.5 lecture		3.6a seminar		3.6b laboratory	14	3.6c project		3.6.d	

Workload distribution [7]	No. of hours
Study based on textbook, course material, reading list and notes	8
Additional research in the library, on specialised electronic platforms, and in the field	3
Preparation for seminar/laboratory/project session, assignments, papers, and portfolios	
Assessment[8]	2
Other activities:	

3.7 Total number of individual study hours[9]	11
3.8 Total number of hours per semester[10]	25
3.9 Number of ECTS credits	1

4. Prerequisites (if applicable)

4.1 Curriculum prerequisites[11]	
4.2 Learning outcomes prerequisites	

5. Requirements

5.1 for the lecture[12]	
5.2 for the seminar[13]	Synthetic football field, tennis courts, gyms; Fitness rooms, specific materials Students must comply with the Student Rights and Obligations Code and with the regulations of the University Charter of the "Gheorghe Asachi" Technical University of Iași.

6. General objective of the course

*The main objective of the **Physical Training 2** course is to increase the students' physical and intellectual capacity, to stimulate the independent practice of physical exercise and to improve basic motor skills. The aim is to strengthen the health and harmonious development of the young people's body, to acquire and consolidate some basic elements and procedures in athletics, gymnastics, sports games, fitness, their application in bilateral games or individual activities; to learn some basic notions related to the regulations for holding various sports competitions.*

7. Learning outcomes [14]

Knowledge	The student/ graduate: - understands basic concepts regarding the rules and techniques of sports games and gymnastic exercises; - knows the structure and purpose of the main physical exercises and sports practiced within physical education disciplines; - understands the role of physical activity in the physical and mental balance necessary for a demanding engineering career;
Skills	The student/ graduate: - Is able to correctly apply technical and tactical elements from athletics, gymnastics, sports games, or fitness; - Actively participate in exercises and applicative games to develop basic motor skills; - Demonstrates physical skills and coordination in the execution of individual or group exercises; - Adapts physical effort to one's own abilities and contributes to team sports activities
Responsibility and autonomy	The student/ graduate: - Demonstrates responsibility in complying with regulations, safety standards, and teacher instructions; - Demonstrates autonomy in practicing physical exercise outside of class; - Assumes correct and collaborative behaviour in collective sports activities; - Raises awareness of the importance of physical education in long-term personal and professional development.

8. Teaching strategies

The teaching activity is performed through demonstrations and exercises.

9. Content

9. 1. Lecture[15]	Teaching strategies	Time allocation
Reading list for the lecture:		
9.2a Seminar	Work methods[16]	Observations, allotted time
1. Sports games: basketball, handball, football, volleyball, badminton: - fundamental positions, positioning, and movement on the field; - simple kicks, services, exercises for receiving, catching, and passing the ball from a standing position and from running; exercises for completing basic technical and technical-tactical actions, marking, and marking exercises; - overall participation in games on small and normal fields with effective differences	Physical activities Exercises and applicative games	7 hours
2. Improving basic motor skills and those specific to certain sports, through the use of bodybuilding, athletics, and fitness equipment: - increasing strength and muscle mass through the appropriate and individualized use of weights, dumbbells, and barbells; exercises to adjust the forms and transform fat into active mass; improving the forms of speed manifestation (reaction, repetition, movement, execution through specific exercises); - improving general coordination indices and specific skill in different specific branches; - increasing mobility and suppleness at the level of different segments Increasing running endurance		7 hours
Reading list for the seminar: 1. Brata Maria,1996, Metodica educaţiei fizice şi sportulu, vol. I, Universitatea Oradea. 2. Cârstea Gh.,1993, Teoria şi Metodica Educaţiei fizice şi sportulu , Editura Universul, Bucureşti. 3. Dragnea A. şi col.,2006, Eduaţie fizică şi sport – teorie si didactica, Editura FEST, Bucureşti. 4. Dragnea, A., Bota, A., 1999, Teoria activităţilor motrice, Editura Didactica şi Pedagogica, R.A., Bucureşti. 5. Gaiţă D.,Merghes P.; 2002, Primul pas – Principii practice ale antrenamentului fizic în bolile cardiovasculare; Ed Mirton, Timisoara. 6. Hanţiu I., 2011, Teoria educaţiei fizice şi sportului, Editura Universităţii din Oradea, Oradea. 7. Ionescu, A., Mazilu ,V. 1971, Exerciţiul fizic în slujba sănătăţii, Editura Stadion, Bucuresti. 8. Ionescu I.V.1995, Fotbal, Ed. Helicon, Bucuresti. 9. Maroti, Ş., 2008 Baschet, volumul I, Editura Universităţii din Oradea, Oradea. 10. Maroti ,Ş., 2009 Baschet. Volumul II, Editura Universităţii din Oradea, Oradea. 11. Merghes P,Ţeghiu A., 2006; Gimnastica medicală pentru prevenirea şi corectarea deficienţelor fizice; Ed Mirton, Timisoara. 12. Morun P.;1996, Curs practic de educaţie fizică şi sport. Lito.		

13. Preda O.;1995, Volei la studenţi; Ed.Mirton, Timisoara.

14. Siclovan I.,1979, Teoria educaţiei fizice şi sportului, Editura Sport - Turism, Bucureşti.

15. Teghiu A., Merghes P, 2009, Deficientele Fizice-ghid practic" Ed. Eurostampa Timisoara.

16. Teodorescu, Leon, 1973, Terminologia educaţiei fizice şi sportului, Editura Stadion, Bucuresti.

17. Ulmeanu, Constantin ,1966, Noţiuni de fiziologie cu aplicaţii la exerciţiile fizice, Editura UCFS, Bucuresti

10. Assessment

Assessment category	10.1 Assessment criteria	10.2 Assessment method	10.3 Percentage of final grade
10.5a Seminar	Ability to apply acquired knowledge Capacity for analysis, personal interpretation, originality, creativity	- active participation in the activities	100%

10.6 Passing requirements
The student passes the course on Physical Training I if he demonstrates fundamental practical skills in athletics, gymnastics, sports games, and bodybuilding/ fitness, respectively the ability to correctly and efficiently execute specific techniques, to actively participate in sports activities and to improve his basic and specific motor qualities through individualized training.
Whole-number grades from 10 to 1 will be awarded, with a grade of 5 certifying the achievement of the minimum learning outcomes required for the course and the awarding of the corresponding ECTS credits.

Date of completion: September 2025

Lecture instructor: -

Seminar instructors: Lecturer Ady-Constantin RANCEA, PhD

Date of departmental approval: Head of Department,
September 2025   Associate Professor Gabriel ASANDULUI, PhD

Date of faculty council approval: Dean,
September 2025   Professor Andrei BURLACU, PhD

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[1] *Bachelor's/ Master's degree.*

[2] *1-4 for bachelor's degree, 1-2 for master's degree.*

[3] *1-8 for bachelor's degree, 1-4 for master's degree.*

[4] *Exam (E), test (T) – from the curriculum.*

[5] *DOB – compulsory course, DOP– elective course, DFA– optional course;*

[6] *It is equal to 14 weeks x the number of hours indicated in section 3.1 (similarly for 3.5, 3.6abc).*

[7] *The lines below refer to individual study; the total is indicated in section 3.7.*

[8] *Between 2 and 6 hours. These represent teaching hours and are not included in individual study.*

[9] *Sum of the values from the previous lines, referring to individual study.*

[10] *Sum of direct contact hours (3.4) and individual study hours (3.7); this must equal the number of credits allocated to the course (section 3.9) × 25 hours per credit.*

[11] *Courses that must be completed beforehand or equivalent courses.*

[12] *Blackboard, projector, flipchart, specific teaching materials, etc.*

[13] *Computing equipment, software packages, experimental setups, etc.*

[14] *Learning outcomes presented as knowledge, skills, responsibility, and autonomy specific to the course. These should be correlated with the learning outcomes in fundamental and bachelor's degree fields (Annex 2 of ARACIS Specific Standards, www.aracis.ro/wp-content/uploads/2025/04/Standarde-specifice-programe-de-studii-universitare-de-licenta_aprilie-2025.pdf). For master's programmes, learning outcomes correspond to level 7 of the National Qualifications Framework (CNC).*

[15] *Chapter and paragraph titles.*

[16] *Discussions, debates, presentation and/or analysis of works, exercises and problem solving.*

[17] *Practical demonstration, exercise, experiment.*

[18] *Case study, demonstration, exercise, error analysis, etc.*

COURSE SYLLABUS

Academic year 2025-2026

1. Programme information

1.1 Higher Education Institution	"Gheorghe Asachi" Technical University of Iași
1.2 Faculty	Faculty of Civil Engineering and Building Services
1.3 Department	Civil and Industrial Engineering
1.4 Field of study	Civil Engineering
1.5 Level of study[1]	Bachelor's degree
1.6. Study programme	Inginerie civilă (în limba engleză)/ Civil Engineering - ICE

2. Course information

2.1.1 Course title	**Practica topografică** **Surveying Practice**				
2.1.2. Course code	CE218				
2.2 Lecture instructor(s)					
2.3 Practical session instructor(s)	Lecturer Daniel COVATARIU, PhD				
2.4 Year of study[2]	2	2.5 Semester[3]	4	2.6 Assessment method[4] C	2.7 Course type[5] DI

3. Estimated total time (hours per semester)

3.1 Number of hours per week	30	3.2 lecture		3.3a seminar		3.3b laboratory		3.3c project			3.3.d practical sessions	
3.4 Total number of hours in the curriculum[6]	60	3.5 lecture		3.6a seminar		3.6b laboratory		3.6c project		3.6. d	60	
Workload distribution [7]										No. of hours		
Study based on textbook, course material, reading list and notes												
Additional research in the library, on specialised electronic platforms, and in the field												
Preparation for seminar/laboratory/project session, assignments, papers, and portfolios												
Assessment[8]										3		
Other activities:												

3.7 Total number of individual study hours[9]	-
3.8 Total number of hours per semester[10]	100
3.9 Number of ECTS credits	4

4. Prerequisites (if applicable)

4.1 Curriculum prerequisites[11]	
4.2 Learning outcomes prerequisites	Surveying, Technical Drawing, Trigonometry, Geometry

5. Requirements

5.1 for the lecture[12]	
5.2 for the seminar / laboratory / project[13]	- Instruments and devices specific to the discipline – total stations, theodolites, tachymeters, level meters, planimeters, accessories, computer with scientific functions - Students will comply with the Labor Protection Regulations, the Code of Student Rights and Obligations and the Regulations provided for by the Chart of the "Gheorghe Asachi" Technical University of Iași

6. General objective of the course

Students' acquisition of the practical methodology regarding the topography activity applied in Civil Engineering, as well as the application of the skills acquired in the "Surveying" discipline in solving practical problems of surveys, topographic layout-ing and monitoring the operational behaviour of the buildings;

Upon completion of the course, students will be able to:

• identify, on topographic plans, the details of the terrain and know the elements necessary for drawing up

topographic plans;
    • *graphically represent different types of buildings, their location and the site plan;*
    • *know and organize the tracing (in plan/vertical) and surveying activities of buildings;*
    • *know the methods of measuring the displacements (horizontal and vertical) of a building, in order to monitor their operational behaviour.*

7. Learning outcomes [14]

Knowledge	The student: - identifies and evaluates the locations of different categories of constructions (location plans, alignment profiles, sections, etc.); - explains the component parts, principles, and operation of specific topographic instruments, as well as their annexes; - identifies, understands, and interprets topographic graphs/ plans
Skills	The student: - collects and manages information regarding the location of the construction, in order to use and understand it within the framework of technical projects, determines reference points, projection systems and examines correlations between them; - operates with topo-geodetic instruments in order to measure and verify construction elements, in order to produce the drawings within the framework of technical projects; - performs specific topographic surveys necessary for the development of the drawings within the framework of technical projects (sketches, surveys, topographic plans, displacement evolution graphs). - performs topographic layoutings for the transposition of engineering projects into the field; - selects and applies methods in order to monitor the operational behaviour of engineering structures.
Responsibility and autonomy	The student: - demonstrates autonomy in learning on issues specific to the field; - integrates into the working group and applies techniques for effective communication and work in multidisciplinary teams, on various hierarchical levels; - permanently informs and documents himself in his own field of activity through the appropriate use of bibliographic methods

8. Teaching strategies

    The method of teaching the topic is based on the notions assimilated during the previous semester in the "Surveying" discipline, mainly on action-based methods (exercise, practical activities and solving practical problems inspired by current site activity), but also on theoretical bibliographic study necessary to identify methods for solving various site/design tasks (surface/volume determinations, displacements, dimensions, etc.).

9. Content

9.2d Practical training	Work methods [18]	Observations, allotted time
Details for the internship period. Programming of activities (group formation, assignment submission, resources, recapitulation (angle and distance measurements) Methods for verifying and centralizing data measured in the field and preparing specific documentation Labor protection instructions to be followed during practical topographic procedures; Instructions for using topographic instruments	Presentation and discussions on field measurement techniques; Practical activities involving sketching / design / measurement / verification / calculation / graphic representation, necessary for solving work tasks	2 hours
Topographic surveying of a land surface by tachymetric surveying, including preparation of a topographical plan to scale and calculation of surfaces by various methods		20 hours
Surveying a building within the FCI perimeter;		4 hours
Determining the vertical position (elevation) of the characteristic points of a building's infrastructure, by using the level surveying method, in order to draw up the longitudinal profile and transverse profiles through the specific given points.		20 hours
Layout of the building in the field using the polar coordinate method, the angular intersection method, and the linear intersection method by using data from an existing topographic plan.		6 hours
Determining the height and verticality of a building within the FCI perimeter (U.C.E.C.)		6 hours
Final evaluation of the project / internship; Colloquium		2 hours

Reading list for the practical trainings:
1. Covatariu Daniel, „Ghid de practică topografică - Surveying Practice Guide", Editura Societății Academice „Matei-Teiu Botez" Iași, ISBN 978-606-582-114-9, 2024
2. Covatariu Daniel, Roșu Ana Raluca, "Land Surveying used in Civil Engineering"; Editura Societății Academice „Matei - Teiu Botez" Iași, ISBN 978-606-582-001-2, 2011
3. Covatariu Daniel, "Surveying", Editura Societății Academice „Matei-Teiu Botez" Iași, ISBN 978-606-582-139-2, 2019;
4. William Irvin, Finlay Maclennan, "Surveying for Construction", ISBN-13:978-0077111144, Mc Graw Hill, 5th edition, 2006;
5. Jan Van Sickle, "1001 Solved Surveying Fundamentals Problems", ISBN 1-888577-12-6, 2nd edition, 1997;
6. Barry Kavanagh, "Surveying with Construction Applications", ISBN 13-978-013-136937-5, 7th edition, 2010
7. W. Schofield, M. Breach, "Engineering Surveying", ISBN 13-978-0-7506-6949, 6th edition, 2007

10. Assessment

Assessment category	10.1 Assessment criteria	10.2 Assessment method	10.3 Percentage of final grade
10.4 Colloquium	- Completeness and correctness of knowledge. - Logical coherence, fluency, argumentative force. - Capacity for analysis, personal interpretation, originality, creativity. - Degree of assimilation of specialized language and communication ability. - Ability to work in a team (to understand and make oneself understood) - Ability to capitalize on acquired skills. - Ability to process data and stated problems.	Continuous assessment along the training period: - Systematic observation of students (solving assignments in teams, using topo-geodetic techniques, preparing a practice notebook with case studies).	50 %
		Final evaluation: - Oral presentation of the project in working teams (discussions); quantitative and qualitative evaluation of the internship project - 10-question multiple-choice test	50 %

10.6 Passing requirements
- To recognize and identify situations specific to the discipline;
- To acquire the practical skills necessary to use methods and tools to solve specific topographic problems;
- To understand/ plan/ solve collective practical assignments (correctly and completely) according to the imposed requirements and the regulations in force.
- To recognize and use specialized terminology.

The final grade for a course is determined by taking into account the scores and weightings assigned to each course activity. Whole-number grades from 10 to 1 will be awarded, with a grade of 5 certifying the achievement of the minimum learning outcomes required for the course and the awarding of the corresponding ECTS credits.

Date of completion: September 2025

Lecture instructor: -

Practical session instructor: Lecturer Daniel COVATARIU, PhD

Date of departmental approval: Head of Department,
September 2025   Lecturer Ioana - Sorina ENȚUC, PhD

Date of faculty council approval: Dean,
September 2025   Professor Andrei BURLACU, PhD

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[1] Bachelor's/ Master's degree.

[2] 1-4 for bachelor's degree, 1-2 for master's degree.

[3] 1-8 for bachelor's degree, 1-4 for master's degree.

[4] Exam (E), test (T) – from the curriculum.

[5] DOB – compulsory course, DOP– elective course, DFA– optional course;

[6] It is equal to 14 weeks x the number of hours indicated in section 3.1 (similarly for 3.5, 3.6abc).

[7] The lines below refer to individual study; the total is indicated in section 3.7.

[8] Between 2 and 6 hours. These represent teaching hours and are not included in individual study.

[9] Sum of the values from the previous lines, referring to individual study.

[10] Sum of direct contact hours (3.4) and individual study hours (3.7); this must equal the number of credits allocated to the course (section 3.9) × 25 hours per credit.

[11] Courses that must be completed beforehand or equivalent courses.

[12] Blackboard, projector, flipchart, specific teaching materials, etc.

[13] Computing equipment, software packages, experimental setups, etc.

[14] *Learning outcomes presented as knowledge, skills, responsibility, and autonomy specific to the course. These should be correlated with the learning outcomes in fundamental and bachelor's degree fields (Annex 2 of ARACIS Specific Standards, www.aracis.ro/wp-content/uploads/2025/04/Standarde-specifice-programe-de-studii-universitare-de-licenta_aprilie-2025.pdf). For master's programmes, learning outcomes correspond to level 7 of the National Qualifications Framework (CNC).*

[15] *Chapter and paragraph titles.*

[16] *Discussions, debates, presentation and/or analysis of works, exercises and problem solving.*

[17] *Practical demonstration, exercise, experiment.*

[18] *Case study, demonstration, exercise, error analysis, etc.*

COURSE SYLLABUS

Academic year 2025 - 2026

1. Programme information

1.1 Higher Education Institution	"Gheorghe Asachi" Technical University of Iași
1.2 Faculty	Civil Engineering and Building Services
1.3 Department	Civil and Industrial Engineering
1.4 Field of study	Civil Engineering
1.5 Level of study[1]	Bachelor's degree
1.6. Study programme	Inginerie civilă (în limba engleză)/ Civil Engineering - ICE

2. Course information

2.1.1 Course title				**Optional 3 – Teoria probabilităților și statistică matematică** **Optional 3 – Probability theory and statistics**			
2.1.2. Course code				CE219			
2.2 Lecture instructor				Lecturer Gabriela COVATARIU, PhD			
2.3 Seminar instructor				Lecturer Gabriela COVATARIU, PhD			
2.4 Year of study[2]	2	2.5 Semester[3]	3	2.6 Assessment method[4]	Vp	2.7 Course type[5]	DO

3. Estimated total time (hours per semester)

3.1 Number of hours per week	3	3.2 lecture	2	3.3a seminar	1	3.3b laboratory		3.3c project			3.3.d practical sessions
3.4 Total number of hours in the curriculum[6]	42	3.5 lecture	28	3.6a seminar	14	3.6b laboratory		3.6c project		3.6.d	
Workload distribution [7]										No. of hours	
Study based on textbook, course material, reading list and notes										3	
Additional research in the library, on specialised electronic platforms, and in the field										3	
Preparation for seminar/laboratory/project session, assignments, papers, and portfolios										2	
Assessment[8]										2	
Other activities:											

3.7 Total number of individual study hours[9]	8
3.8 Total number of hours per semester[10]	50
3.9 Number of ECTS credits	2

4. Prerequisites (if applicable)

4.1 Curriculum prerequisites[11]	
4.2 Learning outcomes prerequisites	Algebra and geometry, Mathematical analysis, Computer programming, and programming languages

5. Requirements

5.1 for the lecture[12]	- Applied activities in physical format, at the faculty headquarters: computer technology, software packages, experimental stands, etc. - The deadlines for the submission of the papers are established by the tenured professors and are sent to the students at the beginning of the semester - Students will comply with the Code of Student Rights and Obligations and the Regulations provided by the Charter of the *"Gheorghe Asachi"* Technical University of Iasi
5.2 for the seminar[13]	- Applied activities in physical format, at the faculty headquarters: computer technology, software packages, experimental stands, etc. - The deadlines for the submission of the papers are established by the tenured professors and are sent to the students at the beginning of the semester - Students will comply with the Code of Student Rights and Obligations and the Regulations provided by the Charter of the *"Gheorghe Asachi"* Technical University of Iasi

6. General objective of the course

In this course you will learn the basics of probability, descriptive and inferential statistics, using modern tools specific to data science.

The course focuses on the acquisition of the procedures and techniques of collecting and processing statistical data in order to obtain statistical indicators, data visualization, as well as methods of discovering the regularities, permanences, laws and trends that manifest themselves in their evolution and, on this basis, their extrapolation in conditions of uncertainty.

The models presented are applied in real engineering contexts, through distribution analysis, parameter estimation, hypothesis testing and regression modelling. This information will be implemented in the practical activities, which will lead to a better understanding of the data, adequate data collection/selection, ways of analysing them, correct interpretation of the results. At the same time, digital skills will be developed for data processing and presentation of results in an appropriate professional way and critical data analysis and the ability to present the analysis in an appropriate engineering paper.

7. Learning outcomes[14]

Knowledge	The Student/ Graduate will: - explain the fundamentals of statistics and probability theory and the steps of a statistical analysis; - compare qualitative and quantitative analyses; - evaluates the data, analytical in statistical terms (estimates of types of errors); - evaluates the effects of systematic errors on analytical results, determination of detection limits, interpretation of statistical tests)
Skills	The Student/ Graduate will be able to: - use digital tools for seminar work and the creation and presentation of the final paper; - plans data collection and understands the use of different sampling methods and analysis methods; - checks and cleans data for proper analysis; - critically evaluates the methods of data collection and analysis, the use of computer tools and the results of the analysis results
Responsibility and autonomy	The Student/ Graduate: - respects the principles, norms, and values of ethics in the correct and timely execution of professional tasks, by approaching a rigorous, efficient, and responsible work strategy in decision-making for problem solving; - integrates into the working group and applies techniques of relationship and efficient work in multidisciplinary teams, on various hierarchical levels; - he/she is permanently informed and documented in his/her own field of activity through the appropriate use of effective methods and techniques of lifelong learning; - develops professional projects in the field of engineering.

8. Teaching strategies

In the teaching activity, participatory lectures and debates will be used based on Power Point presentations that will be made available to students on the *edu.tuiasi.ro platform.* The presentations contain images, sketches, videos, so that the information is easy to understand and assimilate.

The teaching method is also based on models of learning by discovery facilitated by direct and indirect exploration of reality (experiment, demonstration, modelling), but also on action-based methods, such as exercise, practical activities and problem solving.)

9. Content

9. 1. Lecture[15]	Teaching strategies	Time allocation
9.1.1. Introduction. Definitions. Fundamental concept. Practical objectives. Data Science		4 hours
9.1.2. Probability theory. Events. Event field. Bayes' formula		4 hours
9.1.3. Random variables. Discrete variables. Continuous variable	Interactive lecture, debates, explanations	2 hours
9.1.4. Statistical indicators of location, dispersion, symmetry		2 hours
9.1.5. Data visualization		2 hours
9.1.6. Estimates and timings of random variables		2 hours

9.1.7. Probabilistic distributions. Distribution functions. Discrete distributions. Continuous distributions. Central limit theorem	4 hours
9.1.8. Confidence intervals. Statistical tests	2 hours
9.1.9. Correlation and regression. Risk analysis	2 hours
9.1.10. Design of experiments	2 hours
9.1.11. Presentation of the reports	2 hours

Reading list for the lecture:
1. Covatariu G. Statistica - note de curs, www.edu.tuiasi.ro
2. Toplicianu V., Statistica, Ed. Cartea Universitara, București, 2006
3. Ang, A. H. and Tang, W. H., Probability Concepts in Engineering: Emphasis on Applications in Civil & Environmental Engineering, Wiley 2007
4. Ross, S. M., Introduction to Probability and Statistics for Engineers and Scientists. Amsterdam, Elsevier Academic Press, 2004
5. Montgomery D.C, Runger G.C., Montgomery's Applied Statistics and Probability for Engineers, 7th Edition, Global Edition, Wiley, 2018 (orice editie)
6. Jain Rakesh K, Data Science for Civil Engineering: A Beginner's Guide, CRC Pr Inc, 2023

9.2a Seminar	Work methods[16]	Observations, allotted time
9.2.1. Excel for Statistical Analysis	Interactive lecture, debates, explanations, practice work	2 hours
9.2.2. Events. Calculating probabilities		2 hours
9.2.3. Statistical observation. Elements of Sampling Theory		2 hours
9.2.4. Statistical indicators. Regression and correlation. Presentation of statistical data		4 hours
9.2.5. How to write a paper/ a project (content structure, fulfilment of requirements, statistical analysis)		4 hours

Reading list for the seminar:
1. Covatariu G. Statistica - note de curs, www.edu.tuiasi.ro
2. Toplicianu V., Statistica, Ed. Cartea Universitara, București, 2006
3. Ang, A. H. and Tang, W. H., Probability Concepts In Engineering: Emphasis On Applications In Civil & Environmental Engineering, 2nd ed, Wiley 2007
4. Ross, S. M., Introduction to Probability and Statistics for Engineers and Scientists. Amsterdam, Elsevier Academic Press, 2004
5. Montgomery D.C, Runger G.C., Montgomery's Applied Statistics and Probability for Engineers, 7th Edition, Global Edition, Wiley, 2018 (orice editie)
6. Berk K.N., Carey P, Data Analysis with Microsoft Excel, Brooks/Cole, Cengage Learning, 2010

10. Assessment

Assessment category	10.1 Assessment criteria	10.2 Assessment method		10.3 Percentage of final grade
10.4 Final tests	Completeness and accuracy of knowledge Logical coherence, fluency, and strength of argumentation Capacity for analysis, personal interpretation, originality, and creativity Level of assimilation of specialised terminology and communication skills	- systematic observation of students (individual assignments – which must be completed during the week between lectures, preparation of a report, case study) - presentation of the project by each student	50%	50%
	Ability to apply acquired skills Ability to process data and solve the problems presented	- summative assessment test (final assessment)	50%	
10.5a Seminar	Ability to apply acquired knowledge Capacity for analysis, personal interpretation, originality, creativity	- active participation in the activities - assessment test		50%

10.6 Passing requirements
For the final evaluation, the student must demonstrate the choice and correct approach of a set of data, knowledge of statistical indicators, making graphs properly and adapted to the data, that he knows how to present his analysis in an oral presentation and written paper. The final grade for a course is determined by taking into account the scores and weightings assigned to each course activity. Whole-number grades from 10 to 1 will be awarded, with a grade of 5 certifying the achievement of the minimum learning outcomes required for the course and the awarding of the corresponding ECTS credits.

Date of completion: September 2025

Lecture instructor: Lecturer Gabriela COVATARIU, PhD

Seminar instructors: Lecturer Gabriela COVATARIU, PhD

Date of departmental approval: Head of Department,
September 2025   Lecturer Mircea - Vasile VENGHIAC, PhD

Date of faculty council approval: Dean,
September 2025   Professor Andrei BURLACU, PhD

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COURSE SYLLABUS

Academic year 2025-2026

1. Programme information

1.1 Higher Education Institution	"Gheorghe Asachi" Technical University of Iași
1.2 Faculty	Faculty of Civil Engineering and Building Services
1.3 Department	Civil and Industrial Engineering
1.4 Field of study	Civil Engineering
1.5 Level of study[1]	Bachelor's degree
1.6. Study programme	Inginerie civilă (în limba engleză)/ Civil Engineering - ICE

2. Course information

2.1.1 Course title	**Matematică special** **Special Mathematics**					
2.1.2. Course code	CE219					
2.2 Lecture instructor	Associate Professor Marcel Roman, Ph.D.					
2.3 Seminar instructor	Associate Professor Marcel Roman, Ph.D.					
2.4 Year of study[2]	2	2.5 Semester[3]	3	2.6 Assessment method[4]	T	2.7 Course type[5] DO

3. Estimated total time (hours per semester)

3.1 Number of hours per week	3	3.2 lecture	2	3.3a seminar	1	3.3b laboratory		3.3c project		3.3.d practical sessions
3.4 Total number of hours in the curriculum[6]	42	3.5 lecture	28	3.6a seminar	14	3.6b laboratory		3.6c project	3.6.d	

Workload distribution [7]	No. of hours
Study based on textbook, course material, reading list and notes	
Additional research in the library, on specialised electronic platforms, and in the field	
Preparation for seminar, assignments, papers, and portfolios	8
Assessment[8]	2
Other activities:	

3.7 Total number of individual study hours[9]	8
3.8 Total number of hours per semester[10]	50
3.9 Number of ECTS credits	2

4. Prerequisites (if applicable)

4.1 Curriculum prerequisites[11]	
4.2 Learning outcomes prerequisites	To know and to be able to make computations in differential calculus, linear algebra, and analytic geometry

5. Requirements

5.1 for the lecture[12]	- Teaching activities in physical format, at the faculty headquarters: blackboard, video projector, specific teaching materials, etc. - If necessary, teaching activities in synchronous online format (on educational platform Microsoft Teams with academic subscriptions), with the necessary equipment for a video conference: computer/laptop, video camera, microphone, speakers/headphones, internet connection). - Students will comply with the Code of Student Rights and Obligations and the Regulations provided by the Charter of the "Gheorghe Asachi" Technical University of Iasi.
5.2 for the seminar[13]	- Applied activities in physical format, at the faculty headquarters: computing equipment, software packages, experimental stands, etc. - If necessary, applied activities in synchronous online format (on educational platform Microsoft Teams with academic subscriptions), with the necessary equipment for a

| | video conference (computer/laptop, video camera, microphone, speakers/headphones, internet connection). |
| | - The deadlines for submitting the papers are established by the lecturers and are sent to the students at the beginning of the semester. |

6. General objective of the course

- *Students will be able to mathematically and physically model the complex behavior of building structures.*
- *Students will be able to comparatively analyze theories and calculation methods for building elements and structures. Students will be able to use methods of differential calculus, integral calculus, and integral transformations to determine solutions to equations and systems of differential and integral equations describing specific problems in the field of strength of materials, statics and dynamics of constructions, elasticity theory.*

7. Learning outcomes [14]

Knowledge	The student/ graduate: - will know and to use properly the integral calculus, the solving of differential equations and systems of differential equations, the using of residue theory and their applications in integral calculus and in operational calculus (Laplace and Fourier transforms); - will operate with abstract concepts to make judgments from simple to complex, generalizations and customizations; - will understand the major issues related to the notion of Riemann integral, improper integral and parameter integrals and their applications in practice; - will understand the major issues related to the concept of differential equation and some elements of mathematical modeling; - will understand the major issues of Fourier series and Fourier and Laplace transforms;
Skills	The student/ graduate: - will apply abstract concepts for solving practical problems and exercises; - will calculate various integrals; - will solve ordinary differential equations by direct methods and operational methods; - will expand the functions in Fourier series, to calculate the direct/inverse Fourier and Laplace transforms and to use them in operational calculus.
Responsibility and autonomy	The student/ graduate: - complies with ethical principles, norms, and values in completing professional tasks correctly and on time, by adopting a rigorous, efficient, and responsible work strategy in decision-making and problem-solving; - integrates into workgroups and applies effective relationship-building and teamwork techniques in multidisciplinary teams across different hierarchical levels; - continually seeks information and updates knowledge in their field of activity by using appropriate and effective lifelong learning methods and techniques; - develops professional projects in the field of engineering.

8. Teaching strategies

The teaching approach uses discovery-based learning models, facilitated by direct and indirect exploration of applied mathematics (demonstrations, modelling), as well as action-based methods, such as exercises, problem-solving.

9. Content

9. 1. Lecture[15]	Teaching strategies	Time allocation
9.1.1. **First-order ordinary differential equations (ODEs).** Basic concepts and ideas (the order of an ODE, types of solutions, normal form, initial value problems). Elements of mathematical modelling and models leading to ODEs. Existence and uniqueness theorem for initial value problems. Particular classes of first order ODEs (separable, homogeneous, linear, Bernoulli, Riccati, exact, Lagrange, Clairaut). Reduction of order for higher-order ODEs.	Interactive lecture, debates, explanations	6 hours
9.1.2. **Higher-order ODEs with constant coefficients.** Homogeneous higher-order ODEs with constant coefficients. The characteristic equation. Fundamental systems of solutions. Non-homogeneous higher-order ODEs with constant coefficients. Finding		2 hours

	Work methods[16]	Observations, allotted time
particular solutions via variation of constants method and via predefined form method. Alternative systems of solutions. The Wronskian determinant.		
9.1.3. **Systems of first-order linear ODEs with constant coefficients.** Homogeneous systems of first-order linear ODEs with constant coefficients. Reduction method (conversion of the system to a higher-order ODE). Algebraic method (expressing the solution via the eigenvalues and eigenvectors of the matrix of coefficients). Non-homogeneous systems of first-order linear ODEs with constant coefficients.	Interactive lecture, debates, explanations	2 hours
9.1.4. **The theory of functions of a complex variable.** Complex numbers, holomorphic functions, the Cauchy-Riemann equations, elementary complex functions. The complex integral, the Cauchy's integral theorem and related topics. Methods for expanding functions in power series (Taylor series and Laurent series). The residues theorem and the computation of complex integrals using residue theory.		8 hours
9.1.5. **The Laplace transform and its applications.** Fundamental properties (linearity and uniqueness). Laplace transforms of derivatives and integrals. Differentiation and integration of Laplace transforms. Shift theorems. Transformation of the convolution product. Applications to solving initial value problems and integral equations. Further applications to solving systems of ODEs and limit problems.		6 hours
9.1.6. **Scalar and vector fields.** Scalar and vector functions and fields. Directional derivatives. The gradient of a scalar field. The divergence and curl of a vector field. The Laplacian of a scalar field. Irrotational, conservative and harmonic fields. Useful formulas involving gradient, divergence and curl.		4 hours

Reading list for the lecture:

1. I Şabac, Matematici speciale, vol. I, II, Ed. Didactică şi Pedagogică, Bucureşti, 1965
2. D.W.Jordan & P.Smith, „Mathematical Techniques" (third edition), Oxford University Press, ISBN:0 19 924972 5, (2002)
3. Advanced Engineering Mathematics-NPTEL, http://nptel.ac.in/courses/index.php?subjectId=111105035
4. E Kreyszig, Advanced engineering mathematics, (9th edition), John Wiley & Sons, 2005

9.2a Seminar	Work methods[16]	Observations, allotted time
9.2.1. **First-order ordinary differential equations (ODEs).** Basic concepts and ideas (the order of an ODE, types of solutions, normal form, initial value problems). Elements of mathematical modelling and models leading to ODEs. Existence and uniqueness theorem for initial value problems. Particular classes of first order ODEs (separable, homogeneous, linear, Bernoulli, Riccati, exact, Lagrange, Clairaut). Reduction of order for higher-order ODEs.	Interactive lecture, debates, explanations	2 hours
9.2.2. **Higher-order ODEs with constant coefficients.** Homogeneous higher-order ODEs with constant coefficients. The characteristic equation. Fundamental systems of solutions. Non-homogeneous higher-order ODEs with constant coefficients. Finding particular solutions via variation of constants method and via predefined form method. Alternative systems of solutions. The Wronskian determinant.		2 hours
9.2.3. **Systems of first-order linear ODEs with constant coefficients.** Homogeneous systems of first-order linear ODEs with constant coefficients. Reduction method (conversion of the system to a higher-order ODE). Algebraic method (expressing the solution via the eigenvalues and eigenvectors of the matrix of coefficients). Non-homogeneous systems of first-order linear ODEs with constant coefficients.		2 hours
9.2.4. **The theory of functions of a complex variable.** Complex numbers, holomorphic functions, the Cauchy-Riemann equations, elementary complex functions. The complex integral, the Cauchy's integral theorem and related topics. Methods for expanding functions in power series (Taylor series and Laurent series). The residues theorem and the computation of complex integrals using residue theory.		4 hours
9.2.5. **The Laplace transform and its applications.** Fundamental properties (linearity and uniqueness). Laplace transforms of derivatives and integrals. Differentiation and integration of Laplace transforms. Shift theorems. Transformation of the convolution product. Applications to solving initial value problems and integral equations. Further applications to solving systems of ODEs and limit problems.		2 hours
9.2.6. **Scalar and vector fields.** Scalar and vector functions and fields. Directional derivatives. The gradient of a scalar field. The divergence and curl of a vector field. The Laplacian of a scalar field. Irrotational, conservative and harmonic fields. Useful formulas involving gradient, divergence and curl.		2 hours

Reading list for the seminar:

1. I Şabac, Matematici speciale, vol. I, II, Ed. Didactică şi Pedagogică, Bucureşti, 1965.
2. D.W.Jordan & P.Smith, „Mathematical Techniques" (third edition), Oxford University Press, ISBN:0 19 924972 5, (2002).
3. E Kreyszig, Advanced engineering mathematics, (9th edition), John Wiley & Sons, 2005.
4. Advanced Engineering Mathematics-NPTEL, http://nptel.ac.in/courses/index.php?subjectId=111105035

10. Assessment

Assessment category	10.1 Assessment criteria	10.2 Assessment method		10.3 Percentage of final grade
10.4 Test	- Accuracy and completeness of knowledge; - Consistency of logical expression and appropriate use of learned concepts; -The level of assimilation of the subjects taught.	- systematic observation of students (individual assignments – which must be completed during the week between lectures)	20%	60%
		- summative assessment test (final assessment)	80%	
10.5a Seminar	The assessment is based on: - the frequency and relevance of oral interventions; - the quality of solutions of the problems and exercises performed at the seminar	Assessment of oral answers		40%

10.6 Passing requirements
- The student will be able to recognize the type of an elementary differential equation of order 1 and select the appropriate method for calculating solutions
- The student will be able to recognize a homogeneous higher-order differential equation with constant coefficients and express its solution using the roots of the characteristic equation.
- The student will be able to determine a particular solution of a non-homogeneous higher-order differential equation with constant coefficients for the case of a right-hand member of exponential or polynomial type
- The student will be able to apply the properties of the Laplace transform to solve differential equations with constant coefficients and systems of differential equations with constant coefficients
- The student will be able to calculate the gradient, divergence and rotor of scalar and vector fields, respectively

The final grade for a course is determined by taking into account the scores and weightings assigned to each course activity. Whole-number grades from 10 to 1 will be awarded, with a grade of 5 certifying the achievement of the minimum learning outcomes required for the course and the awarding of the corresponding ECTS credits.

Date of completion: September 2025

Lecture instructor: Associate Professor Marcel ROMAN, PhD

Seminar instructor: Associate Professor Marcel ROMAN, PhD

Date of departmental approval: Head of Department,
September 2025   Associate Professor Marcel ROMAN, PhD

Date of faculty council approval: Dean,
September 2025   Professor Andrei BURLACU, PhD

COURSE SYLLABUS

Academic year 2025-2026

1. Programme information

1.1 Higher Education Institution	"Gheorghe Asachi" Technical University of Iași
1.2 Faculty	Faculty of Civil Engineering and Building Services
1.3 Department	Civil and Industrial Engineering
1.4 Field of study	Civil Engineering
1.5 Level of study[1]	Bachelor's degree
1.6. Study programme	Inginerie civilă (în limba engleză)/ Civil Engineering - ICE

2. Course information

2.1.1 Course title			**Opțional 4 - Limba engleză 3** **Optional 4 - English Language 3**			
2.1.2. Course code			CE220			
2.2 Lecture instructor						
2.3 Seminar instructor			Lecturer Lucia-Alexandra TUDOR, Dr.			
2.4 Year of study[2]	2	2.5 Semester[3]	3	2.6 Assessment method[4]	VP	2.7 Course type[5]	DO

3. Estimated total time (hours per semester)

3.1 Number of hours per week	1	3.2 lecture		3.3a seminar	1	3.3b laboratory		3.3c project		3.3.d practical sessions	
3.4 Total number of hours in the curriculum[6]	14	3.5 lecture		3.6a seminar	14	3.6b laboratory		3.6c project		3.6.d	

Workload distribution [7]	No. of hours
Study based on textbook, course material, reading list and notes	5
Additional research in the library, on specialised electronic platforms, and in the field	3
Preparation for seminar/laboratory/project session, assignments, papers, and portfolios	3
Assessment[8]	2
Other activities:	

3.7 Total number of individual study hours[9]	11
3.8 Total number of hours per semester[10]	25
3.9 Number of ECTS credits	1

4. Prerequisites (if applicable)

4.1 Curriculum prerequisites[11]	
4.2 Learning outcomes prerequisites	

5. Requirements

5.1 for the lecture[12]	Blackboard/whiteboard, video projector
5.2 for the seminar[13]	Blackboard/whiteboard, video projector, dictionaries

6. General objective of the course

Acquisition of communication skills according to the Common European Framework of Reference for Foreign Languages, development of written and oral communication skills in English in a technical university, development of written and oral message reception skills in English, both in social, professional, and technical contexts. The aim is to consolidate linguistic skills through the appropriate use of specialized vocabulary, correct grammatical structures and

discursive strategies necessary for the efficient transmission of information for active collaboration with native and non-native speakers.

7. Learning outcomes[14]

Knowledge	The student/ graduate: - understands and explains fundamental concepts and grammatical structures of the English language, adapted to the level of study; - distinguishes and applies general and specialized vocabulary, relevant to the technical and scientific field; - identifies sources of linguistic information and lexical resources (dictionaries, databases, online corpora) and integrates them into the learning process; - understands the mechanisms of receiving oral and written messages in English and the particularities of academic communication
Skills	The student/ graduate: - uses specific tools (printed and online dictionaries, specialized glossaries, linguistic databases) to verify and acquire general and specialized vocabulary; - develops stylistically and grammatically appropriate texts, corresponding to the academic and professional context; - operates with specialized vocabulary and linguistic structures in writing and interpreting texts in English; - uses English correctly in oral and written communication, adapted to various situations (academic, professional, intercultural); - actively participates in discussions, debates, and group projects, demonstrating collaboration capabilities in intercultural contexts; - makes clear and structured oral presentations on general and specialized topics; - interprets and synthesizes information from texts and audio-video materials in English.
Responsibility and autonomy	The student/ graduate: - shows responsibility in applying the language skills acquired in academic and professional contexts; - assumes autonomy in learning and continuously improving the English language; - demonstrates the ability to organize and manage writing and presentation tasks in English individually; - collaborates effectively in teams, assuming various roles and responsibilities in joint projects; - shows initiative and adaptability in intercultural communication situations; - responsibly integrates linguistic and cultural resources in the learning process and in professional development; - demonstrates autonomy and critical thinking in receiving and interpreting messages in English.

8. Teaching strategies

Specific materials for grammar, vocabulary and specialized language in English will be used in the teaching activity, as well as Power Point presentations. The presentations contain images and syntheses, so that the information is easy to understand and assimilate. The teaching method is also based on communicative learning models through discovery, facilitated by direct and indirect exploration of reality, but also on action-based methods, such as exercise and practical written and oral activities.

9. Content

9.2a Seminar	Work methods[16]	Observations, allotted time
9.2a.1. Reading comprehension (1) Identifying main ideas. Applications	Presentation and discussion of the topics, solving exercises and tasks, conversation, debates	2 hours
9.2a.2. Language use – relative clauses. Reading comprehension (2) Rephrasing ideas. Exercises		2 hours
9.2a.3. Language register (formal, neutral, informal) in speaking and writing		2 hours
9.2a.4. Reading comprehension (3) Writing a summary. Applications		2 hours
9.2a.5. Presenting for and against arguments. Applications		2 hours
9.2a.6. Cohesion and clarity in writing: linking words and phrases. Applications		2 hours
9.2a.7. Translation-related issues. Discussion		2 hours
Reading list for the seminar: 1. Allsop, Jake, *Test Your Verbs*, Harlow, Pearson, 2002 [și alte ediții] 2. Coe, Norman, Mark Harrison, Ken Patterson, *Oxford Practice Grammar*, Oxford, Oxford University Press, 2006 3. Frendo, Evan, *English for Construction 1*, Harlow, Pearson, 2017		

4. Hanson, Adrian, Jenny Dooley, *Civil Engineering*, Express Publishing, 2019
5. Literat, Ruxanda (ed.), *Teste de competenţă lingvistică*, Cluj-Napoca, U. T. Press, 2024
6. McCarthy, Michael, Felicity O'Dell, *English Collocations in Use - Intermediate*, Cambridge University Press, 2017
7. Tudor, Lucia-Alexandra, *English for Civil Engineering*, Iaşi, Tehnopress, 2014

10. Assessment

Assessment category	10.1 Assessment criteria	10.2 Assessment method		10.3 Percentage of final grade
10.4 Continuous Assessment	Completeness and accuracy of knowledge Logical coherence, fluency, and strength of argumentation Capacity for analysis, personal interpretation, originality, and creativity; Level of command of specialised terminology and communication skills; Ability to apply acquired skills	- summative assessment test (final assessment)	100%	50%
10.5a Seminar	Ability to apply acquired knowledge Capacity for analysis, personal interpretation, originality, creativity	- active participation in the activities		50%

10.6 Passing requirements
Minimum grade of 5 (five) in both the summative assessment test and in the evaluation of the seminar activity. The student is able to understand and produce oral and written messages in English on topics of general interest, as well as on basic technical topics in the field of civil engineering. The student is able to write texts (e-mails, reports, process descriptions), correctly using fundamental grammatical structures and essential vocabulary. In oral interaction, the student is able to participate in conversations and discussions, to express opinions and to formulate questions, even if some hesitations or mistakes occur.
The final grade for a course is determined by taking into account the scores and weightings assigned to each course activity. Whole-number grades from 10 to 1 will be awarded, with a grade of 5 certifying the achievement of the minimum learning outcomes required for the course and the awarding of the corresponding ECTS credits.

Date of completion: September 2025

Lecture instructor: -

Seminar instructor: Lecturer Lucia-Alexandra TUDOR, Dr.

Date of departmental approval: Head of Department,
September 2025   Associate Professor Gabriel ASANDULUI, PhD

Date of faculty council approval: Dean,
September 2025   Professor Andrei BURLACU, PhD

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[1] *Bachelor's/ Master's degree.*
[2] *1-4 for bachelor's degree, 1-2 for master's degree.*
[3] *1-8 for bachelor's degree, 1-4 for master's degree.*
[4] *Exam (E), test (T) – from the curriculum.*
[5] *DOB – compulsory course, DOP– elective course, DFA– optional course;*
[6] *It is equal to 14 weeks x the number of hours indicated in section 3.1 (similarly for 3.5, 3.6abc).*
[7] *The lines below refer to individual study; the total is indicated in section 3.7.*
[8] *Between 2 and 6 hours. These represent teaching hours and are not included in individual study.*
[9] *Sum of the values from the previous lines, referring to individual study.*
[10] *Sum of direct contact hours (3.4) and individual study hours (3.7); this must equal the number of credits allocated to the course (section 3.9) × 25 hours per credit.*
[11] *Courses that must be completed beforehand or equivalent courses.*
[12] *Blackboard, projector, flipchart, specific teaching materials, etc.*
[13] *Computing equipment, software packages, experimental setups, etc.*
[14] *Learning outcomes presented as knowledge, skills, responsibility, and autonomy specific to the course. These should be correlated with the learning outcomes in fundamental and bachelor's degree fields (Annex 2 of ARACIS Specific Standards, www.aracis.ro/wp-content/uploads/2025/04/Standarde-specifice-programe-de-studii-universitare-de-licenta_aprilie-2025.pdf). For master's programmes, learning outcomes correspond to level 7 of the National Qualifications Framework (CNC).*
[15] *Chapter and paragraph titles.*
[16] *Discussions, debates, presentation and/or analysis of works, exercises and problem solving.*
[17] *Practical demonstration, exercise, experiment.*
[18] *Case study, demonstration, exercise, error analysis, etc.*

COURSE SYLLABUS

Academic year 2025-2026

1. Programme information

1.1 Higher Education Institution	"Gheorghe Asachi" Technical University of Iaşi
1.2 Faculty	Faculty of Civil Engineering and Building Services
1.3 Department	Civil and Industrial Engineering
1.4 Field of study	Civil Engineering
1.5 Level of study[1]	Bachelor's degree
1.6. Study programme	Inginerie civilă (în limba engleză)/ Civil Engineering - ICE

2. Course information

2.1.1 Course title			**Opțional 5 - Limba engleză 4** **Optional 5 - English Language 4**			
2.1.2. Course code			CE221			
2.2 Lecture instructor						
2.3 Seminar instructor			Lecturer Lucia-Alexandra TUDOR, Dr.			
2.4 Year of study[2]	2	2.5 Semester[3]	4	2.6 Assessment method[4]	Vp	2.7 Course type[5]	DO

3. Estimated total time (hours per semester)

3.1 Number of hours per week	1	3.2 lecture		3.3a seminar	1	3.3b laboratory		3.3c project		3.3.d practical sessions	
3.4 Total number of hours in the curriculum[6]	14	3.5 lecture		3.6a seminar	14	3.6b laboratory		3.6c project		3.6.d	

Workload distribution [7]	No. of hours
Study based on textbook, course material, reading list and notes	5
Additional research in the library, on specialised electronic platforms, and in the field	3
Preparation for seminar/laboratory/project session, assignments, papers, and portfolios	3
Assessment[8]	2
Other activities:	

3.7 Total number of individual study hours[9]	11
3.8 Total number of hours per semester[10]	25
3.9 Number of ECTS credits	1

4. Prerequisites (if applicable)

4.1 Curriculum prerequisites[11]	
4.2 Learning outcomes prerequisites	

5. Requirements

5.1 for the lecture[12]	Blackboard/whiteboard, video projector
5.2 for the seminar[13]	Blackboard/whiteboard, video projector, dictionaries

6. General objective of the course

Acquisition of communication skills according to the Common European Framework of Reference for Foreign Languages, development of written and oral communication skills in English in a technical university, development of written and oral message reception skills in English, both in social, professional, and technical contexts. The aim is to consolidate linguistic skills through the appropriate use of specialized vocabulary, correct grammatical structures and

discursive strategies necessary for the efficient transmission of information for active collaboration with native and non-native speakers.

7. Learning outcomes[14]

Knowledge	The student / graduate: - understands and explains fundamental concepts and grammatical structures of the English language, adapted to the level of study; - distinguishes and applies general and specialized vocabulary, relevant to the technical and scientific field; - identifies sources of linguistic information and lexical resources (dictionaries, databases, online corpora) and integrates them into the learning process; - understands the mechanisms of receiving oral and written messages in English and the particularities of academic communication.
Skills	The student / graduate: - uses specific tools (printed and online dictionaries, specialized glossaries, linguistic databases) to verify and acquire general and specialized vocabulary; - develops stylistically and grammatically appropriate texts, corresponding to the academic and professional context; - operates with specialized vocabulary and linguistic structures in writing and interpreting texts in English; - uses English correctly in oral and written communication, adapted to various situations (academic, professional, intercultural); - actively participates in discussions, debates, and group projects, demonstrating collaboration capabilities in intercultural contexts; - makes clear and structured oral presentations on general and specialized topics; - interprets and synthesizes information from texts and audio-video materials in English.
Responsibility and autonomy	The student/ graduate: - shows responsibility in applying the language skills acquired in academic and professional contexts; - assumes autonomy in learning and continuously improving the English language; - demonstrates the ability to organize and manage writing and presentation tasks in English individually; - collaborates effectively in teams, assuming various roles and responsibilities in joint projects; - shows initiative and adaptability in intercultural communication situations; - responsibly integrates linguistic and cultural resources in the learning process and in professional development; - demonstrates autonomy and critical thinking in receiving and interpreting messages in English.

8. Teaching strategies

Specific materials for grammar, vocabulary and specialized language in English will be used in the teaching activity, as well as Power Point presentations. The presentations contain images and syntheses, so that the information is easy to understand and assimilate. The teaching method is also based on communicative learning models through discovery, facilitated by direct and indirect exploration of reality, but also on action-based methods, such as exercise and practical written and oral activities.

9. Content

9.2a Seminar	Work methods[16]	Observations, allotted time
9.2a.1. Technical descriptions. Measuring systems.	Presentation and discussion of the topics, solving exercises and tasks, conversation, debates	2 hours
9.2a.2. Terminology aspects. Creating a short glossary of technical terms.		2 hours
9.2a.3. Language use – If clauses. Writing a CV. Exercises.		2 hours
9.2a.4. Consolidation: letter and email writing. Letters of application.		2 hours
9.2a.5. Expressing preferences and arguing a viewpoint. Job interviews.		2 hours
9.2a.6. Preparing a presentation on an engineering topic: SPA, structure, sources.		2 hours
9.2a.7. Delivering a presentation on an engineering topic: approaches and practice		2 hours
Reading list for the seminar / laboratory / project: 1. Allsop, Jake, Test Your Verbs, Harlow, Pearson, 2002 [și alte ediții] 2. Coe, Norman, Mark Harrison, Ken Patterson, Oxford Practice Grammar, Oxford, Oxford University Press, 2006 3. Frendo, Evan, English for Construction 1, Harlow, Pearson, 2017 4. Hanson, Adrian, Jenny Dooley, Civil Engineering, Express Publishing, 2019 5. Literat, Ruxanda (ed.), Teste de competență lingvistică, Cluj-Napoca, U. T. Press, 2024		

6. McCarthy, Michael, Felicity O'Dell, English Collocations in Use - Intermediate, Cambridge University Press, 2017
7. Tudor, Lucia-Alexandra, English for Civil Engineering, Iași, Tehnopress, 2014

10. Assessment

Assessment category	10.1 Assessment criteria	10.2 Assessment method		10.3 Percentage of final grade
10.4 Continuous Assessment	Completeness and accuracy of knowledge Logical coherence, fluency, and strength of argumentation Capacity for analysis, personal interpretation, originality, and creativity Level of command of specialised terminology and communication skills Ability to apply acquired skills	- summative assessment test (final assessment)	100%	50%
10.5a Seminar	Ability to apply acquired knowledge Capacity for analysis, personal interpretation, originality, creativity	- active participation in the activities		50%

10.6 Passing requirements
Minimum grade of 5 (five) in both the summative assessment test and in the evaluation of the seminar activity. The student is able to understand and produce oral and written messages in English on topics of general interest, as well as on basic technical topics in the field of civil engineering. The student is able to write texts (e-mails, reports, process descriptions), correctly using fundamental grammatical structures and essential vocabulary. In oral interaction, the student is able to participate in conversations and discussions, to express opinions and to formulate questions, even if some hesitations or mistakes occur.

The final grade for a course is determined by taking into account the scores and weightings assigned to each course activity. Whole-number grades from 10 to 1 will be awarded, with a grade of 5 certifying the achievement of the minimum learning outcomes required for the course and the awarding of the corresponding ECTS credits.

Date of completion: September 2025

Lecture instructor: -

Seminar instructor: Lecturer Lucia-Alexandra TUDOR, Dr.

Date of departmental approval: Head of Department,
September 2025   Associate Professor Gabriel ASANDULUI, PhD

Date of faculty council approval: Dean,
September 2025   Professor Andrei BURLACU, PhD

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[1] *Bachelor's/ Master's degree.*

[2] *1-4 for bachelor's degree, 1-2 for master's degree.*

[3] *1-8 for bachelor's degree, 1-4 for master's degree.*

[4] *Exam (E), test (T) – from the curriculum.*

[5] *DOB – compulsory course, DOP– elective course, DFA– optional course;*

[6] *It is equal to 14 weeks x the number of hours indicated in section 3.1 (similarly for 3.5, 3.6abc).*

[7] *The lines below refer to individual study; the total is indicated in section 3.7.*

[8] *Between 2 and 6 hours. These represent teaching hours and are not included in individual study.*

[9] *Sum of the values from the previous lines, referring to individual study.*

[10] *Sum of direct contact hours (3.4) and individual study hours (3.7); this must equal the number of credits allocated to the course (section 3.9) × 25 hours per credit.*

[11] *Courses that must be completed beforehand or equivalent courses.*

[12] *Blackboard, projector, flipchart, specific teaching materials, etc.*

[13] *Computing equipment, software packages, experimental setups, etc.*

[14] *Learning outcomes presented as knowledge, skills, responsibility, and autonomy specific to the course. These should be correlated with the learning outcomes in fundamental and bachelor's degree fields (Annex 2 of ARACIS Specific Standards, www.aracis.ro/wp-content/uploads/2025/04/Standarde-specifice-programe-de-studii-universitare-de-licenta_aprilie-2025.pdf). For master's programmes, learning outcomes correspond to level 7 of the National Qualifications Framework (CNC).*

[15] *Chapter and paragraph titles.*

[16] *Discussions, debates, presentation and/or analysis of works, exercises and problem solving.*

[17] *Practical demonstration, exercise, experiment.*

[18] *Case study, demonstration, exercise, error analysis, etc.*

COURSE SYLLABUS

Academic year 2025 - 2026

1. Programme information

1.1 Higher Education Institution	"Gheorghe Asachi" Technical University of Iaşi
1.2 Faculty	Faculty of Civil Engineering and Building Services
1.3 Department	Civil and Industrial Engineering
1.4 Field of study	Civil Engineering
1.5 Level of study[1]	Bachelor's degree
1.6. Study programme	Inginerie civilă (în limba engleză)/ Civil Engineering - ICE

2. Course information

2.1.1 Course title	**Limbaje de programare pentru rezolvarea problemelor inginereşti - Python Programming Languages for Solving Engineering Problems - Python**
2.1.2. Course code	CE222
2.2 Lecture instructor	Lecturer Gabriela COVATARIU, PhD
2.3 Laboratory instructor	Lecturer Gabriela COVATARIU, PhD

2.4 Year of study[2]	2	2.5 Semester[3]	4	2.6 Assessment method[4]		Vp	2.7 Course type[5]	DL

3. Estimated total time (hours per semester)

3.1 Number of hours per week	4	3.2 lecture	2	3.3a seminar		3.3b laboratory		2	3.3c project		3.3d practical sessions
3.4 Total number of hours in the curriculum[6]	56	3.5 lecture	28	3.6a seminar		3.6b laboratory		28	3.6c project	3.6.d	

Workload distribution [7]	No. of hours
Study based on textbook, course material, reading list and notes	6
Additional research in the library, on specialised electronic platforms, and in the field	7
Preparation for seminar/laboratory/project session, assignments, papers, and portfolios	6
Assessment[8]	2
Other activities:	

3.7 Total number of individual study hours[9]	19
3.8 Total number of hours per semester[10]	75
3.9 Number of ECTS credits	3

4. Prerequisites (if applicable)

4.1 Curriculum prerequisites[11]	
4.2 Learning outcomes prerequisites	General knowledge of computer programming and statistical elements

5. Requirements

5.1 for the lecture[12]	- Applied activities in physical format, at the faculty headquarters: computer technology, software packages, experimental stands, etc. - Students will comply with the Code of Student Rights and Obligations and the Regulations provided by the Charter of the *"Gheorghe Asachi"* Technical University of Iasi
5.2 for the laboratory[13]	- Applied activities in physical format, at the faculty headquarters: computer technology, software packages, experimental stands, etc. - The deadlines for the submission of the papers are established by the tenured professors and are sent to the students at the beginning of the semester - Students will comply with the Code of Student Rights and Obligations and the Regulations provided by the Charter of the "Gheorghe Asachi" Technical University of Iasi

6. General objective of the course

The course aims to create the students' ability to use a programming language and to create programs for solving the problems imposed by the study of construction disciplines. This course aims to develop the programming elements necessary in the processing of data and engineering concepts that appear both during undergraduate studies and later in the career of engineer or researcher. This course complements the course of Computer Programming and Programming Languages and Probability Theory and Statistics by completing the knowledge related to the Python language. The aim is to form structured, logical, mathematical thinking, specific to the adaptation of the activity of the construction engineer in the interaction with information technology.

7. Learning outcomes[14]

Knowledge	The Student/ Graduate will gain advanced knowledge of: - Python language and libraries applicable to engineering problems (data processing, simulation, optimization); - Field-specific numerical modelling techniques; - Ways to integrate and exchange data between Python and other CAD/FEM software used in the industry
Skills	The Student/ Graduate will be able to: - Automate repetitive engineering calculations (e.g., structural sizing, reports) through robust scripts and functions; - Analyze and visualize large experimental or monitoring data sets with complex 2D/ 3D graphs
Responsibility and autonomy	The Student/ Graduate will be able to: - Automate repetitive engineering calculations (e.g., structural sizing, reports) through robust scripts and functions; - Analyze and visualize large experimental or monitoring datasets with complex 2D/ 3D graphs; - Simulate structural processes or behaviours using custom numerical algorithms; - Optimize design solutions (shapes, materials, costs) using MATLAB's dedicated features and toolboxes

8. Teaching strategies

In the teaching activity, participatory lectures and debates will be used based on Power Point presentations that will be made available to students on the *edu.tuiasi.ro platform.* The presentations contain images, sketches, videos, so that the information is easy to understand and assimilate.

The teaching method is also based on models of learning by discovery facilitated by direct and indirect exploration of reality (experiment, demonstration, modelling), but also on action-based methods, such as exercise, practical activities and problem solving.)

9. Content

9. 1. Lecture[15]	**Teaching strategies**	**Time allocation**
9.1.1. Introductory notions. Why Python		3 hours
9.1.2 Variables, expressions, and declarations		3 hours
9.1.3. Conditional Executions		2 hours
9.1.4. Functions		2 hours
9.1.5. Loops and iterations		2 hours
9.1.6. Strings	Interactive lecture, debates, explanations	2 hours
9.1.7. Files		2 hours
9.1.8. List. Tuple		2 hours
9.1.9. Expressions		2 hours
9.1.10. Network programming. Use of Web Services		2 hours
9.1.11. Object programming		2 hours
9.1.12. Databases		2 hours
9.1.13. Data visualization		2 hours
Reading list for the lecture: 1. C.R. Severance - Python for Everybody, https://www.py4e.com/ 2. A.B. Downey – Think Python, O'REILLY, 2015 3. J.M. Zelle, M. Smith - Python Programming: An Introduction to Computer Science, Franklin Beedle & Associates, 2010		
9.2b Laboratory	Work methods[16]	Observations, allotted time
9.2.1. Python software installing		2 hours

9.2.2 Variables, expressions, and declarations		2 hours
9.2.3. Conditional Executions		2 hours
9.2.4. Functions		2 hours
9.2.5. Loops and iterations		2 hours
9.2.6. Strings		2 hours
9.2.7. Files	Interactive lecture, debates, explanations, practice work, examples	2 hours
9.2.8. List. Tuple		2 hours
9.2.9. Expressions		2 hours
9.2.10. Network programming. Use of Web Services		2 hours
9.2.11. Object programming		2 hours
9.2.12. Databases		2 hours
9.2.13. Data visualization		2 hours
9.2.14. Prezentare lucrări		2 hours

Reading list for the laboratory:
1. C.R. Severance - Python for Everybody, https://www.py4e.com/
2. A.B. Downey - Think Python, O'REILLY, 2015
3. J.M. Zelle, M. Smith - Python Programming: An Introduction to Computer Science, Franklin Beedle & Associates, 2010

10. Assessment

Assessment category	10.1 Assessment criteria	10.2 Assessment method		10.3 Percentage of final grade
10.4 Final tests	Completeness and accuracy of knowledge Logical coherence, fluency, and strength of argumentation Capacity for analysis, personal interpretation, originality, and creativity; Level of assimilation of specialised terminology and communication skills; Ability to apply acquired skills; Ability to process data and solve the problems presented	- systematic observation of students (individual assignments – which must be completed during the week between lectures, preparation of a report, case study) - presentation of the project by each student	50%	50%
		- summative assessment test (final assessment)	50%	
10.5b Laboratory	Laboratory activity – Ability to work in a team Ability to apply in practice, in different contexts, the knowledge learned Ability to analyze, personal interpretation, originality, creativity	- making laboratory sheets (all laboratory work must be performed, admitting the recovery of only one outstanding laboratory work); - evaluation test (laboratory colloquium).		50%
10.6 Passing requirements				

For the final evaluation, the student must demonstrate the choice and correct approach to analyze a civil engineering problem and solve it by creating programs in Python. The final grade for a course is determined by taking into account the scores and weightings assigned to each course activity. Whole-number grades from 10 to 1 will be awarded, with a grade of 5 certifying the achievement of the minimum learning outcomes required for the course and the awarding of the corresponding ECTS credits.

Date of completion: September 2025

Lecture instructor: Lecturer Gabriela COVATARIU, PhD

Seminar instructors: Lecturer Gabriela COVATARIU, PhD

Date of departmental approval: Head of Department,
September 2025   Lecturer Mircea - Vasile VENGHIAC, PhD

Date of faculty council approval: Dean,
September 2025   Professor Andrei BURLACU, PhD

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[1] *Bachelor's/ Master's degree.*
[2] *1-4 for bachelor's degree, 1-2 for master's degree.*
[3] *1-8 for bachelor's degree, 1-4 for master's degree.*

[4] *Exam (E), test (T) – from the curriculum.*

[5] *DOB – compulsory course, DOP– elective course, DFA– optional course;*

[6] *It is equal to 14 weeks x the number of hours indicated in section 3.1 (similarly for 3.5, 3.6abc).*

[7] *The lines below refer to individual study; the total is indicated in section 3.7.*

[8] *Between 2 and 6 hours. These represent teaching hours and are not included in individual study.*

[9] *Sum of the values from the previous lines, referring to individual study.*

[10] *Sum of direct contact hours (3.4) and individual study hours (3.7); this must equal the number of credits allocated to the course (section 3.9) $\times$ 27 hours per credit.*

[11] *Courses that must be completed beforehand or equivalent courses.*

[12] *Blackboard, projector, flipchart, specific teaching materials, etc.*

[13] *Computing equipment, software packages, experimental setups, etc.*

[14] *Learning outcomes presented as knowledge, skills, responsibility, and autonomy specific to the course. These should be correlated with the learning outcomes in fundamental and bachelor's degree fields (Annex 2 of ARACIS Specific Standards, www.aracis.ro/wp-content/uploads/2025/04/Standarde-specifice-programe-de-studii-universitare-de-licenta_aprilie-2025.pdf). For master's programmes, learning outcomes correspond to level 7 of the National Qualifications Framework (CNC).*

[15] *Chapter and paragraph titles.*

[16] *Discussions, debates, presentation and/or analysis of works, exercises and problem solving.*

[17] *Practical demonstration, exercise, experiment.*

[18] *Case study, demonstration, exercise, error analysis, etc.*

COURSE SYLLABUS

Academic year 2025-2026

1. Programme information

1.1 Higher Education Institution	"Gheorghe Asachi" Technical University of Iași
1.2 Faculty	Faculty of Civil Engineering and Building Services
1.3 Department	Civil and Industrial Engineering
1.4 Field of study	Civil Engineering
1.5 Level of study[1]	Bachelor's degree
1.6. Study programme	Inginerie civilă (în limba engleză)/ Civil Engineering - ICE

2. Course information

2.1.1 Course title	**Desen tehnic şi Infografică 3** **Technical Drawing and Infographics 3**					
2.1.2. Course code	CE223					
2.2 Lecture instructor	Lecturer Irina IGNĂTESCU - MANEA, PhD					
2.3 Seminar instructor	Lecturer Irina IGNĂTESCU - MANEA, PhD					
2.4 Year of study[2]	2	2.5 Semester[3]	4	2.6 Assessment method[4]	C	2.7 Course type[5] DL

3. Estimated total time (hours per semester)

3.1 Number of hours per week	3	3.2 lecture	1	3.3a seminar		3.3b laboratory	2	3.3c project		3.3.d practical sessions
3.4 Total number of hours in the curriculum[6]	42	3.5 lecture	14	3.6a seminar		3.6b laboratory	28	3.6c project		3.6.d
Workload distribution [7]										No. of hours
Study based on textbook, course material, reading list and notes										22
Additional research in the library, on specialised electronic platforms, and in the field										15
Preparation for seminar/laboratory/project session, assignments, papers, and portfolios										21
Assessment[8]										6
Other activities:										

3.7 Total number of individual study hours[9]	58
3.8 Total number of hours per semester[10]	100
3.9 Number of ECTS credits	4

4. Prerequisites (if applicable)

4.1 Curriculum prerequisites[11]	
4.2 Learning outcomes prerequisites	Technical Drawing and Infographics 1, Technical Drawing and Infographics 2, Descriptive Geometry Spatial Visualization; Computer Applications

5. Requirements

5.1 for the lecture[12]	- Whiteboard, video projector
5.2 for the laboratory[13]	- Computers, internet network access, installed software

6. General objective of the course

     The general objective of the course is to enable students to understand the spatial form of an object based on its 2D representation and to be able to represent it as a solid model using specialized software, building on the concepts acquired in the courses Technical Drawing and Infographics I, Technical Drawing and Infographics II, and Descriptive Geometry.

7. Learning outcomes

Knowledge	The student/ graduate: - Identifies, evaluates, and explains various graphical methods applicable within their area of expertise; - Identifies and explains the use of computer graphics to produce spatial representations of projects in their professional field; - Identifies and evaluates graphical modelling approaches for different categories of simple and complex constructions
Skills	The student/ graduate: - Graphically represents construction elements and types in 3D models for the purpose of producing the drawn components of technical projects; - Collects and manages information from 2D representations for use in 3D graphical representations of projects within their professional field; - Selects and applies concepts, principles, and methods of graphical communication within computer-aided design (CAD) software; - Dimensions and geometrically verifies construction elements
Responsibility and autonomy	The student/ graduate: - Selects and analyzes bibliographic sources; - Demonstrates autonomy in learning; - Engages in documentation in Romanian and in a foreign language for professional and personal development, through continuous training and effective adaptation to new technical specifications

8. Teaching strategies

In the teaching activity, explanatory and participatory lectures will be employed, based on presentations created in real time using dedicated software. These presentations will be made available to students. The materials include graphical representations and text-based messages that illustrate and explain the step-by-step development of technical drawings in the analysed cases, ensuring that the information is easily understood and assimilated.

Each lecture will begin with a brief review of the concepts covered in the previous session. The teaching approach is grounded in two instructional models: the cognitive model and connectivist learning.

9. Content

9. 1. Lecture[15]	Teaching strategies	Time allocation
9.1.1. Computer-aided graphics software enabling three-dimensional graphical representations in civil engineering. Fundamental elements and presentation of the graphical interface of the dedicated software.	Explanatory and participatory lecture; Discussions; Explanations	2 hours
9.1.2. Types of 3D models used in engineering graphics, as well as methods for their generation. Wireframe and Surface (Shell) models.		2 hours
9.1.3. Generation of 3D solid models using Constructive Solid Geometry (CSG)		2 hours
9.1.4. Generation of three-dimensional solid models using commands such as Extrusion, Revolving, Lofting, Sweeping, and other geometric modelling techniques.		4 hours
9.1.5. Generation of orthographic views and sections based on 3D models. Generation of realistic representations (renderings) derived from 3D models.		2 hours
9.1.6. Exporting three-dimensional solid models to computer-aided engineering (CAE) software for simulation purposes. Exporting three-dimensional solid models for 3D printing processes.		2 hours

Reading list for the lecture:
1. The teaching materials will be made available on Google Classroom
2. Andrei Slonovschi, Liviu Prună, Irina Ignătescu-Manea, Ioana-Roxana Baciu Infografics. Autocad. Commands that allow the modification of object properties. Dimensioning commands, settings, and styles. Technical drawing dimensioning. Inquiry commands. Commands for creating closed contours. Editura Pim, Iași, 2024, ISBN 978-606-13-8168-5
3. Paul Richard, 2023, - Introduction to AutoCAD 2024. A Modern Perspective, Pearson Education, Inc., ISBN 10: 0-13-823285-7, ISBN 13: 978-0-13-823285-6
4. Sham Tickoo, 2023, AutoCAD 2024, A Problem-Solving Approach, Basic and Intermediate, 30th Edition,CADCIM Technologies, 525 St. Andrews Drive, Schererville, Indiana 46375, USA, ISBN-13: 978-1640571778
5. Slonovschi, A., Prună L., „Infographics Autocad - Commands that allow object selection and editing.", Editura PIM, Iași, 2019, ISBN 978-606-13-5285-2, 208 pg.
6. Slonovschi, A., Prună L., „Infographics AutoCAD – Drawing commands", Editura PIM, Iași, 2016, ISBN 978-606-13-3423-0, 229 pagini

7. Slonovschi, A., Prună L., „Infographics. AdvanceCAD", Editura PIM, Iași, 2015, ISBN 978-606-13-2247-3, 233 pg
8. Slonovschi, A., Prună, L., "Infographics. Introductory concepts", Editura PIM, Iași, 2014, ISBN 978-606-13-2086-8, 212 pg
9. Dănăilă W., Prună L., Anghel A., Romanescu C., Antonescu I, Slonovschi A., Infographics, Editura PIM, Iași, ISBN ISBN 978-973-716-945-7, 2008
10. Slonovschi A., Anghel A., Antonescu I., Dănăilă W., Prună L., Romanescu C. Infographics, Editura PIM, Iași, ISBN 978-973-716-718-7, 2007

9.2b Laboratory	Work methods[16]	Observation, allotted time
1. Presentation of the CAD interface for 3D modelling. Use of basic commands.	Practical demonstration, exercise.	2 hours
2. Use of three-dimensional visualization methods and coordinate systems in the process of generating three-dimensional models		2 hours
3. Generation of 3D models used in engineering graphics using the Wireframe model.		2 hours
4. Generation of 3D models used in engineering graphics using the Surface (Shell) model.		2 hours
5. Generation of simple 3D models used in engineering graphics using Constructive Solid Geometry (CSG)		4 hours
6. Formative assessment test 1.	Written assessment	2 hours
7. Generation of medium-complexity 3D models used in engineering graphics using Constructive Solid Geometry (CSG).	Practical demonstration, exercise.	4 hours
8. Generation of complex 3D models used in engineering graphics using Constructive Solid Geometry (CSG).		4 hours
9. Formative assessment test 2.		2 hours
10. Generation of orthographic views and sections based on previously developed low- and medium-complexity 3D models. Generation of realistic representations (renderings) derived from previously developed low- and medium-complexity 3D models.		2 hours
11. Summative assessment test.	Written assessment	2 hours

Reading list for the laboratory:
1. The drawings to be completed during laboratory sessions will be posted weekly on Google Classroom
2. R. H. Shih, L. Jumper, 2023, – AutoCAD 2024 Tutorial First Level, SDC Publications, Mission, KS 66222, USA, ISBN 10-163 0575852, 13- 978 1630575854
3. S. Lockhart, 2023, – Tutorial Guide to AutoCAD 2024: 2D Drawing, SDC Publications, Mission, KS 66222, USA, ISBN 13-978-1630576066, 10- 163-0576069

10. Assessment

Assessment category	10.1 Assessment criteria	10.2 Assessment method		10.3 Percentage of final grade
10.4 Final exam/ /test	Completeness and accuracy of knowledge. Logical coherence, fluency, and strength of argumentation. Analytical ability, capacity for personal interpretation, originality, and creativity. Degree of assimilation of specialized terminology and communication skills. Ability to apply and capitalize on acquired skills. Ability to process and solve the stated data and problems.	Systematic observation of students (individual and team assignments – the assignments must be completed during the week between lectures).	10%	80%
		- Formative assessment test 1 (ongoing assessments during the semester).	15%	
		- Formative assessment test 2 (ongoing assessments during the semester).	15%	
		- Summative assessment test (final evaluation).	40%	
10.5a Laboratory	Laboratory activity – Ability to work in a team; ability to apply acquired knowledge in practice across different contexts. Analytical ability, capacity for personal interpretation, originality, and creativity.	Preparation of laboratory worksheets (all laboratory activities must be completed; only one missed laboratory session may be recovered). Assessment test (laboratory colloquium).		20%

10.6 Passing requirements
Both Formative Assessment Tests 1 and 2, as well as the Summative Assessment Test, must be graded above 5.

The final assessment result for a course is determined by considering the scores and weightings assigned to each activity within the course. Final grades are awarded as whole numbers from 10 to 1, with grade 5 certifying the attainment of the minimum learning outcomes required for the course and the allocation of the corresponding study credits.

Date of completion: September 2025

Lecture instructor: Lecturer Irina IGNĂTESCU - MANEA, PhD

Laboratory instructors: Lecturer Irina IGNĂTESCU - MANEA, PhD

Date of departmental approval: Lecturer Liviu PRUNĂ, PhD
September 2025

Date of faculty council approval: Dean,
September 2025   Professor Andrei BURLACU, PhD

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[1] Bachelor's/ Master's degree.

[2] 1-4 for bachelor's degree, 1-2 for master's degree.

[3] 1-8 for bachelor's degree, 1-4 for master's degree.

[4] Exam (E), test (T) – from the curriculum.

[5] DOB – compulsory course, DOP– elective course, DFA– optional course;

[6] It is equal to 14 weeks x the number of hours indicated in section 3.1 (similarly for 3.5, 3.6abc).

[7] The lines below refer to individual study; the total is indicated in section 3.7.

[8] Between 2 and 6 hours. These represent teaching hours and are not included in individual study.

[9] Sum of the values from the previous lines, referring to individual study.

[10] Sum of direct contact hours (3.4) and individual study hours (3.7); this must equal the number of credits allocated to the course (section 3.9) × 25 hours per credit.

[11] Courses that must be completed beforehand or equivalent courses.

[12] Blackboard, projector, flipchart, specific teaching materials, etc.

[13] Computing equipment, software packages, experimental setups, etc.

[14] Learning outcomes presented as knowledge, skills, responsibility, and autonomy specific to the course. These should be correlated with the learning outcomes in fundamental and bachelor's degree fields (Annex 2 of ARACIS Specific Standards, www.aracis.ro/wp-content/uploads/2025/04/Standarde-specifice-programe-de-studii-universitare-de-licenta_aprilie-2025.pdf). For master's programmes, learning outcomes correspond to level 7 of the National Qualifications Framework (CNC).

[15] Chapter and paragraph titles.

[16] Discussions, debates, presentation and/or analysis of works, exercises and problem solving.

[17] Practical demonstration, exercise, experiment.

[18] Case study, demonstration, exercise, error analysis, etc.

1. Date despre program

1.1 Instituția de învățământ superior	Universitatea Tehnică „Gheorghe Asachi" din Iași
1.2 Facultatea	-
1.3 Departamentul	Departamentul pentru Pregătirea Personalului Didactic
1.4 Domeniul de studii	Științe ale educației
1.5 Ciclul de studii[1]	Licență
1.6. Programul de studii	Program de formare psihopedagogică

2. Date despre disciplină

2.1.1 Denumirea disciplinei	**Pedagogie II -** **Teoria și metodologia instruirii. Teoria și metodologia evaluării** **Pedagogy II - Instruction Theory and Methodology. Assessment Theory and Methodology**
2.1.2. Codul disciplinei	CE224
2.2 Titularul activităților de curs	Lector univ. dr. Roxana BOBU
2.3 Titularul activităților de aplicații (S)	Lector univ. dr. Roxana BOBU

2.4 Anul de studii[2]	2	2.5 Semestrul[3]	3	2.6 Tipul de evaluare[4]	E	2.7 Tipul disciplinei[5]	DL

3. Timpul total estimat al activităților zilnice (ore pe semestru)

3.1 Număr de ore pe săptămână	4	3.2 curs	2	3.3a sem.	2	3.3b laborator		3.3c proiect		3.3.d practică	
3.4 Total ore din planul de învățământ[6]	56	3.5 curs	28	3.6a sem.	28	3.6b laborator		3.6c proiect		3.6.d	

Distribuția fondului de timp[7]	Nr. ore
Studiul după manual, suport de curs, bibliografie și notițe	50
Documentare suplimentară în bibliotecă, pe platformele electronice de specialitate și pe teren	6
Pregătire seminarii/laboratoare/proiecte, teme, referate și portofolii	13
Examinări[8]	4
Alte activități:	

3.7 Total ore studiu individual[9]	69
3.8 Total ore pe semestru[10]	125
3.9 Numărul de credite	5

4. Precondiții (acolo unde este cazul)

4.1 de curriculum[11]	
4.2 de rezultate ale învățării	- Identifică nivelul achizițiilor anterioare ale copiilor/elevilor/ tinerilor, individuale și de grup, și valorifică datelor obținute în proiectarea procesului educațional; - Identifică obiective de învățare în acord cu documentele curriculare, care să susțină dezvoltarea potențialului fiecărui copil/elev/tânăr; - Dezvoltă atitudini creatoare și constructive în aplicarea designului și principiilor pedagogice

5. Condiții

5.1 de desfășurare a cursului[12]	Tablă interactivă/ fleepchart; videoproiector/ laptop.
5.2 de desfășurare a seminarului / laboratorului / proiectului[13]	Tablă interactivă/ fleepchart; videoproiector/ laptop; fișe de lucru pentru aplicații; consumabile (birotică).

6. Obiectiv generalal disciplinei

    Dobândirea competențelor vizând cunoașterea și aplicarea problematicii teoriei și metodologiei instruirii, a teoriei și metodologiei evaluării, a modalităților de organizare a activităților didactice în acord cu nevoile de învățare ale elevilor.

7. Rezultatele învățării[14]

	Studentul/ Absolventul:
Cunoștințe	- Prezintă conținuturile specific domeniului și corelează principalele teorii și orientări metodologice ale învățării din perspectiva proiectării/ designului pedagogic; - Argumentează relațiile dintre predare-învățare-evaluare și formulează unele soluții creative pentru optimizarea componentelor educaționale; - Aplică principii și metode didactice specifice activităților educaționale care să asigure progresul copiilor /elevilor/ tinerilor/altor categorii de persoane; - Explică specificul și potențialul formativ al strategiilor didactice, metodelor, procedeelor, mijloacelor didactice și al tehnologiilor digitale; - Prezintă principiile, rolurile, funcțiile și scopurile evaluării, precum și a metodelor și instrumentelor de evaluare corelate cu tipul de activitate și stadiul de dezvoltare a copiilor/ elevilor /tinerilor; - Descrie și corelează principalele metode și instrumente de evaluare/ autoevaluare a rezultatelor școlare
Aptitudini	Studentul/ Absolventul: - Utilizează cunoștințe de specialitate, psihopedagogice, în cadrul întregului demers pedagogic de proiectare a activităților și resurselor educaționale; - Aplică principiile și strategiile didactice în proiectarea activităților educaționale specifice nivelului de vârstă și grupului cu care se lucrează; - Identifică nivelul achizițiilor anterioare ale copiilor/ elevilor/ tinerilor, individuale și de grup, și valorifică datelor obținute în proiectarea procesului educațional; - Elaborează modele de proiectare a activităților educaționale sau design pedagogic, integrând resursele inovative; - Dezvoltă contexte diverse în proiectarea activității didactice, în care copiii/ elevii/ tinerii pot demonstra progresul în dezvoltarea competențelor, facilitând autoevaluarea, reflecția și stabilirea noilor obiective de învățare; - Utilizează strategii didactice (predare, învățare și evaluare) diverse, creative și eficiente, pentru facilitarea progresului în învățare al fiecărui elev; - Construiește contexte de învățare autentică, în manieră integrată, în care elevii își valorifică experiențele de viață și interesele de cunoaștere; - Utilizează o gamă largă de metode și instrumente de evaluare, înregistrare, analiză și comunicare a rezultatelor evaluării, specifice domeniului; - Evaluează eficacitatea strategiilor utilizate și a impactuluilor asupra copiilor/ elevilor/ tinerilor/ grupurilor prin raportare la standarde și obiective menționate în documente curriculare; - Elaborează unele modele de înregistrare a rezultatelor evaluărilor, individual și pentru grupuri, în funcție de particularitățile de vârstă (și individuale) ale copiilor/ elevilor/ tinerilor
Responsabilitate și autonomie	Studentul/ Absolventul: - Abordează critic responsabilitățile profesiei didactice cu evidențierea complexității procesului de învățământ; - Dezvoltă atitudini creatoare și constructive în aplicarea designului și principiilor pedagogice; - Organizează activitățile educaționale cu respectarea principiilor și metodologiilor specifice didacticilor aplicate în învățământ (pentru orice tip/ categorie de copii/ elevi /tineri/ grupuri); - Indică necesitate autilizării unor resurse variate pentru eficientizarea predării, susținerea învățării și sprijinirea elevilor în folosirea lor autonomă; - Aplică în mod consecvent abordările didactice care susțin dezvoltarea competențelor de literație, numerație, digitale și civice; - Comunică eficient prin oferirea de feedback constructiv și susține implicarea activă a elevilor în propriul proces de învățare; - Utilizează informațiile obținute din evaluări pentru optimizarea procesului educațional, analiza critică a activităților și luarea deciziilor amelioriative; - Realizează evaluări și autoevaluări ale activității educaționale cu respectarea normelor de etică și deontologie profesională

8. Metode de predare

În activitatea de predare vor fi utilizate metode didactice atât tradiționale (expunerea; conversația; studiul de caz; problematizarea; jocul de rol etc.), cât și interactive (mozaic; tehnica Frisco; metoda piramidei; predarea-învățarea reciprocă etc.). Vor fi utilizate mijloace didactice precum: prezentări Power Point; aplicații digitale utilizate pentru sistematizarea și recapitularea cunoștințelor; fișe; filme documentare etc.). Organizarea activității didactice va respecta design-ul activităților de formare aspecifice formării adulților, integrând armonios noile cunoștințe cu cele transmise anterior și valorificând experiența de învățare/ viață a studenților în analiza aplicațiilor propuse.

9. Conținuturi

9. 1. Curs[15]	Metode de predare	Timp alocat
9.1.1. Procesul de învățământ	Prelegere	2 ore
9.1.2. Principiile didactice	interactivă,	2 ore

9.1.3. Strategia didactică: metode didactice, mijloace didactice, forme de organizare. Metode de predare online	Conversația Explicația Dezbaterea	4 ore
9.1.4. Forme de organizare a procesului de învăţământ. Teoria și practica lecţiei		2 ore
9.1.5. Proiectare adidactică.		4 ore
9.1.6. Evaluarea didactică: conceptul de evaluareîneducaţie, funcţii și operaţii ale evaluării		2 ore
9.1.7. Tipuri de evaluare în cadrul procesului de învăţământ		2 ore
9.1.8. Metode de evaluare tradiţionale. Metode de evaluare complementare. Metode/ aplicaţii de evalaure digitală		4 ore
9.1.9. Probele de evaluare: redactarea probei; tehnici de elaborare a iemilor; elaborare barem notare		4 ore
9.1.10. Apreciarea rezultatelor şcolare. Distorsiuni (erori) în aprecierea rezultatelor şcolare. Modalităţi de prevenire şi diminuare a variabilităţii în notare		2 ore

Bibliografie curs:
1. Bobu, R. Pedagogie II - Suport de curs, ediția 2022-2023
2. Bocoș, M., D., Jucan, D., Teoria și metodologia instruirii. Teoria și metodologia evaluării. Repere și instrumente didactice pentru formarea profesorilor, ediția a IV-a,Editura Paralela 45, Pitești, 2019
3. Cristea, S., Dicţionar enciclopedic de pedagogie, Editura Didactica Publishing House, București, 2015
4. Cucoș, C., Pedagogie, ediția a III-a revăzută și adăugită, Editura Polirom, Iași, 2014
5. Teacher Education for Sustainability , vol. 20, Issue 2, Published online, 2019
6. Tiron, E., Stanciu, T., Teoria și metodologia instruirii. Teoria și metodologia evaluării, Ed. Didactică și Pedagogică, București, 2019
7. Trif L., Teoria și metodologia instruirii, Editura Universității 1 Decembrie 1918 din Alba Iulia, 2018
8. Trif, L., coord., Psihopedagogie- ghid pentru pregatirea gradelor didactice, Editura Universității, 2017
9. Manasia, L., Ianos, M.G., Pedagogie co-creării, editura universitară, București, 2022
10. Marin, T., Marin, L.M., Pedagogie. Compediu, Editura pro Universitaria, București, 2024
11. Pânișoară, I.O., (coord.), Enciclopedia metodelor de învăţământ, Editura polirom, Iași, 2024
12. Istrate, O., Ceobanu, C., Velea, S., Pedagogie digitală, Editura Polirom, Iași, 2025
13. Cucoș, C., Pânișoară, I.O., Istrate, O., Ceobanu, C., Educația digitală, Editura Polirom, Iași, 2022

9.2a Seminar	Metode de lucru[16]	Observații, timp alocat
9.2.1. Prezentare disciplină, tematică, bibliografie, explicare mod de realizare a activităților didactice de seminar. Procesul de învăţământ - caracterul formativ-educativ	Exerciţii individuale/ grup Studii de caz Jocuri de rol Discuția panel	2 ore
9.2.2. Interelaţii predare-învăţare-evaluare, semnificaţii tradiţionale și moderne. Forme şi factori ai predării. Identificarea și analizarea propriilor stiluri de învăţare		2 ore
9.2.3. Sistemul principiilor didactice. Studii de caz		2 ore
9.2.4. Sistemul metodelor didactice- exemplificare în secvenţe de învăţare: metode tradiţionale; metode moderne bazate pe interactivitate		2 ore
9.2.5. Forme de organizare a procesului de învăţământ. Teoriaşipracticalecţiei - organizarea pe clase și pe lecţii; cerinţe metodice în organizare și desfăşurare; tipuri și variante de lecţii - exemplificare		2 ore
9.2.6. Proiectarea didactică. Exerciţii de proiectare a activităţilor didactice		2 ore
9.2.7. Evaluarea în procesul de învăţământ: funcţiile evaluării, structura actului de evaluare măsurare. Formele evaluării - iniţială, continuă, finală		2 ore
9.2.8. Metodeşitehnici de evaluare: tradiţionaleşicomplementare		2 ore
9.2.9. Probele de evaluare: exerciţii de elaborare		2 ore
9.2.10. Apreciarea rezultatelor şcolare. Distorsiuni (erori) în aprecierea rezultatelor şcolare. Studii de caz		2 ore

Bibliografie aplicaţii (seminar):
1. Bobu, R., Pedagogie II – seminar, ppt, ediția 2022-2023
2. Bocoș, M., D., Jucan, D., Teoria și metodologia instruirii. Teoria și metodologia evaluării. Repere și instrumente didactice pentru formarea profesorilor, ediția a IV-a,Editura Paralela 45, Pitești, 2019
Cucoș, C., Pânișoară, I.O., Istrate, O., Ceobanu, C., Educația digitală, Editura Polirom, Iași, 2022
3. Cucoș, C., Pedagogie, ediția a III-a revăzută și adăugită, Editura Polirom, Iași, 2014
disponibil https://dppd.tuiasi.ro/wp-content/uploads/2022/01/Pedagogie-II-seminar-1.pdf
4. Istrate, O., Ceobanu, C., Velea, S., Pedagogie digitală, Editura Polirom, Iași, 2025
5. Manasia, L., Ianos, M.G., Pedagogie co-creării, editura universitară, București, 2022
6. Marin, T., Marin, L.M., Pedagogie. Compediu, Editura pro Universitaria, București, 2024
7. Pânișoară, I.O., (coord.), Enciclopedia metodelor de învăţământ, Editura polirom, Iași, 2024
8. Tiron, E., Stanciu, T., Teoria și metodologia instruirii. Teoria și metodologia evaluării, Ed. Didactică și Pedagogică, București, 2019

10. Evaluare

Tip activitate	10.1 Criterii de evaluare	10.2 Metode de evaluare		10.3 Pondere din nota finală
10.4 Examen	Completitudinea și corectitudinea cunoștințelor.	- observarea sistematică a studenţilor (teme		50%

	Coerenţa logică, fluenţa, forţa de argumentare. Capacitatea de analiză, de interpretare personală, originalitatea, creativitatea. Gradul de asimilare a limbajului de specialitate şi capacitatea de comunicare. Capacitatea de a valorifica abilitățile dobândite. Capacitatea de a prelucra datele şi problemele enunțate.	individuale/ de echipă - temele trebuie efectuate în săptămâna dintre cursuri, pregătirea unui referat - studiu de caz).		
		- test de evaluare formativ (verificări pe parcursul semestrului).		
		- test de evaluare sumativ (verificare finală).	100%	
10.5a Seminar	Capacitatea de aplicare în practică a cunoştinţelor învăţate. Capacitatea de analiză, de interpretare personală, originalitatea, creativitatea.	- participare activă la activităţi; - test de evaluare.		50%
10.6 Condiţii de promovare				
Rezultatul evaluării finale: nota finală minim 5.				

Data completării: Septembrie 2025

Titular curs: Lecturer Roxana BOBU, Dr

Titular aplicaţii: Lecturer Roxana BOBU, Dr

Data avizării în departament: Head of Department,
Septembrie 2025   Associate Professor Gabriel ASANDULUI, PhD

Data avizării în Consiliul Facultăţii: Dean,
Septembrie 2025   Professor Andrei BURLACU, PhD

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[1]*Licenţă/ Masterat.*
[2]*1-4 penrtru licenţă, 1-2 pentru masterat.*
[3]*1-8 pentru licenţă, 1-4 pentru masterat.*
[4]*Examen (E), verificare (V) – din planul de învăţământ.*
[5]*DOB – disciplină obligatorie, DOP– disciplină opţională, DFA– disciplină facultativă;*
[6]*Este egal cu 14 săptămâni x numărul de ore de la punctul 3.1 (similar pentru 3.5, 3.6abc).*
[7]*Liniile de mai jos se referă la studiul individual; totalul se completează la punctul 3.7.*
[8] *Între 2 şi 6 ore. Acestea reprezintă ore didactice şi nu se includ în studiul individual.*
[9] *Suma valorilor de pe liniile anterioare, care se referă la studiul individual.*
[10] *Suma dintre numărul de ore de activitate didactică directă (3.4) şi numărul de ore de studiu individual (3.7); trebuie să fie egală cu numărul de credite alocat disciplinei (punctul 3.9) x 25 de ore pe credit.*
[11] *Se menţionează disciplinele obligatoriu a fi promovate anterior sau echivalente.*
[12] *Tablă, vidoproiector, flipchart, materiale didactice specifice etc.*
[13] *Tehnică de calcul, pachete software, standuri experimentale, etc.*
[14]*Rezultatele învăţării prezentate sub formă de cunoştinţe, aptitudini, responsabilitate şi autonomie specifice disciplinei. Acestea vor fi corelate cu rezultatele învăţării pe domenii fundamentale şi domenii de licenţă (Anexa 2 din Standarde specifice ARACIS, www.aracis.ro/wp-content/uploads/2025/04/Standarde-specifice-programe-de-studii-universitare-de-licenta_aprilie-2025.pdf). Pentru programele de masterat, rezultatele învăţări sunt aferente nivelului 7 din CNC.*
[15]*Titluri de capitole şi paragrafe.*
[16]*Discuţii, dezbateri, prezentare şi/sau analiză de lucrări, rezolvare de exerciţii şi probleme.*
[17]*Demonstraţie practică, exerciţiu, experiment.*
[18]*Studiu de caz, demonstraţie, exerciţiu, analiza erorilor etc.*

FIȘA DISCIPLINEI
Anul universitar 2025-2026

1. Date despre program

1.1 Instituția de învățământ superior	Universitatea Tehnică „Gheorghe Asachi" din Iași
1.2 Facultatea	-
1.3 Departamentul	Departamentul pentru Pregătirea Personalului Didactic
1.4 Domeniul de studii	Științe ale educației
1.5 Ciclul de studii[1]	Licență
1.6. Programul de studii	Program de formare psihopedagogică

2. Date despre disciplină

2.1.1 Denumirea disciplinei	**Didactica specializarii** **Didactics of the Specialization**
2.1.2. Codul disciplinei	CE225
2.2 Titularul activităților de curs	Conf. univ. dr. Tudor STANCIU
2.3 Titularul activităților de aplicații (S)	Conf. univ. dr. Tudor STANCIU

2.4 Anul de studii[2]	2	2.5 Semestrul[3]	4	2.6 Tipul de evaluare[4]	E	2.7 Tipul disciplinei[5]	DL

3. Timpul total estimat al activităților zilnice (ore pe semestru)

3.1 Număr de ore pe săptămână	4	3.2 curs	2	3.3a sem.	2	3.3b laborator		3.3c proiect		3.3.d practică	
3.4 Total ore din planul de învățământ[6]	56	3.5 curs	28	3.6a sem.	28	3.6b laborator		3.6c proiect		3.6.d	

Distribuția fondului de timp[7]	Nr. ore
Studiul după manual, suport de curs, bibliografie și notițe	50
Documentare suplimentară în bibliotecă, pe platformele electronice de specialitate și pe teren	6
Pregătire seminarii/laboratoare/proiecte, teme, referate și portofolii	13
Examinări[8]	4
Alte activități:	

3.7 Total ore studiu individual[9]	69
3.8 Total ore pe semestru[10]	125
3.9 Numărul de credite	5

4. Precondiții (acolo unde este cazul)

4.1 de curriculum[11]	CE127/ Educational Psychology CE128/ Pedagogy I - The Fundamentals of Pedagogy. Curriculum Theory and Methodology CE224/ Pedagogy II - Instruction Theory and Methodology. Assessment Theory and Methodology
4.2 de rezultate ale învățării	- Rezultate ale învățării specifice disciplinelor Psihologia educației, Pedagogie I și Pedagogie II

5. Condiții

5.1 de desfășurare a cursului[12]	- Tablă inteligenta, videoproiector, materiale didactice - Atunci când se impune, cursurile se vor efectua online (pe platformă educațională Google Meet).
5.2 de desfășurare a seminarului[13]	- Mijloace de învățământ specifice pentru desfășurarea seminariilor fizic și / sau online.

6. Obiectiv generalal disciplinei

Cunoaşterea noţiunilor de didactica a specializarii din domeniul tehnic, utilizarea metodelor pedagogice, familiarizarea cu rolul de profesor (prin joc de rol).

7. Rezultatele învăţării[14]

Cunoştinţe	Studentul/ Absolventul: - Cunoaşte, înţelege si utilizeaza limbajul de specialitate; - Cunoaşte metodelor de predare-evaluare; - Cunoaşte modalităţilor de proiectare a lecţiilor; - Corelează cunoştinţele de specialitate, psihopedagogice, în realizarea activităţilor instructiv-educative din învăţământ și a altor activităţi educaţionale; - Argumentează potenţialul formativ al teoriilor, principiilor și practicilor didactice specifice domeniului
Aptitudini	Studentul/ Absolventul: - Aplica practic conceptele învăţate. - Observa şi evalueaza comportamentele şcolare şi sociale ale elevilor. - Realizeaza lecţii de probă si finale. - Construieşte contexte de învăţare autentică, în manieră integrată, în care elevii îşi valorifică experienţele de viaţă şi interesele de cunoaştere.
Responsabilitate şi autonomie	Studentul/ Absolventul: - Executa responsabil sarcinile profesionale, în condiţii de autonomie restrânsă şi asistenţă calificată. - Dezvoltă atitudini creatoare şi constructive în aplicarea principiilor didactice. - Indică necesitatea utilizării unor resurse variate pentru eficientizarea predării, susţinerea învăţării şi sprijinirea elevilor în folosirea lor autonomă. - Comunică eficient prin oferirea de feedback constructiv şi susţine implicarea activă a elevilor în propriul proces de învăţare.

8. Metode de predare

În activitatea de predare vor fi utilizate metode didactice diverse, cum ar fi: prelegerea, explicaţia, descrierea, conversaţia, discuţia colectivă, problematizarea.

9. Conţinuturi

9. 1. Curs[15]	**Metode de predare**	**Timp alocat**
1. Didactica şi procesul de învăţământ. 1.1. Caracteristicile procesului de învăţământ. 1.2. Didactica - teorie generală a procesului de învăţământ. 1.3. Obiectul de studiu al didacticii. 1.4. Legătura didacticii cu metodicile predării disciplinelor. 1.5. Locul şi rolul disciplinelor domeniului în învăţământul preuniversitar	Prelegere interactivă, discuţii, explicaţii, comunicarea euristică, studiul de caz	1 oră
2. Aplicarea noului curriculum pentru disciplinele domeniului. 2.1. Definiţii şi concepţii despre curriculum. 2.2. Curriculumul Naţional. 2.3. Ciclurile curriculare ale învăţământului. 2.4. Documentele şcolare (Planuri – cadru de învăţământ, Programele şcolare, Manualul şcolar)		2 ore
3. Obiective educaţionale în procesul de instruire. 3.1. Niveluri de definire a obiectivelor educaţionale. 3.2. Funcţiile obiectivelor educaţionale. 3.3. Obiective cadru, obiective de referinţă, obiective operaţionale. 3.4. Competenţe generale, competenţe specifice şi conţinuturi. 3.5. Transpunerea competenţelor în obiective operaţionale. 3.6. Metodologia operaţionalizării obiectivelor. Tehnici de operaţionalizare		4 ore
4. Metode de învăţământ specifice disciplinelor domeniului. 4. 1. Definirea conceptelor tehnologie didactică, strategie didactică, metodologie didactică, metode de învăţământ, procedee didactice. 4. 2. Clasificarea metodelor de învăţământ utilizate la predarea disciplinelor domeniului. 4. 2. 1. Metode de învăţare prin comunicare orală. Metode expozitive. 4. 2. 2. Metode de învăţare prin comunicare orală. Metode interogative. 4. 2. 3. Metode de învăţare prin comunicare scrisă. 4. 2. 4. Metode de învăţare prin explorarea realităţii. 4. 2. 5. Metode de învăţare bazate pe acţiune. 4. 2. 5. 1. Metode de învăţare bazate pe acţiunea reală. 4. 2. 5. 2. Metode de învăţare bazate pe acţiunea fictivă. 4. 2. 6. Metode de raţionalizare a învăţării şi predării		6 ore
5. Mijloace de învăţământ specifice disciplinelor domeniului. 5.1. Definirea mijloacelor de învăţământ. 5.2. Funcţiile didactice ale mijloacelor de învăţământ. 5.3. Tipuri de mijloace de învăţământ şi caracteristicile lor. 5.4. Descrierea mediului de instruire. 5.5. Dotarea mediului de instruire		2 ore
6. Forme de organizare şi de desfăşurare a activităţii de instruire. 6.1. Organizarea pe clase şi lecţii a procesului didactic la disciplinele domeniului. 6.2. Tipuri de lecţii specifice disciplinelor domeniului. 6.3. Alte forme de organizare a procesului didactic ce pot fi abordate în cadrul disciplinelor domeniului. 6.3.1. Excursiile şi vizitele didactice. 6.3.2. Lucrările practice în ateliere şi laboratoare. 6.3.3. Cercurile de elevi. 6.3.4. Consultaţiile didactice. 6.3.5. Meditaţii didactice		3 ore
7. Evaluarea în procesul de învăţământ. 7.1. Conceptul de evaluare a procesului de învăţământ. 7.2. Obiective. Funcţii. 7.3. Tipuri de evaluări. Caracterizare. 7.4. Metode de evaluare tradiţionale. 7.5. Metode de evaluare moderne. 7.6. Calităţile instrumentelor de evaluare. 7.7. Tipologia itemilor		6 ore

8. **Proiectarea demersului didactic pentru aria curriculară tehnologii**. 8.1. Lectura personalizată a programelor şcolare. 8.2. Planificarea calendaristică orientativă. 8.3. Proiectarea unităţii de învăţare. 8.4. Proiectarea lecţiei		3 ore
9. **Pregătirea profesorului pentru activitatea la catedră.** 9.1. Funcţiile exercitate de către profesor în activitatea la catedră. 9.2. Competenţele metodice ale cadrului didactic.		1 oră

Bibliografie curs:

1. Cucoş C., Pedagogie, Editura Polirom, Iaşi, 2002
2. Nicola I., Pedagogie, Editura Didactică şi Pedagogică, Bucureşti, 1994
3. Cerghit I., Neacşu I., Negreţ-Dobridor I., Pânişoară I. O., Prelegeri Pedagogice, Editura Polirom, Iaşi, 2002
4. Onu P., Luca C., Didactica specialităţii, Editura „Gh. Asachi", Iaşi, 2002
5. Postelnicu C., Fundamente ale didacticii şcolare, Editura Aramis, Bucureşti, 2002
6. Stanciu M., Didactica postmodernă, Editura Universităţii Suceava, 2003
7. Oproiu G.-C., Elemente de didactica disciplinelor tehnice, Editura Printech, 2003
8. Ionescu M., Radu I., Didactica modernă, Editura Dacia, Cluj Napoca, 2001
9. MEC – Consiliul Naţional pentru Curriculum. Curriculum Naţional. Planuri cadru pentru învăţământ preuniversitar, Bucureşti, 1999
10. Niţucă C., Stanciu T., Didactica disciplinelor tehnice, Editura Performantica, Iaşi, 2006
11. Tiron E., Stanciu T., Teoria si metodologia instruirii. Teoria si metodologia evaluarii, Ed. Didactica si Pedagogica, Bucuresti, 2019

9.2a Seminar	Metode de lucru[16]	Observaţii, timp alocat
1. Rolul şi importanţa disciplinelor tehnice în procesul de învăţământ		1 oră
2. Finalităţile studierii disciplinelor domeniului		1 oră
3. Analiza planurilor cadru şi a programelor şcolare specifice disciplinelor domeniului		1 oră
4. Analiza manualelor şcolare	Exerciţiul, conversaţia, dezbaterea, lucrul pe grupe, eseul, problematizarea	1 oră
5. Planificarea activităţii didactice. Planificarea calendaristică anuală (Planificarea semestrială)		2 ore
6. Planificarea activităţii didactice. Proiectarea unităţii de învăţare		2 ore
7. Planificarea activităţii didactice. Proiectarea planurilor de lecţie (pe tipuri)		4 ore
8. Aprofundarea succesiunii evenimentelor lecţiei. Elaborarea structurii unei lecţii de specialitate pentru diverse tipuri sau variante de lecţii		3 ore
9. Elaborarea de secvenţe şi teste de evaluare		4 ore
10. Rolul catedrei tehnice, al cabinetului de specialitate şi al activităţii de dirigenţie în sistemul activităţilor de instruire		4 ore
11. Simularea lecţiilor de probă		5 ore

Bibliografie aplicaţii (seminar):

1. Cucoş C., Pedagogie, Editura Polirom, Iaşi, 2002
2. Nicola I., Pedagogie, Editura Didactică şi Pedagogică, Bucureşti, 1994
3. Cerghit I., Neacşu I., Negreţ-Dobridor I., Pânişoară I. O., Prelegeri Pedagogice, Editura Polirom, Iaşi, 2002
4. Onu P., Luca C., Didactica specialităţii, Editura „Gh. Asachi", Iaşi, 2002
5. Postelnicu C., Fundamente ale didacticii şcolare, Editura Aramis, Bucureşti, 2002
6. Stanciu M., Didactica postmodernă, Editura Universităţii Suceava, 2003
7. Oproiu G.-C., Elemente de didactica disciplinelor tehnice, Editura Printech, 2003
8. Ionescu M., Radu I., Didactica modernă, Editura Dacia, Cluj Napoca, 2001
9. MEC – Consiliul Naţional pentru Curriculum. Curriculum Naţional. Planuri cadru pentru învăţământ preuniversitar, Bucureşti, 1999
10. Niţucă C., Stanciu T., Didactica disciplinelor tehnice, Editura Performantica, Iaşi, 2006
11. Tiron E., Stanciu T., Teoria si metodologia instruirii. Teoria si metodologia evaluarii, Ed. Didactica si Pedagogica, Bucuresti, 2019

10. Evaluare

Tip activitate	10.1 Criterii de evaluare	10.2 Metode de evaluare		10.3 Pondere din nota finală
10.4 Examen	Completitudinea şi corectitudinea cunoştinţelor. Coerenţa logică, fluenţa, forţa de argumentare. Capacitatea de analiză, de interpretare personală, originalitatea, creativitatea. Gradul de asimilare a limbajului de specialitate şi capacitatea de comunicare. Capacitatea de a valorifica abilităţile dobândite. Capacitatea de a prelucra datele şi problemele enunţate.	- observarea sistematică a studenţilor (teme individuale/ de echipă - temele trebuie efectuate în săptâmâna dintre cursuri, pregătirea unui referat - studiu de caz).		50%
		- test de evaluare sumativ (verificare finală).	100%	

10.5a Seminar	Capacitatea de aplicare în practică a cunoștințelor învățate. Capacitatea de analiză, de interpretare personală, originalitatea, creativitatea.	- participare activă la activități; - test de evaluare.	50%
10.6 Condiții de promovare			
Rezultatul evaluării finale: nota finală minim 5.			

Data completării: Septembrie 2025

Titlar curs: Associate Professor Tudor STANCIU, Dr

Titlar aplicații: Associate Professor Tudor STANCIU, Dr

Data avizării în departament: Head of Department,
Septembrie 2025   Associate Professor Gabriel ASANDULUI, PhD

Data avizării în Consiliul Facultății: Dean,
Septembrie 2025   Professor Andrei BURLACU, PhD

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[1]*Licenţă/ Masterat.*

[2]*1-4 penrtru licenţă, 1-2 pentru masterat.*

[3]*1-8 pentru licenţă, 1-4 pentru masterat.*

[4]*Examen (E), verificare (V) – din planul de învăţământ.*

[5]*DOB – disciplină obligatorie, DOP– disciplină opţională, DFA– disciplină facultativă;*

[6]*Este egal cu 14 săptămâni x numărul de ore de la punctul 3.1 (similar pentru 3.5, 3.6abc).*

[7]*Liniile de mai jos se referă la studiul individual; totalul se completează la punctul 3.7.*

[8] *Între 2 şi 6 ore. Acestea reprezintă ore didactice şi nu se includ în studiul individual.*

[9] *Suma valorilor de pe liniile anterioare, care se referă la studiul individual.*

[10] *Suma dintre numărul de ore de activitate didactică directă (3.4) şi numărul de ore de studiu individual (3.7); trebuie să fie egală cu numărul de credite alocat disciplinei (punctul 3.9) x 25 de ore pe credit.*

[11] *Se menţionează disciplinele obligatoriu a fi promovate anterior sau echivalente.*

[12] *Tablă, vidoproiector, flipchart, materiale didactice specifice etc.*

[13]*Tehnică de calcul, pachete software, standuri experimentale, etc.*

[14]*Rezultatele învăţării prezentate sub formă de cunoştinţe, aptitudini, responsabilitate şi autonomie specifice disciplinei. Acestea vor fi corelate cu rezultatele învăţării pe domenii fundamentale şi domenii de licenţă (Anexa 2 din Standarde specifice ARACIS, www.aracis.ro/wp-content/uploads/2025/04/Standarde-specifice-programe-de-studii-universitare-de-licenta_aprilie-2025.pdf). Pentru programele de masterat, rezultatele învăţări sunt aferente nivelului 7 din CNC.*

[15]*Titluri de capitole şi paragrafe.*

[16]*Discuţii, dezbateri, prezentare şi/sau analiză de lucrări, rezolvare de exerciţii şi probleme.*

[17]*Demonstraţie practică, exerciţiu, experiment.*

[18]*Studiu de caz, demonstraţie, exerciţiu, analiza erorilor etc.*

Academic year 2025-2026

1. Programme information

1.1 Higher Education Institution	"Gheorghe Asachi" Technical University of Iași
1.2 Faculty	Faculty of Civil Engineering and Building Services
1.3 Department	Civil and Industrial Engineering
1.4 Field of study	Civil Engineering
1.5 Level of study[1]	Bachelor's degree
1.6. Study programme	Inginerie civilă (în limba engleză)/ Civil Engineering - ICE

2. Course information

2.1.1 Course title	**Etică și Integritate** **Ethics and Integrity**				
2.1.2. Course code	CE226				
2.2 Lecture instructor	Lecturer Oana - Mihaela BANU, PhD				
2.3 Seminar instructor	Lecturer Oana - Mihaela BANU, PhD Lecturer Claudiu ROMILA, PhD				
2.4 Year of study[2]	2	2.5 Semester[3]	4	2.6 Assessment method[4]	C	2.7 Course type[5]	DL

3. Estimated total time (hours per semester)

3.1 Number of hours per week	3	3.2 lecture	2	3.3a seminar	1	3.3b laboratory		3.3c project		3.3.d practical sessions	
3.4 Total number of hours in the curriculum[6]	42	3.5 lecture	28	3.6a seminar	14	3.6b laboratory		3.6c project		3.6.d	

Workload distribution [7]	No. of hours
Study based on textbook, course material, reading list and notes	4
Additional research in the library, on specialised electronic platforms, and in the field	2
Preparation for seminar/laboratory/project session, assignments, papers, and portfolios	2
Assessment[8]	2
Other activities:	

3.7 Total number of individual study hours[9]	8
3.8 Total number of hours per semester[10]	50
3.9 Number of ECTS credits	2

4. Prerequisites (if applicable)

4.1 Curriculum prerequisites[11]	
4.2 Learning outcomes prerequisites	

5. Requirements

5.1 for the lecture[12]	- blackboard, computer/ laptop, video projector, specific teaching materials and internet connection;
5.2 for the seminar[13]	- blackboard/ whiteboard, computer/ laptop, video projector, specific teaching materials and internet connection; - the deadlines for handing in the assignments are established by the seminar instructors and the students are informed about them from the beginning of the semester.

6. General objective of the course

The course **Ethics and Integrity** *aims to familiarize students with the fundamental concepts of ethics, integrity, and professional responsibility, as well as to develop their ability to apply these principles consistently in their academic activity and future careers. By presenting the ethical principles specific to research activities—such as respect for copyright, avoidance of plagiarism, and the prevention of data fabrication and falsification—the course provides students with the necessary tools to produce original, properly documented academic works in accordance with international academic standards. Practicing responsibility and honesty in academic settings contributes to the development of the ability to address complex professional situations ethically. Moreover, the course promotes an understanding of the value of intellectual effort and fosters an academic environment based on merit, fairness, and mutual respect.*

7. Learning outcomes [14]

Knowledge	The student/ graduate: - understands the definitions of the terms *Ethics*, *Morality*, and *Integrity*, and the ways in which they are relevant in both professional and personal contexts; - is familiar with the main ethical theories and with the ways in which moral dilemmas can be analysed; - understands the concept of integrity and its importance for personal and professional development; - is familiar with the forms of plagiarism and the consequences associated with it; - learns about intellectual property rights and the proper use of resources; - identifies and applies the ethical principles specific to the future profession (e.g., research ethics, business ethics, or ethics in engineering).
Skills	The student/ graduate: - analyses the ethical elements of a complex situation, evaluates the arguments behind different solutions, and recognizes ethical dilemmas; - applies ethical theories to choose the most just and responsible course of action in morally ambiguous or conflictual situations; - produces academic work that reflects their own original effort; - attributes ideas and references correctly and avoids plagiarism; - understands and applies the laws and regulations regarding copyright and uses resources ethically.
Responsibility and autonomy	The student/ graduate: - complies with ethical principles, norms, and values in completing professional tasks correctly and on time, by adopting a rigorous, efficient, and responsible work strategy in decision-making and problem-solving; - takes responsibility for contributing to professional knowledge and practices and/or for reviewing the strategic performance of teams; - demonstrates critical thinking and rigor in the analysis and interpretation of complex situations; - works autonomously and collaborates effectively in interdisciplinary teams to integrate ethical principles into construction projects.

8. Teaching strategies

The teaching activities will include interactive lectures and debates based on PowerPoint presentations that will be made available to students. The presentations contain the necessary information, so that the new concepts could be easily understood and assimilated. Each lecture will begin with a brief review of the concepts covered in the previous class and short case studies will be debated to conclude the theoretical framework.

The teaching approach uses discovery-based learning models, facilitated by direct and indirect exploration of reality (case studies), as well as action-based methods, such as group debates on practical ethical dilemmas.

9. Content

9. 1. Lecture[15]	Teaching strategies	Time allocation
9.1.1. **Introduction to Ethics and Integrity:** Basic notions.	Interactive lecture, debates, explanations	2 hours
9.1.2. **Ethical Theories:** Metaethics. Normative Ethics. Applied Ethics.		8 hours
9.1.3. **Personal Responsibility and Morality**: Ethical dilemmas.		2 hours
9.1.4. **Applied Ethics at the Workplace**: Professional Codes of Ethics.		2 hours
9.1.5. **Integrity:** Concept. Fundamental Moral Value.		2 hours
9.1.6. **Academic Ethics**: Academic Codes of Ethics.		4 hours

9.1.7. **Academic Integrity**: Students' Academic Rights and Responsibilities.		2 hours
9.1.8. **Honesty and Academic Integrity:** Forms of Academic Dishonesty and Lack of Integrity. Examples.		2 hours
9.1.9. **Research Ethics**: Ethical Conduct and Guidelines for writing a Scientific Manuscript.		2 hours
9.1.10. **Research Ethics**: Team Work and Scientific dialogue.		2 hours

Reading list for the lecture:

1. Banu Oana-Mihaela (2024), Ethics an Integrity – Lecture notes.
2. Rohini De Alwis Seneviratne, Ethics of Research, Journal of the National Science Foundation of Sri Lanka, 51(2), 2023.
3. Kambhampati S., Menon J., Maini L., Ethics in Research and Publications, Indian Journal of Orthopaedics, 2023.
4. The Ethics Centre (2018). What is Ethics?
5. Angel Borja, Six things to do before writing your manuscript, ELSEVIER, elsevier.com/connect/six-things-to-do-before-writing-your-manuscript, 2014.
6. BBC Ethics Centre (2014). What is Ethics?
7. Markkula Center for Applied Ethics, Santa Clara University (2010). What is Ethics?
8. Copp David, The Oxford Handbook of Ethical Theory, Oxford University Press, New York, 2005.
9. Luban, David (2003). Integrity: its causes and cures. Fordham Law Review, vol. 72, pp. 279-310.
10. Kenneth Carpenter, How to Write a Scientific Article, The Journal of Paleontological Sciences: JPS.TD.07.0001, 2001.
11. Slote Michael, From Morality to Virtue , Oxford University Press, New York, 1995.

9.2 Seminar	Work methods[16]	Observations, allotted time
9.2.1. Academic Ethics and Integrity. Causes and Strategies for Reducing Fraud in Higher Education	Discussions, debates, presentation, and/or analysis of practical case studies	2 hours
9.2.2. Norms and Codes of Ethics for conducting Academic and Professional Activities.		4 hours
9.2.3. Preparing and Writing the Diploma Thesis. Strategies and steps. Ethical principles and Plagiarism.		2 hours
9.2.4. Writing Scientific Manuscripts (scientific papers, research reports, thesis) and their public presentation. Strategies and Steps. Practical examples.		4 hours
9.2.5. Debate and Critical Analysis on various case studies from Ethical Principles point of view.		2 hours

Reading list for the seminar:

1. Wim Dubbink, Business Ethics, Springer Nature Switzerland, 2023.
2. The National Society of Professional Engineers (NSPE), Code of Ethics for Engineers, July 2021.
3. Clayton Bingham, What is the structure of research papers/article? 6 March, on line at https://www.quora.com/What-is-the-structure-of-research-papers-article, 2018.
4. Angel Borja, 11 steps to structuring a science paper editors will take seriously, ELSEVIER, 24 June, elsevier.com/connect/11-steps-to-structuring-a-science-paper-editors-will-take-seriously, 2014.
5. The Royal Academy of Engineering (RAE), Engineering ethics in practice: a guide for engineers, August 2011.
6. Cargill M, O'Connor P., Writing Scientific Research Articles: Strategy and Steps, 1st edition, Blackwell Publishing, New York, 2009.
7. Martin Mike and Schinziger Ronald, Ethics in Engineering, 4th Ed. McGraw Hill Education, 2004.
8. Joanna Kimmerly-Smith, How to Format a Scientific Paper, on-line at https://www.scribendi.com/advice/format_a_scientific_paper.en.html#JoannaKimmerly-Smith.

10. Assessment

Assessment category	**10.1 Assessment criteria**	**10.2 Assessment method**		**10.3 Percentage of final grade**
10.4 Final exam	Completeness and accuracy of knowledge Level of command of specialised terminology and communication skills Ability to apply acquired skills Ability to process data and solve the problems presented	- summative assessment test (final assessment): the presentation of a case study that demonstrates the student's ability to critically analyse the ethical aspects of the given issue;	50%	50%
		the original writing of an academic paper with proper citation of the bibliography.	50%	

10.5 Seminar	Ability to apply acquired knowledge Capacity for analysis, personal interpretation, originality, creativity.	- active participation in the activities, group debates on various case studies.	100%	50%

10.6 Passing requirements
The student must demonstrate the ability to understand the ethical aspects of a given problematic or conflictual situation and to critically evaluate the context, being able to provide recommendations for selecting the optimal course of action from an ethical point of view.
The final grade for a course is determined by taking into account the scores and weightings assigned to each course activity. Whole-number grades from 10 to 1 will be awarded, with a grade of 5 certifying the achievement of the minimum learning outcomes required for the course and the awarding of the corresponding ECTS credits.

Date of completion: September 2025

Lecture instructor: Lecturer Oana-Mihaela BANU, PhD

Seminar instructors: Lecturer Oana-Mihaela BANU, PhD

                                          Lecturer Claudiu ROMILA, PhD

Date of departmental approval: Head of Department,
September 2025   Lecturer Mircea - Vasile VENGHIAC, PhD

Date of faculty council approval: Dean,
September 2025   Professor Andrei BURLACU, PhD

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[1] *Bachelor's/ Master's degree.*

[2] *1-4 for bachelor's degree, 1-2 for master's degree.*

[3] *1-8 for bachelor's degree, 1-4 for master's degree.*

[4] *Exam (E), test (T) – from the curriculum.*

[5] *DOB – compulsory course, DOP– elective course, DFA– optional course;*

[6] *It is equal to 14 weeks x the number of hours indicated in section 3.1 (similarly for 3.5, 3.6abc).*

[7] *The lines below refer to individual study; the total is indicated in section 3.7.*

[8] *Between 2 and 6 hours. These represent teaching hours and are not included in individual study.*

[9] *Sum of the values from the previous lines, referring to individual study.*

[10] *Sum of direct contact hours (3.4) and individual study hours (3.7); this must equal the number of credits allocated to the course (section 3.9) × 25 hours per credit.*

[11] *Courses that must be completed beforehand or equivalent courses.*

[12] *Blackboard, projector, flipchart, specific teaching materials, etc.*

[13] *Computing equipment, software packages, experimental setups, etc.*

[14] *Learning outcomes presented as knowledge, skills, responsibility, and autonomy specific to the course. These should be correlated with the learning outcomes in fundamental and bachelor's degree fields (Annex 2 of ARACIS Specific Standards, www.aracis.ro/wp-content/uploads/2025/04/Standarde-specifice-programe-de-studii-universitare-de-licenta_aprilie-2025.pdf). For master's programmes, learning outcomes correspond to level 7 of the National Qualifications Framework (CNC).*

[15] *Chapter and paragraph titles.*

[16] *Discussions, debates, presentation and/or analysis of works, exercises and problem solving.*

[17] *Practical demonstration, exercise, experiment.*

[18] *Case study, demonstration, exercise, error analysis, etc.*