

SYLLABUS

1. Data about the program of study

1.1	Institution	The Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Constructions
1.3	Department	Railways, Roads and Bridges
1.4	Field of study	Civil Engineering
1.5	Cycle of study	Master of Science
1.6	Program of study/Qualification	Transport Infrastructure Engineering / Engineer
1.7	Form of education	Full time
1.8	Subject code	15.00

2. Data about the subject

2.1	Subject name	Performing Technologies Applied to Roads									
2.2	Subject area	Civil Engineering									
2.3	Course responsible/lecturer	Senior Lecturer, Eng. Remus CIOCAN, PhD Remus.ciocan@cfdp.utcluj.ro									
2.4	Teachers in charge of seminars	, PhD Remus.ciocan@cfdp.utcluj.ro									
2.5	Year of study	II	2.6	Semester	3	2.7	Assessment	Exam	2.8	Subject category	DA/DI

3. Estimated total time

3.1	Number of hours per week	4	of which: 3.2 course	2	3.3 applications:	2
3.4	Total hours in the curriculum	56	of which: 3.5 course	28	3.6 applications:	28
Individual study						hours
Manual, lecture material and notes, bibliography						25
Supplementary study in the library, online and in the field						17
Preparation for seminars/laboratory works, homework, reports, portfolios, essays						24
Tutoring						-
Exams and tests						4
Other activities						-
3.7	Total hours of individual study	69				
3.8	Total hours per semester	125				
3.9	Number of credit points	5				

4. Pre-requisites (where appropriate)

4.1	Curriculum	Not applicable
4.2	Competence	Not applicable

5. Requirements (where appropriate)

5.1	For the course	<ul style="list-style-type: none"> Room equipped with: blackboard, projector, flipchart Students will not attend lectures, seminars / laboratories / projects with their mobile phones turned on. Also, telephone calls will not be tolerated during the course, nor
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		<p>will the students leave the classroom in order to take personal telephone calls;</p> <ul style="list-style-type: none"> • Tardiness will not be tolerated; <p>Cluj-Napoca, str. Observatorului, Nr. 72-74 - Amphitheatre A4, A5.</p>
5.2	For the applications	<ul style="list-style-type: none"> • Room equipped with teacher's desk, tables and chairs; • The deadline for submitting the papers shall be determined by the Coordinator in mutual agreement with the students. Late submission of the papers shall result in the deduction of 1 point/day of delay ; <p>Cluj-Napoca, Observator Building, Nr. 72-74 – O102, O5, O15, O13.</p>

6. Specific competences

Professional competences	<p>After completing the discipline, the students should know:</p> <ul style="list-style-type: none"> • modern and high-performance technologies used in road construction; • new materials and processes for their implementation; • technical-economic analysis for roads; <p>After completing the discipline, the students should be able:</p> <ul style="list-style-type: none"> • To deepen their knowledge about the special technologies applied to the execution of roads; • To determine the most efficient technical solutions for the rehabilitation, modernization or construction of roads; • To size and verify road structures for designing new roads; • To assess route variants through technical-economic analysis. <p>After completing the discipline, the students should be able:</p> <ul style="list-style-type: none"> • To be able to apply the legislative norms in the field for design, execution and reception; • To elaborate the steps of a logical road design chart; • To be able to assess the inconsistencies in the calculations / execution; • To be able to execute a road through modern methods.
Cross competences	<ul style="list-style-type: none"> • Application of effective and responsible work strategies, punctuality, seriousness and personal responsibility, based on the principles, norms and values of professional ethics; • To do research in Romanian for professional and personal development, through continuing professional development and efficient adaptation to new technical specifications; • To carry out a rigorously documented overview paper, taking into account the efficient adaptation to the new technical specifications • To create and present a Calculation Method Summary Sheet; • To discuss the solutions of the colleagues in the working group (semigroup); dissemination of results.

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

7.1	General objective	<ul style="list-style-type: none"> Developing skills related to compliance with safety requirements and sustainable behaviour of roads, bridges and railways, special technologies and a coherent and comprehensive system of norms, various design methods and specific execution elements.
7.2	Specific objectives	<ul style="list-style-type: none"> Creating the skills required for using the best technologies in infrastructure works; Assimilating theoretical knowledge regarding modern road construction solutions;

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
General notions. The future of infrastructure in Romania.	Presentation, discussions Interactive teaching	Video-projector Edited materials
Performance conditions of road structures		
Reinforcement of earthworks Use of geosynthetics		
Stabilized road mixtures: - Mechanical stabilization - Stabilization with binders - Stabilization with chemicals		
High-performance technologies applied to road pavements		
High-performance technologies applied to temporary and semi-permanent bituminous mixtures: - thin asphalt mixtures - high modulus asphalt mixtures		
High-performance technologies applied to permanent bituminous mixtures: - Anti-cracking asphalt mixtures - Asphalt mixtures with low air void content - Special asphalt mixtures		
Special bituminous treatments		
Modern technologies for regeneration and reuse of old asphalt coatings: - cold recycling - hot recycling		
Technologies applied to rigid road mixtures: - execution with fixed formwork - execution with sliding formwork		
Special technologies applied to rigid road mixtures: - use of dispersed cement concrete - use of continuous disperse-reinforced concrete - use of pre-compressed cement concrete		
Other special technologies and mixed road solutions		
Use of modern technologies in the road execution process		

supervision using the methodology for calculating the performance of the execution process		
Bibliography 1. Ciocan R., Iliescu M. - Performing Technologies Applied to Roads – Course, Cluj-Napoca, 2015; 2. Iliescu – Trafic și autostrăzi; 3. ILIESCU, M.: Drumuri. Volumul I.Proiectarea drumurilor. UTPRESS, Cluj, 2011; 4. ILIESCU, M.: Drumuri. Volumul II.Structuri rutiere. Infrastructura drumurilor. UTPRESS, Cluj, 2011; 5. ILIESCU, M.: Drumuri. Volumul III.Suprastructura drumurilor. UTPRESS, Cluj, 2011; 6. ILIESCU, M.: Proiectarea drumurilor.Teorie si practica. UTPRESS, Cluj, 2011; 7. ILIESCU, M., POP, M.: Indrumator pentru lucrari de laborator de drumuri. UTPRESS, Cluj, 2011; 8. BEURAN, M.,: Proiectarea și construcția drumurilor. LITO I PCLUJ, 1977; 9. JERCAN, S. ,: Suprastructura și întreținerea drumurilor, Ed. Didactică și Pedagogică, 1981;		
8.2. Applications/Seminars	Teaching methods	Notes
Calculation of structures with geosynthetics	Presentation, applications, workshop	Projection guide, Video-projector, manual, norms and regulations
Comparative study of the use of several types of stabilizers		
Reinforcement of flexible and semi-rigid road structures		
Calculation of a rigid road structure		
Reinforcement of rigid road structures		
Proposal for intersection planning		
Proposal for roundabout planning		
Technical Report, Specification Sheet and Tender Book for roads;		
Technical-economic calculation for roads;		
Creation of a Specification Sheet and aTender Book for a technology for the production of asphalt mixtures		
Calculation of resistance and stability of a retaining wall;		
Financial indicators for the assessment of major investments;		
Bibliography 10. BEURAN, M., ILIESCU, M.,: Construcția drumurilor. Îndrumător de lucrări de laborator, IPCLUJ, 1995; 11. GUGIUMAN, Gh.,: Suprastructura drumurilor, Ed. Tehnică U.T. a Moldovei, Chișinău, 1996; 12. BELC, F. ,: Căi de comunicație terestră. Orizonturi Universitare, Timișoara, 1999; 13. LUCACI, Gh., COSTESCU, I., BELC, F. ,: Construcția drumurilor, Ed. Tehnică, București, 2000; 14. HODA, G., ILIESCU, M.,: Căi de comunicație. UTPRESS, Cluj, 2009.		

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

The acquired skills will be necessary for the employees who carry out their activity in the field of road research, design and execution. The content of the discipline is correlated with the needs of employers in the field of civil engineering. In order to identify the needs and expectations of the employers in the field, to establish the content of the course was discussed with other professors within the faculty, with representatives of professional associations and with graduates of the study program. The content and complexity of the notions taught are permanently correlated with those of the related disciplines in the curriculum and adapt to the evolution of the knowledge needed in the field of master's studies.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	Written examination (2 hours)	Written examination – theoretical assessment Duration of examination 2 hours	66.67%
10.5 Applications	The project is assessed and graded	The project is defended and submitted. Duration 1 hour	16.67%
	Submission of applications	Defence of applications	16.66%
10.6 Minimum standard of performance			
<p>a) Eligibility condition for acceptance to examination: attendance to no less than 12 (twelve) test sessions and submission of papers (project) before deadline. The grade obtained for the tests * (will be recorded in the electronic gradebook): (P): min. 5 (five)</p> <p>(b) Grade for applications (A): min. 5(five)</p> <p>(c) Grade for theoretical knowledge(T): min. 5(five)</p>			
Grade calculation formula	$E = [(A) + (T) + (P)]/3$ <p>Condition for passing the examination / obtaining the credits: $E \geq 5$, if $A \geq 5$, $T \geq 5$, $P \geq 5$. OBS: In determining the final grade, the student's involvement throughout the semester will be also taken into account: participation in debates, scientific sessions, attendance, etc.</p>		

Date of filling in:		Title Surname Name	Signature
24.09.2019	Lecturer	Senior Lecturer, Eng. Remus CIOCAN, PhD Remus.ciocan@cfdp.utcluj.ro	
	Teachers in charge of application	Senior Lecturer, Eng. Remus CIOCAN, PhD Remus.ciocan@cfdp.utcluj.ro	

Date of approval in the department

Head of department
Gavril HODA, EngD, Reader

Date of approval in the faculty

Dean
Nicolae CHIRA, EngD, Reader