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Course unit English denomination	Advanced design of transport infrastructures
Teacher in charge (if defined)	Augusto Cannone Falchetto
Teaching Hours	24
Number of ECTS credits allocated	4
Course period	From Wednesday 12/02/2025 to Friday 22/02/2025, each day, 9:30 – 12:30 AM
Course delivery method	<input type="checkbox"/> In presence <input type="checkbox"/> Remotely <input checked="" type="checkbox"/> Blended
Language of instruction	English
Mandatory attendance	<input checked="" type="checkbox"/> Yes (80% minimum of presence) <input type="checkbox"/> No
Course unit contents	Basics of transport infrastructures design. Standards and design software. Fundamentals of Infrastructure Building Information Modeling (I-BIM). Elements of vehicles mechanics, analysis of vehicle-infrastructure interaction and safety of transport infrastructures. Study of infrastructures behavior, definition of components, evaluation of materials properties and advanced tests to characterize the infrastructure materials. Introduction to the mechanics of the Multilayer Flexible Pavements (MFPs) and to constitutive modeling of bituminous binders and concretes. Analysis of the stress-strain state in MFPs. Design of road and airport superstructures with real applications. Construction, management, and maintenance techniques for infrastructures. Life Cycle Assessment, Life Cycle Cost Analysis and risk assessment/management for transport infrastructures.
Learning goals	The main aim of the course is acquiring and developing knowledge about theories, techniques, methods of analysis and best practices about the design, construction and operation of road, railway and airport infrastructures. The course provides the proper skills for dealing with the modelling of the materials for transport infrastructures, evaluation of its behavior, life cycle analysis and cost assessment of transport infrastructures, and digital techniques and methodologies for infrastructure design.
Teaching methods	Class method: frontal lecturing, using blackboard and/or video projector. Seminars from other teachers can be held.
Course on transversal, interdisciplinary, transdisciplinary skills	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

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Available for PhD  
students from other  
courses

- Yes  
 No

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Prerequisites  
(not mandatory)

Basic knowledge of mathematics, physics, civil engineering, materials for transport infrastructures.

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Examination  
methods  
(in applicable)

Oral examination at the end of the course, checking on completeness and suitability of knowledge.

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Suggested readings

- Santagata, F. A., Pasetto, M., Pasquini, E. et al., *Strade - Teoria e tecnica delle costruzioni stradali*. Milano: Pearson, 2016. vol. 2
- Nikolaides, A., *Highway engineering - Pavements, materials and control of quality*. Boca Raton: CRC Press - Taylor and Francis Group, 2015
- Papagiannakis, A. T and Masad, E. A, *Pavement Design and Materials*. New York: Wiley, 2017.
- Fwa, T. F., *The handbook of highway engineering*. Boca Raton: CRC Press, Taylor & Francis Group, 2006
- Lecture notes from teacher(s).

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Additional  
information

The course will take place in blended mode: in room "ICAR/04" (ground floor) in presence and on-line (using Zoom).  
Link Zoom: <https://unipd.zoom.us/j/85482561564>.

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