



Course unit English denomination	Advanced design of transport infrastructures
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SS	CEAR-03/A (ex ICAR/04)
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Teacher in charge (if defined)	Augusto Cannone Falchetto
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Teaching Hours	24
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Number of ECTS credits allocated	4
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Course period	February
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Course delivery method	☐ In presence ☐ Remotely ☒ Blended
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Language of instruction	English
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Mandatory attendance	☒ Yes (80% minimum of presence) ☐ No
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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.
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Learning goals	The main aim of the course is to acquire and develop knowledge about theories, techniques, methods of analysis, and best practices in the design, construction, and operation of road, railway, and airport infrastructures. The course provides skills modeling materials for transport infrastructures, evaluation of their behaviour, life cycle analysis and cost assessment of
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	transport infrastructures, and digital techniques and methodologies for infrastructure design.
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Teaching methods	Class method: frontal lecturing, using a blackboard and/or video projector. Seminars from other teachers can be held.
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Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
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Available for PhD students from other courses	☒ Yes ☐ No
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Prerequisites	Basic knowledge of mathematics, physics, civil engineering, and materials for transport infrastructures.
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Examination methods	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 • Nikolaidis, 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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