ISEL
INSTITUTO SUPERIOR DE ENGENHARIA DE LISBOA

DEC
ÁREA DEPARTAMENTAL DE ENGENHARIA CIVIL

Course file

Study cycle	BACHELOR IN CIVIL ENGINEERING		
Course	TRANSPORTATION INFRASTRUTURES I	Mandatory	☒
		Optional	☐
Course scientific area	CIVIL ENGINEERING	Category	E

Course category: B - Basic; C - Core Engineering; E - Specialization; P - Complementary.

Year: 3rd	Semester: 5th		ECTS: 5,5		Total: 149
Contact time	T: 22,5	TP: 45	PL:	S:	OT:

T - Lectures; TP - Theory and practice; PL - Lab Work; S - Seminar; OT - Tutorial Guidance.

Course Director	**Title**	**Position**
Luísa Ferreira Cardoso Teles Fortes	Especialista	Professor Adjunto

Learning objectives (knowledge, skills and competences to be developed by students)

(max. 1000 characters)

Transmition of general knowledge associated with transportation infrastructures, within the course of civil engineering, as well as knowledge of the complexity of the overall design of an infrastructure of this kind.
This curricular unit will allow the student's acquisition of the needed competences to develop roads calculation and design (municipality roads), associated to the calculation of earthworks and the knowledge of equipments used.

Syllabus

(max. 1000 characters)

Portuguese Road Network: Present and future perpectives.
Road infrastructures: its characterisation.
Service levels.
Phases of the design and the basic elements required for the development of each phase.
General notions about traffic and dimensioning.
Typical cross section.
Specific components of the Global Execution Design – their interconnection and dependency.
Project Management.
Geometry - Horizontal and vertical alignments calculation.
The design of Municipal or local roads
Notions about transition curves - overwidening and superelevation.
Visibility distances.
Earthworks – general concepts, volumes calculation (methods), earth distribution, Bruckner's graphic and

equipments.
Drainage and Pavement engineering - general concepts.

Demonstration of the consistency between the syllabus and the course objectives

(max. 1000 characters)

As this is the first curricular unit dedicated to the transportation infrastrutures, it is important to transmit general concepts to students, allowing them to understand the dimension and complexity of a global project of this kind, situation reflected in the syllabus. To garantee the acquisition of competences in the field of geometric design (infrastrutures with local importance, municipality roads), the calculation methodologies for horizontal and vertical alignments are transmited to the students, as the aspects linked to the superelevation and the overwidening, and the calculation of earth volumes and their distribution. Like this, the syllabus is organized to be consistent with the course objectives.

Teaching methodology (evaluation included)

(max. 1000 characters)

Lectures are alternated with the theoretical and practical lessons, to allow the sequential use of knowledge obtained. Students can carry out continuous assessment or final examination. The final exam (regular session and appeal) consists of a part without consultation of any documentation (more theoretical) worth 8 points and a part with consultation (more practical) worth 12 points, requiring a total of at least 9,5 points to be approved. The result of continuous assessment is obtained by the arithmetic mean between a practical work on group (with discussion and individual evaluation) and an individual test (with the same characteristics of the final examination but only about the matters not evaluated on group work). In continuous assessment each student must obtain at least the classification of 9,5 values both at work and in the test, with the possibility of repeating the test on the first date of examination.

Demonstration of the consistency between teaching methodology and the course learning objectives

(max. 3000 characters)

Having the objective to ensure students acquire the skills needed for the development of road projects with small dimension and local importance (municipality roads), this matter is covered in the lectures and has its application in practical classes. In order to place students in situations of real design decision, the data for the work of each group is given on cartography in electronic form (so it can be performed with use of CAD), being supplied the existent conditionings observed along the 600 meters long on the place where the road design will be done and whose cross-section type and design speed were previously defined. Students should pay particular attention to compliance with the geometric standards, orographic characteristics, occupation of the area and drainage aspects and present the calculation and design of the road plan/longitudinal profile, characteristic transverse profiles and earthmoving work (graphic of Brückner and equipment). This methodology ensures not only that the student acquires the skills needed to develop the road design as well

as getting additional knowledge about the complexity of this kind of projects, which gives coherence between the teaching methodology adopted and the course learning objectives.

Main Bibliography

(max. 1000 characters)

Normas de Traçado, actual (JAE, 1994);
Normas de Traçado, in revision (InIR, Nov 2010);
Plano Rodoviário Nacional (National Roads Planning);
Vocabulário de Estradas e Aeródromos (LNEC);
Curricular unit notes and slides.