ISEL
INSTITUTO SUPERIOR DE ENGENHARIA DE LISBOA

DEC
ÁREA DEPARTAMENTAL DE ENGENHARIA CIVIL

Course file

Study cycle	MASTER IN CIVIL ENGINEERING		
Course	Urban Hydraulics I	Mandatory	☒
		Optional	☐
Course scientific area	CIVIL ENGINEERING	Category	C

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

Year: 3rd	Semester: 5th		ECTS: 5,5		Total: 148
Contact time	T:	TP: 67,5	PL:	S:	OT:

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

Course Director	**Title**	**Position**
Alexandre Almeida Mendes Borga	Mestre	Professor Adjunto

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

(max. 1000 characters)

To provide to the students the knowledge and skills to design, size, implement and operate urban water supply infrastructures for up to 10,000 inhabitants, as well as water supply networks for small and medium size buildings, including construction works and related equipment, namely in the following components:

O1 - drinking water quality parameters;

O2 - captations and desinfection instalations;

O3 - pumping stations and main pipes;

O4 - reservoirs;

O5 - urban water distribution networks;

O6 - building water distribution networks;

O7 - processes of water desinfection.

Syllabus

(max. 1000 characters)

C1 - Basic concepts:

a) drinking water quality parameters;

b) standards and regulations for drinking water;

c) desinfection;

d) water consumption forecast;

C2 - Urban water distribution systems:

a) captation;

b) transport;

c) pumping installations;

d) reservoirs;

e) distribution networks;

f) standards and regulations for urban water distribution systems;

C3 - Building water distribution systems:

a) general design criteria;

b) storage reservoirs;

c) network mapping;

d) domestic hot water supply;

e) pipe sizing;

f) building pumping installations;

g) water fire-fighting systems in buildings;

h) standards and regulations for building water distribution systems.

Demonstration of the consistency between the syllabus and the course objectives

(max. 1000 characters)

In the scheme below, Ci -> Oj means that the syllabus component i (Ci) contributes to the learning outcome j (Oj)

C1a to C1d -> O1 to O7;

C2a) -> O2;

C2b and C2c -> O3

C2d -> O4;

C2e -> O5;

C2f -> O2 to O5;

C3a to C3h -> O6;

Teaching methodology (evaluation included)

(max. 1000 characters)

Classes are used to present and discuss theoretical and practical questions and the regulations that concern the structures included in the course programme, as well as to solve exercises on applying rules of design and sizing. Classes are supplemented with 2 practical project work, accompanied by the teacher and discussed at the end of the semester, as part of the assessment.

Project work is done primarily outside class hours and the students are provided with tutorial support based on weekly availability hours in a fixed schedule, and also through contacts by email.

The evaluation is achieved by performing a theoretical and practical test and includes the classification of the 2 practical project work done by students.

The test is performed on the exam dates and has a relative weight of 2/3 of the final grade, with a minimum of 10 marks (out of 20). Project work is classified and discussed with students, and weights 1/3 to the final grade, with a minimum of 10 marks.

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

(max. 3000 characters)

The knowledge required for students to acquire the ability to conceive, design and scale the types of infrastructure comprised in the course programme are taught during classes, in which the teacher analyzes and presents the most relevant technical and economic constraints related to the design, sizing and operation of the works involved, including regulatory rules.

The exercises performed in class and the discussion of the results obtained allow students to become familiar with the dimensional aspects of the works, in order to be able later to evaluate critically the solutions they find in their work.

The project work (in teams 2-4 students), provides an opportunity for students to apply their knowledge and

to develop their creativity and their capacity for analysis and decision-making around the possible alternative solutions. During the preparation of this work students are encouraged to do research on actual cases of works of the same type and to take into account issues related to quality of materials, cost, works longevity, safety, ease of operation and most appropriate construction techniques.

The final discussion of the work with the teacher allows students to describe and to justify the adopted solutions and it allows the teacher to highlight the main positive and negative aspects of the work done by the students.

Main Bibliography

(max. 1000 characters)

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