

<i>Course</i>	<b>Master in Civil Construction</b>			<i>Academic year</i>	2021/2022		
<i>Subject</i>	<b>Computer-Aided in Urban Hydraulics</b>			ECTS	6,0		
<i>Type of course</i>	<b>Compulsory</b>						
<i>Year</i>	<b>2nd</b>	<i>Semester</i>	<b>1<sup>st</sup> sem</b>	<i>Student Workload:</i>			
<i>Professor</i>	<b>Expert Helena Maria Martins Simão</b>			<i>Total</i>	168	<i>Contact</i>	52,5
<i>Area Coordinator</i>	<b>PhD José Carlos Costa de Almeida</b>						

**Planned**

## 7. LEARNING OBJECTIVES

With this course is intended to convey the concepts and practices appropriate to the project, planning, operation and management of urban water supply and drainage and stormwater systems, familiarization with modern tools of CAD/CAM.

### 1. PROGRAMME

- 1 - Review of concepts.
- 2 - Hydraulic Transients: quasi-permanent flows and flow variables. simplified model. Method of characteristics. Protective devices hydraulic shock.
- 3 - Sustainability in Urban Hydraulics infrastructure.
- 4 - Urban water supply systems (dynamic modelling).
- 5 - Urban drainage systems (modelling and flow analysis).
- 6 – Sustainable urban drainage systems (SUDS).

### 2. COHERENCE BETWEEN PROGRAMME AND OBJECTIVES

The defined curriculum allows students to develop instrumental skills (analysis, synthesis, organization, planning and decision computer knowledge on the scope of the study, use of internet as a communication tool and as a source of information), personal skills (work teamwork and interpersonal relations, critical thinking, ethical commitment) and systemic (autonomous learning, creativity, entrepreneurial spirit and initiative, practical application of theoretical knowledge).

### 3. MAIN BIBLIOGRAPHY

[1] MOPTC - *Regulamento Geral dos Sistemas Públicos e Prediais de Distribuição de Água e de Drenagem de Águas Residuais*, Decreto Regulamentar nº 23/95 de 23 de Agosto.

[2] Sá Marques, J. A. A.; Sousa, J. J. O. (2009, 2ª ed) – *Hidráulica Urbana: Sistemas de Abastecimento de Água e de Drenagem de Águas Residuais*. Edição da Imprensa da Universidade de Coimbra, Coimbra.

[3] BMT WBM Pty Ltd. (2009) - *Evaluating Options for Water Sensitive Urban Design—A National Guide*; Joint Steering Committee for Water Sensitive Cities: Brisbane, Australia.

[4] Willems, P.; Olsson, J.; Arnbjerg-Nielsen, K.; Beecham, S.; Pathirana, A.; Gregersen, I.B.; Madsen, H.; Nguyen, V.-T.-V. (2012) - *Impacts of Climate Change on Rainfall Extremes and Urban Drainage*; IWA Publishing: London, UK

### 5. TEACHING METHODOLOGIES (INCLUDING EVALUATION)

The objectives of this course are to provide students with knowledge on design and modeling techniques for water supply and sewer and water drainage (Urban Water Cycle) as well as a legislative background, namely Portuguese legislation.

It is intended that students will be able of an evaluation, analyze and technical economical discussion.

It is intended that, in relation to the topics, students develop skills of independent learning and critical thinking, and analysis and synthesis, focusing on the practical application of theoretical knowledge to enable the resolution of problems.

Thus, the weight of the evaluation will be, for the project, 60% and 40% for a written assessment test.

For approval at the course the student must obtain a minimum of 10 points (scale 0-20 points).

In any of the assessment components the student must obtain a minimum of 25%.

Ratings above 16 (scale 0-20) must be defended in an oral examination.

## **6. COHERENCE BETWEEN TEACHING METHODOLOGIES AND OBJECTIVES**

To achieve the objectives, the proposed methodology in the course is based on principles of theoretical- practice training.

The methods and teaching techniques, using affirmative method with technical exhibition and demonstration and with group interaction, with the teacher's responsibility for reinforce learning and coordination, seeking to contribute to the development of personal training and skills acquisition techniques taught in fluid mechanics domains.

## **7. ATTENDANCE**

## **8. CONTACTS AND OFFICE HOURS**

## **9. OTHERS**

Date:

Professor,

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Area Coordinator,

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