

POLI ESCOLA SUPERIOR TECNOLOGIA GESTÃO TÉCNICO GUARDA	SUBJECT DESCRIPTION	MODELO PED.013.03
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Course	Master in Construções Cívicas					
Subject	Prestressed concrete					
Academic year	2023/2024	Curricular year	1st	Study period	1st semester	
Type of subject	Compulsory	Student workload (H)	Total: 140	Contact: 52.5	ECTS	5.0
Professor(s)	PhD José Carlos Costa de Almeida					
<input checked="" type="checkbox"/> Area/Group Coordinator <input type="checkbox"/> Head of Department	(select) PhD José Carlos Costa de Almeida					

PLANNED SUBJECT DESCRIPTION

1. LEARNING OBJECTIVES

Deepen the knowledge in the field of reinforced concrete, completing the training received in the 1st cycle, especially in the field of prestressed concrete.

Analysis of specific needs of the application of prestressing. Develop the capacity at the level of understanding the behaviour of reinforced concrete and prestressed structures to obviate the difficulty with new work situations.

Knowledge acquisition to increase capacity in the evaluation and decision making regarding the behaviour of structures.

2. PROGRAMME

1. General concepts;
2. Material properties;
3. Section analysis;
4. Design of prestressed elements;
5. Design of isostatic beams;
6. Prestress losses;
 - a. Immediate losses;
 - b. Time dependent losses in prestress;
7. Ultimate limit state verifications;
8. Verification and design of the anchorage zones;
9. Prestress in statically indeterminate structures;
10. Design with strut and tie models.

3. COHERENCE BETWEEN PROGRAMME AND OBJECTIVES

The established syllabus allows students to develop skills in the understanding the behaviour of reinforced and prestressed concrete regarding the new European standards. The various chapters presented allow students to have the bases for design of prestressed concrete structures as well to understand the behavior of structures in the discontinuity regions, enabling the realization and understanding of projects of prestressed structures.

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4. MAIN BIBLIOGRAPHY

NP EN 1990 "Eurocódigo: Bases para o projeto de estruturas" Instituto Português da Qualidade, 2009.

NP EN 1991-1-1 "Eurocódigo 1: Ações em estruturas – Parte 1-1: Ações gerais (Pesos volúmicos, pesos próprios, sobrecargas em edifícios" Instituto Português da Qualidade, 2009.

NP EN 1992-1-1 "Eurocódigo 2: Projecto de estruturas de betão" Instituto Português da Qualidade, 2010.

Collins M.P. e Mitchell D. "Prestressed concrete structures" Prentice Hall, Englewood Cliffs, New Jersey, Estados Unidos da América, 1991, 766 p.

Leonhardt F. "Construções de concreto (Vol. 5) – concreto protendido" Interciência, Brasil, 1983, 316 p.

Nilson, Arthur H. "Design of prestressed concrete" John Wiley & Sons, New York, Estados Unidos da América, 1987, 608 p.

Walther R. e Miehlabradt M. "Dimensionnement des structures en béton: bases et technologie" Traité de Génie Civil Vol (7), Presses Polytechniques et Universitaires Romandes, Lausanne, Suíça, 1990, 404 p.

5. TEACHING METHODOLOGIES (INCLUDING EVALUATION)

The teaching methodology will allow the student to be the centre of learning. It will be taught all the concepts and techniques in a theoretical way, supported by case studies, which will acquire the knowledge necessary for their practical application. It will be offered practical work for students to apply and develop the taught techniques. The proposed work will be debated in the classes. The student's learning will be complemented with the support of school guidance and tutorial visit the works.

The evaluation of UC will be continuous through the practical work throughout the semester. This evaluation will be completed by the end of the semester with a written exam that covers the theoretical and practical aspects of the taught issues. The final grade results from the weighted sum of partial assessments. The weight of the assessment in relation to work is 40% and the remaining 60% related to assessment by written examination.

6. COHERENCE BETWEEN TEACHING METHODOLOGIES AND OBJECTIVES

The teaching methodology adopted for the curricular unit, has a special focus on the concept of learning by doing. This methodology allows the student to practice the exercises and the preparation of a project, applying, step by step, all the concepts for the various involved phases of prestressed structures.

7. ATTENDANCE

N/A

8. CONTACTS AND OFFICE HOURS

Contacts: jcalmeida@ipg.pt; Office 75

Office hours: Tuesday: 11:30-13:00; 14:15-15:30; Thursday: 11:30-13:00;

9. OTHERS

N/A

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DATE

21 de outubro de 2022

SIGNATURES

Professor(s), Area/Group Coordinator or Head of Department signatures

Professor

(signature)

Area/Group Coordinator

(signature)