

POLI ESCOLA SUPERIOR TECNOLOGIA GESTÃO TÉCNICO GUARDA	SUBJECT DESCRIPTION	MODELO PED.013.03
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Course	Equipment Design					
Subject	Fluids and Heat Applications					
Academic year	2023-24	Curricular year	3rd	Study period	1st semester	
Type of subject	Compulsory	Student workload (H)	Total: 112	Contact: 45	ECTS	4
Professor(s)	Mestre Pedro Alexandre Nogueira Cardão					
<input checked="" type="checkbox"/> Area/Group Coordinator <input type="checkbox"/> Head of Department	(select)	Professor Doutor Rui António Pitarma S. Cunha Ferreira				

PLANNED SUBJECT DESCRIPTION

1. LEARNING OBJECTIVES

The curricular unit aims to provide students with the basic knowledge of fluid mechanics and heat transfer needed to identify and understand the various engineering problems with practical relevance. Intends to prepare, educate and sensitize students to the various factors that influence physical phenomena, their identification, analysis and synthesis for the formulation of explanatory hypotheses of results. As a complementary objective, students should be able to integrate the design in the design process, research and product development in order to maximize its visual component without compromising the technical performance.

2. PROGRAMME

1. Introduction: General and historical notes; Dimensions and Units; Relevant parameters in thermal engineering; Experimental techniques and measuring. 2. Basics of fluid mechanics: Introduction; Principles of static fluid; Principles of fluid dynamics; Notes of aerodynamics; Design vs Fluid Mechanics; Examples and problems; Work(s). 3. Basics of heat transfer: Introduction; Principles of Heat Transfer; Color and light, color temperature, thermal radiation; Design vs heat transfer; Examples and problems; Work(s). 4. Engineering problems: Design vs thermal and fluids; Renewable energy and environment; Case Studies.

3. COHERENCE BETWEEN PROGRAMME AND OBJECTIVES

Chapters 1, 2 and 3 are intended to achieve the main objective of the curricular unit, ie, provide students with the basic knowledge of fluid mechanics and heat transfer needed to identify and understand the various engineering problems with practice relevance. The last chapter attempts to achieve the complement objective, particularly to integrate the knowledge acquired in the optimization of the design process, research and product development in its aesthetic and technical aspects.

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4. MAIN BIBLIOGRAPHY

- Teacher notes; Professor Pedro Cardão, 2023;
- Teacher notes; C. A. Figueiredo Ramos; IPG, 2022;
- Mecânica dos Fluídos; Luis Adriano Oliveira e António Gameiro Lopes; Ed.Lidel. (ISBN:978-972-9480-13-4).
- Fundamentos de Transferência de Calor e e Massa; Frank P. Incropera e David P. DeWitt; Ed. LTC. (ISBN:85-216-1146-3-199).
- Introduction to Thermal and Fluid Engineering; Deborah Kaminski and Michael Jensen; Ed. Wiley (ISBN:0-471-45236-X).

5. TEACHING METHODOLOGIES (INCLUDING EVALUATION)

Expositive lessons using audio-visual media, case studies, problem-solving, practical work and lab demonstrations. In the classes are combined theoretical, practical and laboratory dimensions, encouraging the participation, debate and individual/group discussion. Many educational media are used: schemas in table, multimedia presentations, videos and lab activities. In tutorial orientation sessions will be analysed and clarified the students' questions and suggested studying methods. Continuous assessment regime: attendance, laboratory works and final test.

Final Grade = 10% Attendance + 25% works + 65% Test

(Minimum test score: 7 e 20)

The student whose final classification is equal to or greater than 10 points is approved.

6. COHERENCE BETWEEN TEACHING METHODOLOGIES AND OBJECTIVES

The main objective is globally achieved with the following methodologies: expositive and interactive lessons; laboratory sessions. The complementary objective is achieved through laboratory sessions, problem-solving and case studies encouraging the individual/group discussion and the debate.

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7. ATTENDANCE

Lectures attendance is not compulsory.

8. CONTACTS AND OFFICE HOURS

E-mail: pcardao@ipg.pt;

Cabinet No: 15

Service hours: **Wednesday: 14:00 - 16H00**

DATE

18 de Setembro de 2023

SIGNATURES

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

Professor

(signature)

Area/Group Coordinator

(signature)