

Course	Mechanical and Industrial Informatics			Academic year	2021/2022		
Subject	Fluids and Heat Transfer			ECTS	6		
Type of course	Compulsory						
Year	1st	Semester	2nd	Student Workload:			
Professor(s)	Rui Pitarma Ferreira			Total	162	Contact	60
Area Coordinator	Rui Pitarma Ferreira						

Planned SD

1. LEARNING OBJECTIVES

Acquire the basic and fundamental knowledge of Fluid Mechanics and Heat Transfer. Analyze and solve problems involving fluid flows, transformations and mass and energy transfer through a suitable compromise between theory and practice. Become aware of the importance of the fluid and heat transfer phenomena in the industry and the importance of operating the equipment, systems and processes efficiently, ensuring efficient use of energy and natural resources keeping in mind the energy and environmental problems. Acquire the basis to become prepared for learning subsequent subjects.

2. PROGRAMME

1. Introduction and properties of fluids; 2. Basics of fluid statics; 3. Basics of fluid flow; 4. Practical applications of basic equations of static and fluid dynamics 5. Similitude and dimensional analysis; Notes of CFD applications; 7. Basics of turbomachinery; 8. Principles of heat transfer (conduction and convection); 9. Principles of thermal radiation. 10. Practical applications of heat transfer.

3. COHERENCE BETWEEN PROGRAMME AND OBJECTIVES

Chapters 1, 2, 3, 4, 8, and 9 are intended to achieve the main objective of the subject, i.e., provide students with the basic knowledge of fluid mechanics and heat transfer. Chapters 5, 6, 7 and 10 intend to achieve the complementary objective of studying practical applications of the fundamental laws of fluid mechanics and heat transfer, as well as integrating the knowledge acquired to identify, understand and solve a number of engineering problems with practical relevance.

4. MAIN BIBLIOGRAPHY

- White, Frank M., Mecânica dos Fluidos, McGraw-Hill, 2002. ISBN: 858680424X

- Oliveira, Luís Adriano e Gameiro, António Lopes, Mecânica dos Fluidos, ETEP - Edições Técnicas e Profissionais, 2006. ISBN: 978-972-9480-13-4 (Distribuído por Lidel - Edições Técnicas, Lda)
- Kaminski, Deborah A. and Jensen, Michael K., Introduction to Thermal and Fluid Engineering, Wiley, 2005. ISBN:0- 471-45236-X
- Incropera, Frank P. and DeWitt, David P., Fundamentos de Transferência de Calor e e Massa; Editora LTC, 1998. ISBN:85-216-1146-3 199
- Pitarma, R.A., Mecânica de Fluidos (notas didáticas da unidade curricular). IPG.

5. TEACHING METHODOLOGIES (INCLUDING EVALUATION)

Lectures using audiovisual media, case studies, problem-solving, laboratory assignments and demonstrations. In the classes theoretical, practical and laboratory dimensions are combined, encouraging participation, debate and individual/group reflection. Many educational media are used: schemas in table, multimedia presentations, videos and lab activities. In tutorial orientation sessions the students' questions and suggested studying methods will be analyzed and clarified.

Ongoing evaluation: 10% Attendance + 20% Practical works + 70% Final Test (minimum grade required on final test = 7 out of 20).

6. COHERENCE BETWEEN TEACHING METHODOLOGIES AND OBJECTIVES

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

7. ATTENDANCE

Attendance is strongly recommended but there is no mandatory minimum to be observed by students.

8. OTHERS

Doubts and questions should be clarified in tutorial hours or service hours.

9. CONTACTS AND OFFICE HOURS

Professor and Area Coordinator: Rui Pitarma Ferreira (Ph.D); rpitarma@ipg.pt; office n.º 14

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