

## SUBJECT TEACHING GUIDE

### G1501 - Heat Transfer and Two-Phase Flow

### BILINGUAL UC-CU CIVIL ENGINEERING PROGRAM

Academic year 2023-2024

1. IDENTIFYING DATA				
Degree	BILINGUAL UC-CU CIVIL ENGINEERING PROGRAM		Type and Year	Compulsory. Year 1
Faculty	School of civil Engineering			
Discipline	Obligatory Subjects			
Course unit title and code	G1501 - Heat Transfer and Two-Phase Flow			
Number of ECTS credits allocated	6	Term	Semester based (2)	
Web				
Language of instruction	English	Mode of delivery	Face-to-face	

Department	DPTO. INGENIERIA ELECTRICA Y ENERGETICA			
Name of lecturer	PABLO BERNARDO CASTRO ALONSO			
E-mail	pablo.castro@unican.es			
Office	E.P. de Ingeniería de Minas y Energía. Planta: + 0. DESPACHO SUBDIRECCION 059 (059)			
Other lecturers	JUAN CARCEDO HAYA			

### 3.1 LEARNING OUTCOMES

- Knowledge of the heat transfer processes: conduction, convection and radiation.
- Ability to solve heat exchangers and extended surfaces problems.
- Obtain the necessary skills to carry out engineering design involving heat transfer.

#### 4. OBJECTIVES

- To obtain a deep view of the heat transfer processes , in steady and unsteady conditions and in one and more dimensions.
- To learn about the theory and different practical approaches of the sources of heat transfer : conduction, convection and radiation.
- To design facilities to exchange heat , as extended surfaces and heat exchangers.

#### 6. SUBJECT PROGRAM

CONTENTS	
1	PART I: CONDUCTION HEAT TRANSFER I.1. Steady Heat Conduction. I.2. Heat Transfer with Extended Surfaces (Fins). I.3. Transient Heat Conduction.
2	PART II: CONVECTION HEAT TRANSFER II.1. Forced and Natural Convection. Internal and external flows. II.2. Heat Exchangers.
3	PART III: RADIATION HEAT TRANSFER III.1. Introduction to Radiation. III.2. Radiation Between Surfaces.
4	PART IV: NUMERICAL HEAT TRANSFER IV.1. Numerical Methods in Heat Conduction. IV.2. Numerical Heat Transfer Software.

#### 7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Mid-term exam 1	Written exam	No	Yes	40,00
Mid-term exam 2	Written exam	Yes	Yes	40,00
Classwork	Work	No	Yes	20,00
TOTAL				100,00
Observations				
To pass the subject through continuous assessment is necessary to achieve simultaneously : -To attend to 80% of the class activities. -To obtain more than 30% of the maximum score in the mid-term exams. -To obtain a final average score of 50% or more of the maximum score.				
Observations for part-time students				
Part-time students must take an exam of all the contents of the subject in the ordinary or extraordinary call.				

**8. BIBLIOGRAPHY AND TEACHING MATERIALS**

## BASIC

Heat Transfer: a Practical Approach

Yunus A. Cengel

ISBN: 978-0072458930

Publisher: Higher Education; 2nd Ed

896 pages

Introduction to Heat Transfer

Frank P. Incropera, David P. DeWitt, Theodore L. Bergman, Adrienne S. Lavine

ISBN: 978-0471457275

Publisher: John Wiley & Sons; 5th Edition edition

912 Pages

Published 2006