

## SUBJECT TEACHING GUIDE

### 1128 - Fluid mechanics and heat transmission

Master's Degree in mining engineering

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Academic year 2024-2025

1. IDENTIFYING DATA					
Degree	Master's Degree in mining engineering Master's Degree in mining engineering			Type and Year	Compulsory. Year 1 Compulsory. Year 1
Faculty	School of Mines and Energy Engineering				
Discipline	SCIENTIFIC EXPANSION				
Course unit title and code	1128 - Fluid mechanics and heat transmission				
Number of ECTS credits allocated	4,5	Term	Semester based (1)		
Knowledge Field					
Web					
Language of instruction	Spanish	English Friendly	Yes	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	JOSE SALMON GARCIA				

4. OBJECTIVES
Understanding the physical principles and mathematical tools for the study of fluid mechanics and heat transfer
Solve specific problems of fluid mechanics.
Formulate and solve complex problems of heat transfer by conduction, convection and radiation.

6. SUBJECT PROGRAM	
CONTENTS	
1	PART I: CONDUCTION HEAT TRANSFER I.1. steady state conduction. I.2. extended surfaces.
2	PART II: CONVECTION HEAT TRANSFER II.1. Introduction to convection. Natural and forced convection II.2. Heat exchangers
3	PART III: RADIATION HEAT TRANSFER III.1. Radiation: processes and properties. III.2. Radiation exchange between surfaces.
4	PART IV: NUMERICAL HEAT TRANSFER IV.1. Numerical Methods in Heat Conduction. IV.2. Numerical Heat Transfer Software.
5	PART V: DIMENSIONAL ANALYSIS AND SIMILARITY V.1. Buckingham pi theorem. V.2. Common dimensionless parameters.
6	PART VI: BOUNDARY LAYER VI.1. Introduction. VI.2. laminar and turbulent boundary layer on flat plate. VI.3. Thickness and boundary layer flow.

7. ASSESSMENT METHODS AND CRITERIA				
Description	Type	Final Eval.	Reassessn	%
practical and theoretical exercises	Others	No	Yes	15,00
Final exam	Written exam	Yes	Yes	35,00
Mid-term exam	Written exam	Yes	Yes	35,00
Excercises	Others	No	Yes	15,00
TOTAL				100,00
Observations				
In case of not reaching the minimum score assigned to the exams, the final mark will be the lower value between 4,9 and the average score.				
Observations for part-time students				
Part-time students will take a final exam over 100% of the total score.				

8. BIBLIOGRAPHY AND TEACHING MATERIALS
BASIC
Mecánica de fluidos aplicada; R. MOTT; ED. PRENTICE HALL
Fundamentos de Transferencia de Calor y de Masa; F. INCROPERA, D. DEWITT; ED. PEARSON EDUCACION

