



Teaching Guide

Teaching Guide				
Identifying Data				2017/18
Subject (*)	Thermal engineering		Code	730497005
Study programme	Mestrado Universitario en Enxeñaría Industrial (plan 2012)			
Descriptors				
Cycle	Period	Year	Type	Credits
Official Master's Degree	1st four-month period	First	Obligatoria	4.5
Language	Spanish			
Teaching method	Face-to-face			
Prerequisites				
Department	Ciencias da Navegación e Enxeñaría MariñaEnxeñaría Naval e Industrial			
Coordinador	Arce Ceinos, Alberto		E-mail	alberto.arce@udc.es
Lecturers	Arce Ceinos, Alberto Fernandez Feal, Maria Luisa		E-mail	alberto.arce@udc.es luisa.fféal@udc.es
Web				
General description				

Study programme competences

Code	Study programme competences
A5	Coñecementos e capacidades para o deseño e a análise de máquinas e motores térmicos, máquinas hidráulicas e instalacións de calor e frío industrial.
B2	Que os estudantes saiban aplicar os coñecementos adquiridos e a súa capacidade de resolución de problemas en ámbitos novos ou pouco coñecidos dentro de contextos máis amplos (ou multidisciplinares) relacionados coa súa área de estudo.
B3	Que os estudantes sexan capaces de integrar coñecementos e enfrontarse á complexidade de formular xuízos a partir dunha información que, sendo incompleta ou limitada, inclúa reflexións sobre as responsabilidades sociais e éticas vinculadas á aplicación dos seus coñecementos e xuízos.
B5	Que os estudantes posúan as habilidades de aprendizaxe que lles permitan continuar estudando dun modo que terá que ser en boa medida autodirixido ou autónomo.
B7	Falar ben en público.

Learning outcomes

Learning outcomes	Study programme competences		
Exergy	AJ5	BJ2 BJ3 BJ5 BJ7	
Psicrometry	AJ5	BJ2 BJ3 BJ5 BJ7	
Refrigeration systems	AJ5	BJ2 BJ3 BJ5 BJ7	
Optimization and simulation	AJ5	BJ2 BJ3 BJ5 BJ7	



Contents	
Topic	Sub-topic
0 Os temas seguintes desenrolan os contidos establecidos nas fichas da Memoria de Verificación que son:	(i) Revisión de termodinámica y transferencia de calor. (ii) Introducción al análisis energético de sistemas térmicos. (iii) Intercambiadores de calor: diseño y simulación. (iv) Fundamentos de psicrometría y aplicaciones: industriales (secado), confort térmico y climatización. (v) Sistemas frigoríficos. (vi) Ciclos motores a vapor y de aire. (vii) Introducción a las técnicas de optimización y simulación de sistemas térmicos.
1 Thermodynamic and heat transfer revision	Termodinámica Transferencia de calor
2 Introduction to the exergy analysis of thermal systems	Balance de exergía Sistemas abiertos
3 Heat exchangers	3.1 Design 3.2 Simulation
4 Fundamentals of psicrometry and applications	4.1 Drying 4.2 Comfort and air conditioning
5 Refrigeration systems	Refrigerantes Ciclo de compresión de calor Coeficiente de rendemento Bomba de calor
6 Air and vapor motor cycles	Ciclo Rankine Ciclo Brayton
7 Introduction to optimization techniques and simulation of thermal systems	Optimización Simulación

Planning				
Methodologies / tests	Competencies	Ordinary class hours	Student's personal work hours	Total hours
Guest lecture / keynote speech	A5 B2 B3 B5 B7	12	15.5	27.5
Problem solving	A5 B2 B3 B5 B7	28	56	84
Personalized attention		1	0	1
(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.				

Methodologies	
Methodologies	Description
Guest lecture / keynote speech	Oral presentation audiovisually aided and the introduction of questions with the aim of transmitting knowledge and assisting the learning.
Problem solving	Oral presentation audiovisually aided and the introduction of questions with the aim of transmitting knowledge and assisting the learning.

Personalized attention	
Methodologies	Description
Guest lecture / keynote speech Problem solving	Tutoring and email assistance

Assessment			
Methodologies	Competencies	Description	Qualification
Guest lecture / keynote speech	A5 B2 B3 B5 B7	Exam	20



Problem solving	A5 B2 B3 B5 B7	Exam	80
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Assessment comments

Exam:
100% of the qualification
210 min
Consists on solving 3 or 4 problems similar to those proposed in each chapter. The use of textbook and solved exercises could be allowed during the exam.

Sources of information

Basic	- Incropera, F. P. y DeWitt, D. P. (). Fundamentos de transferencia de calor. - Moran y Shapiro (). Fundamentos de termodinámica técnica. - Stoecker y Jones (). Refrigeration and air conditioning. - Eastop & Maconky (). Applied thermodynamics for Engineering and Technologists.
Complementary	

Recommendations

Subjects that it is recommended to have taken before

Subjects that are recommended to be taken simultaneously

Energy technology/730497006

Subjects that continue the syllabus

Master Thesis/730497015

Other comments

(*)The teaching guide is the document in which the URV publishes the information about all its courses. It is a public document and cannot be modified. Only in exceptional cases can it be revised by the competent agent or duly revised so that it is in line with current legislation.