UNIVERSIDADE DA CORUÑA

Teaching Guide				
Identifying Data				2022/23
Subject (*)	Wind, Hydraulic and Marine Systems		Code	730547005d
Study programme	Máster Universitario en Eficiencia Enerxética e Sustentabilidade (a distancia)			
Descriptors				
Cycle	Period	Year	Type	Credits
Official Master's Degree	1st four-month period	First	Obligatory	4.5
Language	SpanishGalician			
Teaching method	Face-to-face			
Prerequisites				
Department	Enxeñaría Industrial			
Coordinador	Rodríguez Charlón, Santiago Ángel	E-mail	santiago.rodriguez.charlon@udc.es	
Lecturers	Rodríguez Charlón, Santiago Ángel	E-mail	santiago.rodriguez.charlon@udc.es	
Web				
General description	Fundamentos de conversión de enerxía eólica, hidráulica e mariña. Estrutura, elementos e características dos xeradores eólicos, hidráulicos e mariños. Métodos de cálculo da enerxía xerada. Metodoloxía para o deseño de parques eólicos, hidráulicos e mariños, así como a análise de impactos. Avaliación de sistemas: aspectos tecnolóxicos, económicos e legais.			

Study programme competences / results	
Code	Study programme competences / results
A7	CE7 - Have knowledge of the fundamentals, potential, technology, applications and regulations of renewable energy sources
A8	CE8 - Analyze and include renewable energies in different facilities
A13	CE13 - Analyze, apply and optimize energy use systems
A14	CE14 - Design and analyze wind systems
B2	CB7 - That students know how to apply the knowledge acquired and their ability to solve problems in new or little-known environments within broader (or multidisciplinary) contexts related to their area of study
B5	CB10 - That students have the learning skills that allow them to continue studying in a way that will be largely self-directed or autonomous
B9	CG4 - Extract, interpret and process information, from different sources, for use in the study and analysis
B11	CG6 - Acquire new knowledge and skills related to the professional field of the master's degree
B16	CG11 - Evaluate the application of emerging technologies in the field of energy and the environment
C2	CT2 - Master the oral and written expression and comprehension of a foreign language
C3	CT3 - Use the basic tools of information and communication technologies (ICT) necessary for the exercise of their profession and for learning throughout their lives
C5	CT5 - Understand the importance of entrepreneurial culture and know the means available to entrepreneurs
C6	CT6 - Gain life skills and healthy habits, routines, and lifestyles
C7	CT7 - Develop the ability to work in interdisciplinary or transdisciplinary teams, to offer proposals that contribute to sustainable environmental, economic, political and social development
C8	CT8 - Value the importance of research, innovation and technological development in the socioeconomic and cultural progress of society

Learning outcomes			
Learning outcomes	Study programme competences / results		
Allow access to knowledge of the influence that the different processes and systems used have on the Environment, as well as the mechanisms to limit said influence	AC7	BC2 BC5 BC9 BC11 BC16	

Know the different techniques and technological processes for the transformation of wind, hydraulic and marine energy into electrical energy	AC8 AC13	BC9 BC11	CC2 CC6
Train the student in the techniques for the study and development of wind, hydraulic and marine energy projects that can be used in the professional field		BC11	CC3 CC5 CC7 CC8
Provide the student with the knowledge and skills necessary to be able to carry out specific tasks in the field of wind, hydraulic and marine energy within the scope of companies in the sector	AC7 AC8	BC2 BC11	CC6 CC8
Know the fundamentals that govern the behavior of the wind from a physical point of view, and familiarize the student with the conversion process of wind, hydraulic and marine energy	AC7 AC8 AC13 AC14	BC2 BC5	CC7
Know the elements and devices of a wind, hydraulic and marine generation system, as well as its characteristics and operating principles	AC7 AC8 AC13 AC14	BC2 BC5	CC7
Learn to determine the response of a wind system, especially from the point of view of energy generation, as well as determine the factors that influence said response and its impact on the conversion into electrical energy	AC7 AC8 AC13 AC14	BC2 BC5 BC11	CC5 CC8

Contents	
Topic	**Sub-topic**
WIND SYSTEMS	-Current Situation of the Wind Sector -Environmental impact of a wind farm -Wind Resource Analysis -Wind turbines: typologies and their components -Design of Wind Farms -Assembly of Wind Farm -Offshore Wind Energy
HYDRAULIC SYSTEMS	-Types of mini hydroelectric plants -Design of a hydroelectric exploitation -Civil works installations -Electromechanical equipment -Economic, administrative and environmental factors
MARINE SYSTEMS	Technologies: -Wave Energy -Tidal Energy -Saline gradient -Maremothermal

Planning				
Methodologies / tests	**Competencies / Results**	**Teaching hours (in-person & virtual)**	**Student?s personal work hours**	**Total hours**
Problem solving	A7 A8 A13 A14 B2 B5 C7	6	20	26
Supervised projects	A7 A8 B2 B5 B9 B11 B16 C2 C3 C5 C8	0	35	35
Seminar	A7 B5 B16 C5 C6 C7	2	2	4
Objective test	A7 A13 B2	4	5	9

Guest lecture / keynote speech	A7 A8 A13 A14 B2 B5 B9 B11 B16 C2 C3 C5 C6 C7 C8	23	23	46
Personalized attention		5	0	5
(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.				

Methodologies	
Methodologies	Description
Problem solving	Assumptions or problems related to the subject will be proposed
Supervised projects	The realization of one or several projects of wind, hydraulic or marine energy installations will be proposed, for which a report and an exhibition will have to be presented.
Seminar	They will consist of conferences given by professionals from the sector
Objective test	Al final del cuatrimestre, en las fechas determinadas por el calendario del Máster, se realizará una prueba objetiva en la que se evalúen los conocimientos adquiridos en la materia, tanto de las clases como de los seminarios
Guest lecture / keynote speech	The contents of the syllabus will be reviewed during classes to expose the main concepts that allow the student to carry out problems and related works.

Personalized attention	
Methodologies	Description
Supervised projects	O profesor estará dispoñible en horario de tutorías para atender as dúbidas ou realizar as aclaracións que poidan xurdir ao longo do curso tanto en forma presencial, teams ou a través do seu correo electrónico.

Assessment			
Methodologies	Competencies / Results	Description	Qualification
Problem solving	A7 A8 A13 A14 B2 B5 C7	During the course, problems will be proposed that the students have to solve during the timetable of one of the classes to be evaluated.	20
Supervised projects	A7 A8 B2 B5 B9 B11 B16 C2 C3 C5 C8	The students will propose the scope of their work, totally related to the subject matter, and must be approved by the teacher in order to begin its execution.	30
Objective test	A7 A13 B2	On the official dates set by the Master's calendar, an objective test was carried out	50

Assessment comments
In the 2nd evaluation opportunity, it will consist of the objective test (50%), maintaining the same grade obtained during the problem solving course (20%) and in the tutored works (30%)

Sources of information	
Basic	
Complementary	

Recommendations
Subjects that it is recommended to have taken before
Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
Other comments

<p>Para ayudar a conseguir un entorno inmediato sostenible y cumplir con el objetivo de la acción número 5: ?Docencia e investigación saludable y sostenible ambiental y social? del "Plan de Acción Green Campus Ferrol":</p><div>
</div><div>La entrega de los trabajos documentales que se realicen en esta materia se solicitarán en formato virtual y/o soporte informático, sin necesidad de imprimirlos.</div>