

SUBJECT TEACHING GUIDE

G612 - Further Nuclear Engineering and Nuclear Fuel Cycle

Degree in Energy Resources Engineering

Academic year 2023-2024

1. IDENTIFYING DATA					
Degree	Degree in Energy Resources Engineering			Type and Year	Optional. Year 4
Faculty	School of Mines and Energy Engineering				
Discipline	Optional Subjects for Energy Resources Module: Optional Training				
Course unit title and code	G612 - Further Nuclear Engineering and Nuclear Fuel Cycle				
Number of ECTS credits allocated	6	Term	Semester based (2)		
Web					
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. INGENIERIA ELECTRICA Y ENERGETICA				
Name of lecturer	RAMON LECUNA TOLOSA				
E-mail	ramon.lecuna@unican.es				
Office	E.P. de Ingeniería de Minas y Energía. Planta: + 1. ALMACEN (134)				
Other lecturers					

3.1 LEARNING OUTCOMES
- Knowledge of the different fields where nuclear engineering is applied.
- Knowledge about new nuclear generation technologies.
- Knowledge of international R&D lines in the field of nuclear engineering.

4. OBJECTIVES
- To provide students a advanced knowledge about a current energy source , the nuclear power.
- To train students for professional practice in a sector with demand of technicians graduated or postgraduated .

6. COURSE ORGANIZATION	
CONTENTS	
1	SECTION I. Nuclear Physics. Extension of nuclear physics.
2	SECTION II. Fuels. The nuclear fuel cycle. Pre and post-reactor phases. Transmutation of nuclear waste.
3	SECTION III. Reactors. Advanced fission reactors. Fusion reactors.
4	SECTION IV. Industrial Applications. Particle accelerators. Medical applications of radionuclides and ionizing radiation. Industrial applications of radionuclides and radiation ionizing.
5	SECTION V. Metrology and Standars. Radiation detection and measurement systems. Regulations on nuclear and radioactive facilities.

7. ASSESSMENT METHODS AND CRITERIA				
Description	Type	Final Eval.	Reassessn	%
- Complementary activities	Others	No	No	15,00
- Theoretical & practical exam 1	Written exam	No	Yes	30,00
- Theoretical & practical exam 2	Written exam	No	Yes	30,00
- Simulation practices.	Activity evaluation with Virtual Media	No	Yes	25,00
TOTAL				100,00
Observations				
- If student does not pass the minimum grades established, the overall grade will be obtained as the minimum value between 4.9 and the weighted average of the different grades.				
Observations for part-time students				
Part-time students will be assessed as follows:				
- Attendance to the simulation practices, having to satisfactorily overcome them according the same criteria established for full-time students. If the student can not attend to the simulation practices, the student has the right to be evaluated through a simulation selected by the lecturer. Percentage value of this test over the final grade: 30%.				
- Performing the examination in official date. Percentage value of test 1: 35 % and test 2: 35 %.				

8. BIBLIOGRAPHY AND TEACHING MATERIALS
BASIC
- Nuclear physics and reactor theory. DOE fundamentals hanbook. Vol. 1 y 2. U.S. Department of Energy. 2009
- Introduction to Nuclear Engineering. John R. Lamarsh, Anthony J. Baratta. Editorial: Prentice Hall, 3ª Ed. 2001