

**1. General information****Course:** NUCLEAR ENGINEERING**Type:** ELECTIVE**Degree:** 421 - UNDERGRADUATE DEGREE PROG. IN MECHANICAL ENGINEERING**Center:** 602 - E.T.S. INDUSTRIAL ENGINEERING OF C. REAL**Year:** 4**Main language:** Spanish**Use of additional languages:****Web site:** <https://campusvirtual.uclm.es/login/index.php>**Code:** 56364**ECTS credits:** 6**Academic year:** 2022-23**Group(s):** 20**Duration:** C2**Second language:** English**English Friendly:** Y**Bilingual:** N**Lecturer:** MANUEL DOMINGO BARRIGA CARRASCO - **Group(s):** 20

Building/Office	Department	Phone number	Email	Office hours
Politécnico/2-A26	MECÁNICA ADA. E ING. PROYECTOS	Vía Teams	manueld.barriga@uclm.es	The tutoring schedule will be arranged with the student by email.

2. Pre-Requisites

Recommended Physics I and Physics II. Also Chemistry and Calculus I and II, and "Extension of Mathematics".

3. Justification in the curriculum, relation to other subjects and to the profession

Nuclear engineering is a subject where the basic concepts of nuclear fission energy and promising fusion are seen. It is related to power and thermal plants as they are other power plant for electricity production. This course provides basic knowledge and skills to engineers working in nuclear power plants around the world.

4. Degree competences achieved in this course**Course competences**

Code	Description
CB01	Prove that they have acquired and understood knowledge in a subject area that derives from general secondary education and is appropriate to a level based on advanced course books, and includes updated and cutting-edge aspects of their field of knowledge.
CB02	Apply their knowledge to their job or vocation in a professional manner and show that they have the competences to construct and justify arguments and solve problems within their subject area.
CB03	Be able to gather and process relevant information (usually within their subject area) to give opinions, including reflections on relevant social, scientific or ethical issues.
CB04	Transmit information, ideas, problems and solutions for both specialist and non-specialist audiences.
CB05	Have developed the necessary learning abilities to carry on studying autonomously
CEO36	Ability to manage, analyse and design alternative power plants and sources, nuclear power plants and power installations in general.
CG03	Knowledge of basic and technological subjects to facilitate learning of new methods and theories, and provide versatility to adapt to new situations.
CG04	Ability to solve problems with initiative, decision-making, creativity, critical reasoning and to communicate and transmit knowledge, skills and abilities in the field of industrial engineering.
CG05	Knowledge required to carry out measurements, calculations, valuations, appraisals, valuations, surveys, studies, reports, work plans and other similar work.
CG06	Ability to handle specifications, regulations and mandatory standards.
CG07	Ability to analyse and assess the social and environmental impact of technical solutions.
CT02	Knowledge and application of information and communication technology.
CT03	Ability to communicate correctly in both spoken and written form.

5. Objectives or Learning Outcomes**Course learning outcomes****Description**

Understanding the basic concepts of nuclear engineering.

6. Units / Contents**Unit 1: The special theory of relativity****Unit 2: Nuclear reactions****Unit 3: Wave properties of particles****Unit 4: Interaction of particles with matter****Unit 5: Fission****Unit 6: Fusion****Unit 7: Other applications of nuclear engineering**

7. Activities, Units/Modules and Methodology							
Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	Description
Class Attendance (theory) [ON-SITE]	Lectures	CB01 CB02 CB03 CB04 CB05 CEO36 CG03 CG04 CG05 CG06 CG07 CT02 CT03	1.6	40	N	-	
Class Attendance (practical) [ON-SITE]	Combination of methods	CB01 CB02 CB03 CB04 CB05 CEO36 CG03 CG04 CG05 CG06 CG07 CT02 CT03	0.64	16	Y	N	
Study and Exam Preparation [OFF-SITE]	Self-study	CB01 CB02 CB03 CB04 CB05 CEO36 CG03 CG04 CG05 CG06 CG07 CT02 CT03	3.6	90	N	-	
Final test [ON-SITE]	Assessment tests	CB01 CB02 CB03 CB04 CB05 CEO36 CG03 CG04 CG05 CG06 CG07 CT02 CT03	0.16	4	Y	Y	
Total:			6	150			
Total credits of in-class work: 2.4				Total class time hours: 60			
Total credits of out of class work: 3.6				Total hours of out of class work: 90			

As: Assessable training activity

Com: Training activity of compulsory overcoming (It will be essential to overcome both continuous and non-continuous assessment).

8. Evaluation criteria and Grading System			
Evaluation System	Continuous assessment	Non-continuous evaluation*	Description
Assessment of problem solving and/or case studies	15.00%	15.00%	In continuous evaluation, the student must solve problems in each topic throughout the course. In non-continuous evaluation, the student must present a list of problems solved on the day of the ordinary and extraordinary calls.
Assessment of activities done in the computer labs	15.00%	15.00%	In the continuous evaluation, the student must attend seminars and visits. In the non-continuous evaluation, the student will be evaluated from the seminars and visits.
Final test	70.00%	70.00%	In the continuous and non-continuous evaluation, a final written or oral test will be carried out.
Total:	100.00%	100.00%	

According to art. 4 of the UCLM Student Evaluation Regulations, it must be provided to students who cannot regularly attend face-to-face training activities the passing of the subject, having the right (art. 12.2) to be globally graded, in 2 annual calls per subject, an ordinary and an extraordinary one (evaluating 100% of the competences).

Evaluation criteria for the final exam:

Continuous assessment:

In addition to the percentage of each evaluation system, we describe each of these parts more specifically. The final test normally consists of a series of theoretical questions to be developed and some problems to be solved. The problem solving part corresponds to solving and explaining a problem proposed by the teacher to the rest of the class. The last part of the evaluation corresponds to attendance at seminars and visits to nuclear facilities that are proposed during the course.

Non-continuous evaluation:

After the final test (70%), which consists of a series of theoretical questions to be developed and some problems to be solved, a specific test will be carried out to evaluate the resolution of problems or cases (15%) and another to evaluate the knowledge that they should have been acquired in seminars and visits (15%).

Specifications for the resit/retake exam:

The evaluation criteria are the same as in the ordinary call.

Specifications for the second resit / retake exam:

The evaluation criteria are the same as in the ordinary call.

9. Assignments, course calendar and important dates	
Not related to the syllabus/contents	
Hours	hours
Class Attendance (theory) [PRESENCIAL][Lectures]	40
Class Attendance (practical) [PRESENCIAL][Combination of methods]	16
Study and Exam Preparation [AUTÓNOMA][Self-study]	90
Final test [PRESENCIAL][Assessment tests]	4
Global activity	
Activities	hours
Class Attendance (practical) [PRESENCIAL][Combination of methods]	16
Class Attendance (theory) [PRESENCIAL][Lectures]	40
Study and Exam Preparation [AUTÓNOMA][Self-study]	90

10. Bibliography and Sources

Author(s)	Title/Link	Publishing house	City	ISBN	Year	Description
John D. McGervey	Introduction to modern physics	Academic Press	USA	9780124835504	1971	
Kenneth Krane	Física moderna	Noriega editores	México	968-18-3860-2	1991	
Kenneth S. Krane	Introductory Nuclear Physics	John Wiley & Sons	New York	0-471-80553-X	1988	
M. Alonso y E. J. Finn	Fundamentos cuánticos y estadísticos	Addison-Wesley Iberoamericana	Mexico		1986	
Ronald Gautreau	Física moderna	Serie Schawn, Ed. Mc Graw-Hill.		978-9701032022	2001	
S. Burbano de Ercilla	Problemas de física	Ed. Tebar, 27 ed. Madrid		978-8473602402	2006	
W. N. Cottingham y D. A. Greenwood	An introduction to nuclear physics, 2 edition	Cambridge U. Press	Cambridge	978-0521657334	2001	