Last update: 03-10-2018

220219 - Fundamentals of Nuclear Engineering

Coordinating unit: 205 - ESEIAAT - Terrassa School of Industrial, Aerospace and Audiovisual Engineering

Teaching unit: 748 - FIS - Department of Physics

Academic year: 2018

Degree: MASTER'S DEGREE IN SPACE AND AERONAUTICAL ENGINEERING (Syllabus 2016). (Teaching unit Optional)
MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2013). (Teaching unit Optional)
MASTER'S DEGREE IN AERONAUTICAL ENGINEERING (Syllabus 2014). (Teaching unit Optional)

ECTS credits: 3 Teaching languages: English

Teaching staff

Coordinator: Josep Sempau

Teaching methodology

The course is divided into:

1. Face-to-face activities. Lectures will be given on selected topics. Guided work on problems, cases and theoretical topics will be carried out by the students, with guidance from the teacher. Short presentations by students can occasionally be requested.

2. Autonomous work. Self-study, readings, problem solving, etc., either individually or in group.

Continuous assessment can occasionally be used by defining deliverables.

Learning objectives of the subject

Learning outcomes:

- Define radioactivity and describe the main features of radioactive processes.
- Identify and explain the effects of the passage of ionizing radiation through matter.
- Solve basic problems related to nuclear structure, radioactivity and interaction of ionizing radiation with matter.
- Identify some of the nuclear reactions of interest to nuclear engineering.
- Enumerate the main features of a nuclear reactor.

Study load

Total learning time: 75h	Hours large group:	27h	36.00%
	Self study:	48h	64.00%

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Content

Fundamentals of Nuclear Engineering	Learning time: 75h Theory classes: 13h 20m Practical classes: 7h Guided activities: 6h 40m Self study : 48h

Description:
Topics:
1. Historical background
2. Atomic and nuclear structure. Radioactivity
3. Radiation transport
4. Photon interactions with matter
5. Charged particle interactions with matter
6. Neutron interactions with matter. Fission chain reaction
7. Radiation detection
8. Nuclear reactors
9. Fuel cycle and nuclear waste management

Qualification system

The assessment of the learning process is based on the following activities, each one having a weight of 25% in the final grade:

1. A written test, with both theoretical and practical questions.

2. A set of exercises to be delivered in written form along the extent of the course.

3. Oral presentations of the work done.

4. Short quizzes posed during class sessions.

Bibliography