

Curso Académico: ( 2024 / 2025 )

Fecha de revisión: 23-04-2024

Departamento asignado a la asignatura: Departamento de Física

Coordinador/a: LEGUEY GALAN, TERESA

Tipo: Obligatoria Créditos ECTS : 6.0

Curso : 1 Cuatrimestre : 2

**REQUISITOS (ASIGNATURAS O MATERIAS CUYO CONOCIMIENTO SE PRESUPONE)**

Basic knowledge of Atomic Physics, Electrodynamics, Material Science and Solid State Physics (graduate level).

**OBJETIVOS**

The students should be able to:

- Obtain the main parameters of magnetically confined fusion plasmas.
- Evaluate power balance of fusion plasmas.
- Calibrate gamma particle detectors.
- Determine alpha particle-target material interaction cross-sections.
- Characterize materials using the stress-strain curve.
- Obtain parameters that describe the mechanical characteristics of a material.
- Correlate mechanical characteristics and microstructure.

**DESCRIPCIÓN DE CONTENIDOS: PROGRAMA**

1. PLASMA DIAGNOSTICS. Interaction of lasers, microwave and infrared radiation, light atoms and heavy ions with plasmas: Thomson scattering, Laser induced fluorescence, reflectometry, interferometry, active charge-exchange spectroscopy and heavy ion beam probe diagnostics. VIS, VUV, soft and hard X-ray spectroscopy, electron cyclotron emission, magnetic and electrostatic probes. Measurement of fusion products.

2. NUCLEAR PHYSICS. Characteristics of detectors for alpha and gamma particles: Ionisation and scintillation detectors and photomultipliers. Neutron detectors. Signal transmission and electronics for pulse signal processing: amplifiers, analogical to digital converters.

3. MECHANICAL PROPERTIES. Structural Materials in Fusion Reactors. Mechanical Testing. Elastic Deformation. Materials Failure. Dislocations and Strengthening Mechanisms.

**ACTIVIDADES FORMATIVAS, METODOLOGÍA A UTILIZAR Y RÉGIMEN DE TUTORÍAS**

Classroom lectures plus post-lecture assignments.

**SISTEMA DE EVALUACIÓN**

**Peso porcentual del Examen Final:** 70

**Peso porcentual del resto de la evaluación:** 30

Evaluation shall take into account attendance, class participation, homework assignments and the mark obtained by the student in a questionnaire at the end of the course.

