# COURSE DATA

## DATA SUBJECT

**Code:** 46820
**Name:** Laboratory Practicals
**Cycle:** Master's Degree
**ECTS Credits:** 10
**Academic year:** 2025-26

## STUDY (S)

| Degree | Center | Acad. year | Period |
|---|---|---|---|
| 2273 - Master¿s Degree in Environmental Radiation Protection | Facultat de Física | 1 | Annual |

## SUBJECT-MATTER

| Degree | Subject-matter | Character |
|---|---|---|
| 2273 - Master¿s Degree in Environmental Radiation Protection | Prácticas de laboratorio | COMPULSORY |

## COORDINATION

YAHLALI HADDOU NADIA

DIAZ MEDINA JOSE

# SUMMARY

The subject `Laboratory Practicals¿ belongs to the Practical Module that forms part of the Master's Degree in Environmental Radiation Protection. The laboratory practicals will provide students with practical training in all aspects related to environmental radioactivity, from sample collection and conservation, through sample treatment, the use of different detection techniques, to data processing and report writing.
The work to be carried out in the supervised practicals will have a duration of 100 classroom hours, of which 20 hours will be devoted to evaluations and self-evaluations.

# PREVIOUS KNOWLEDGE

## RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

## OTHER REQUIREMENTS

No requirements have been established for this subject.

## COMPETENCES / LEARNING OUTCOMES

### 2273 - Master¿s Degree in Environmental Radiation Protection

Be able to apply the appropriate scientific concepts and data processing tools in the diagnosis and solution of problems arising from environmental radioactivity.

Be able to communicate conclusions, and the knowledge and rationale underpinning these, concerning ionising radiation, its use and effects on the environment, to specialist and non-specialist audiences, clearly and unambiguously.

Be able to develop projects in the field of environmental radiation protection.

Be able to integrate knowledge of the sources of radioactivity, its interaction with matter and its effects on living organisms and to handle the complexity of formulating judgements with incomplete or limited information, but that includes reflections on the social and ethical responsibilities linked to the application of knowledge and judgements.

Demonstrate knowledge and understanding of ionising radiations that provide a basis or opportunity to be original in developing or applying ideas, often in a research context in the field of environmental radioactivity.

Have basic skills in instrumentation methods and data processing techniques for determining relevant quantities for the analysis of problems arising from environmental radioactivity.

Have the learning skills that allow students to continue to study in a manner that may be largely self-directed or autonomous.

Identify, state and comprehensively analyse the problems arising from environmental radioactivity.

Identify and apply technologies, tools and techniques in the field of environmental radiation protection.

Integrate radiological protection into the environmental and sustainable development framework.

Know how to apply knowledge and problem-solving abilities in new or unfamiliar environments within broader (or multidisciplinary) contexts related to the field of study.

## DESCRIPTION OF CONTENTS

1. Sample collection and preservation.

2. Radiochemical treatment of samples.

3.Preparation of radioactive sources for different geometries according to the radiometric technique.

4.Calibration in energy and efficiencies according to the radiometric technique.

5. Quantification of total alpha and total beta indices. Self-absorption curves.

6. Processing of alpha, beta and gamma spectra.

7. Quantification of activity concentration, uncertainty and detection limit for alpha, beta and gamma emitting radionuclides.

8. Reporting of results.

## WORKLOAD

### PRESENCIAL ACTIVITIES

| Activity | Hours |
|---|---|
| Laboratory | 100,00 |
| **Total hours** | **100,00** |

### NON PRESENCIAL ACTIVITIES

| Activity | Hours |
|---|---|
| Attendance at other activities | 0,00 |
| Individual or group project | 0,00 |
| Independent study and work | 150,00 |
| Preparation of lessons | 0,00 |
| Preparation for assessment activities | 0,00 |
| Resolution of case studies | 0,00 |
| **Total hours** | **150,00** |

## TEACHING METHODOLOGY

| | |
|---|---|
| MD2 | Practical work in specialised laboratories or computer rooms |
| MD4 | Individual or group tutorials, with teacher-student interaction |
| MD6 | Assessments and exams |

## EVALUATION

1. Practical sessions in laboratories or in computer classrooms.

Description: AF1 Practical sessions in laboratories or in computer classrooms. Purpose: The supervised practical sessions are the main activity of this subject, enabling the proposed learning outcomes to be achieved. Methodology: MD2 Practical sessions in specialised laboratories or computer classrooms and MD4 Individual or group tutorials, with teacher-student interaction.

Hours: 80

Assessment criteria: SE2 Presentation of reports and practical and problem-solving reports. Each student will be assessed individually on the suitability of the procedures applied and the accuracy of the results obtained, as well as the effectiveness of the presentation format and the clarity of the oral and/or written presentation. Learning outcomes CN1, CN3, HA1, HA2, HA3, HA4, HA5 are assessed.

2. Examination

Description: AF2 Assessment and self-assessment. Methodology: MD6 Assessments and exams. Several self-evaluations will be carried out before and after the supervised laboratory practicals. In addition, there will be a written exam, in which questions of practical application seen in the course will be asked.

Hours: 20

Evaluation criteria: SE1 Individual written tests of knowledge and resolution of exercises and practical cases, and SE3 Presentation and defence of tutored work. The basic criteria for correction will be the adequacy of the procedures applied in the resolution of the proposed problems, and the accuracy of the solution obtained. Learning outcomes CN2, CM1, CM2, and CM3 are assessed.

The final grade for this subject will be calculated by weighting the results of the following assessment activities, taking into account the observations indicated at the bottom of the table. In order for the subject to be considered passed, the final grade must be equal to or higher than 5.0 on a scale of 0 to 10.

| Assessment activities | Weight of the final grade | Recoverable (Yes/No) | Minimum mark* | Validation mark** |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| Individual written tests of knowledge and resolution of exercises and practical cases | 40% | yes | -- | -- |
| Submission of reports and practical and problem-solving reports | 40% | no | -- | -- |
| Submission and defence of tutored work | 20% | no | -- | -- |

* The minimum mark is the mark required for the assessment element to be considered in the average mark (with its corresponding weight). If it is not exceeded, it will be marked with 0 points. The student can pass the subject if the final grade is sufficient.

** The validation mark is the mark required for the assessment element to be considered in the average mark (with its corresponding weight). If it is not passed, it will be marked with 0 points. The student cannot pass the subject.

9.3. Fraud in assessment elements

In accordance with Regulatory Agreement 15418 of 26 March 2024, which approves the regulations on behaviour constituting academic fraud and behaviour contrary to the Code of Integrity in the assessment processes of the University of the Balearic Islands, the following consequences will apply: (a) in the case of academic fraud, a disciplinary procedure will be opened; (b) in the case of behaviour contrary to the Code of Integrity, the assessment element in question will be marked with `0¿, and it will lose, where appropriate, the status of recoverable.

## REFERENCES

Reference bibliography of the Master's Degree, contained in the set of subjects that comprise it.