

## 29349 - Radiation Safety

### Syllabus Information

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**Academic year:** 2023/24

**Subject:** 29349 - Radiation Safety

**Faculty / School:** 229 - Facultad de Ciencias de la Salud y del Deporte

**Degree:** 442 - Degree in Odontology

**ECTS:** 3.0

**Year:** 5

**Semester:** Second semester

**Subject type:** Optional

**Module:**

### 1. General information

- To provide students with the theoretical and practical knowledge that will enable them to manage X-ray facilities for dental diagnostic purposes according to Spanish legislation
- To know the risk involved in the use of ionizing radiation and the biological effects it can produce in living beings, especially in people undergoing diagnostic tests in the dental field.
- To know the operation of the different types of dental X-ray equipment, the regulations and legislation that regulate their use, both nationally and internationally (technical-legal-administrative requirements)
- To acquire basic knowledge of radiation protection from the point of view of the patient, the exposed worker and the public.

The subject is homologated according to IS-17 by the NSC, so that students who pass the subject, have attended more than 90 % of the theoretical classes, have completed the practices (requirements demanded by the NSC) and are in the last year of the degree may receive (when receiving their degree diploma) the diploma with the accreditation to MANAGE X-RAY FACILITIES FOR DENTAL MEDICAL DIAGNOSTIC PURPOSES.

### 2. Learning results

Passing the subject will lead to obtaining, for students in the last year of the degree, the diploma for the ACCREDITATION TO MANAGE X-RAY INSTALLATIONS FOR DENTAL MEDICAL DIAGNOSTIC PURPOSES, according to the agreement of the Nuclear Safety Council dated January 22, 2009.

The NSC requires that theory classes, practical classes and the final exam be conducted in person with a maximum of 30 students per subject. In the event that the practices and the final exam are not taken in person, the Council of Nuclear Safety will NOT allow the delivery of the diploma ACCREDITING TO MANAGE X-RAY FACILITIES FOR DENTAL MEDICAL DIAGNOSTIC PURPOSES.

The student, in order to pass this subject, must demonstrate the following results...

To know the Spanish legislation and their responsibility when managing a dental radiodiagnostic facility.

To know the radiological protection criteria applicable to a dental radiodiagnostic facility.

To know the risk posed by the use of ionizing radiation and the biological effects it can produce in living beings .

### 3. Syllabus

#### 3.1- Program

Theoretical program:

1. ATOMIC STRUCTURE AND ELECTROMAGNETIC RADIATION
2. INTERACTION OF CHARGED PARTICLES WITH MATTER (1)
3. INTERACTION OF CHARGED PARTICLES WITH MATTER (2)
4. INTERACTION OF PHOTONS WITH MATTER (1)
5. INTERACTION OF PHOTONS WITH MATTER (2)
6. PHYSICAL CHARACTERISTICS OF RADIODIAGNOSTIC EQUIPMENT.
7. THE X-RAY BEAM. RX SPECTRUM.
8. RADIOLOGICAL MAGNITUDES AND UNITS.
9. RADIATION DETECTION AND DOSIMETRY.
10. BIOLOGICAL EFFECTS OF IONIZING RADIATION.
11. PROTECTION AGAINST IONIZING RADIATION.

12. OPERATIONAL RADIATION PROTECTION.
  13. PARTICULAR ASPECTS OF RADIOLOGICAL PROTECTION IN DIFFERENT UNITS OF DENTAL RADIODIAGNOSIS.
  - 14- QUALITY ASSURANCE AND QUALITY CONTROL IN DENTAL RADIODIAGNOSTIC FACILITIES.
  - 15- DOSE ESTIMATION IN DENTAL RADIOLOGY.
  - 16- SPANISH LEGISLATION APPLICABLE TO RADIODIAGNOSTIC FACILITIES (1).
  - 17- SPANISH LEGISLATION APPLICABLE TO RADIODIAGNOSTIC FACILITIES (2).
  - 18- PREGNANCY AND MEDICAL IRRADIATION.
  - 19- RISK COMPARISON.
  - 20- INTERNATIONAL GUIDELINES, RECOMMENDATIONS AND STANDARDS (1)
  - 21- INTERNATIONAL GUIDELINES, RECOMMENDATIONS AND STANDARDS (2)
- Practical program: 4 practical sessions.

#### **4. Academic activities**

Theoretical sessions with face-to-face lessons.

Content of the practical sessions:

Handling of the different types of radiation monitors used in radiology, interpretation of the results of the measurements.

Estimation of the doses that could be received by operating personnel and members of the public, considering the weekly workload and the results of environmental radiation measurements. Checking the effectiveness of structural shielding and personal protection elements. Classification and marking of areas of the radiology facility. Verification of the variation of the dose intensity due to scattered radiation, depending on the size of the irradiated field and the operating parameters, and also with respect to the position of the operator in relation to the focus and the patient. Application of basic operating procedures that reduce doses and avoid taking the image again.

Interpretation of the results of some basic quality controls. Application of criteria to estimate the quality of radiographic images, using appropriate standards. Handling of image acquisition and recording systems.

#### **5. Assessment system**

The student must demonstrate that they have achieved the intended learning results through the following assessment activities:

Theoretical: Final exam (60 single-choice multiple-choice questions with 4 possible answers). There will be two midterm exams of 10 short questions each.

Practical: Attendance and realization of reports.

The subject is passed with 90% attendance to theoretical classes, attendance to all practical classes, with at least 45 correct answers in the final exam and with a final grade higher than 5. The final grade of the subject will be the average between the grade of the final exam and the average of the grades of the two midterm exams.

**GRADING SYSTEM:**

Grades will be established in the following range: - From 0 to 4.9: Fail (S); 5.0 to 6.9: Pass (A); 7.0 to 8.9: Notable (N); from 9.0 to 10: Outstanding (SB). The "Honours" may be awarded to students who have obtained a grade equal to or higher than 9.0.