

**COURSE DATA****Data Subject**

<b>Code</b>	36318
<b>Name</b>	Medical image breakthrough
<b>Cycle</b>	Grade
<b>ECTS Credits</b>	4.5
<b>Academic year</b>	2021 - 2022

**Study (s)**

<b>Degree</b>	<b>Center</b>	<b>Acad. year</b>	<b>Period</b>
1204 - Degree in Medicine	Faculty of Medicine and Odontology	5	First term

**Subject-matter**

<b>Degree</b>	<b>Subject-matter</b>	<b>Character</b>
1204 - Degree in Medicine	18 - Optional subjects	Optional

**Coordination**

<b>Name</b>	<b>Department</b>
DUALDE BELTRAN, DELFINA	260 - Medicine
GIL ROMERO, JOAQUIN	260 - Medicine

**SUMMARY**

This optional subject is about an effective and appropriate use of several forms of medical imaging, through its display and reading, in early diagnosis, assessment of aggressiveness and extension, guidance of the treatment and evaluation of therapeutical responses to the main illnesses. It allows students to establish the use of medical imaging and it complements information regarding other clinical subjects.

**PREVIOUS KNOWLEDGE**



### Relationship to other subjects of the same degree

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

### Other requirements

Se recomienda a los estudiantes cursar esta asignatura en el 5º curso del grado de Medicina, con las asignaturas de 3º (Radiología General) y de 4º (Radiología Clínica) aprobadas.

## OUTCOMES

### 1204 - Degree in Medicine

- Students must be able to apply their knowledge to their work or vocation in a professional manner and have acquired the competences required for the preparation and defence of arguments and for problem solving in their field of study.
- Students must have the ability to gather and interpret relevant data (usually in their field of study) to make judgements that take relevant social, scientific or ethical issues into consideration.
- Understand and recognise the effects, mechanisms and manifestations of diseases over the structure and function of the human body.
- Understand the foundations of action, indications and efficacy of therapeutic interventions, based on available scientific evidence.
- Proper organisation and planning of the workload and timing in professional activities.
- Team-working skills and engaging with other people in the same line of work or different.
- Criticism and self-criticism skills.
- Capacity for communicating with professional circles from other domains.
- Acknowledge diversity and multiculturality.
- Consideration of ethics as a fundamental value in the professional practise.
- Working capacity to function in an international context.

## LEARNING OUTCOMES

At the end of the course, students should be able to:

1. Acknowledge how evidence is used, as well as the risk-benefit relationship in the indication of diagnostic and therapeutical tests, based on medical imaging.
2. Be aware of the contributions of medical imaging, both quantitative and qualitative, to the diagnosis and treatment of diseases.



3. Know of the main imaging biomarkers, and their use in healthcare and research.
4. Be acquainted with the advantages of medical imaging in the digital environment (storage, processing, handling, display).
5. Be aware of the main advantages of minimally painful treatment based on medical imaging.
6. Acknowledge the main contributions made by structural imaging, perfusion, diffusion, molecular, functional, and multivariate imaging in early diagnosis, grading, stratification and follow-up of the effects of therapy in diseases.
7. Acknowledge the essential applications of all these techniques in the main illnesses related to fundamental organs and systems.

## DESCRIPTION OF CONTENTS

### 1. THEORETICAL CLASSES.

1. Adequacy of radiological examinations and their current importance. New concepts of medical imaging.
2. Imaging biomarkers: concept, development and validation.
3. Medical imaging in cancer patients: from screening to grading.
4. Clinical trials evaluated through imaging.
5. Image-guided therapy: radiological interventionism.
6. Treatment of peripheral vascular disease through imaging.
7. Imaging of blood perfusion: normal vessels and neoangiogenesis.
8. Imaging of stroke. Recanalization therapies.
9. Molecular imaging in Nuclear Medicine: SPECT-TC, PET-TC, PET-RM.
10. Molecular diffusion imaging. MR spectroscopy.
11. Functional and multivariate imaging: improving the relevance of examinations.
12. New imaging techniques (multimodal, high field, multispectral).
13. Teragnosis: therapy based on Nuclear Medicine imaging (I).
14. Teragnosis: therapy based on Nuclear Medicine imaging (II).
15. Imaging in multidisciplinary approach to patients.
16. Imaging of facial trauma in multidisciplinary approach to patients.
17. Conventional radiological report and modern structured report.
18. Phase contrast. Applications in MR. Radiological study of hydrocephalus.
19. Neuroradiological study of patients with epilepsy. Specific sequences.

### 2. PRACTICAL CLASSES

13 seminars (26 hours 2 hours/seminary)

1. Imaging of CNS inflammation.
2. Imaging of neurodegeneration.
3. Imaging of brain tumors.



4. Imaging of cervicofacial spaces.
5. Imaging the lung: tumors and inflammation.
6. Thoracic imaging in the critically ill patient.
7. Cardiac PET. Clinical applications.
8. Female imaging. Applying BI-RADS. Gynecological tumor pathology. Infertility.
9. Imaging the vascular system.
10. Imaging the liver: tumors and diffuse lesions.
11. Current advances in radioguided surgery.
12. Joint imaging.
13. Interventionism in musculoskeletal pathology.

## WORKLOAD

ACTIVITY	Hours	% To be attended
Seminars	26,00	100
Theory classes	19,00	100
Study and independent work	55,00	0
Readings supplementary material	7,00	0
Preparation of practical classes and problem	5,00	0
Resolution of online questionnaires	0,50	0
<b>TOTAL</b>	<b>112,50</b>	

## TEACHING METHODOLOGY

**In theoretical lessons**, professors will present the most important concepts and content through master classes in a structured way, in order to help students develop several skills and meet the objectives. Students' participation in the class should be encouraged and they will have access to the didactic material professors may have used through the electronic platform *Aula Virtual*, if they consider it to be appropriate.

**Practise in the classroom:** seminars. In small groups, professors will present deeply specialised themes, case studies, management of bibliography, current issues... Team work is encouraged, as well as oral presentation skills, which could be interpreted as 'cooperative learning'.



## EVALUATION

The evaluation will be carried out by means of a written exam that will consist of 50 questions with multiple choice answers, of which 25 will correspond to the theoretical part and 25 to the seminars.

The questions will have 4 possible answers and only one correct one.

Each correct answer will be worth 0.1 points, and there will be a penalty of 0.025 points for each wrong answer.

Attendance at seminars will be compulsory and will be controlled by means of a signature sheet.

Attendance to practical sessions is mandatory. Unjustified non-attendance to more than 20% of the sessions will make it impossible to pass the course.

To pass the course it will be necessary to obtain a minimum of 5 points in the written exam.

The maximum grade that can be obtained with the written exam will be 9 points. Attendance to at least 80% of seminars will be taken into account to obtain the remaining point.

It is a requirement to access the advance notice of this subject that the student has completed all of their practices.

## REFERENCES

### Basic

- DEL CURA, J.L.; PEDRAZA, S.; GAYETE, A.; & ROVIRA, A. (Eds.). Radiología esencial. 2ª edición. 2018, SERAM, Editorial Médica Panamericana.

## ADDENDUM COVID-19

**This addendum will only be activated if the health situation requires so and with the prior agreement of the Governing Council**

Siguiendo las recomendaciones del Ministerio, la Consellería y el Rectorado de nuestra Universidad, para el período de la "nueva normalidad", la organización de la docencia para el primer cuatrimestre del curso 2021-22, seguirá un modelo híbrido, donde tanto la docencia teórica como práctica se ajustará a los horarios aprobados por la CAT pero siguiendo un modelo de Presencialidad / No presencialidad en la medida en que las circunstancias sanitarias y la normativa lo permitan y teniendo en cuenta el aforo de las aulas y laboratorios docentes. Se procurará la máxima presencialidad posible y la modalidad no presencial se podrá realizar mediante videoconferencia cuando el número de estudiantes supere el coeficiente de ocupación requerido por las medidas sanitarias. De manera rotatoria y equilibrada los estudiantes que no puedan entrar en las aulas por las limitaciones de aforo asistirán a las clases de manera





no presencial mediante la transmisión de las mismas de manera síncrona/asíncrona via “on line”.

