

69325 - Medical imaging capture techniques

Información del Plan Docente

Academic Year	2016/17
Academic center	110 - Escuela de Ingeniería y Arquitectura
Degree	547 - Master's in Biomedical Engineering
ECTS	3.0
Course	1
Period	Second semester
Subject Type	Optional
Module	---

1.Basic info

1.1.Recommendations to take this course

1.2.Activities and key dates for the course

2.Initiation

2.1.Learning outcomes that define the subject

2.2.Introduction

3.Context and competences

3.1.Goals

3.2.Context and meaning of the subject in the degree

3.3.Competences

3.4.Importance of learning outcomes

4.Evaluation

5.Activities and resources

5.1.General methodological presentation

Learning will follow the flipped classroom method. It basically consists of

the previous reading and viewing of written documents and multimedia material with in-class discussion and problem and case solving.

5.2.Learning activities

69325 - Medical imaging capture techniques

A01 Lectures (10 in class hours). Presentation, by the instructor, in class, of the main contents. After the previous reading and viewing by the student of the assigned material, the instructor will only lecture the subjects presenting the highest difficulty.

A02 Problems and case solving (14 in class hours). Based on quizzes and small exercises available on the Course Management System and prepared by the student, a complete discussion will be carried out in class. Case and problem solving will be collaboratively developed.

A03 Laboratory practicals (2 laboratory hours). One practical session will take place in the laboratory. Learning outcomes in this session will also be evaluated in the final exam.

A05 Assignments. The student will work on a specific subject previously agreed with the instructor. This assignment will result in a written document of no more than approximately 15 pages.

A06: Tutoring. Time will be allocated for private tutoring of the students. Both the subjects contemplated in class and the topics included in the assignment will be objects of revision with the instructor.

A08: Evaluation. Written theory-practical exams, assignment oral presentation.

5.3.Program

1. Ultrasound Imaging.

1.1. Physics of ultrasound.

1.2. Image modes.

2. Magnetic Resonance Imaging (MRI).

2.1. MRI basics.

2.2. Measurement of relaxation times.

2.3. Image formation.

2.4. Contrast.

2.5. MRI spectroscopy and contrast agents.

3. X-ray Imaging

3.1. Basics of X-rays: Generation, effects on matter, and detection.

69325 - Medical imaging capture techniques

3.2. Projection Radiography.

3.3. Computed Tomography (CT).

4. Nuclear Medicine Imaging.

4.1. Planar Scintigraphy (PS).

4.2. Emission Computed Tomography (SPECT, PET).

5.4.Planning and scheduling

Both the in-class and laboratory activities will be scheduled according the calendar established by the school. Deadlines and assignment presentations will be announced in due advance.

5.5.Bibliography and recomended resources

The basic material will consist of lecture notes and videos readily available to the student at the Course Management System. Although not indispensable, the following textbooks may also be considered as auxiliary literature:

- Prince, J.L., Links, J.M., *Medical Imaging, Signals and Systems* , ISBN0-13-065353-5, Pearson Prentice Hall, 2006.
- Webb, A., *Introduction to Biomedical Imaging* , ISBN 0-471-23766-3, IEEE Press, 2003.
- McRobbie, D.W., Moore, E.A., Graves, M.J., Prince, M.R., *MRI: From picture to proton* , ISBN 13-978-0-521-86527-2, Cambridge University Press, 2007.
- Bushberg, J.T. et al., *The Essential Physics of Medical Imaging* , ISBN-13: 978-0781780575 ISBN-10: 0781780578, Wolters-Kluwer Health - Lippincott, Williams and Wilkins, 2011