Course: CAD Computer Aided Diagnosis (5 ECTS = 125h)

1. Syllabus

1. Introduction to diagnosis and CADx (2h)

2. Image characterization: morphological, texture, and shape descriptors (2h)

3. Deformable template matching and active shape model (3h)
   Template matching + active shape models

4. Free-form segmentation and active contours (3h)
   Snakes + levelsets

5. Interest point detectors and descriptors (1h)

6. Object and image characterisation (3h)

7. CADx evaluation and applications.

Lecturers:

Dr. Xavier Lladó (llado@eia.udg.edu)
Dr. Arnau Oliver (aoliver@eia.udg.edu)
Offices located at the building P4 (basement)

Objectives:

ECTS: 5
Teaching hours:
18 hours lecture courses (including 4h lecture activities)
18 hours practical exercises
Student personal work:
89h (P1&P2 18h; Lecture given by students 21h; Readings related to lectures 10h; Project 40h)

Semester: 1
Lectures: Friday 10:00-12:00 in Classroom II.04B, located in Building P2 of the EPS.
Labs: Thursday & Friday 08:00-10:00 in the Computer Vision Lab (P2 Building of the EPS).

Contents & Planning:

Lecture 1A. – Course organization (1 hour) Lecture 1B. – Applications (1 hour)	Xavi / Arnau Arnau	21/09/2018
Lecture 2. – Image characterisation (2 hours)	Xavi	28/09/2018
Lecture 3. – Deformable models 1 (2 hours)	Arnau	05/10/2018
Lecture 4. – Deformable models 2/ Active contours 1 (2 hours)	Arnau	19/10/2018
Lecture 5. – Active contours 2 (2 hours)	Arnau	26/10/2018
Lecture 6. – Interest point detectors and descriptors (2 hours)	Xavi	31/10/2018
Presentation of activity "class given by students" (1 hours)	Xavi & Arnau	09/11/2018
Lecture 7. – Object and image classification (2 hours)	Xavi	09/11/2018
Lecture activity - review (2 hours)	Xavi & Arnau	16/11/2018 30/11/2018
Lectures 8 & 9: CADx evaluation and applications (4 hours)	MAIA students	14/12/2018

Lab sessions

1. Active Shape Models (Mammo: Lesion ROIs) (3 sessions = 6h). Date: 18&19/10/2018, 25&26/10/2017, and 30&31/10/2018.
2. Image characterisation (Fabrice's Lab) (2 sessions = 4h). Date: During November.
3. Project Deep Learning. Mammo DDSM dataset. BIRADS classification (3 sessions = 6h) Date: 29&30/11/2018, 13&14/12/2018 and 20&21/12/2018. Delivery January 2019.

Lecture activity

Topic assignments → students prepare a lecture (ppt) and give an oral presentation of 20min. Dates: 09/11/2018 Presentation, 16&30/11/2018 Review, 13&14/12/2018 Oral presentations.

Evaluation:

The evaluation is based on the different activities: 20% P1 + 20% P2 + 30% Project + 30% Lecture Activity.

Evaluation Criteria:

From Labs: 70% strategy and results + 30% document.
From Lectures given by students: 50% document + 50% presentation and interaction.

Rules for the coursework deadlines

- The deadline for all the lab courseworks will be always one week after the last lab session.
- The coursework will be marked up to **10 points**.

Late submission penalisations:

- Up to 1 week after the proposed deadline → the mark will be up to **8 points**
- More than 1 week after the deadline → the mark will be up to **5 points**

The objective of these rules is to ensure that the students are able to correctly follow the SSI course scheduling.