Cunice
EUROPEAN UNIVERSITY

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EUROPEAN UNIVERSITY FOR CUSTOMISED EDUCATION

STUDY GUIDE

Medical Image Processing

Organised by

University of Mons (UMONS)

Co-funded by the Erasmus+ Programme of the European Union

1. IDENTIFYING DATA.	
· Course Name.	*M*edical Image Processing
· Coordinating University.	*U*MONS
· Partner University(ies) Involved.	*N*/A
· Course Field(s).	Electrical engineering, computer vision
· Related Study Programme.	Polytech >> electrical engineering => master 1 of " Data Science for Dynamical Systems"
· Course Code.	I-ISIA-013
· ISCED Code.	*0*713
· SDG.	*S*DG 3: "Good health and well-being"
· Study Level.	*Master (M)*

· Number of ECTS credits allocated.	*3*
· Mode of Delivery.	*Hybrid format (available both on-site and online)*
· Language of Instruction.	*English*
· Delivery Period.	*2nd semester*
· Course Dates.	*9th February – 16th March*
· Precise Schedule of the Lectures.	*2 hours each Thursday at 8h15 (9/2, 16/2, 23/2, 2/3, 9/3, 16/3)*
· Key Words.	*Medical Imaging, image reconstruction, MRI, CT scan, PET scan, image registration, image segmentation*
· Catchy Phrase.	*Understand medical images and practice!*
· Link to Course Guide.	*N/A*

· Prerequisites and co-requisites.	*The students need to have checked the CVMI (Computer Vision & Machine Intelligence) course. No other prerequisites: it is an introductory course.* *English: B1 minimum*
· Number of EUNICE students that can attend the Course.	*70*
· Course inscription procedure(s).	*Registrations through EUNICE website*

2. CONTACT DETAILS.

· Department.	*N/A*
· Name of Lecturer.	*Matei Mancas*
· E-mail.	*Matei.MANCAS@umons.ac.be*
· Office.	*N/A*
· Other Lecturers.	*N/A*

3. COURSE CONTENT.

The module will focus on medical Imaging, image processing and computer vision

4. LEARNING OUTCOMES.

1/ Knowing and understanding the different types of medical imaging 2/ Understanding how they are visualized 3/ Some basic anatomy knowledge 4/ Medical images preprocessing 5/ Medical images registrations 6/ Medical images segmentation 7/ Some tools to read, visualize and process medical images

5. OBJECTIVES.

[1/Understand medical images, 2/Pre-process, register, segment medical images]

6. COURSE ORGANISATION.

UNITS	
1.	Chapter I: Introduction to Medical Imaging 1/ Introduction 2/ Instrumentation and imaging modalities 3/ Basic visualization
2.	Chapter II: Image Reconstruction & Visualization 1/ Image Reconstruction 2/ Images & data 3/ Visualization
3.	Chapter III: Anatomy, debluring & registration 1/ Anatomy and imaging modalities 2/ Medical images denoising 3/ Medical images registration
4.	Chapter IV: Medical Images Segmentation 1/ Medical Imaging: Why ? 2/ Some segmentation techniques used in medical imaging 2.1/ Global segmentation 2.2/ Local segmentation 2.3/ Knowledge/Atlas-based segmentation 3/ Conclusion
5	Chapter V: Tools and Applications 1/ Knowledge-based Segmentation 2/ ITK & Tools 3/ Medical Image Retrieval Example 4/ Clinical Examples 5/ New Developements for Registration 6/ Towards better atlasses
LEARNING RESOURCES AND TOOLS.	
Moodle Material	
PLANNED LEARNING ACTIVITIES AND TEACHING METHODS.	

Lectures

7. ASSESSMENT METHODS AND CRITERIA.
Exam : oral with 30 minutes of preparation on a set of questions. The first part will be more about course questions, the second part will be a discussion around an open question.
OBSERVATIONS.

8. BIBLIOGRAPHY AND TEACHING MATERIALS.
The course is an introductory one, no need for reading