

# STUDY GUIDE

## MEDICAL IMAGE PROCESSING

Organised by

UNIVERSITY OF MONS  
(UMONS)



1. IDENTIFYING DATA.	
· Course Name.	Medical image processing
· Coordinating University.	UMONS
· Partner University Involved.	N/A
· Course Field(s).	Electrical engineering, computer vision
· Related Study Program.	Polytech >> electrical engineering => master 1 of " Data Science for Dynamical Systems"
· Course Code.	I-ISIA-013
· ISCED Code.	0713
· SDG.	SGD 3 : "Good Health and Well Being"
· Study Level.	Master (M)

· Number of ECTS credits allocated.	3ECTS
· Mode of Delivery.	Courses : blended format (onsite and online)
· Language of Instruction.	English
· Delivery Period.	2 <sup>nd</sup> semester
· Course Dates.	1. Thursday 10 <sup>th</sup> February : from 8:15 until 10:15 2. Thursday 17 <sup>th</sup> February : from 8:15 until 10:15 3. Thursday 24 <sup>th</sup> February : from 8:15 until 10:15 4. Thursday 03 <sup>rd</sup> March : from 8:15 until 10:15 5. Thursday 10 <sup>th</sup> March : from 8:15 until 10:15 Thursday 17 <sup>th</sup> March : from 8:15 until 10:15
· Precise Schedule of the Lectures.	From 10th of February until 17 <sup>th</sup> March   Thursday   08:15-10:15
· Key Words.	Medical imaging, image reconstruction, MRI, CT scan, PET scan, image registration, image segmentation
· Catchy Phrase.	After this course you will be able to understand, read, visualize and process medical images such as CT scans or MRIs !
· 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. No minimum level of English is fixed.
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· Number of EUNICE students that can attend the Course.	70 EUNICE students (10 students per each university of the alliance)
· Course inscription procedure(s).	Contact your local International Relations Office
· Applications Deadline.	17th January 2022

## 2. CONTACT DETAILS.

· Department.	N/A
· Name of Lecturer.	MANCAS Matei (and GOSSELIN Bernard)
· 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.

N/A

## 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, deblurring & 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 atlases
<b>LEARNING RESOURCES AND TOOLS.</b>	
Moodle material	
<b>PLANNED LEARNING ACTIVITIES AND TEACHING METHODS.</b>	
Lectures (6)	

## 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.

N/A

## 8. BIBLIOGRAPHY AND TEACHING MATERIALS.

The course is an introductory one, no need for reading.

