



# Syllabus

1. **Course name:** Biomedical Image Processing Lab

2. **Course code:** BIMP312465

3. **Credits:** 1 credits (0:1:2) (0 lecture periods, 1 lab period, 2 self-study periods per week)

4. **Instructors**

- a. Chief lecturer: Ba-Viet Ngo, MEng
- b. Fellow lecturer: Dr. Manh-Hung Nguyen
- c. Fellow lecturer: Dr. Thanh-Tai Duong

5. **Course Requirements:**

Prerequisite course(s): Biomedical Image Processing

Previous course(s): Signals and Systems; Biosignal Processing

6. **Course Description**

Based on the knowledge learned in Biomedical Image Processing, the student can simulate biomedical image processing processes on Matlab or Python software and aim to perform on real image processing systems.

7. **Learning Outcomes (CLOs)**

CLOs	Descriptions	ELO(s) /PI(s)	Compe- tency
	<i>On successful completion of this course students will be able to:</i>		
CLO1	Read and display images using Matlab/Python software.	ELO1/PI1.2	R
CLO2	Apply image processing methods such as image transformation, enhancement, noise filtering, feature extraction, edge detection, and segmentation.	ELO1/PI1.3	R
CLO3	Work in groups and write technical reports.	ELO6/PI6.1	R
CLO4	Analyze requirements and provide solutions in biomedical image processing.	ELO7/PI7.3	R

8. **Content outline**

- Instructions for using Matlab/Python scripts to read images, represent images and use image processing libraries.
- Design filters in the time domain or the frequency domain.
- Programming to transform images in the frequency domain.
- Programming for morphological processing.
- Programmable for histogram analysis and image enhancement.
- Programmable to detect edges and image segments.
- Programming to create a GUI.

9. **Teaching Methods**

- Presentation
- Teamwork
- Problem solving.

## 10. Assessment(s)

- Grading scale: **10**
- Assessment plan:

No.	Content	CLOs	Competency	Assessment methods	Assessment tools	Weighting %
<b>Formative assessment</b>						<b>60</b>
1.	Read and display images using a GUI.	CLO1/PI1.2	R	Questions	Score sheet	10
2.	Filter design	CLO2/PI1.3	R	Questions	Score sheet	20
3.	Image enhancement		R	Questions	Score sheet	10
4.	Edge detection and Segmentation		R	Questions	Score sheet	10
5.	Morphological processing		R	Questions	Score sheet	10
<b>Summative assessment</b>						<b>40</b>
6.	Applying image processing methods to implement a small project in the medical field	CLO3/PI6.1 CLO4/PI7.3	R	Project	Rubric	40

## 11. Learning Materials:

- Textbook(s):  
[1] Wolfgang Birkfellner, "Applied Medical Image Processing", CRC Press, 2014.
- References:  
[2] "Image Processing Toolbox User's Guide", The MathWorks, Inc, 2004.

## 12. General Information:

### Academic Integrity

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## 13. Approval Date: <01/08/2021>

## 14. Endorsement:

Dean	Head of Department	Chief Lecturer
Assoc. Prof. Dr. Nguyen Minh Tam	Assoc. Prof. Dr. Nguyen Thanh Hai	<Full Name>

## 15. Revision History:

1 <sup>st</sup> Revision: <dd/mm/yyyy>	Lecturer:
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	Head of Department: <b>Assoc. Prof. Dr. Nguyen Thanh Hai</b>
<b>2<sup>nd</sup> Revision:</b> <dd/mm/yyyy>	Lecturer:  Head of Department: