Syllabus Details

Syllabus ID:	8972
Syllabus Name:	**Computer Vision_Thị giác máy tính**
Syllabus English:	
Subject Code:	**CPV301**
NoCredit:	3
Degree Level:	Bachelor
Time Allocation:	45h (60 sessions) contact hours + 1h final exam + 104h self-study
Pre-Requisite:	PFP191, CSD203
Description:	-This course provides the basics of computer vision. -Students will have access to knowledge from image representation, lighting, image acquisition through the camera, camera calibration techniques. -Learn line and edge detection techniques in images, filters as well as Canny, RANSAC methods -Students will learn advanced image processing knowledge such as Image segmentation, object detection, object recognition, and object tracking. -Implement a computer vision project in recognizing objects in photos or videos
StudentTasks:	- Students must attend at least 80% of contact slots in order to be accepted to the final examination. - Student is responsible to do all exercises given by instructor in class or at home and submit on time. - Use laptop in class only for learning purpose - Promptly access to the FU CMS at http://cms.fpt.edu.vn for up-to-date course information
Tools:	Text Book 'Pycharm or Matlab Internet
Scoring Scale:	10
DecisionNo MM/dd/yyyy:	1077/QĐ-ĐHFPT dated 11/24/2022
IsApproved:	**True**
Note:	
MinAvgMarkToPass:	5
IsActive:	True
ApprovedDate:	11/24/2022

6 material(s)

Computer Vision: Algorithms and Applications	Richard Szeliski	Springer	10/19/2010 12:00:00 AM	1st	978-1848829343	☑	☐	☑	https://szeliski.org/Book/
OpenCV Computer Vision with Python	Joseph Howse	Packt	4/1/2013 12:00:00 AM	1st	978-1782163923	☐	☑	☐	
Computer Vision: A Modern Approach	David Forsyth, Jean Ponce	Pearson	10/26/2011 12:00:00 AM	2nd	978-0136085928	☐	☑	☐	
Multiple View Geometry in Computer Vision	Richard Hartley	Cambridge University Press	4/19/2004 12:00:00 AM	2nd	978-0521540513	☐	☑	☐	
Course slide						☐	☐	☐	
Labs & assignment						☐	☐	☐	

9 LO(s)

1	CLO1	Understand the basics of computer vision, its related fields, and its applications
2	CLO2	Understand the concepts of image formation: image representation, lighting, image acquisition through the camera, camera calibration techniques.
3	CLO3	Basic knowledge of image processing on points, lines, image filtering techniques and corresponding algorithm implementation
4	CLO4	Understand the techniques of feature extraction and matching, implement the techniques of edges, lines extraction
5	CLO5	Understand the basics of segmentation, techniques such as active contours, split and merge, mean shift and mode finding
6	CLO6	Discuss feature-based alignments like 2D and 3D feature-based alignment
7	CLO7	Discuss the principles and the implementation of Image stitching
8	CLO8	Understand and implement the object detection techniques
9	CLO9	Explain the principles of face recognition, object tracking

View mapping of CLOs to PLOs

Download All Student Material 60 sessions (45'/session)

1	Introduction: 1.1 Welcome to Computer Vision	Offline	LO1	I	Textbook, slides	mat1	Study materials, implement sample examples	
2	Introduction: 1.2 Computer vision overviews	Offline	LO1	I	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	
3	Image formation 2.1 Geometric primitives and transformations	Offline	LO2	I,T	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	
4	Image formation 2.1 Geometric primitives and transformations	Offline	LO2	I,T	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	
5	Image formation 2.2 Photometric image formation	Offline	LO2	I,T	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	
6	Image formation 2.2 Photometric image formation	Offline	LO2	I,T	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	
7	Image formation 2.3 The digital camera	Offline	LO2	I,T	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	
8	Image formation 2.3 The digital camera	Offline	LO2	I,T	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	

9	Lab 1 assistance	Offline	LO1, LO2	U	Textbook, slides,assignment's questions	FLM and suggested online-drive		
10	Lab 1 assistance	Offline	LO1, LO2	U	Textbook, slides,assignment's questions	FLM and suggested online-drive		
11	Image processing 3.1 Point operators	Offline	LO3	I,T	Textbook, slides, lab's questions	FLM and suggested online-drive	Study materials, implement sample examples	
12	Image processing 3.1 Point operators	Offline	LO3	I,T	Textbook, slides, lab's questions	FLM and suggested online-drive	Study materials, implement sample examples	
13	Image processing 3.2 Linear filtering	Offline	L03	I, T	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	
14	Image processing 3.2 Linear filtering	Offline	L03	I, T	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	
15	Image processing 3.3 Fourier transforms	Offline	LO3	I, T	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	
16	Image processing 3.3 Fourier transforms	Offline	LO3	I, T	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	
17	Image processing 3.4 Geometric transformations	Offline	LO3	I,T	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	
18	Image processing 3.4 Geometric transformations	Offline	LO3	I,T	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	
19	Lab 2 assistance	Offline	LO2, LO3	U	Textbook, slides,assignment's questions	FLM and suggested online-drive		
20	Lab 2 assistance	Offline	LO2, LO3	U	Textbook, slides,assignment's questions	FLM and suggested online-drive		
21	Feature detection and matching 4.1 Points and patches	Offline	LO3, LO4	I,T	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	
22	Feature detection and matching 4.1 Points and patches	Offline	LO3, LO4	I,T	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	
23	Feature detection and matching 4.2 Edges	Offline	LO4	I,T	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	

24	Feature detection and matching 4.2 Edges	Offline	LO4	I,T	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	
25	Feature detection and matching 4.3 Lines	Offline	LO4	I,T	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	
26	Feature detection and matching 4.3 Lines	Offline	LO4	I,T	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	
27	Lab 3 assistance Progress test 1	Offline	LO1, LO2, LO3, LO4	U	Textbook, slides,assignment's questions	FLM and suggested online-drive		
28	Lab 3 assistance Progress test 1	Offline	LO1, LO2, LO3, LO4	U	Textbook, slides,assignment's questions	FLM and suggested online-drive		
29	Segmentation 5.1 Active contours	Offline	LO4, LO5	I,T	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	
30	Segmentation 5.1 Active contours	Offline	LO4, LO5	I,T	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	
31	Segmentation 5.2 Split and merge	Offline	LO5	I,T	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	
32	Segmentation 5.2 Split and merge	Offline	LO5	I,T	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	
33	Segmentation 5.3 Mean shift and mode finding	Offline	LO5	I,T	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	
34	Segmentation 5.3 Mean shift and mode finding	Offline	LO5	I,T	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	
35	Lab 4 assistance	Offline	LO3, LO4, LO5	U	Textbook, slides, lab's questions	FLM and suggested online-drive		
36	Lab 4 assistance	Offline	LO3, LO4, LO5	U	Textbook, slides, lab's questions	FLM and suggested online-drive		
37	Feature-based alignment 6.1 2D and 3D feature-based alignment	Offline	LO6	I,T	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	
38	Feature-based alignment 6.1 2D and 3D feature-based alignment	Offline	LO6	I,T	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	

39	Lab 5 assistance	Offline	L04, LO6	U	Textbook, slides,assignment's questions	FLM and suggested online-drive		
40	Lab 5 assistance	Offline	L04, LO6	U	Textbook, slides,assignment's questions	FLM and suggested online-drive		
41	Image stitching 7.1 Motion models	Offline	LO7	I,T	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	
42	Image stitching 7.2 Global alignment	Offline	LO7	I,T	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	
43	Lab 6 assistance	Offline	LO7	U	Textbook, slides,assignment's questions	FLM and suggested online-drive		
44	Lab 6 assistance	Offline	LO7	U	Textbook, slides,assignment's questions	FLM and suggested online-drive		
45	Detection 8.1 Object detection	Offline	LO8	I,T	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	
46	Detection 8.1 Object detection	Offline	LO8	I,T	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	
47	Recognition 9.1 Face recognition	Offline	LO9	I,T	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	
48	Recognition 9.1 Face recognition	Offline	LO9	I,T	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	
49	Recognition 9.2 Object tracking	Offline	LO9	I,T	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	
50	Recognition 9.2 Object tracking	Offline	LO9	I,T	Textbook, slides	FLM and suggested online-drive	Study materials, implement sample examples	
51	Lab 7 assistance	Offline	LO5, LO8, LO9	U	Textbook, slides,assignment's questions	FLM and suggested online-drive		
52	Lab 8 assistance	Offline	LO5, LO8, LO9	U	Textbook, slides,assignment's questions	FLM and suggested online-drive		
53	Progress test 2+ workshop evaluation	Offline	LO5, LO6, LO7, LO8, LO9	U	Textbook, slides	FLM and suggested online-drive		
54	Progress test 2+ workshop evaluation	Offline	LO5, LO6, LO7, LO8, LO9	U	Textbook, slides	FLM and suggested online-drive		

55	Review	Offline	LO1,LO2,LO3,LO4,LO5,LO6, LO7,LO8,LO9	I,T	Textbook, slides	FLM and suggested online-drive			
56	Review	Offline	LO1,LO2,LO3,LO4,LO5,LO6, LO7,LO8,LO9	I,T	Textbook, slides	FLM and suggested online-drive			
57	Assignment Evaluation	Offline		U		FLM and suggested online-drive			
58	Assignment Evaluation	Offline		U		FLM and suggested online-drive			
59	Practical Exam	Offline	LO2,LO3,LO4,LO5,LO6, LO7,LO8,LO9	U		FLM and suggested online-drive			
60	Review course Results	Offline	LO01,LO2,LO3,LO4,LO5,LO6, LO7,LO8,LO9	U		FLM and suggested online-drive			

0 Constructive question(s)

5 assessment(s)

Assignment	on-going	1	30.0%	>0	28 slots	LO1->LO9	Option 1: N/A Option 2: Questions or Activities proposed by lecturer	Option 1: N/A Option 2: Follow lecturer's proposal	All subjects in syllabus	in class, by teacher	
Lab	on-going	8	10.0%	>0	90'/each	LO1->LO9	Option 1: N/A Option 2: Questions or Activities proposed by lecturer	Option 1: N/A Option 2: Follow lecturer's proposal		in class, by teacher	
Practical Exam	on-going	1	20.0%	>0	90'/each	LO2->LO9				in class, by teacher	
Progress Test	on-going	2	10.0%	>0	30'/each	Test 1: LO1, LO2, LO3, LO4 Test 2: LO5, LO6, LO7, LO8, LO9	Option 1: Multiple choices Marked by Computer or a suitable format Option 2: Questions or Activities proposed by lecturer	Option 1: 20/each Option 2: Follow lecturer's proposal		in class, by LMS system	Instruction and schedules for Progress Tests must be presented in the Course Implementation Plan approved by director of the campus. Progress test must be taken right after the last lectures of required material. Instructor has responsibility to review the test for students after graded.

Final Exam	final exam	1	30.0%	4	60'/each	LO1->LO9	Multiple choicesMarked by Computer	50	All subjects in syllabus	By Exam Board	The exam questions must be updated or different at least 70% to the previous ones.