

Planning and Quality Assurance Affairs

Form (A)

Course Specifications

General Information

Course name	Computer Vision
Course number	ITCS4340
Faculty	
Department	
Course type	Major Needs
Course level	4
Credit hours (theoretical)	3
Credit hours (practical)	0
Course Prerequisites	

Course Objectives

- 1 - Understanding cameras and projection models
- 2 - Low-level image processing methods such as edge detection
- 3 - Mid-level vision topics such as segmentation
- 4 - High-level vision tasks such as object recognition and 3D shape reconstruction.

Intended Learning Outcomes

Knowledge and Understanding	<ul style="list-style-type: none"> * a1. Understand the essential mathematics relevant to computer vision. * a2. Use high-level programming languages. * a3. Show a critical understanding of the principles of image and object recognition.
Intellectual Skills	<ul style="list-style-type: none"> * b1. Define traditional and nontraditional computer vision problems, set goals towards solving them, and observe results. * b2. Perform comparisons between (algorithms, methods, techniques...etc). * b3. Identify attributes, components, relationships, patterns, main ideas, and errors. * b4. Solve computer vision problems with pressing commercial or industrial constraints.
Professional Skills	<ul style="list-style-type: none"> * c1. Use appropriate programming languages. * c2. Evaluate computer vision systems in terms of general quality attributes and possible tradeoffs presented within the given problem. * c3. Apply the principles of human-computer interaction to the evaluation and construction of computer vision systems.
General Skill	<ul style="list-style-type: none"> * d1. Manage tasks effectively. * d2. Manage ones own learning and development, including time management. * d3. Search for information and adopt life-long self-learning. * d4. Communicate effectively by oral, written and visual means. * d5. Work effectively as an individual and as a member of a team.

Course Contents

<ol style="list-style-type: none"> 1 - Introduction to the theory and application of computer vision. 2 - Biological vision system, image formation, image noise, binary images, gray images, color images 3 - low-level image processing methods such as edge detection 4 - mid-level vision topics such as segmentation, and line and curve detection 5 - high-level vision tasks such as object recognition and 3D shape reconstruction techniques
--

Teaching and Learning Methods

<ol style="list-style-type: none"> 1 - Lectures 2 - Tutorial Exercises 3 - Practical Exercises 4 - Projects 5 - Case Study

Students Assessment

<u>Assessment Method</u>	<u>TIME</u>	<u>MARKS</u>
Final Exam	The sixteenth week	50%
Practical Exam	The fifteenth week	20%
Projects	The fourteenth week	20%
Class Work	During the tutorial	10%

Books and References

Course note	Short course notes available at doctor's office
Essential books	Bogusław Cyganek, J. Paul Siebert, "An Introduction to 3D Computer Vision Techniques and Algorithms", John Wiley & Sons, 2009.
Recommended books	David A. Forsyth, Jean Ponce, "Computer Vision: A Modern Approach", Prentice Hall, 2002.

Knowledge and Skills Matrix

Main Course Contents	Study Week	Knowledge and Understanding	Intellectual Skills	Professional Skills	General Skill
Introduction to the theory and application of computer vision.	1-1	---	b1,b3	c2	d3
Biological vision system, image formation, image noise, binary images, gray images, color images	2-3	a1,a3	b2,b3	---	d1,d2,d3,d4,d5
low-level image processing methods such as edge detection	4-7	a1,a2,a3	b2,b3	c1	d1,d2,d3,d4,d5
mid-level vision topics such as segmentation, and line and curve detection	8-11	a1,a2,a3	b2,b3	c1	d1,d2,d3,d4,d5
high-level vision tasks such as object recognition and 3D shape reconstruction techniques	12-15	a1,a2,a3	b1,b3,b4	c1,c2,c3	d1,d2,d3,d4,d5