Tamkang University Academic Year 102, 1st Semester Course Syllabus

Course Title	ADVANCED COMPUTER VISION	Instructor	YEN SHWU-HUEY
Course Class	TEIXD1A DOCTORAL PROGRAM, DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION ENGINEERING, 1A	Details	◆ Selective ◆ One Semester ◆ 3 Credits

Departmental teaching objectives

Ⅰ. Cultivate the ability to conduct independent research and problem solving.

Ⅱ. Strengthen creativity and research capacity.

Ⅲ. Build profound professional knowledge in computer science and information engineering.

Ⅳ. Engage in self-directed lifelong learning.

Departmental core competences

A. Independent problem solving ability.

B. Independent innovative thinking ability.

C. Research paper writing and presentation ability.

D. Research&development (R&D) ability in information engineering.

E. Project execution and control ability.

F. Lifelong self-directed learning ability.

Course Introduction	The course is a continuation of "computer vision". The goal is to introduce the advanced concepts, techniques and the newest applications of computer vision. This course will discuss the principle and theory, and cooperate with projects implementation as well as studying the most updated journal papers. In addition, selected topics are assigned to students for survey. English-oral/English-written report is also required in this course.

The Relevance among Teaching Objectives, Objective Levels and Departmental core competences

I.Objective Levels (select applicable ones) :

(i) Cognitive Domain : C1-Remembering, C2-Understanding, C3-Applying, C4-Analyzing, C5-Evaluating, C6-Creating

(ii) Psychomotor Domain : P1-Imitation, P2-Mechanism, P3-Independent Operation, P4-Linked Operation, P5-Automation, P6-Origination

(iii) Affective Domain : A1-Receiving, A2-Responding, A3-Valuing, A4-Organizing, A5-Charaterizing, A6-Implementing

II.The Relevance among Teaching Objectives, Objective Levels and Departmental core competences :

(i) Determine the objective level(s) in any one of the three learning domains (cognitive, psychomotor, and affective) corresponding to the teaching objective. Each objective should correspond to the objective level(s) of ONLY ONE of the three domains.

(ii) If more than one objective levels are applicable for each learning domain, select the highest one only. (For example, if the objective levels for Cognitive Domain include C3,C5,and C6, select C6 only and fill it in the boxes below. The same rule applies to Psychomotor Domain and Affective Domain.)

(iii) Determine the Departmental core competences that correspond to each teaching objective. Each objective may correspond to one or more Departmental core competences at a time. (For example, if one objective corresponds to three Departmental core competences: A,AD, and BEF, list all of the three in the box.)

No.	Teaching Objectives	Relevance	
		Objective Levels	Departmental core competences
1	1. Students will learn related definitions and operations on computer vision	C2	AB
2	2. Students will apply various image processing techniques on computer vision tasks (project implementation)	C6	ABCDE
3	3. Students will practice oral report and technical writing in English.	C4	BCF
4	4. Students will survey updated journal papers of related issues and make presentations	C5	BCF
5	5. Students will learn how to comment pro and con of academic/technical papers	C5	BF

Teaching Objectives, Teaching Methods and Assessment

No.	Teaching Objectives	Teaching Methods	Assessment
1	1. Students will learn related definitions and operations on computer vision	Lecture, Discussion	Participation, Program ex
2	2. Students will apply various image processing techniques on computer vision tasks (project implementation)	Discussion, Problem solving	Report, Participation, program ex
3	3. Students will practice oral report and technical writing in English.	Lecture, Discussion	Written test, Report, Participation

4	4. Students will survey updated journal papers of related issues and make presentations	Discussion	Report, Participation, presentati
5	5. Students will learn how to comment pro and con of academic/technical papers	Lecture, Discussion	Report, Participation

This course has been designed to cultivate the following essential qualities in TKU students

Essential Qualities of TKU Students	Description
◆ A global perspective	Helping students develop a broader perspective from which to understand international affairs and global development.
◆ Information literacy	Becoming adept at using information technology and learning the proper way to process information.
◆ A vision for the future	Understanding self-growth, social change, and technological development so as to gain the skills necessary to bring about one's future vision.
◇ Moral integrity	Learning how to interact with others, practicing empathy and caring for others, and constructing moral principles with which to solve ethical problems.
◆ Independent thinking	Encouraging students to keenly observe and seek out the source of their problems, and to think logically and critically.
◇ A cheerful attitude and healthy lifestyle	Raising an awareness of the fine balance between one's body and soul and the environment; helping students live a meaningful life.
◆ A spirit of teamwork and dedication	Improving one's ability to communicate and cooperate so as to integrate resources, collaborate with others, and solve problems.
◇ A sense of aesthetic appreciation	Equipping students with the ability to sense and appreciate aesthetic beauty, to express themselves clearly, and to enjoy the creative process.

Course Schedule

Week	Date	Subject/Topics	Note
1	102/09/16 ~ 102/09/22	Topic One: Features I	
2	102/09/23 ~ 102/09/29	Topic One: Features II	
3	102/09/30 ~ 102/10/06	Application: Recognition	
4	102/10/07 ~ 102/10/13	Application: Matching & Stitching	
5	102/10/14 ~ 102/10/20	Student report and comment (I)	
6	102/10/21 ~ 102/10/27	Student report and comment(II) and Project progress report I	
7	102/10/28 ~ 102/11/03	Topic Two: ASM & AAM I	
8	102/11/04 ~ 102/11/10	Topic Two: ASM & AAM II	

9	102/11/11～ 102/11/17	期中考試	
10	102/11/18～ 102/11/24	Application: facial reconstruction	
11	102/11/25～ 102/12/01	Application: facial stylization_caricature generation	
12	102/12/02～ 102/12/08	Student report and comment (III)	possible participation of the conference held in CSIE department
13	102/12/09～ 102/12/15	Student report and comment(IV) and Project progress report II	possible participation of the conference held in CSIE department
14	102/12/16～ 102/12/22	Topic Three: Super-resolution I	
15	102/12/23～ 102/12/29	Topic Three: Super-resolution II	
16	102/12/30～ 103/01/05	Student report and comment (V)	
17	103/01/06～ 103/01/12	Project Presentation	
18	103/01/13～ 103/01/19	期末考試	

Requirement	This course is teaching by ALL-English. Students should be aware of this.You are require to hand in one survey report, several small programs, and One term project.
Teaching Facility	Computer, Projector
Textbook(s)	Computer Vision: Algorithms and Applications" by Richard Szeliski (2010)
Reference(s)	Download the most recent academic papers for survey and presentation.
Number of Assignment(s)	(Filled in by assignment instructor only)
Grading Policy	◆ Attendance： 10.0 % ◆ Mark of Usual： % ◆ Midterm Exam： % ◆ Final Exam： % ◆ Other〈One survey report, s〉：90.0 %
Note	This syllabus may be uploaded at the website of Course Syllabus Management System at http://info.ais.tku.edu.tw/csp or through the link of Course Syllabus Upload posted on the home page of TKU Office of Academic Affairs at http://www.acad.tku.edu.tw/CS/main.php . **※ Unauthorized photocopying is illegal. Using original textbooks is advised. It is a crime to improperly photocopy others' publications.**