

Tamkang University Academic Year 102, 2nd Semester Course Syllabus

Course Title	ROBOTICS	Instructor	CHI-TAI CHENG
Course Class	TETEM1A MASTER'S PROGRAM IN ROBOTICS ENGINEERING, DEPARTMENT OF ELECTRICAL ENGINEERING, 1A	Details	<ul style="list-style-type: none"> ◆ Selective ◆ One Semester ◆ 3 Credits
Departmental Aim of Education			
<ul style="list-style-type: none"> I. To educate students with electrical/robotic knowledge to solve electrical engineering related problems. II. To educate students to be senior engineers with creative thinking and team-working discipline to independently complete their assignments. III. To educate students to have advanced international perspective and global competitive skills to compete the challenge in today's diversified professional fields. 			
Departmental core competences			
<ul style="list-style-type: none"> A. Have the capability with professional knowledge to solve electrical engineering related problems. B. Have the capability to plan and execute electrical engineering projects. C. Have the capability to prepare electrical engineering technical reports. D. Have creative thinking and the capability to independently solve electrical engineering problems. E. To have the capability to cooperate and integrate with different professional personnel. F. To have advanced international perspective. G. To have lead, manage and plan capabilities. H. To have lifetime self- learning and growth capability. 			
Course Introduction	<p>This course will teach students the theories and design concepts of the robotics. The course includes lecture, simulation and implementation. The concepts and the theories are taught via the lecture. We will explore the topics such as kinematics, circuit design, motor control, and navigation. In order to reinforce the learning efficiency, implementation of a robotic project is required.</p>		

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	Teach the theory and design skill of robotics	C4	ADH
2	Design a robot system	P6	ADEGH
3	Discuss how to implement the robot system	A6	ABCDEFGH

Teaching Objectives, Teaching Methods and Assessment

No.	Teaching Objectives	Teaching Methods	Assessment
1	Teach the theory and design skill of robotics	Lecture	Report
2	Design a robot system	Discussion, Problem solving	Report
3	Discuss how to implement the robot system	Problem solving	Report

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	103/02/17 ~ 103/02/23	Introduction to Robotics	
2	103/02/24 ~ 103/03/02	Robotic Systems	
3	103/03/03 ~ 103/03/09	Sensing Techniques	
4	103/03/10 ~ 103/03/16	Robot Vision	
5	103/03/17 ~ 103/03/23	Communication Systems	
6	103/03/24 ~ 103/03/30	Motor Control Method	
7	103/03/31 ~ 103/04/06	Motor Driving System	
8	103/04/07 ~ 103/04/13	Robot Kinematics	
9	103/04/14 ~ 103/04/20	Midterm Presentation	
10	103/04/21 ~ 103/04/27	Midterm Exam Week	
11	103/04/28 ~ 103/05/04	Inverse Kinematics	
12	103/05/05 ~ 103/05/11	Path Planning	

13	103/05/12 ~ 103/05/18	Particle Filter	
14	103/05/19 ~ 103/05/25	Integration of the Robotic System	
15	103/05/26 ~ 103/06/01	Human Machine Interface	
16	103/06/02 ~ 103/06/08	Final Project Reports	
17	103/06/09 ~ 103/06/15	Final Project Reports	
18	103/06/16 ~ 103/06/22	Final Exam Week	
Requirement			
Teaching Facility	Computer, Projector		
Textbook(s)	J.J. Craig, Introduction to Robotics: Mechanics and Control. (3rd ed.) N.Y., Pearson Prentice-Hall, 2005.		
Reference(s)			
Number of Assignment(s)	2 (Filled in by assignment instructor only)		
Grading Policy	◆ Attendance : 20.0 % ◆ Mark of Usual : % ◆ Midterm Exam : 30.0 % ◆ Final Exam : 50.0 % ◆ Other < > : %		
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.		