

Tamkang University Academic Year 114, 1st Semester Course Syllabus

Course Title	APPLICATION OF ROBUST CONTROL	Instructor	YANG, YU-TING
Course Class	TETKM1A MASTER'S PROGRAM, DIVISION OF ARTIFICIAL INTELLIGENCE SYSTEMS INTEGRATION, DEPARTMENT OF ELECTRICAL AND COMPUER ENGINEERING, 1A	Details	◆ General Course ◆ Selective ◆ One Semester ◆ 3 Credits
Relevance to SDGs	SDG4 Quality education SDG8 Decent work and economic growth SDG9 Industry, Innovation, and Infrastructure SDG11 Sustainable cities and communities		
D e p a r t m e n t a l A i m o f E d u c a t i o n			
I . Educate students to have electrical and robotic engineering knowledge to solve electrical engineering related problems. II. Educate the student as a senior electrical and robotic engineer to enable creative thinking, to be independently complete the assigned tasks and be willing to work as a team member. III. Educate students to have advanced global awareness to cope with the challenges of modern diversified professor careers.			
S u b j e c t D e p a r t m e n t a l c o r e c o m p e t e n c e s			
A. Core competency 1.1: Have professional knowledge in the disciplines of electrical, computer and robotic engineerings.(ratio:20.00) B. Core competency 1.2: Have the ability to plan and execute electrical and robotic engineering research studies.(ratio:10.00) C. Core competency 2.1: Have the ability to prepare professional papers in the electrical and robotic engineering field.(ratio:20.00) D. Core competency 2.2: Have the abilities to be creative thinking and to independently solve electrical and robotic engineering related problems.(ratio:20.00) E. Core competency 2.3: Have the ability to lead, manage, plan, coordinate and integrate personnel from various fields.(ratio:10.00) F. Core competency 3.1: Have advanced global awareness and the ability of lifelong self-study.(ratio:20.00)			
S u b j e c t S c h o o l w i d e e s s e n t i a l v i r t u e s			
1. A global perspective. (ratio:10.00) 2. Information literacy. (ratio:20.00) 3. A vision for the future. (ratio:10.00)			

4. Moral integrity. (ratio:10.00)				
5. Independent thinking. (ratio:20.00)				
6. A cheerful attitude and healthy lifestyle. (ratio:10.00)				
7. A spirit of teamwork and dedication. (ratio:10.00)				
8. A sense of aesthetic appreciation. (ratio:10.00)				
Course Introduction	The current course introduces the followings: (1)The basic principles of electrical machinery, circuit concepts, magnetic circuit concepts, power, energy, and torque. (2)Single-phase and three-phase motor system introduction. (3)Structure and composition of embedded control systems. (4)Controller design. (5)Simulation and Analysis of Brushless DC Motor System. (5)Robust performance analysis.			
<p>The correspondences between the course's instructional objectives and the cognitive, affective, and psychomotor objectives.</p> <p>Differentiate the various objective methods among the cognitive, affective and psychomotor domains of the course's instructional objectives.</p> <p>I. Cognitive : Emphasis upon the study of various kinds of knowledge in the cognition of the course's veracity, conception, procedures, outcomes, etc.</p> <p>II.Affective : Emphasis upon the study of various kinds of knowledge in the course's appeal, morals, attitude, conviction, values, etc.</p> <p>III.Psychomotor: Emphasis upon the study of the course's physical activity and technical manipulation.</p>				
No.	Teaching Objectives			objective methods
1	The primary goal of this course is to provide students with a comprehensive and well-structured understanding of robust control fundamentals, design, and industrial applications.			Cognitive
The correspondences of teaching objectives : core competences, essential virtues, teaching methods, and assessment				
No.	Core Competences	Essential Virtues	Teaching Methods	Assessment
1	ABCDEF	12345678	Lecture, Discussion, Practicum, Experience, Imitation	Study Assignments, Discussion(including classroom and online), Practicum, Report(including oral and written)

Course Schedule			
Week	Date	Course Contents	Note
1	114/09/15 ~ 114/09/21	Description of electrical machinery	
2	114/09/22 ~ 114/09/28	Principle and classification of motor	
3	114/09/29 ~ 114/10/05	Introduction of Matlab Simlab	
4	114/10/06 ~ 114/10/12	Steady state analysis of DC motor and simulation of DC motor by Matlab simulink	
5	114/10/13 ~ 114/10/19	Brushless DC motor	
6	114/10/20 ~ 114/10/26	Simulation of brushless DC motor and speed control	
7	114/10/27 ~ 114/11/02	The structure and composition of embedded control systems	
8	114/11/03 ~ 114/11/09	Sampling, aliasing, and fixed-point arithmetic	
9	114/11/10 ~ 114/11/16	Quantification effect	
10	114/11/17 ~ 114/11/23	Controller Design 1	
11	114/11/24 ~ 114/11/30	Controller Design 2	
12	114/12/01 ~ 114/12/07	Closed-loop system simulation	
13	114/12/08 ~ 114/12/14	Controlled object modeling	
14	114/12/15 ~ 114/12/21	Linearization	
15	114/12/22 ~ 114/12/28	Discretization	
16	114/12/29 ~ 115/01/04	LQ regulator with H^∞ filter	
17	115/01/05 ~ 115/01/11	Final Paper Report	
18	115/01/12 ~ 115/01/18	Final Paper Report	
Key capabilities		self-directed learning Information Technology Problem solving Interdisciplinary	
Interdisciplinary		STEAM course (S:Science, T:Technology, E:Engineering, M:Math, A field:Integration of Art and Humanist) Competency-based education 'competency exploration' sustained competency or global issues STEEP (Society, Technology, Economy, Environment, and Politics) In addition to teaching content of the teacher's professional field, integrate other subjects or invite experts and scholars in other fields to share knowledge or teaching	

Distinctive teaching	Industry-university collaboration courses Project implementation course Special/Problem-Based(PBL) Courses
Course Content	Computer programming or Computer language (students have hands-on experience in related projects) Logical Thinking Green Energy Sustainability issue
Requirement	It is recommended to bring a computer to operate Matlab
Textbooks and Teaching Materials	Self-made teaching materials:Presentations, Handouts Using teaching materials from other writers:Presentations, Handouts
References	Design of Embedded Robust Control Systems Using Matlab(r) / Simulink(r)
Grading Policy	<p>◆ Attendance : 30.0 % ◆ Mark of Usual : 20.0 % ◆ Midterm Exam : %</p> <p>◆ Final Exam : 10.0 %</p> <p>◆ Other 〈報告〉 : 40.0 %</p>
Note	<p>This syllabus may be uploaded at the website of Course Syllabus Management System at https://web2.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.</p> <p>※"Adhere to the concept of intellectual property rights" and "Do not illegally photocopy, download, or distribute." Using original textbooks is advised. It is a crime to improperly photocopy others' publications.</p>