

Tamkang University Academic Year 110, 2nd Semester Course Syllabus

Course Title	DESIGN AND PRACTICE OF INTELLIGENT CONTROL	Instructor	CHIEN-FENG WU
Course Class	TETJM1A MASTER'S PROGRAM IN ARTIFICIAL INTELLIGENCE ROBOTICS, DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING, 1A	Details	<ul style="list-style-type: none"> ◆ General Course ◆ Required ◆ One Semester
Relevance to SDGs	SDG4 Quality education		
Departmental Aim of Education			
<ul style="list-style-type: none"> 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. 			
Subject Departmental core competences			
<ul style="list-style-type: none"> A. Core competency 1.1: Have professional knowledge in the disciplines of electrical, computer and robotic engineerings.(ratio:30.00) B. Core competency 1.2: Have the ability to plan and execute electrical and robotic engineering research studies.(ratio:30.00) 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:10.00) F. Core competency 3.1: Have advanced global awareness and the ability of lifelong self-study.(ratio:10.00) 			
Subject Schoolwide essential virtues			
<ul style="list-style-type: none"> 1. A global perspective. (ratio:10.00) 2. Information literacy. (ratio:25.00) 3. A vision for the future. (ratio:20.00) 4. Moral integrity. (ratio:15.00) 5. Independent thinking. (ratio:30.00) 			

Course Introduction	Intelligent Controls deals with the application of artificial intelligence, knowledge base, expert systems fuzzy logic and/ or neural networks for controlling complex physical processes that are difficult to control using conventional methods.
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The correspondences between the course's instructional objectives and the cognitive, affective, and psychomotor objectives.

Differentiate the various objective methods among the cognitive, affective and psychomotor domains of the course's instructional objectives.

- I. Cognitive : Emphasis upon the study of various kinds of knowledge in the cognition of the course's veracity, conception, procedures, outcomes, etc.
- II. Affective : Emphasis upon the study of various kinds of knowledge in the course's appeal, morals, attitude, conviction, values, etc.
- III. Psychomotor: Emphasis upon the study of the course's physical activity and technical manipulation.

No.	Teaching Objectives	objective methods
1	Ensure our graduate students can use theories of artificial intelligence, fuzzy logic and neural networks to design a controller for complex system.	Cognitive

The correspondences of teaching objectives : core competences, essential virtues, teaching methods, and assessment

No.	Core Competences	Essential Virtues	Teaching Methods	Assessment
1	ABCDF	12345	Lecture, Discussion	Testing, Study Assignments

Course Schedule

Week	Date	Course Contents	Note
1	111/02/21 ~ 111/02/25	Dynamical Systems and Modeling	
2	111/02/28 ~ 111/03/04	Reachability and Controllability	
3	111/03/07 ~ 111/03/11	Observability and Constructability	
4	111/03/14 ~ 111/03/18	Basic Definitions of Stability	
5	111/03/21 ~ 111/03/25	Lyapunov' s Indirect Method	

6	111/03/28 ~ 111/04/01	LaSalle' s Invariance Principle	
7	111/04/04 ~ 111/04/08	Fuzzy Arithmetic and Fuzzy Relations	
8	111/04/11 ~ 111/04/15	Fuzzy Relations	
9	111/04/18 ~ 111/04/22	Composition of Fuzzy Relations	
10	111/04/25 ~ 111/04/29	Fuzzy Logic Control	
11	111/05/02 ~ 111/05/06	Radial-Basis Function (RBF) Networks	
12	111/05/09 ~ 111/05/13	A Self-Organizing Network	
13	111/05/16 ~ 111/05/20	Stability Analysis of the Network	
14	111/05/23 ~ 111/05/27	Genetics as an Inspiration for an Optimization Approach	
15	111/05/30 ~ 111/06/03	Simple Evolutionary Algorithm (EA)	
16	111/06/06 ~ 111/06/10	Evolutionary Fuzzy Logic Controllers	
17	111/06/13 ~ 111/06/17	Controlling Chaotic Systems	
18	111/06/20 ~ 111/06/24	Final exam	
Requirement	N/A		
Teaching Facility	Computer, Projector		
Textbooks and Teaching Materials	Zak, S. H. (2003). Systems and control (Vol. 198). New York: Oxford University Press.		
References			
Number of Assignment(s)	4 (Filled in by assignment instructor only)		
Grading Policy	◆ Attendance : 15.0 % ◆ Mark of Usual : 15.0 % ◆ Midterm Exam : % ◆ Final Exam : 30.0 % ◆ Other <Simulation Projects> : 40.0 %		
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.		