Tamkang University Academic Year 113, 1st Semester Course Syllabus

Course Title	DESIGNS AND PRACTICES OF EMBEDDED SYSTEMS	Instructor	JEONG JAESIK
Course Class	TKFXB3A DEPARTMENT OF ARTIFICIAL INTELLIGENCE, 3A	Details	◆ General Course ◆ Selective ◆ One Semester ◆ 3 Credits
Relevance to SDGs	SDG4 Quality education SDG9 Industry, Innovation, and Infrastructure SDG17 Partnerships for the goals		

Departmental Aim of Education

Ⅰ. Students may analyze problems in applied science based on the fundamental knowledge of programming, mathematics, and artificial intelligence.

Ⅱ. Students may plan and implement an AI system following the procedures of problem analysis, experiment testing, data visualizing, derivation and deduction.

Ⅲ. Educate the students to be AI engineers who may accomplish their missions indepedently and may collaborate with their colleagues in the workplace.

Ⅳ. Students may have basic skills and global competence for career diversification, and may keep lifelong learning.

Subject Departmental core competences

A. Professional analysis.(ratio:35.00)

B. Practical application.(ratio:30.00)

C. Professional attitude.(ratio:15.00)

D. Global Mobility.(ratio:20.00)

Subject Schoolwide essential virtues

1. A global perspective. (ratio:15.00)
2. Information literacy. (ratio:15.00)
3. A vision for the future. (ratio:15.00)
4. Moral integrity. (ratio:5.00)
5. Independent thinking. (ratio:20.00)
6. A cheerful attitude and healthy lifestyle. (ratio:5.00)
7. A spirit of teamwork and dedication. (ratio:15.00)
8. A sense of aesthetic appreciation. (ratio:10.00)

Course Introduction	The Embedded Systems course is designed to provide students with a comprehensive understanding of the principles and practices involved in the design and implementation of embedded systems. Covering both theoretical concepts and practical applications, this course explores microcontrollers, embedded software development, real-time operating systems, and hardware/software interfacing. Through hands-on projects and problem-solving exercises, students will develop the skills to create efficient, innovative embedded solutions.

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	1. Foundational Knowledge and Skills in Embedded Systems 2. Understanding and Solving for Real-World Problems 3. Discussing each other to understand effectively	Psychomotor

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

No.	Core Competences	Essential Virtues	Teaching Methods	Assessment
1	ABCD	12345678	Lecture, Discussion, Practicum, Experience	Testing, Discussion(including classroom and online), Practicum, Report(including oral and written)

Course Schedule

Week	Date	Course Contents	Note
1	113/09/09 ~ 113/09/15	Introduction to Embedded System	
2	113/09/16 ~ 113/09/22	Review Programming Language for Embedded System	
3	113/09/23 ~ 113/09/29	Registers & Functions for Embedded System	

4	113/09/30 ~ 113/10/06	Circuit Design	
5	113/10/07 ~ 113/10/13	GPIO – Digital Input / Output	
6	113/10/14 ~ 113/10/20	Interrupt	
7	113/10/21 ~ 113/10/27	Timer	
8	113/10/28 ~ 113/11/03	Analog to Digital Convert with Sensors	
9	113/11/04 ~ 113/11/10	Midterm Exam/Midterm Assessment Week (Project Proposal)	
10	113/11/11 ~ 113/11/17	Serial Communication	
11	113/11/18 ~ 113/11/24	Inter-Integrated Circuit	
12	113/11/25 ~ 113/12/01	Serial Peripheral Interface Bus	
13	113/12/02 ~ 113/12/08	UI Programming	
14	113/12/09 ~ 113/12/15	Advanced UI Programming	
15	113/12/16 ~ 113/12/22	Communication Methods for Embedded Systems and UI	
16	113/12/23 ~ 113/12/29	Final Exam/Final Assessment Week	
17	113/12/30 ~ 114/01/05	開國紀念日(放假一天)	
18	114/01/06 ~ 114/01/12	Flexible Teaching Week: Generally, no in-person classes; teachers may arrange teaching activities or final assessments, among other options.	

Key capabilities	self-directed learning Information Technology Problem solving
Interdisciplinary	STEAM course (S:Science, T:Technology, E:Engineering, M:Math, A field:Integration of Art and Humanist)
Distinctive teaching	Project implementation course Learning technologies (such as AR/VR,etc.) incorporated to physical courses

Course Content	Computer programming or Computer language (students have hands-on experience in related projects) Logical Thinking AI application
Requirement	
Textbooks and Teaching Materials	Self-made teaching materials:Presentations
References	
Grading Policy	◆ Attendance： 10.0 % ◆ Mark of Usual：30.0 % ◆ Midterm Exam： 20.0 % ◆ Final Exam： 40.0 % ◆ 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.**