Tamkang University Academic Year 113, 1st Semester Course Syllabus

Course Title	DIGITAL LOGIC DESIGN	Instructor	HSIN-YI HSU
Course Class	TEBXB1P DEPARTMENT OF MECHANICAL AND ELECTRO-MECHANICAL ENGINEERING, 1P	Details	◆ General Course ◆ Selective ◆ One Semester ◆ 3 Credits
Relevance to SDGs	SDG4 Quality education SDG9 Industry, Innovation, and Infrastructure SDG13 Climate action		

Departmental Aim of Education

Ⅰ. To prepare students with a solid background in applied sciences and engineering to enter the field of mechanical and electromechanical engineering.

Ⅱ. To train emerging engineers who possess the professional expertise and superior engineering ethics to meet the needs and expectations of the local community and global society.

Ⅲ. To instill in students a lifelong love of learning that extends beyond basic skills to acquire attributes of flexibility and adaptability in a diverse and competitive global marketplace.

Subject Departmental core competences

A. Head: Knowledge of mechanical and electromechanical engineering.(ratio:30.00)

B. Hand: Hands-on skills and practical realization.(ratio:40.00)

C. Heart: Love of learning and innovation.(ratio:20.00)

D. Eye: Vision of progress and improvements.(ratio:10.00)

Subject Schoolwide essential virtues

1. A global perspective. (ratio:20.00)
2. Information literacy. (ratio:30.00)
3. A vision for the future. (ratio:20.00)
4. Moral integrity. (ratio:10.00)
5. Independent thinking. (ratio:5.00)
6. A cheerful attitude and healthy lifestyle. (ratio:5.00)
7. A spirit of teamwork and dedication. (ratio:5.00)
8. A sense of aesthetic appreciation. (ratio:5.00)

Course Introduction	This course is compiled from simple to advanced based on current practical cases of optics, machinery, electricity, and communications composed of digital logic components. The core content covers electronic circuits, power electronics, open/closed loop control systems and microprocessors (MCU), logic chips (CPLD, FPGA), artificial intelligence Internet of Things (AIOT) hardware design case analysis and discussion of basic application technologies.

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	This teaching process is based on "learning by doing" and "ability-based", with the goal of guiding students to build basic exploration, analysis, design and implementation capabilities in AIOT industrial technology and practical topics.	Cognitive

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, Publication, Practicum, Experience, Imitation	Testing, Study Assignments, Discussion(including classroom and online), Practicum, Report(including oral and written), Activity Participation

Course Schedule

Week	Date	Course Contents	Note
1	113/09/09 ~ 113/09/15	Electronic circuits: Soldering skills practice on plug-in electronic components PCB boards	Teacher’ s practical demonstration and student practice + Homework

2	113/09/16 ~ 113/09/22	Same as above	Same as above
3	113/09/23 ~ 113/09/29	Electronic circuits: Soldering skills practice on SMD electronic component PCB boards	Same as above
4	113/09/30 ~ 113/10/06	Same as above	Same as above
5	113/10/07 ~ 113/10/13	Power Electronics: AC-DC & DC-DC Switching Power	Same as above
6	113/10/14 ~ 113/10/20	Power Electronics: AC-AC & DC-AC Switching Power	Same as above
7	113/10/21 ~ 113/10/27	Open loop control system (solar photovoltaic system)	Same as above
8	113/10/28 ~ 113/11/03	Same as above	Same as above
9	113/11/04 ~ 113/11/10	Midterm	Practical test
10	113/11/11 ~ 113/11/17	Closed loop control system (motor with feedback system)	Teacher’ s practical demonstration and student practice + Homework
11	113/11/18 ~ 113/11/24	CPLD: Intel (Altera) MAX 3000A-EPM3064A Circuit board hardware design With its Embedded Development Kit (EDK)	Same as above
12	113/11/25 ~ 113/12/01	Same as above	Same as above
13	113/12/02 ~ 113/12/08	FPGA: AMD (Xilinx) Spartan-6 XC6SLX9-2 TQG144 C Circuit board hardware design With its Embedded Development Kit (EDK)	Same as above
14	113/12/09 ~ 113/12/15	Same as above	Same as above
15	113/12/16 ~ 113/12/22	MCU (Atmel_Arduino UNO R3) circuit board hardware design With its Embedded Development Kit (EDK)	Same as above
16	113/12/23 ~ 113/12/29	Same as above	Same as above
17	113/12/30 ~ 114/01/05	Final Exam	Final report
18	114/01/06 ~ 114/01/12	Artificial Intelligence Internet of Things (AIOT)	Topic analysis
Key capabilities		self-directed learning International mobility Information Technology Social Participation Humanistic Caring Problem solving	

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) Intellectual Property (learning intellectual property) Gender Equality Education Logical Thinking Environmental Safety Green Energy AI application Sustainability issue
Requirement	
Textbooks and Teaching Materials	Self-made teaching materials:Textbooks, Presentations, Handouts, Videos, Worksheets Using teaching materials from other writers:Textbooks, Presentations, Handouts, Videos, Worksheets
References	
Grading Policy	◆ Attendance： 10.0 % ◆ Mark of Usual：10.0 % ◆ 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.**