Tamkang University Academic Year 114, 1st Semester Course Syllabus

Course Title	UNMANNED AERIAL VEHICLE NETWORKS, COMMUNICATIONS, NAVIGATION AND COUNTERATTACK	Instructor	HSIN-YI HSU
Course Class	TEBXD1A DOCTORAL PROGRAM, DEPARTMENT OF MECHANICAL AND ELECTRO-MECHANICAL ENGINEERING, 1A	Details	◆ General Course ◆ Selective ◆ One Semester ◆ 3 Credits
Relevance to SDGs	SDG7 Affordable and clean energy SDG8 Decent work and economic growth SDG9 Industry, Innovation, and Infrastructure SDG17 Partnerships for the goals		

Departmental Aim of Education

Ⅰ. To prepare students who have a comprehensive understanding of the principles of applied sciences and engineering to be innovators in the field of mechanical and electromechanical engineering.

Ⅱ. To train emerging professionals who possess a high level of expertise and ethical standards who will become independent research and development leaders in the industry.

Ⅲ. To motivate students who will pursue continuing education as a means to stay on the cutting edge of global competiveness and meet changes in their careers and the workplace with confidence and ease.

Subject Departmental core competences

A. Head: Knowledge of mechanical and electromechanical engineering.(ratio:20.00)

B. Hand: Hands-on skills and practical realization.(ratio:60.00)

C. Heart: Love of learning and innovation.(ratio:10.00)

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

Subject Schoolwide essential virtues

1. A global perspective. (ratio:10.00)

2. Information literacy. (ratio:30.00)

3. A vision for the future. (ratio:10.00)

4. Moral integrity. (ratio:5.00)

5. Independent thinking. (ratio:30.00)

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 starts with the assembly and theory of "quadrotor drone", explores it through communication and inertial navigation experiments, and finally conducts the artificial intelligence Internet of Things (AIOT) application of drones and analysis of Counterattack.

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 for drone AIOT technical practice.	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	Testing, Study Assignments, Discussion(including classroom and online), Practicum, Report(including oral and written), Activity Participation

Course Schedule

Week	Date	Course Contents	Note
1	114/09/15 ~ 114/09/21	1. Overview of course content 2. Hardware assembly of quadcopter drone	Teacher’ s practical demonstration and student practice + Homework

2	114/09/22～ 114/09/28	The dynamics of a quadcopter drone	Multimedia teaching
3	114/09/29～ 114/10/05	Quadcopter drone control system	Same as above
4	114/10/06～ 114/10/12	Drone communication	Same as above
5	114/10/13～ 114/10/19	UAV communication experiment	Teacher’ s practical demonstration and student practice + Homework
6	114/10/20～ 114/10/26	Same as above	Same as above
7	114/10/27～ 114/11/02	Same as above	Same as above
8	114/11/03～ 114/11/09	Same as above	Same as above
9	114/11/10～ 114/11/16	Midterm	Personal learning experience report
10	114/11/17～ 114/11/23	UAV inertial navigation system	Teacher’ s practical demonstration and student practice + Homework
11	114/11/24～ 114/11/30	UAV inertial navigation system experiment	Same as above
12	114/12/01～ 114/12/07	Same as above	Same as above
13	114/12/08～ 114/12/14	Same as above	Same as above
14	114/12/15～ 114/12/21	Drone Artificial Intelligence Internet of Things (AIOT) Application and Counterattack Analysis	Teachers and students discuss together
15	114/12/22～ 114/12/28	Same as above	Same as above
16	114/12/29～ 115/01/04	Same as above	Same as above
17	115/01/05～ 115/01/11	Final exam	Personal learning experience report
18	115/01/12～ 115/01/18	Same as above	Same as above

Key capabilities	self-directed learning International mobility Information Technology 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	Project implementation course Special/Problem-Based(PBL) Courses Collaborative teaching (multiple teachers and business teachers in the school) course
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 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. ※"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.