Tamkang University Academic Year 110, 1st Semester Course Syllabus

Course Title	TAGUCHI QUALITY ENGINEERING	Instructor	KUAN OU YANG
Course Class	TENXM1A MASTER'S PROGRAM, DEPARTMENT OF AEROSPACE ENGINEERING, 1A	Details	◆ General Course ◆ Selective ◆ One Semester
Relevance to SDGs	SDG4 Quality education SDG9 Industry, Innovation, and Infrastructure		

Departmental Aim of Education

Ⅰ. To lay down a concrete foundation of professional ethics in aerospace and aeronautical engineering, and to cultivate the students' ability in multidisciplinary expertise and continuous learning.

Ⅱ. To setup the students' hands-on ability of and the ability in resolving problem, so that both practical implementations and theories can be emphasized.

Ⅲ. To foster students with diligent and sociable attitude in work, and broadeded international perspective.

Subject Departmental core competences

A. To equip with specific aerospace engineering knowledge and expertise.(ratio:25.00)

B. Be able to master information, capable of utilizing computer to assist solving problems, and possess the ability of conducting learning new knowledge.(ratio:30.00)

C. Be able to design and conduct experiments as well as to analyze, and to solve practical aerospace related engineering problems.(ratio:25.00)

D. Be able to write professional research papers in the field of aerospace engineering. (ratio:10.00)

E. Have a creative thinking, complete analyzing, effective communication, the spirit of teamwork and the ability to solve industrial problems.(ratio:10.00)

Subject Schoolwide essential virtues

1. A global perspective. (ratio:30.00)

2. Information literacy. (ratio:30.00)

3. A vision for the future. (ratio:20.00)

5. Independent thinking. (ratio:20.00)

Course Introduction	This course introduces the Taguchi method and its application on actual engineering problems. Course content includes factor and level, orthogonal array, ratio of signal to noise, the procedure of the Taguchi method, analysis of variance, confirmation experiment and prediction. Some industry cases are provided to demonstrate the application of Taguchi method.

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	Students can understand the meanings of quality engineering, the Taguchi quality engineering method, some evaluation techniques of quality, the use of the functions provided by EXCEL to analyze qualities. Finally, students can apply the Taguchi method to actual engineering problems.	Cognitive

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

No.	Core Competences	Essential Virtues	Teaching Methods	Assessment
1	ABCDE	1235	Lecture, Discussion	Testing, Discussion(including classroom and online)

Course Schedule

Week	Date	Course Contents	Note
1	110/09/22 ~ 110/09/28	Introduction	
2	110/09/29 ~ 110/10/05	Quality characteristics	
3	110/10/06 ~ 110/10/12	Controllable factors and noise factors	

4	110/10/13 ~ 110/10/19	Orthogonal array	
5	110/10/20 ~ 110/10/26	Response of quality characteristics	
6	110/10/27 ~ 110/11/02	Test 1	
7	110/11/03 ~ 110/11/09	Response table/graph (I)	
8	110/11/10 ~ 110/11/16	Response table/graph (II)	
9	110/11/17 ~ 110/11/23	Confirmation and prediction	
10	110/11/24 ~ 110/11/30	Midterm Exam	
11	110/12/01 ~ 110/12/07	Robust parameter design (I)	
12	110/12/08 ~ 110/12/14	Robust parameter design (II)	
13	110/12/15 ~ 110/12/21	Steps of Taguchi method (I)	
14	110/12/22 ~ 110/12/28	Steps of Taguchi method (II)	
15	110/12/29 ~ 111/01/04	Test 2	
16	111/01/05 ~ 111/01/11	S/N ratio calculations	
17	111/01/12 ~ 111/01/18	Standard deviation, probability density, normal distribution	
18	111/01/19 ~ 111/01/25	Final Exam	

Requirement	
Teaching Facility	Computer, Projector
Textbooks and Teaching Materials	Design and Analysis of Experiments, Second Edition, Angela Dean, Springer, 2017
References	Taguchi Methods: Principles and Practices of Quality Design, Forth Edition, Lee, H.-H., Gau Lih Book Co., Taiwan, 2011.
Number of Assignment(s)	(Filled in by assignment instructor only)
Grading Policy	◆ Attendance： 10.0 % ◆ Mark of Usual： % ◆ Midterm Exam： 30.0 % ◆ Final Exam： 30.0 % ◆ Other〈Quizzes or reports〉：30.0 %

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.**