Tamkang University Academic Year 108, 2nd Semester Course Syllabus

Course Title	ENGINEERING MATHEMATICS	Instructor	TYAN FENG
Course Class	TENXB2A DEPARTMENT OF AEROSPACE ENGINEERING, 2A	Details	◆ General Course ◆ Required ◆ 2nd Semester

Departmental Aim of Education

Ⅰ. Apply scientific knowledge and engineering techniques to analyze and solve fundamental aerospace engineering problem.

Ⅱ. Through fundamental theory to design and implement experiments, and be able to analyze experimental data.

Ⅲ. Maintain the spirit of independent thinking, self-elevate, and continuous learning.

Ⅳ. Uphold the responsible attitude of work ethics and team work.

Ⅴ. Will have access to information, using basic knowledge, diversification, and better ability to adapt to circumstances.

Subject Departmental core competences

A. With basic aerospace engineering expertise.(ratio:30.00)

B. Able to solve basic engineering problems via fundamental theory.(ratio:30.00)

C. Capable of lifelong learning and research capacity for further studies.(ratio:20.00)

D. To work with a sense of mission and responsibility.(ratio:5.00)

E. Have team spirit and the ability to communicate with each other.(ratio:5.00)

F. With an international perspective, have the ability to connect with the world.(ratio:5.00)

G. Taking full advantage of information and utilization of computer-assisted problem solving skills.(ratio:5.00)

Subject Schoolwide essential virtues

1. A global perspective. (ratio:10.00)

2. Information literacy. (ratio:20.00)

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

5. Independent thinking. (ratio:50.00)

	Course Introduction	This course will give an introduction to linear algebra that is useful in various fields. Starting with matrix arithmetic, several topics will be covered in the lectures, including determinants, introduction of vector space, bases and dimensions, inner and outer product, similarity and diagonalization, and so on. Computer programming will be applied to this course so that students knows how to make use of the computer technology as well as linear algebra to solve for engineering problems. Homework, midterm examination and final examination will be used for the evaluation.

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	Have students understand the meaning and the techniques of differential equations	Cognitive
2	understand how to solve the differential equations by using power series and Laplace transformation	Cognitive
3	understand how to use computer to solve linear problems in engineering	Cognitive
4	develop the ability of analyzing engineering problems with mathematics	Cognitive
5	Have students understand the meaning and the techniques of differential equations.	Cognitive

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

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

3	ABCDEG	1235	Lecture, Discussion	Testing, Discussion(including classroom and online)
4	ABCDEFG	1235	Lecture, Discussion	Testing, Discussion(including classroom and online)
5	ABCDEFG	1235	Lecture, Discussion	Testing, Discussion(including classroom and online)

Course Schedule

Week	Date	Course Contents	Note
1	109/03/02 ~ 109/03/08	vector space	
2	109/03/09 ~ 109/03/15	vector space	
3	109/03/16 ~ 109/03/22	Matrices and Linear Equations	
4	109/03/23 ~ 109/03/29	Matrices and Linear Equations	
5	109/03/30 ~ 109/04/05	The Eigenvalue Problem	
6	109/04/06 ~ 109/04/12	The Eigenvalue Problem	
7	109/04/13 ~ 109/04/19	Differential Calculus of Functions of Several Variables	
8	109/04/20 ~ 109/04/26	Differential Calculus of Functions of Several Variables	
9	109/04/27 ~ 109/05/03	Midterm Exam Week	
10	109/05/04 ~ 109/05/10	Vectors in 3D-Space	
11	109/05/11 ~ 109/05/17	Vectors in 3D-Space	
12	109/05/18 ~ 109/05/24	Curves, Surfaces and Volumes	
13	109/05/25 ~ 109/05/31	Curves, Surfaces and Volumes	
14	109/06/01 ~ 109/06/07	Scalar and Vector Field Theory	
15	109/06/08 ~ 109/06/14	Scalar and Vector Field Theory	
16	109/06/15 ~ 109/06/21	Fourier Series, Fourier Integral and Fourier Transform	
17	109/06/22 ~ 109/06/28	Final Exam Week (Date:109/6/18-109/6/24)	
18	109/06/29 ~ 109/07/05	Supplementary teaching: Fourier Series, Fourier Integral and Fourier Transform	

Requirement	Work hard.
Teaching Facility	Computer, Projector
Textbooks and Teaching Materials	T.B.D.
References	C.R. Wylie, "Advanced Engineering Mathematics," 6th ed, 1995 Gareth Williams, "Linear Algebra with Applications," 8th ed, Johns & Bartlett Learning, 2014 Gilbert Strang, &amp;quot;Introduction to Linear Algebra,&amp;quot; 4th ed., Wellesley Cambridge Press, 2009
Number of Assignment(s)	**8** (Filled in by assignment instructor only)
Grading Policy	◆ Attendance： % ◆ Mark of Usual： % ◆ Midterm Exam： 35.0 % ◆ Final Exam： 50.0 % ◆ Other〈Homework〉：15.0 %
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.**