Course Title	ENGINEERING MATHEMATICS	Instructor	TYAN FENG
Course Class	TENXB2A DEPARTMENT OF AEROSPACE ENGINEERING, 2A	Details	◆ General Course ◆ Required ◆ 2nd Semester ◆ 3 Credits
Relevance to SDGs	SDG4 Quality education SDG9 Industry, Innovation, and Infrastructure		

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)

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 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	12345678	Lecture, Discussion, Practicum	Testing, Study Assignments, Discussion(including classroom and online), Practicum
2	ABCDEFG	12345678	Lecture, Discussion, Practicum	Testing, Study Assignments, Discussion(including classroom and online), Practicum
3	ABCDEFG	12345678	Lecture, Discussion, Practicum	Testing, Study Assignments, Discussion(including classroom and online), Practicum
4	ABCDEFG	12345678	Lecture, Discussion, Practicum	Testing, Study Assignments, Discussion(including classroom and online), Practicum
5	ABCDEFG	12345678	Lecture, Discussion	Testing, Study Assignments, Discussion(including classroom and online), Practicum

Course Schedule

Week	Date	Course Contents	Note
1	114/02/17～114/02/23	vector space	
2	114/02/24～114/03/02	vector space	
3	114/03/03～114/03/09	Matrices and Linear Equations	
4	114/03/10～114/03/16	Matrices and Linear Equations	
5	114/03/17～114/03/23	The Eigenvalue Problem	
6	114/03/24～114/03/30	The Eigenvalue Problem	
7	114/03/31～114/04/06	Differential Calculus of Functions of Several Variables	
8	114/04/07～114/04/13	Differential Calculus of Functions of Several Variables	
9	114/04/14～114/04/20	Midterm Exam/Midterm Assessment Week (teachers can adjust the week as needed)	
10	114/04/21～114/04/27	Vectors in 3D-Space	
11	114/04/28～114/05/04	Vectors in 3D-Space	
12	114/05/05～114/05/11	Curves, Surfaces and Volumes	

13	114/05/12～114/05/18	Curves, Surfaces and Volumes	
14	114/05/19～114/05/25	Scalar and Vector Field Theory	
15	114/05/26～114/06/01	Scalar and Vector Field Theory	
16	114/06/02～114/06/08	Fourier Series, Fourier Integral and Fourier Transform	
17	114/06/09～114/06/15	Final Exam/Final Assessment Week (teachers can adjust the week as needed)	
18	114/06/16～114/06/22	Flexible Teaching Week: Generally, no in-person classes; teachers may arrange teaching activities or final assessments, among other options.	

Key capabilities	self-directed learning Problem solving
Interdisciplinary	STEAM course (S:Science, T:Technology, E:Engineering, M:Math, A field:Integration of Art and Humanist)
Distinctive teaching	Learning technologies (such as AR/VR,etc.) incorporated to physical courses
Course Content	Logical Thinking AI application Sustainability issue
Requirement	Work hard.
Textbooks and Teaching Materials	Self-made teaching materials:Textbooks, Presentations, Handouts Using teaching materials from other writers:Textbooks, Presentations, Handouts, Videos
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
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 .
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