

108-2 Full Curriculum of Da-Yeh University

Information			
Title	Engineering Mathematics(2)	Serial No./ID	0760 /MAI2002
Required/Credit	Required /3	Time/Place	(Mon)34 /H439, (Thu)5 /H439
Language	Chinese	Grade Type	Number
Lecturer /Full- or Part-time	/Full-time	Graduate Class	Non-graduating Class
School System /Dept /Class, Grade	Bachelor /Department of Mechanical and Automation Engineering /Class 1, Grade 2		
Office Hour / Place	(Wed) 12:00~13:20, (Thu) 12:00~13:20, (Fri) 12:00~13:20, (Fri) 13:20~14:10 / H215		
Lecturer	n.a.		

Introduction

Engineering mathematics is an important tool for exploring and resolving engineering problems. The objectives of this course are to expose students to the problems frequently encountered in engineering fields, to make students grasp the fundamental capability of engineering mathematics, and to apply mathematics in mechanical engineering fields. The contents of this course are: 1. Linear Algebra; 2. Vector differential/integral calculus; 3. Fourier series; 4. Partial differential equations.

Outline

Unit 1: Linear Algebra: Matrices, Vectors, Determinants, Linear Systems.
Unit 2: Vector Differential Calculus. Grad, Div, Curl.
Unit 3: Linear Algebra: Matrix Eigenvalue Problems.
Unit 4: Vector Integral Calculus. Integral Theorems.
Unit 5: Fourier Series, Integrals, and Transforms.
Unit 6: Partial Differential Equations (PDEs).

Prerequisite

English reading competence, fundamental mathematics, calculus.

The Relationship Between Courses and Departmental Core Competencies and Basic Skills

-  ability to apply knowledge of mathematics, science, and engineering
-  ability to design and conduct experiments, as well as to analyze and interpret data
-  ability to use techniques, skills, and tools necessary for engineering practices
-  ability to design an engineering system, component, or process
-  knowledge of contemporary issues; an understanding of the impact of engineering solutions in environmental, societal, and global contexts; and the ability to cultivate habits of life-long learning
-  understanding of professional ethics and social responsibility

ability to manage projects, multidisciplinary ,communicate effectively and function in a team



ability to identify, analyze, and solve Integrated engineering problems

Teaching Plan						
Core Capability	Weight(%)) 【A】	Ability index(Performance Indicators)	Teaching Methods	Assessment and Weight	Core Competency Learning Outcomes 【B】	Final Exam Grades 【C=B*A 】
ability to apply knowledge of mathematics, science, and engineering	40	Students can apply the knowledge of calculus to develop the relevant equations in the mechanical engineering fields. Students can integrate knowledge of mechanics, electrics, and machinery into electromechanical applications	Lecturing	Quiz: 20% Midterm Exam: 30% Final Exam: 30% Homework Assignment: 1% Course Participation: 17% Assistant Observation Record: 1% Class Notes: 1%	Total: 100	40
ability to design and conduct experiments, as well as to analyze and interpret data	10	Students can arrange and carry out experimental processes. Students can acquire needed experimental data and resolve the trouble arising from experiments. Students can display experimental results by figures or tables, and explain the trend of data.	Lecturing	Final Exam: 30% Midterm Exam: 30% Quiz: 20% Homework Assignment: 1% Class Notes: 1% Assistant Observation Record: 1% Course Participation: 17%	Total: 100	10
ability to use techniques, skills, and tools necessary for engineering practices	10	Students can operate machine tools to make simple mechanical parts. Students can operate computers and write computer programs. Students can produce engineering drawing by computer aided drawing tools.	Lecturing	Quiz: 20% Midterm Exam: 30% Final Exam: 30% Assistant Observation Record: 1% Course Participation: 17% Homework Assignment: 1% Class Notes: 1%	Total: 100	10

ability to design an engineering system, component, or process	10	Students can design machinery or electromechanical parts by using computer aided engineering tools. Students can design components of machinery, vehicles and automatic manufacturing systems.	Lecturing	Final Exam: 30% Midterm Exam: 30% Quiz: 20% Homework Assignment: 1% Class Notes: 1% Assistant Observation Record: 1% Course Participation: 17%	Total: 100	10
knowledge of contemporary issues; an understanding of the impact of engineering solutions in environmental, societal, and global contexts; and the ability to cultivate habits of life-long learning	10	Students understand the roles of professional subjects in the issues of science and technology. Students know that the resources of information related to industrial contemporary issues and technologies can be obtained from the newspaper, network, and textbooks. Students can form the habits of ordinary, and life-long, sustained learning.	Lecturing	Final Exam: 30% Midterm Exam: 30% Quiz: 20% Homework Assignment: 1% Course Participation: 17% Assistant Observation Record: 1% Class Notes: 1%	Total: 100	10
understanding of professional ethics and social responsibility	10	Students understand that professional software holds intelligent propriety. Students understand the conflict of interest as career change occurs. Students understand the social obligation of environmental protection.	Lecturing	Final Exam: 30% Midterm Exam: 30% Quiz: 20% Homework Assignment: 1% Class Notes: 1% Assistant Observation Record: 1% Course Participation: 17%	Total: 100	10

ability to identify, analyze, and solve Integrated engineering problems	10	Students can spot design errors and estimate design requirements. Students can find ways of remedying design errors and ways of meeting design requirements.	Lecturing	Quiz: 20% Midterm Exam: 30% Final Exam: 30% Homework Assignment: 1% Course Participation: 17% Assistant Observation Record: 1% Class Notes: 1%	Total: 100	10
---	----	--	-----------	--	------------	----

Grade Auditing

Final Exam: 30%

Midterm Exam: 30%

Quiz: 20%

Course Participation: 17%

Assistant Observation Record: 1%

Class Notes: 1%

Homework Assignment: 1%

Book Type (Respect intellectual property rights. Please use official textbooks and do not illegally photocopy others' works.)

Book Type	Book name	Author
Textbook	工程數學(Advanced Engineering Mathematics)	原著: Erwin Kreyszig

Lesson Plan

Weeks	Content	Teaching Methods
1	review of 5.1 & Intellectual Property Protection (use legitimate textbooks only) & Traffic safety Propaganda	Lecturing
2	5.2 Laplace transform of derivatives and integrals	Lecturing
3	5.3 step function & 2nd shift theorem; 5.4 impulse function & partial function	Lecturing
4	6.1 matrices and vectors 6.2 multiplication of matrices	Lecturing
5	6.3 system of linear equations and Gauss elimination	Lecturing

6	6.4 linear independence and matrix's rank; vector space	Lecturing
7	6.5 Existence and uniqueness of linear system's solution	6.6 Lecturing
	2nd & 3rd order determinant	
8	6.7 determinant , Cramer's Rule	Lecturing
9	Midterm Exam.	test
10	7.1 Eigen value and Eigen vector of matrices	Lecturing
11	7.2 Some application of Eigen value problem	Lecturing
12	8.1 2-D & 3-D Vectors	Lecturing
13	8.2 Dot Product of vectors	Lecturing
14	8.3 Cross product of vectors	Lecturing
15	8.4 Scalar and vector functions; fields and differential of vectors	Lecturing
16	8.6 gradient of scalar field , directional derivatives	Lecturing
17	8.7 divergence and curl of vector fields	Lecturing
18	Final ExamF	test