

國立中正大學機械工程學系 114 學年度第 1 學期教學大綱表

Syllabus for the first semester of the 114 academic year of the Department of Mechanical Engineering, National Chung Cheng University

Class Name: (中文) 工程數學(一) (英文) Engineering Mathematics (I)					Dept.	ME
					Class No.	4202001
Instructor	Liu, De-Shin	Credit	3	Selected Course	Level	2ABC
全英文授課 EMI	☒ 是 ☐ 否					
課程類別 course type	☐ 人文關懷課程 ☐ 競賽專題課程 ☐ 問題導向課程 ☒ 專題導向課程 ☐ 總整課程 ☐ 實作課程 ☐ 實習 ☐ 其他					
Prerequisites: Basic calculus operations.						
Course overview: Engineering mathematics is the basis and method for deriving engineering physics phenomena into mathematical models. Subjects included differential equations, Laplace transformations, series solutions, and vector and matrix calculations will be taught to cultivate students' ability to have both theory and practice.						
Textbook	1. Advanced Engineering mathematics (7th, Edition, Zill & Cullen) 「請尊重智慧財產權，不得非法影印教師指定之教科書籍」					
教學要點概述						
教材編選 teaching materials	☒ 自製簡報(ppt) ☐ 課程講義 ☐ 自編教科書 ☒ 教學程式 ☐ 自製教學影片 ☐ 其他					
教學方法 teaching methods	☒ 講述 ☐ 小組討論 ☐ 學生口頭報告 ☐ 問題導向學習 ☐ 個案研究 ☐ 其他					
評量工具 Evaluation tools	☒ 期中考 ☒ 期末考 ☐ 隨堂測驗 ☐ 隨堂作業 ☒ 課後作業 ☐ 期中報告 ☐ 期末報告 ☐ 專題報告 ☐ 評量尺規 ☐ 其他					
教學資源 teaching resources	☒ 課程網站 ☒ 教材電子檔供下載 ☐ 實習網站					
教師相關訊息 instructor's information	劉德騏老師為機械系教授，在力學分析住值計算較學經驗超過 30 年					

Agenda		Teaching Hours				Achievable core competence
Topics	Content Outline	Lecture	Demonstration	Exercises	Other	
1. Introduction of ODE	Formulation of ODE	2				B1, B5, B6
2. 1st Order ODE	1. Separable Variables 2. Integrating Factor	8				B1, B5, B6
3. Higher-Order Diff.	1. 2nd Order ODE 2. Higher-Order Diff. Eq.	8				B1, B5, B6
4. The Laplace Transform	1. Definition of L-transform 2. Translation Theorems 3. Operational Properties	8				B1, B5, B6
5. Series Solution of Diff. Eq.	1. Power Series 2. Series Solutions of Diff. Eq.	6				B1, B5, B6
Achievable core competence		Achievable target				
B1	Capable of basic engineering mathematics, solid mechanics, thermodynamics, automatic control and material science analysis	Capable of basic engineering mathematics analysis				
B5	Capable of mechanical system, component design and manufacturing process planning	Capable of deriving engineering physics phenomena into mathematical models				
B6	Ability to discover, analyze and solve professional problems	Ability to discover, analyze and solve mathematical models related to mechanical system				

Overview of teaching plan: Engineering Mathematics (I)

Class date	Class room	Exam.	Office hour	Teaching quality evaluation
Wednesday & Friday 10:15AM ~11:30 AM	工學 2 館 ME 117 School of Engineering Building No. 2 ME 117	Homework 10% (Including attendance) Mid-term-I 30% Mid-term-II 30% Final Test 30%	Tuesday: 10:10-12:00 AM Thursday: 14:10-16:00 PM 12:00 AM Rm. 425 Tel: 2720411 ext. 33305 E-mail: imedsl@ccu.edu.tw	teaching opinion survey
Weekly	Teaching plan			Remark
1	Introduction of Differential Equations			
2	Separable Variables			
3	Integrating Factor			
4	Exact Equations			
5	2nd Order ODE			

6	Higher-Order Diff. Eq.	
7	Cauchy-Euler Equation	
8	Mid-term (I)	Mid-term (I)
9	Definition of L-transform	
10	Translation Theorems	
11	Reverse Translation Technique	
12	Operational Properties	
13	Mid-term (II)	Mid-term (II)
14	Power Series -1	
15	Power Series -2	
16	Series Solutions of Diff. Eq. -1	
17	Series Solutions of Diff. Eq. -2	
18	Final Exam	
Other supplementary notes:		