國立中正大學機械工程學系 114 學年度第一學期教學大綱表

Couse Contents of 2025 Fall

Department of Mechanical Engineering, National Chung Cheng University

<table>
<tr><td colspan="5">課程名稱： 彈性力學
Course Name: Elasticity</td><td>開課單位
Department</td><td>機械系
Mechanical Engineering</td></tr>
<tr><td colspan="5"></td><td>課程代碼
Course Code</td><td>4205007</td></tr>
<tr><td>授課教師
Lecture</td><td>林派臣
Pai-Chen Lin</td><td>學分數
Credit</td><td>3</td><td>選修
Selective</td><td>開課年級
Grade</td><td>碩博士班
M.S. & Ph.D.</td></tr>
<tr><td>全英文授課
EMI</td><td colspan="6">■是 □否</td></tr>
<tr><td colspan="7">先修科目或先備能力：靜力學、材料力學
Required Courses: Statistics, Mechanics of Materials</td></tr>
<tr><td colspan="7">課程概述：本課程主要介紹彈性力學，包含張量介紹、力學基本理論、直角座標之二維問題、極座標之三維問題及能量法等。主要是使學生能掌握分析彈性體應力和變形的基本方法，為以後進一步研究實際工程構件和結構的強度、剛度、可靠性、斷裂和疲勞等固體力學問題建立必要的理論基礎。
Course Descriptions: This course is mainly to introduce the elasticity, including tensor introduction, fundamental mechanics theory, 2D Cartesian coordinate problems, polar coordinate problems, and energy method, etc. This course can help students to handle the basic methods for elastic stress and strain, to build up a strong theoretical basis for study the strength, stiffness, reliability, fracture and fatigue problems of practical engineering components and structures.
目標：本課程的目標是希望學生瞭解有關彈性力學領域內之基本常識及原理，並將此基本理論應用於工程上的問題，使學生了解如何將實際問題以方程式及邊界條件表示出來，為學習有限元素法、複合材料力學、斷裂力學和疲勞等課程奠立基礎。使學生能具有對工程問題分析的能力及技巧。
Objective: The purpose of this course is to allow students to understand the common sense and theory of elastic mechanics, and then to apply them to many engineering problems, such as how to present the formulas and boundary conditions of a real problem, and how to prepare the courses of finite element analysis, fracture mechanics, and fatigue. Finally, allow students to have ability and skill to analyze the engineering problems.</td></tr>
<tr><td>教科書</td><td colspan="6">1. Elasticity, J. R. Barber, 3ed., Springer, 2009
2. Theory of Elasticity, Timoshenko and Goodier, McGraw-Hill, 1970
3. Elasticity in Engineering Mechanics, Arthur P. Boresi and Ken P. Chong, John Wiley & Sons, New York, 2000
「請尊重智慧財產權，不得非法影印教師指定之教科書籍」</td></tr>
<tr><td colspan="7">教學要點概述</td></tr>
<tr><td>教材編選
teaching materials</td><td colspan="6">■ 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</td></tr>
</table>

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	林派臣 Email: imepcl@ccu.edu.tw Room: 532A

課程大綱 Course Outlines		分配時數 Hours				可達成核心能力 Core Competence
單元主題 Unit Title	內容綱要 Contents	講授 Lecture	示範 Demo	習作 Practice	其他 Others	
Introduction	Elasticity	3				D1 D2 D4
Stress & Strain	1. Indicial notation 2. Stress 3. Strain 4. Stress-strain relation 5. Plane stress & plane strain	23	1			D1 D2 D4
Stress Function Approach	1. Stress function formulation 2. Problems in rectangular coordinate 3. End effects 4. Body forces 5. Problems in polar coordinates 6. Calculation of displacements	23	1			D1 D2 D4

可達成核心能力 **Core Competence of Graduate Program**		核心能力達成指標 **Index of Core Competence**
D1	具固力領域之專業知識。 Well established advanced knowledge in solid mechanics	具固力領域之專業知識。 Well established advanced knowledge in solid mechanics
D2	策劃及執行固力及其相關領域專題研究之能力。 Competence in planning and conducting research and development projects in solid mechanics and related disciplines	策劃及執行固力及其相關領域專題研究之能力。 Competence in planning and conducting research and development projects in solid mechanics and related disciplines

D4	創新思考及獨立解決固力問題之能力。 Capacity of innovative thinking and independent problem solving for solid mechanics challenges	創新思考及獨立解決固力問題之能力。 Capacity of innovative thinking and independent problem solving for solid mechanics challenges

教學要點概述:

上課時間 Course Time	上課地點 Course Location	學習成果評量方式 Grading	Office hour	教學品質評量方式 Evaluation
星期一 13-15	工二館 215 右 ME Bldg. Rm. 215R	作業 30%(Hw) 期中考 30% (Mid term Ex.) 期末考 40% (Final)	星期一 13:00-16:00	教學意見調查核心能力重要性及達成度分析問卷 Questionnaire

週次 Weeks	教學與作業進度 Teaching & Homework Progress	備註 Note
1	Introduction/ Indicial notation	
2	Indicial notation	HW#1 due in 3th week
3	Stress	
4	Stress	HW#2 due in 5th week
5	Strain	
6	Strain	HW#3 due in 7th week
7	Stress - Strain relation	HW#4 due in 8th week
8	Plane stress & plane strain	
9	期中考(Midterm Exam)	
10	Stress function formulation	HW#5 due in 11th week
11	Problems in rectangular coordinate	
12	Problems in rectangular coordinate	HW#6 due in 13th week
13	End effects	
14	Body forces	
15	Body forces	HW#7 due in 16th week
16	Problems in polar coordinates	HW#8 due in 17th week
17	Calculation of displacements	HW#9 due in 18th week

18	期末考 (Final Exam)	
其他 (Others):		