

## 國立台灣科技大學 114學年 第2學期 課程大綱

## Spring 2026 NTUST Course Outline

授課教師：許士昱

Instructor: Shi-Yu XU

課程名稱：有限元素法

Course Title : Finite Element Method

2026/6/22

課程代號：CT5202701 Course Code	必選修：選修/半學年 Required/Elective: Elective/Half Yr.
學分數：3 Credits	先修課程： Prerequisites
節次教室：T2(IB-610) T3(IB-610) T4(IB-610) Time/Location	
專業核心能力： Core Professional Competencies	
課程網址： Course Website	
課程宗旨： Course Objectives	此課程提供有限元素法(FEM)應用在結構力學問題上的基本介紹，主要授課目標為瞭解有限元素法的基本觀念、優點、限制及實務應用。 This course will provide an introduction to the finite element method (FEM) as applied to the fields of structural mechanics problems. To have a fundamental understanding of the FEM concepts, their strengths, their limitations and their practical application is the major goal for this course.
課程大綱： Outline of Lectures	Week 1: Introduction to finite element method; Introduction to MATLAB Week 2: Bar element Week 3: Truss element Week 4: Finite element formulation of truss structures with MATLAB Week 5: Static condensation Week 6: Midterm Exam I Week 7: Euler-Bernoulli beam element Week 8: Rigid jointed frames Week 9: Frames with internal hinges; Eigenvalue analysis Week 10: Strong form and weak form Week 11: Dynamic formulation Week 12: Midterm Exam II Week 13: Stress and strain analysis; Introduction to ABAQUS Week 14: Analysis of truss structures with ABAQUS Week 15: Analysis of a frame with ABAQUS; Eigenvalue extraction with ABAQUS Week 16: Final exam
授課方式： Method of Instruction	講授 Lecture : 70% 分組討論 Group discussion : 0% 案例研討 Case study : 15% 操做練習 Practical exercises : 15% 講授 Lecture : N/A%
教科書： Textbooks	本課程未使用任何特定教科書。 No textbook is required.
參考書目： References	

1. Bucalem, M. L. and Bathe, K.-J. (2011). The Mechanics of Solids and Structures. Springer
2. Chandrupatla, T.R. and Belegundu, A.D. "Introduction to finite elements in engineering", PrenticeHall.
3. Hughes T.J.R.. "The Finite Element Method: Linear Static and Dynamic Finite Element Analysis", Dover Publications.

修課須知： 本課程內容不會包括固體元素(solid element)之背景理論。  
Notice This course WILL NOT cover the finite element formulation of solid elements.

評量方式： Class Participation 10%  
Grading Homework Assignments 25%  
Midterm Exam I \*\* 20%  
Midterm Exam II \*\* 20%  
Term Project 25%

備註說明： 本課程某些作業必須自行撰寫 MATLAB 程式。  
Notes In some homework assignments, students will need to compose computer programs using MATLAB.