有限元素法導論

114-2 開課 | 異動

收藏 加入預選

流水號
25146

課號
ME5163

課程識別碼
522 U4270

無分班

3 學分

選修
機械工程學系 / 機械工程學研究所

黃琮暉

三 6, 7, 8

機械系計中

2 類

修課總人數 54 人
本校 54 人

領域專長
固體力學與應用

英文授課

NTU COOL

核心能力與課程規劃關聯圖

備註

機械系 本課程以英語授課。機械系系定選修
機械所 本課程以英語授課。

修課限制

限本系所學生(含輔系、雙修生)

本校選課狀況

已選上	剩餘名額	已登記
37 / 54	17	0

課程概述

This course provides an introductory overview of the theoretical foundations of the Finite Element Method (FEM), in conjunction with fundamental topics in solid mechanics and related coupled physical phenomena in mechanical engineering. By integrating the use of commercial finite element software, the course aims to equip students with fundamental problem-solving skills for engineering applications involving numerical computer simulations.
This course is recommended for undergraduate beginners.
本課程將簡單介紹有限元素法的理論基礎，配合機械基礎固體力學等相關物理耦合現象，並且搭配商用有限元素軟體，使學生具備電腦模擬數值計算的基礎工程問題解決能力。
本課程建議大學部初學者修習。

課程目標

The course covers the theoretical foundations of the Finite Element Method, enabling students to acquire the basic knowledge required for CAE-based numerical analysis. Combined with a theoretical background in engineering mechanics, particularly solid mechanics, including basic statics and mechanics of materials, the course also introduces selected concepts from vibration and advanced mechanics of materials. Through hands-on computer-based numerical simulations, students will develop the ability to handle engineering problems involving multiple physical fields.
本課程涵蓋有限元素法的理論基礎，使學生具備此CAE數值計算的基礎，結合工程力學的理論背

景，尤其固體力學將涵蓋基本的靜力學與材料力學，並引導部分的振動學與高等材料力學的觀念，進行電腦操作的數值計算，培養多物理量的工程問題處理方法。

課程要求

Prerequisites: Mechanics of materials and other fundamental mechanics course.
建議先修材料力學與其他基礎力學課程

The course introduces fundamental numerical methods of the Finite Element Method, along with the necessary theoretical background. The course covers mechanical engineering topics including statics, dynamics, mechanics of materials, and heat transfer, with selected content related to vibration. The course includes hands-on CAE operations, requiring students to complete full analysis case studies. The course aims to develop students' oral presentation and technical report writing skills.
課程將講解有關有限元素法的基本數值方法，具相關理論基礎並涵蓋機械力學（靜力、動力、材力、熱流）、振動學與其他機械相關理論知識。 課程亦包含電腦CAE操作，需完整執行分析案例。同時也透過課程培養學生口頭報告與書面報告的能力

預期每週課前或/與課後學習時數

Each week, a lecture of 3 hours will be conducted to introduce the fundamental principles and software operation of finite element method. Students are expected to devote an additional 3 hours per week outside of class to further their understanding of the subject matter and to complete the assigned work.

本課程每週安排 3 小時之課堂講授，內容涵蓋有限元原理與有限元軟體基本操作。修課學生預期每週需額外投入約 3小時於課後學習，以加深對課程內容之理解並完成相關作業。

Office Hour

Appointment via Email

*此 Office Hour 需要提前預約

指定閱讀

Abaqus實務攻略：入門必備，士盟科技，2020
Amar Khennane, Introduction to finite element analysis using MATLAB and Abaqus, Boca Raton : Taylor & Francis 2013 (Electronic Resource)

授課教師會以投影片方式講解課程講義。上課前會上傳講義，請同學自行下載至平板或筆記型電腦。Lecture notes will be given via slides. Students are expected to copy them out or onto a notebook, tablet or laptop.

參考書目

Reference:
Abaqus實務入門引導 / Getting Started with ABAQUS/Standard，全華圖書2013
Abaqus進階動力學，全華圖書2007
D.L. Longan, A first course in the finite element method. 5th ed., 歐亞書局, 2012.
T.R. Chandrupatla, A.D. Belegundu, Introduction to Finite Elements in Engineering. 4th ed., Prentice Hall, 新月, 2012.
G.R. Liu and S.S. Quek, The Finite Element Method: A Practical Course. 2nd ed., Elsevier, 2014.

評量方式

20%	**Homework 作業** The actual allocation of topics, weekly schedule, and assessment weights may be adjusted during the semester and will follow the official syllabus announced in class. 實際分數分配以課堂公布之課程大綱為主
30%	**Midterm 期中考** The actual allocation of topics, weekly schedule, and assessment weights may be adjusted during the semester and will follow the official syllabus announced in class. 實際分數分配以課堂公布之課程大綱為主
30%	**Final exam 期末考** The actual allocation of topics, weekly schedule, and assessment weights may be adjusted during the semester and will follow the official syllabus announced in class. 實際分數分配以課堂公布之課程大綱為主
20%	**Final Project 課堂專題報告** The actual allocation of topics, weekly schedule, and assessment weights may be adjusted during the semester and will follow the official syllabus announced in class. 實際分數分配以課堂公布之課程大綱為主

1. 本校尚無訂定 A+ 比例上限。
2. 本校採用等第制評定成績，學生成績評量辦法中的百分制分數區間與單科成績對照表僅供參考，授課教師可依等第定義調整分數區間。詳見 學習評量專區 。

針對學生困難提供學生調整方式

調整方式	說明
A3	提供學生彈性出席課程方式 Provide students with flexible ways of attending courses
B1	延長作業繳交期限 Extension of the deadline for submitting assignments
B6	學生與授課老師協議改以其他形式呈現 Mutual agreement to present in other ways between students and instructors
C1	延後期末考試日期(時間) Final exam date postponement
D1	由師生雙方議定 Negotiated by both teachers and students

補課資訊

課程進度

2/25
第 1 週

3/04
第 2 週

3/11
第 3 週

3/18
第 4 週

3/25
第 5 週

4/01
第 6 週

4/08
第 7 週

4/15
第 8 週

4/22
第 9 週

4/29
第 10 週

5/06
第 11 週

5/13
第 12 週

5/20
第 13 週

5/27
第 14 週

6/03
第 15 週