



破壞力學

114-2 開課 | 異動

♡ 收藏

加入預選



流水號

12605



課號

ME7126



課程識別碼

522 M3120



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



四 6, 7, 8



機械116



2 類



修課總人數 40 人

本校 40 人



無領域專長



英文授課



NTU COOL



核心能力與課程規劃關聯圖

目 備註

本課程以英語授課。

↗ 本校選課狀況

已選上	剩餘名額	已登記
8 / 40	32	0

目 課程概述

Fracture mechanics is an important tool used to analyze and improve the performance of mechanical components. The vast increase in the use of high strength metals and the reduction in design safety factors motivated many researchers to investigate the mechanics of the fracture. As a result, Fracture Mechanics, a new branch of materials mechanics, has emerged and acted as a primary approach to controlling fracture and fatigue failures in structures.

破壞力學是一項重要的工具，用於分析並提升機械元件的性能。隨著高強度金屬的廣泛應用，以及設計安全係數的降低，促使許多研究人員投入於斷裂行為力學的研究。因此破壞力學（Fracture Mechanics）作為材料力學中的一個新分支應運而生，並成為控制結構中斷裂與疲勞破壞的主要方法之一。

🕒 課程目標

The present course has two aims:

- (a) To provide the physical mechanics and the mathematical theory of fracture mechanics.
- (b) To present different fracture mechanics applications to practical engineering problems.

本課程具有兩個主要目標：

- (a) 提供破壞力學的物理基礎與數學理論。
- (b) 介紹破壞力學在實際工程問題中的各類應用。

☰ 課程要求

Prerequisites: Elasticity or advanced mechanics of materials. (will be helpful for understanding the lecture material)

至少修過線彈性力學或是高等材料力學兩門科目會有助於理解課堂內容

🕒 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 basic principles of fracture mechanics. 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，內容涵蓋破壞力學原理。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

Fracture Mechanics: Fundamentals and Applications by T.L. Anderson, (CRC Press, 1998). Textbooks are recommended but not mandatory. There are already very rich online resources for computer programming. 教科書不是必備，現在已經有非常豐富的線上教學資源，不需要仰賴教科書。

參考書目

Advanced fracture mechanics by M.F. Kanninen and C.H. Popelar (Oxford University Press, 1985)

Elements of Fracture Mechanics by P. Kumar, (Mc Graw Hill Education, 2009)

Elementary engineering fracture mechanics, D. Broek (Martinus Nijhoff Publication, 1986)

評量方式

30% 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 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

10% Final Project 期末專題報告

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](#)。
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📌 針對學生困難提供學生調整方式

調整方式	說明
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A2	以錄影輔助 Assisted by video
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A3	提供學生彈性出席課程方式 Provide students with flexible ways of attending courses
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B1	延長作業繳交期限 Extension of the deadline for submitting assignments
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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
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C1	延後期末考試日期(時間) Final exam date postponement
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D1	由師生雙方議定 Negotiated by both teachers and students
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🔔 補課資訊

📅 課程進度

3/05	Brittle and ductile fracture
第 2 週	The energy criterion The stress intensity factors

3/12 第 3 週	Linear elastic fracture mechanics (LEFM) Brief review of elasticity
3/19 第 4 週	The Griffith energy balance
3/26 第 5 週	Airy stress function method and complex variable method
4/02 第 6 週	Other methods in fracture mechanics analysis
4/09 第 7 週	Stress intensity factor and fracture toughness
4/16 第 8 週	Midterm Exam
4/23 第 9 週	Elastic-Plastic Fracture Mechanics (EPFM) Brief review of nonlinear elasticity
4/30 第 10 週	Crack-tip opening displacement (CTOD)
5/07 第 11 週	Energy release rate
5/14 第 12 週	J-integral
5/21 第 13 週	Fatigue
5/28 第 14 週	Dynamic fracture
6/04 第 15 週	Other advanced topics
6/11 第 16 週	Final Exam

臺大課程網

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