

相變化熱傳

114-2 開課

♡ 收藏

加入預選

流水號
38081

課號
<> ME5088

課程識別碼
IIII 522 U6670

無分班

3 學分

選修
機械工程學系 / 奈米工程與科學碩士學位學程 / 奈米工程與科學博士學位學程 / 機械工程學研究所

呂明璋

四 2, 3, 4

機械105

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

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
6 / 40	34	0

課程概述

This course focuses on the fundamentals and applications of heat transfer involving phase-change processes. Topics include the thermodynamics of phase change, wetting phenomena, interfacial transport, nucleation, boiling, evaporation, and condensation.

課程目標

The primary goal is to develop a mechanistic understanding of liquid-vapor phase-change heat transfer, including boiling, condensation, evaporation, and the interfacial phenomena governing these processes. Through this course, students will learn the fundamental physical principles and transport mechanisms underlying phase-change phenomena and evaluate experimental and practical designs.

This course also serves as a foundational introduction to electronic cooling technologies that utilize phase-change processes, such as boiling, evaporation, and condensation, which are essential in advanced thermal management of microelectronic and power devices.

課程要求

Thermodynamics, Heat Transfer, Fluid Mechanics

預期每週課前或/與課後學習時數

2 hours

Office Hour

TA: Mr. Hung-Chih Chen (陳宏志)

TA Office Hours: 2-4 PM, Friday

Venue: Room 411 in the ME building.

指定閱讀

Liquid-Vapor Phase-Change Phenomena: An Introduction to the Thermophysics of Vaporization and Condensation Processes in Heat Transfer Equipment, Third Edition, Van P. Carey, 2020

參考書目

Frank P. Incropera et al., Incropera's Principles of Heat and Mass Transfer, Wiley

評量方式

30% Homework

The late homework submitted within one day after the due date will be 20% deducted from the original score. The homework submitted beyond one day after the due date will not be accepted.

35% Midterm

35% Final project

The final project is a two-student team project. The grade of the final project will be judged based on the content, presentation, and the written report.

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

補課資訊

課程進度

第 1 週 The Liquid-Vapor Interfacial Region: A Nanoscale Perspective

第 2 週 The Liquid-Vapor Interfacial Region: A Nanoscale Perspective

第 3 週 The Liquid-Vapor Interfacial Region: A Macroscopic Treatment

第 4 週 Wetting Phenomena and Contact Angles

第 5 週	Transport Effects and Dynamic Behavior at Interfaces
第 6 週	Transport Effects and Dynamic Behavior at Interfaces
第 7 週	Homogeneous Nucleation and Bubble Growth in Liquids
第 8 週	Midterm exam
第 9 週	Heterogeneous Nucleation
第 10 週	Pool Boiling
第 11 週	Pool Boiling
第 12 週	Condensation
第 13 週	Convective flow boiling
第 14 週	Convective flow boiling
第 15 週	Recent Advances in Phase-Change Heat Transfer and Applications
第 16 週	Final project presentation

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