



微奈米尺度熱傳

114-2 開課

♡ 收藏

加入預選



流水號

32343



課號

ME5047



課程識別碼

522 U6230



無分班



3 學分



選修

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



呂明璋



二 2, 3, 4



機械114



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
8 / 40	32	0

課程概述

This course is taught in English. It focuses on the mechanisms of energy transport of micro/nanoscale systems, particularly thermal energy transport. The concepts of statistical physics, quantum mechanics, solid-state physics, kinetic theory, Boltzmann transport equation, and energy transport by waves will be introduced.

課程目標

The students will (1) gain an understanding of the fundamentals of kinetic theory, statistical thermodynamics, solid-state physics, and quantum mechanics; (2) learn the mechanisms of energy transport at the micro/nanoscale; (3) acquire the skills for the modeling of the transport properties of the micro/nanoscale systems, such as thermal conductivity and resistivity.

課程要求

Thermodynamics,
Heat Transfer,
Fluid Mechanics

預期每週課前或/與課後學習時數

Office Hour

星期三	13:00 - 16:00
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TA: Kuang-Yu Chen 陳光宇

TA Office hours: 1-4 pm on Wednesday

Location: ME 411

Email: f08522117@ntu.edu.tw

Phone: 61789

指定閱讀

Nanoscale Energy Transport and Conversion, Gang Chen, 2005

參考書目

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1. Chang-Lin Tien, Arunava Majumdar, Frank M. Gerner, Microscale Energy Transport, 1997
 2. Van P. Carey, Statistical Thermodynamics and Microscale Thermophysics, 1999
 3. Charles Kittel, Introduction to Solid State Physics, 2005
 4. David J. Griffiths, Introduction to Quantum Mechanics, 2nd Edition, 2005
 5. Zhuomin M. Zhang, Nano/Microscale Heat Transfer, 2008
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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 exam

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.

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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
A2	以錄影輔助 Assisted by video

補課資訊

課程進度

第 1 週 Introduction: Length scale, kinetic theory, mean free path, etc.

第 2 週 Statistical Thermodynamics

第 3 週 Statistical Thermodynamics

第 4 週 Quantum Mechanics

第 5 週 Quantum Mechanics

第 6 週 Quantum Mechanics

第 7 週 Solid State Physics

第 8 週 Midterm exam

第 9 週 Solid State Physics

第 10 週 Solid State Physics

第 11 週 Boltzmann Transport Equations

第 12 週 Boltzmann Transport Equations

第 13 週 Boltzmann Transport Equations

第 14 週 Energy Transport by Waves

第 15 週 Interface resistance

第 16 週 Final project presentation

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