高等熱傳學

114-2 開課

收藏 加入預選

流水號
13934

課號
ME5150

課程識別碼
522 U3740

無分班

3 學分

選修
機械工程學系 / 機械工程學研究所

許 麗

三 2, 3, 4

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

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。

本校選課狀況

已選上	剩餘名額	已登記
23 / 40	**17**	**0**

課程概述

This course is an ADVANCED LEVEL heat transfer class, and also serves as one of the required subjects of the qualifying exam for Ph.D. students in the Mechanical Engineering Department.

NOTE: [本課程以英文授課] The lectures of this class will be given in English. However, you can also ask or raise questions in Mandarin.
NOTE: Class meets on Wednesdays 9:10--12:10.

COURSE DESCRIPTION
This is a 3-unit half-year elective course on intermediate to advanced level conduction, convection, and radiation heat transfer directed towards graduate students and undergraduate upperclassman audiences. This course also serves as one of the required subjects of the qualifying exam for Ph.D. students in the Mechanical Engineering Department.

Three major topics are to be discussed in this class. They are:
1. Steady and unsteady conduction heat transfer.
2. Laminar/turbulent convection heat transfer of internal and external flows.
3. Radiation heat transfer covers black and non-black surfaces, shape factors, radiation exchange in gray diffuse enclosures, and multimode heat transfer.

課程目標

1. To understand the underlying physics and mechanisms governing the conduction, convection, and radiative heat energy transfer processes in general engineering systems from a macroscopic continuum point of view.

2. To acquire the classical mathematical tools and techniques required in analyzing conduction, convection, and radiation heat transfer problems.

3. To develop physical intuition and insights towards heat transfer problem solving so that general complex engineering heat transfer problems can be described by simple physical models and solved with minimum mathematical efforts, i.e., "back of the envelope calculations."

課程要求

Engineering Mathematics, Elementary Thermodynamics, Elementary Heat & Mass Transfer

預期每週課前或/與課後學習時數

Office Hour

星期二	10:00 - 12:00

Teacher's office, 627 Mechanical Engineering Building.

指定閱讀

參考書目

W.M. Kays and M.E. Crawford, Convective Heat and Mass Transfer, 4th edition, 2004
A. Bejan, Convection Heat Transfer, 3rd edition, 2004.
M.N. Ozisik, Heat Conduction, 2nd edition, 1993.
R. Siegel and J. Howell, Thermal Radiation Heat Transfer, 4th edition, 2002.
Incropera et al., Principles of Heat and Mass Transfer, Global edition, 2017 (Chapter on radiation).

評量方式

10%	**Attendance**
45%	**Midterm exam**
45%	**Final exam**

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
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
D1	由師生雙方議定 Negotiated by both teachers and students

補課資訊

課程進度

第 1 週	Introduction to Conduction
第 2-3 週	Steady-State Conduction
第 4-5 週	Transient Conduction
第 6-7 週	Convection - Laminar Boundary Layer Flow
第 9-10 週	Forced Convection for Internal Laminar Flow
第 11-12 週	Turbulent Flow
第 13 週	Fundamentals of Radiation
第 14-15 週	Radiation Exchange between Surfaces