

99 學年度第二學期
研究所 高等熱傳學 (Advanced Heat Transfer) 簡介

授課教師：施陽正 老師

教師簡介：-國立台北科技大學能源與冷凍空調工程系專任副教授 2005.2 迄今
-國立台北科技大學能源與冷凍空調工程系系主任 2006.8-2009.7
-國立台北科技大學冷凍空調工程系專任助理教授 2000.8-2005.2
-美國賓州州立大學(The Pennsylvania State University)機械工程博士，1997
-工業技術研究院能源與資源研究所研究員，1997.11-2000.7
-工業技術研究院能源與資源研究所副研究員，1991.11-1992.7
-國立台灣大學機械工程碩士，1989

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討論時間：週二 14:00~18:00 週三：16:00~18:00

修課資格：適合已修過工程數學及基礎熱流學課程者選修。

課程簡介：

熱傳學主要內容是研究由於溫度梯度所造成能量傳遞之一門學問，為一般冷凍、空調、食品冷藏及各類型熱交換器設計之基本知識程，其他大如各類發電廠，小如電腦微晶片散熱亦有密切關係。本課程之安排以奠定學生在熱傳方面之智能，作為未來進入冷凍、空調與能源相關學門之踏腳石。

教科書：

Wong, K.F., *Intermediate Heat Transfer*, Marcel Dekker, Inc, 2003. (亞勃克國際圖書有限公司)

參考書：1*. JiJi, L.M., *Heat Convection*, Springer, 2006. (巨擘書局)

(亞勃克國際圖書)

2*. Incropera, F.P., Dewitt, D.P., Bergman, T.L., and Lavine, A.S., *Introduction to Heat Transfer*, 5th ed., 2007 (東華書局).

3*. Cengel, Y.A., *Heat and Mass Transfer: A Practical Approach*, 3rd ed., 2006. (滄海書局)

4. Holman, J.P., *Heat Transfer*, 9th ed., 2002. (歐亞書局)

5. Oosthuizen, P.H. and Naylor, D., *Introduction to Convective Heat Transfer Analysis*, 1999 (巨擘書局)

6. Arpaci, V.S. and Larsen, P.S., *Convection Heat Transfer*, 1984 (台科大圖書館)

7. Bejan, A., *Convection Heat Transfer*, 1st ed. 1984 (圖書館), 2nd ed. 1994 (巨擘)

評分標準：Homework 10%, Mid-terms (two) 60%, Final Exam 30%

Contents of Advanced Heat Transfer

Week 1

(1) Course outline; (2) Introduction to Heat Transfer; (3) Conservation of Energy (with Exercises)

Week 2 228 National Holiday (No Class)

Week 3

(1) Introduction to Heat Conduction; (2) Heat Conduction Equation; (3) One-Dimensional Steady-State Heat Conduction

Week 4

(1) Extended Surfaces-Fins; (2) Exercises of One-Dimensional Steady-State Heat Conduction and Fins

Week 5

Transient Heat Conduction: (1) Lumped Capacity Method; (2) Conduction in Semi-infinite Domain; (3) Periodic Heating

Week 6

(1) Two-Dimensional Steady and One-Dimensional Unsteady Heat Conduction; (2) Phase-Change Problems

Week 7

(1) Equations for Convection; (2) Order of Magnitude Analysis (or Scale Analysis)

Week 8

Mid-term I

Integral Method for External Forced Convection

Week 9

Similarity Solution for External Forced Convection

Week 10

Internal Forced Convection-I

Week 11

Internal Forced Convection-II

Week 12

Natural Convection-Similarity Solution

Week 13

Mid-term II

Natural Convection-Integral Method; Mixed Convection

Week 14

(1) Basic Relations of Radiation; (2) Radiative Exchange in a Non-Participating Medium

Week 15

(1) Radiation in Long Enclosures; (2) Radiation with Other Modes of Heat Transfer

Week 16

Dragon Festival (National Holiday, No Class)

Week 17

Turbulence

Week 18

Final Exam