課程資訊	
課程名稱	高等化工熱力學 Advanced Chemical Engineering Thermodynamics
開課學期	112-2
授課對象	分子科學與技術國際研究生博士學位學程
授課教師	康敦彥
課號	ChemE7003
課程識別碼	524EM1110
班次	02
學分	3.0
全/半年	半年
必/選修	選修
上課時間	星期二 3,4(10:20~12:10)星期四 3(10:20~11:10)
上課地點	
備註	本課程以英語授課。初選不開放大學部選修，欲修本課在開學後找老師索授權碼。 上課地點:化工 2 館慶琅廳。 限碩士班以上 總人數上限：70 人
課程簡介影片	
核心能力關聯	核心能力與課程規劃關聯圖
課程大綱	
為確保您我的權利,請尊重智慧財產權及不得非法影印	
課程概述	This course will review the content of classical thermodynamics and also introduce statistical thermodynamics.
課程目標	To learn the quantities the thermodynamics: internal energy, entropy, free energy, etc. To be able to apply balance equations to solve engineering problems. To know the relationships among thermodynamic quantities. To know to concept of the ensemble theory. To know the connections between microscopic and macroscopic description of thermodynamic quantities.
課程要求	- Attend the lecture - Solve exercising problem in class - Attend the midterms and the final exam
預期每週課後學習時數	
Office Hours	另約時間 備註： I will be available to answer questions after the lecture. Make appointments with me if you need extra time for the questions.

指定閱讀	1. Chemical, Biochemical, and Engineering Thermodynamics, 5th Edition, Stanley I. Sandler 2. An Introduction to Applied Statistical Thermodynamics, 1st Edition, Stanley I. Sandler
參考書目	Transport Phenomena, Revised 2nd Edition 2nd R. Byron Bird (Author), Warren E. Stewart (Author), Edwin N. Lightfoot (Author)
評量方式 (僅供參考)	

No.	項目	百分比	說明
1.	Midterm 1	34%	
2.	Midterm 2	33%	
3.	Final	33%	

課程進度

週次	日期	單元主題
Week 1	2/20, 2/22	1-1 Energy and First Law 1-2 Applications of Energy Balance
Week 2	2/27, 2/29	1-3 Energy Balance: Microscopic Point of View 1-4 Entropy, Second Law, and
Week 3	3/5, 3/7	1-5 Origin of Entropy Generation 1-6 Mathematical Relations of Thermodyna
Week 4	3/12, 3/14	1-7 Thermodynamic Properties of Real Fluids 1-8 Solution Thermodynamics
Week 5	3/19, 3/21	1-9 Chemical Potential and Phase Equilibrium
Week 6	3/26, 3/28	3/26 Midterm 1 3/28 Problem Reviews for Midterm 1
Week 7	4/2	2-1 Introduction to Statistical Thermodynamics 2-2 The Canonical Ensemble
Week 8	4/9, 4/11	2-3 Single- and Many-Particle Systems 2-4 Thermodynamic Properties from P
Week 9	4/16, 4/18	2-5 Ideal Monatomic Gas 2-6 Physical Meaning of Free Energy and Entropy
Week 10	4/23, 4/25	2-7 Energy Fluctuations and Number of Microstates
Week 11	4/30, 5/2	4/30 Midterm 2 5/2 Problem Reviews for Midterm 2
Week 12	5/7, 5/9	3-1 Partition Functions for Rotation and Chemical Bonds 3-2 Ideal Diatomic G
Week 13	5/14, 5/16	3-3 Monatomic Crystal - Einstein Model 3-4 Monatomic Crystal - Debye Mod
Week 14	5/21, 5/23	3-5 The Microcanonical Ensemble 3-6 The Grand Canonical Ensemble
Week 15	5/28, 5/30	3-7 The Isobaric-Isothermal Ensemble
Week 16	6/4	6/4 Final exam