國立台灣科技大學 114學年 第2學期 課程大綱

Spring 2026 NTUST Course Outline

授課教師：Iman Adipur

Instructor:Iman Adipurnama

課程名稱：質能均衡

Course Title：Material and Energy Balances

2026/11/4

課程代號： TE2110301 Course Code	必選修：必修/半學年 Required/Electve:Required/Half Yr.
學分數： 3 Credits	先修課程： Prerequisites
節次教室： Time/Location	M6(TR-516) R3(TR-409-2) R4(TR-409-2)
專業核心能力： Core Professional Competencies	運用數學、科學及化學知識的能力 發掘、分析及處理問題的能力
課程網址： Course Website	
課程宗旨： Course Objectives	The major course objectives are summarised below: 1. Introduce fundamental principles and calculation techniques used in chemical and process industries.。 2. Apply material and energy balances to analyze chemical processes, including reactors and separation systems.。 3. Develop problem-solving skills through structured exercises, conceptual analysis, and real-world case studies.。 4. Gain experience in problem definition, data collection, and quantitative analysis.。 5. Apply MEB principles to reactors, separation processes, and energy systems.。 6. Enhance understanding through clear explanations and real-world examples to simplify complex concepts.。 7. Foster lifelong problem-solving skills and critical thinking in chemical engineering applications.。 8. Help students decide whether he or she has chosen the right field of study.。
課程大綱： Outline of Lectures	Part I. Engineering Problem Analysis: 1. Definitions of Chemical Engineering/What Some Chemical Engineering Do for a Living 2. Introduction to Engineering Calculations 3. Processes and Process Variables 。 Part II. Material Balances: 1. Fundamentals of Material Balances 2. Single-Phase Systems 3. Multiphase Systems 。 Part III. Energy Balances: 1. Energy and Energy Balances 2. Balance on Nonreactive Processes 3. Balance on Reactive Processes 。
授課方式： Method of Instruction	講授 Lecture：50% 分組討論 Group discussion：15% 案例研討 Case study：15%

	操做練習 Practical exercises：20% 講授 Lecture：%
教科書： Textbooks	- Teaching Strategy: 1. Constructive Alignment. 2. BOPPPS Model. - Teaching Approaches/Methods: 1. Active Learning. 2. CTask-Based Learning. 3. Collaborative Learning. 4. Context-Based Learning (Chemical Engineering Show & Tell). 5. Challenge-Based Learning (Optional).
參考書目： References	Elementary Principles of Chemical Processes, 3rd Edition, by Richard M. Felder and Ronald W. Rousseau, 2005 John Wiley and Sons Ltd (ISBN: 9780471375876, Tung Hua Book Co., Ltd)
修課須知： Notice	1. Teaching Approaches: Active Learning, Problem-Based Learning, Task-Based Learning, Collaborative Learning, Context-Based Learning.。 2. There is a TA for this course.。 3. All materials on Moodle, Padlet, Line, or my Channel are protected by copyright and privacy laws. Do not share, copy, or use them without permission.。 4. This course may be recorded and photographed, and data from student activities may be collected for documentation, editing, or potential public sharing.
評量方式： Grading	1. Quizzes and Homework: 25%.。 2. Midterm Exam: 25%.。 3. Final Exam: 30%.。 4. Attendance, Attitude, Engagement (including interaction, Q&A, discussions, exercises, and explanations), Group & Individual Work, and Others: 20%
備註說明： Notes	1/Principles of Chemical Engineering Processes: Material and Energy Balances, 2e.。2/Basic Principles and Calculations in Chemical Engineering, 8e.。3/Perry's Chemical Engineers' Handbook, 9e.。4/Chemical, Biochemical, and Engineering Thermodynamics, 4e.。5/Separation Process Principles: Chemical and Biochemical Operations, 3e.。6/Chemical Process Analysis: Mass and Energy Balances.。7/Process Dynamics and Control, 3e.。8/AccessEngineering。9/Visual Encyclopedia of Chemical Engineering Equipment.