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：Darwin

Instructor:Darwin Kurniawan

課程名稱：單元操作與輸送現象(一)

Course Title：Unit Operation and Transport Phenomena (1)

2026/6/22

課程代號：CH2205304 Course Code 學分數：3 Credits	必選修：必修/半學年 Required/Electve:Required/Half Yr. 先修課程： Prerequisites
節次教室：T10(IB-507) T9(IB-507) W8(IB-507) Time/Location	
專業核心能力： Core Professional Competencies	
課程網址： Course Website	
課程宗旨： Course Objectives	General molecular transport equation for momentum, heat, and mass transfer. Viscosity of fluids and types of fluid flow and Reynolds number. Overall mass balance and continuity equation. Overall energy balance. Overall momentum balance. Shell momentum balance and velocity profile in laminar flow. Design equations for laminar and turbulent flow in pipes. Flow past immersed objects and packed and fluidized beds. Measurement of flow of fluids. Differential equations of continuity. Differential equations of momentum transfer or motion. Use of differential equations of continuity and motion.
課程大綱： Outline of Lectures	Chapter 1: Introduction • Introduction to transport phenomena • General molecular transport equation for momentum, heat, and mass transfer Chapter 2: Fluid Properties and Fluid Flows • Introduction to fluids and fluid statics • Viscosity of fluids • Types of fluid flow and Reynolds number Chapter 3: Overall Balances • Overall mass balance and continuity equation • Overall energy balance • Overall momentum balance • Shell momentum balance and velocity profile in laminar flow • Design equations for laminar and turbulent flow in pipes Chapter 4: Applications of Momentum Transfer • Flow past immersed objects • Flow in packed beds • Flow in fluidized beds • Measurement of flow of fluids • Pumps and gas-moving equipment • Agitation, mixing of fluids, and power requirements • Non-Newtonian Fluids Chapter 5: Principles of Momentum Transfer • Introduction to vectors and tensors • Differential equation of continuity • Differential equations of momentum transfer or motion • Use of differential equations of continuity and motion • Other methods for solution of differential equations of motion • Boundary-layer flow and turbulence

授課方式： Method of Instruction	講授 Lecture：80% 分組討論 Group discussion：0% 案例研討 Case study：0% 操做練習 Practical exercises：20% 講授 Lecture：%
教科書： Textbooks	Geankoplis, C. J., Transport Processes and Separation Process Principles, 4th ed., Pearson Education Limited (2014).
參考書目： References	• Geankoplis, C. J., Hersel, A. A., Lepek, D. H., Transport Processes and Separation Process Principles, 5th ed., Pearson Education Limited (2018) • Welty, J. R., Rorrer, G. L., Foster, D. G., Fundamentals of Momentum, Heat, and Mass Transfer, 6th ed., John Wiley & Sons (2015) • • Bird, R.B., Stewart, W.E., Lightfoot, E.N., Transport Phenomena, 2nd ed., John Wiley & Sons, Inc (2007).
修課須知： Notice	
評量方式： Grading	• Attendance: 10% • Homework: 20% • Mid-term exam: 35% • Final-term exam: 35% There will always be a short quiz on the day of homework submission (students will not be informed beforehand), where the quiz score will be used as a bonus point to increase the final score.
備註說明： Notes	