

南臺科技大學 108 學年度第 1 學期課程資訊

課程代碼	40D08101
課程中文名稱	單元操作(一)
課程英文名稱	Unit Operation I
學分數	3.0
必選修	必修
開課班級	四技化材三甲
任課教師	吳文昌
上課教室(時間)	週二第 2 節(I0701) 週二第 3 節(I0701) 週二第 4 節(I0701)
課程時數	3
實習時數	0
授課語言 1	華語
授課語言 2	
輔導考照 1	化學技術士
輔導考照 2	
課程概述	本學科之課程內容包括(1)質量守恆與物質均衡(2)能量守恆與熱量均衡(3)流體靜力學(4)動量、熱量與質量傳送的輸送方程式(5)總質量均衡與連續方程式(6)總動量均衡(7)在層流中殼動量均衡與速度分佈(8)流體流動的測量(9)連續的微分方程式(10)運動的微分方程式。
先修科目或預備能力	
課程學習目標與核心能力之對應	<p>※編號，中文課程學習目標，英文課程學習目標，對應系指標</p> <p>-----</p> <p>1.能了解單元操作之基本原理及應用此原理於各別單元，並具備化工製程之基本知識，To be able to realize the basic principles of unit operation, apply these principles to each unit and possess the basic knowledge of chemical process，1 工程知識</p> <p>2.能熟悉流體流量以及壓差測定裝置，並能應用該裝置於流動摩擦實驗設備之設計，To be familiar with flow rate and pressure drop measuring devices and able to apply them to design the experimental equipments for measuring friction or Venturi coefficients，2 實驗分析</p> <p>3.能具備選擇幫浦以及配管技巧之基本實務能力，Possessing the ability of choosing pumps and piping construction skill for the engineering practice，3 工程實務</p>

	<p>4.能設計各種化工製程中流體輸送之設備單元 , To be able to conduct basic design for each kinds of fluid transport systems , 4 系統設計</p> <p>5.能分析並解決化工製程中流體輸送之相關問題 , To be able to analyze and solve the problems of fluid transport , 6 解決問題</p>
中文課程大綱	<p>本學科之課程單元主題包括:</p> <p>(1)質量守恆與物質均衡 (2)能量與熱量單位 (3)能量守恆與熱量均衡 (4)流體靜力學 (5)一般分子動量、熱量與質量傳送的輸送方程式 (6)總質量均衡與連續方程式 (7)總動量均衡 (8)管中層流與亂流之設計方程式 (9)在層流中殼動量均衡與速度分佈 (10)流體流動的測量 (11)連續的微分方程式 (12)動量傳送或運動的微分方程式 (13)運動與連續微分方程式之運用</p>
英/日文課程大綱	<p>The Units Topics of This Course Include :</p> <p>(1) Conservation of Mass and Material Balances (2) Energy and Heat Units (3) Conservation of Energy and Heat Balances (4) Fluid Statics (5) General Molecular Transport Equation for Momentum, Heat, and Mass Transfer (6) Overall Mass Balance and Continuity Equation (7) Overall Momentum Balance (8) Design Equations for Laminar and Turbulent Flow in Pipes (9) Shell Momentum Balance and Velocity Profile in Laminar Flow (10) Measurement of Flow of Fluids (11) Differential Equations of Continuity (12) Differential Equations of Momentum Transfer or Motion (13) Use of Differential Equations of Continuity and Motion</p>
課程進度表	<p>1~2weeks:Introduction to engineering principles and units includes (1) Conservation of Mass and Material Balances (2) Energy and Heat Units (3) Conservation of Energy and Heat Balances</p> <p>3~6weeks:Introduction to steady state momentum-transfer includes (1) Fluid Statics (2) Overall Momentum Balance (3)Design Equations for Laminar and Turbulent Flow in Pipes (4)Shell Momentum Balance and Velocity Profile in Laminar Flow (5) Measurement of Flow of Fluids</p> <p>7~8weeks:Introduction to steady state heat-transfer includes (1)Conduction heat transfer (2)Steady state conduction and sharp factor</p> <p>9 week :Midterm</p> <p>10~12weeks: Introduction to steady state heat-transfer includes (3)Force convection heat transfer inside pipe (4)heat exchanges</p> <p>13~15weeks:Introduction to steady state mass-transfer includes (1)Introduction to mass transfer and diffusion (2)Molecular diffusion in gases, liquids and solids</p>

	16~17weeks: Introduction to unit operation and separation process (1)Evaporation 18week:Final test
教學方式與評量 方法	※課程學習目標，教學方式，評量方式 ----- 能了解單元操作之基本原理及應用此原理於各別單元，並具備化工製程之基本知識，課堂講授，作業筆試筆試 能熟悉流體流量以及壓差測定裝置，並能應用該裝置於流動摩擦實驗設備之設計，課堂講授啟發思考，作業筆試 能具備選擇幫浦以及配管技巧之基本實務能力，課堂講授，作業筆試 能設計各種化工製程中流體輸送之設備單元，課堂講授，作業筆試 能分析並解決化工製程中流體輸送之相關問題，課堂講授，作業筆試
指定用書	書名：Transport Processes and Separation Process Principle (includes Unit Operations) Fourth edition 作者：Christie John Geankoplis 書局：滄海書局(Prentics Hall PTR) 年份：2003 ISBN：0-13-121760-7 版本：4
參考書籍	James R. Welty、Charles E. Wicka、Robert E. Wilson、Fundamentals of Momentum、Heat、and Mass Transfer 4th edition、WILEY、2000.
教學軟體	板書，講義
課程規範	無