# 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：楊延齡

Instructor:

課程名稱：程序控制

Course Title：Process Control

2026/11/3

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| 課程代號： TE3045301<br>Course Code<br>學分數： 3<br>Credits | 必選修：必修/半學年<br>Required/Electve:Required/Half Yr.<br>先修課程：<br>Prerequisites |
| 節次教室：<br>Time/Location | R3(RB-508) R4(RB-508) W1(RB-509) |
| 專業核心能力：<br>Core Professional Competencies | 運用數學、科學及工程知識的能力與執行工程實務所需技術、技巧及使用現代化工具的能力。 |
| 課程網址：<br>Course Website | |
| 課程宗旨：<br>Course Objectives | 從化工程序的觀點來探討控制的問題。內容包括控制系統元件和控制概念之介紹以及拉氏轉換和控制器設計方法，最後介紹頻率應答以及設計之基準。 1. Introduction to Process Control 2. Theoretical Models of Chemical Processes 3. Laplace Transforms 4. Transfer Function and State-Space Models 5. Dynamic Behavior of First-Order and Second-Order Processes 6. Dynamic Response Characteristics of More Complicated Processes 7. Development of Empirical Models from process Data 8. Feedback Controllers 9. Control System Instrumentation 10. Overview of Control System Design 11. Dynamic Behavior and Stability of Closed-Loop Control Systems 12. PID Controller Design, Tuning, and Troubleshooting 13. Frequency Response Analysis 14. Control System Design Based on Frequency Response Analysis |
| 課程大綱：<br>Outline of Lectures | 從化工程序的觀點來探討控制的問題。內容包括控制系統元件和控制概念之介紹以及拉氏轉換和控制器設計方法，最後介紹頻率應答以及設計之基準。 1. Introduction to Process Control 2. Theoretical Models of Chemical Processes 3. Laplace Transforms 4. Transfer Function and State-Space Models 5. Dynamic Behavior of First-Order and Second-Order Processes 6. Dynamic Response Characteristics of More Complicated Processes 7. Development of Empirical Models from process Data 8. Feedback Controllers 9. Control System Instrumentation 10. Overview of Control System Design 11. Dynamic Behavior and Stability of Closed-Loop Control Systems 12. PID Controller Design, Tuning, and Troubleshooting 13. Frequency Response Analysis 14. Control System Design Based on Frequency Response Analysis |
| 授課方式：<br>Method of Instruction | 講授 Lecture：0%<br>分組討論 Group discussion：0%<br>案例研討 Case study：0%<br>操做練習 Practical exercises：0%<br>講授 Lecture：% |
| 教科書：<br>Textbooks | |
| 參考書目：<br>References | |

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| 修課須知：<br>Notice | |
| 評量方式：<br>Grading | |
| 備註說明：<br>Notes | This course combines theory and simulation practice, using Python with Aspen Plus Dynamics for dynamic simulations to connect fundamentals with practical applications.<br>本課程結合理論與模擬實作，將以 Python 搭配 Aspen Plus Dynamics 進行動態模擬，強化理論與實務的連結。 |