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：郭俊良

Instructor:Chunliang Kuo

課程名稱：實驗設計與分析方法

Course Title：Experimental Design and Analysis

2026/5/6

課程代號： ME5913701 Course Code 學分數： 3 Credits	必選修：選修/半學年 Required/Electve:Elective/Half Yr. 先修課程： Prerequisites
節次教室： R6(T3-718) R7(T3-718) R8(T3-718) Time/Location	
專業核心能力： 實驗方法，統計數學，檢定分析 Core Professional Competencies	
課程網址： Course Website	
課程宗旨： Course Objectives	This course introduces methods of experimental designs and the techniques of converting the parametric effects into mathematical equations via analytical and statistical modelling methods. In addition, methods and techniques of the statistical analysis for orthogonal arrays, Taguchi arrays, and the Yates methods, from baseline experiments to the final validation experiments, will be introduced and taught. The techniques of established equations with confidence intervals, analysis of variance, confirmation of parametric contributions, statistical tests for significance of the controlled variables, and response surface modelling are all included and reviewed.
課程大綱： Outline of Lectures	In this course, the following topics and techniques will be introduced and taught. 1. Differences between analytical solution and statistical modeling. 2. Introduction to the experimental design and statistical analysis. 3. Strategy of experiment. 4. Single Factor Design 5. Basic statistical techniques 6. Confidence Interval and Sampling Size 7. Principles of Experimental Design and Tests 8. Two-way Analysis of Variance 9. Two-way Analysis with Replication 10. The 2n Factorial Experiments 11. Yates Method 12. Main Effect Plots, Interaction Plots, and Response Surface Methods 13. Methods of Fractional Factorial Designs (Taghcui methods) 14. Analysing Data from Orthogonal Arrays 15. Fitting Lines to Data 16. Investigation of Noise Factors 17. Loss Function
授課方式： Method of Instruction	講授 Lecture：60% 分組討論 Group discussion：20% 案例研討 Case study：20% 操做練習 Practical exercises：0%

	講授 Lecture：This course will be taught in Chinese and English in alternate semesters.%
教科書： Textbooks	1. Professor's handout book. 2. Design and analysis of experiments (Douglas Montgomery, 2010-2025) 3. Taguchi techniques for quality engineering (Phillip Ross, 2011)
參考書目： References	1.Artificial intelligence in design (D. Pham, 1991) 2.Intelligent optimization techniques (D. Pham, 2000) 3.Neural networks for identification, prediction and control (D. Pham, 2000)
修課須知： Notice	
評量方式： Grading	Mid term exam: 50% Final group presentation(case study): 50%
備註說明： Notes	None.