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：高裕翔

Instructor:YUH-SHYING GAU

課程名稱：精實生產系統

Course Title：Lean Manufacturing and Management

2026/11/3

課程代號： SI5018701 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： Time/Location	W2(華夏恆毅樓D401) W3(華夏恆毅樓D401) W4(華夏恆毅樓D401)
專業核心能力： Core Professional Competencies	■ 具備解決工程與管理問題之能力 ■ 專業知識(Comprehensive management knowledge) ■ 倫理意識與社會責任(Ethic & Social responsibility)
課程網址： Course Website	
課程宗旨： Course Objectives	This course will introduce lean manufacturing and management principles and practices. Lean emerged from the Japanese automotive industry, particularly Toyota, and focuses on creating value by eliminating waste. This course will provide students with a comprehensive overview of techniques and concepts of lean operation (such as seven wastes, value-stream mapping, standardization and multi-skill workers, push vs. pull system, Kanban system, production smoothing (Heijunka), setup reduction, autonomation (Jidoka) and error proofing, Kaizen and total quality management) to allow them to contribute immediately to manufacturing, operations or service industries.
課程大綱： Outline of Lectures	

1. 精實生產沿革與概述 (Toyota Production History and Overview)
2. 豐田模式: 大野耐一的教誨 (God father Taiichi Ono's lessons)
3. 豐田模式: 十四條管理原則 (Toyota 14 Principles)
4. 剛好即時系統 (流、拉、看、平、拍) (JIT System)
5. 自動化與設備改善(Automation and Kaizen)
6. 6S與目視管理 (6s and Visual Management)
7. 七大浪費與改善 (7 waste and improvment)
8. 精實生產系統演練 I: 標準工序與工時/傳統生產線 (Standard Operation Procedures and Traditional Production Line)
9. 精實生產系統演練 II:生產線平衡 (Simulation Practice using Flexsim)
10. SIPOC與價值溪流分析 (Value Stream Analysis)
11. 精實與六標準差 (Lean Six Sigma)
12. 精實生產系統理論應證: 存貨理論與等候線理論 (Inventory and Waiting Line)
13. 精實企業 1. Introduction to Lean manufacturing systems
    2. PTS model
    3. PTS 14 rules
    4. Just In Time
    5. Autonomation (Jidoka)
    6. 6S
    7. Kaizen
    8. Practice I
    9. Practice I
    10. SIPOC and value stream
    11. Six sigma
    12. Inventory and queueing models
    13. Lean enterprise
14. 敏捷式管理精神 (Agile Management)
15. 品質屋介紹 (House of Quality)
16. 蒙地卡羅模擬 (Monte Carlo Simulation)
17. 田口氏品質方法 (Taguchi Quality Method)
18. 大數據精實管理技巧 (Big Data Analysis Management)

授課方式： Method of Instruction	講授 Lecture：70% 分組討論 Group discussion：20% 案例研討 Case study：0% 操做練習 Practical exercises：10% 講授 Lecture：This course will introduce some key topics and tools used for improving manufacturing efficiency. Some simulation tools, such as business dynamic tools and digital twin simulation tools like Flexsim, will be used for practice. The grading rules could be adjusted based on students' backgrounds and the focus on learning attributes.%
教科書： Textbooks	There is no textbook. All materials are prepared by the instructors.
參考書目： References	The Machine That Changed the World: The Story of Lean Production by James P. Womack, Daniel T. Jones, Daniel Roos(English, Chinese both) The Goal:by Eliyahu M. Goldratt
修課須知： Notice	For students who are not interested in joining the discussion or may have difficulty attending class. Please do not register.
評量方式： Grading	The grading rules are primarily based on the tests, including the terminology test, the midterm, and the final exam. There is a project using the simulation tool to simulate the actual production line or project scenarios. Our grading rule might be changed subject to students' performance, but it will be published on the first day of class.
備註說明： Notes	The students may need to prepare for laptop computers and submit homework using them.