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：製造程序與分析

Course Title：Manufacturing Process and Analysis

2026/11/3

課程代號： SI5020701 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	T2(華夏恆毅樓D405) T3(華夏恆毅樓D405) T4(華夏恆毅樓D405)
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) ■ 研究議題之能力(Research capability in practical discipline)
課程網址： Course Website	
課程宗旨： Course Objectives	Course Description: Designed to equip manufacturing engineers with essential professional knowledge, this course offers a comprehensive yet accessible exploration of practical processing principles and technologies, integrated with modern manufacturing theories. The primary objective is to foster an understanding of contemporary product development processes and their core tools. Through a hands-on product development project, students will gain insight into standard industrial practices. Furthermore, the curriculum places special emphasis on electronic and semiconductor manufacturing processes and incorporates trending applications of Deep Learning. Key Topics Include: Mechanical manufacturing; structure and manufacturing properties of metallic materials; mechanical properties of materials; precision metrology and statistical quality control (SQC); conventional and unconventional casting methods; powder metallurgy; metal forming; stamping die and manufacturing technology; engineering materials (plastics, ceramics, and composites); metal cutting; machine tools; numerical control (NC) and computer-aided manufacturing (CAM); and various machining processes.
課程大綱： Outline of Lectures	

	1: 製造程序與研發管理概論 (Introduction to Manufacturing and Product Development Process) 2: 金屬材料結構與製造性質 (Structure and Manufacture Properties of Metallic Materials) 3: 材料之機械性質 (Mechanical Properties of Materials) 4: 精密量測與統計品質管制 (Precision Measurement and Statistical Quality Control) 5: 傳統鑄造法 (Traditional Casting) 6: 特殊鑄造法(Special Casting Method) 7: 粉末冶金(Powder Metallurgy) 9: 塑性加工 (Plastic Working) 10: 衝壓模具與製造技術(Stamping Dies and Manufacturing Technology) 11: 工程材料--塑膠陶瓷與複合材料(Engineering Materials--Plastic Ceramics and Composite Materials) 12: 金屬切削-線切割(Metal Cutting-Wire Cutting) 13: 工具機 (Machine Tools) 14: 數值控制與電腦輔助製造(Numerical Control and Computer Aided Manufacturing) 15: 機械加工法(Machining Method) 17: 半導體製造程序 (Introduction to Semiconductor Manufacturing Process) 18: 3D列印介紹與實習 (3D Printing Overview) 19: 印刷電路設計與製造程序(Printed Circuit Board Design and Manufacturing) 20: 半導體封裝製造程序(Semiconductor Packing Overview and Challenges)
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 product development and the manufacturing process. Some design tools, such as PTC Creo and Autodesk 123D, will be utilized to assist teaching. The course requires students to complete a project using the skills learned in class and present it during the final presentation. In addition to the traditional mechanical process, PCB and semiconductor-related knowledge will also be included.%
教科書： Textbooks	Fundamentals of Modern Manufacturing: materials, processes, and systems. 7th Edition, WILEY, Mikell P. Groovers. ISBN 978-119-70642-7 (This is a bible)
參考書目： References	Introduction to Manufacturing Process: Chinese simplified version by 周永燦, 黃博滄譯 ISBN 978-986-90920-5-0 滄海圖書
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. The class will provide 3d printing machine outside the campus to practice.