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：何慶炎

Instructor:

課程名稱：雷射先進應用

Course Title：Advanced Applications of Laser

2026/11/3

課程代號：EN5809701 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：F6(TR-310-2) F7(TR-310-2) F8(TR-310-2) Time/Location	
專業核心能力： Core Professional Competencies	■ 具備自我求知能力 ■ 具備專業知識 ■ 具備跨領域整合
課程網址： Course Website	
課程宗旨： Course Objectives	Let learners to understand the applications of lasers in microscale lithography, thermal processing, cold processing, signal transmission, biomedical detection, non-contact internal surgery on living organisms, precision measurement, material modification, medical aesthetics, weapons, cooling, holography, silicon photonics, and the related scientific principles of these applications and the laser characteristics used.
課程大綱： Outline of Lectures	(1) Microscale ablation. (2) Microscale joining. (3) Electron excitation. (4) Signal transmission or communication. (5) Laser abnormal cell removal or virus detection. (6) Cold processing of femtosecond-pulse laser. (7) Applications in nanoscale process . (8) Measurement applications. (9) Ultra-short pulse forming treatment. (10) Applications of micro-modeling of material surface structure. (11) Application of laser plasma creation. (12) Medical and aesthetic applications for spot removal, whitening, and hair growth. (13) Laser weapons. (14) Laser driving for electrons. (15) Laser holography. (16) Laser cooling. (17) Laser freeze of atoms and molecules . (18) Special laser processing of soft, thin and super-hard materials. (19) Laser non-contact material internal molding. (20) Non-contact brain processing.
授課方式： Method of Instruction	講授 Lecture：80% 分組討論 Group discussion：0% 案例研討 Case study：0% 操做練習 Practical exercises：20% 講授 Lecture：%

教科書： Textbooks	Principles of lasers / Orazio Svelto ; translated from Italian and edited by David C. Hanna.
參考書目： References	Laser Principles and Practical Technology, compiled by Su Pinshu, Fuhan Publishing House.
修課須知： Notice	
評量方式： Grading	Usual performance (attendance, class exercises) account for 80% of the grade, and report grades account for 20%.
備註說明： Notes	Equiped with basic knowledge of laser optics.