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：樊俊遠

Instructor:Chun-Yuan Fan

課程名稱：富立葉光學

Course Title：Fourier Optics

2026/11/3

課程代號： EO5910701 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： T6(IB-601-2) T7(IB-601-2) T8(IB-601-2) Time/Location	
專業核心能力： Core Professional Competencies	
課程網址： Course Website	
課程宗旨： Course Objectives	本課程詳細探討傅氏轉換之特性,著重物理意義之闡釋,培養學生能夠靈活處理頻譜問題,並將二維系統與二維傅氏轉換的觀念應用於空間中光波傳播,繞射,成像及影像處理問題
課程大綱： Outline of Lectures	First part: Fourier transform and related topics: 1. Definition, fundamental properties, and theorems of Fourier transforms 2. Measure of width, the uncertainty relation, the central limit theorem 3. Linear filters and transfer functions, sampling theory, dft and fft 4. Hilbert transform and other transforms 5. Two-dimensional Fourier transforms and two-dimensional systems 6. Reconstruction from projections, Abel transform, and radon transform Second part. Fourier optics: 1. Scalar diffraction theory, the angular spectrum of plane waves 2. Fresnel and fraunhofer diffraction 3. Fourier transforming and imaging properties of lenses 4. Frequency analysis of optical imaging systems 5. Spatial filtering and optical information processing 6. Introduction to holography (or wavefront-reconstruction imaging)
授課方式： Method of Instruction	講授 Lecture：100% 分組討論 Group discussion：0% 案例研討 Case study：0% 操做練習 Practical exercises：0% 講授 Lecture：%
教科書： Textbooks	[1]. Goodman, Joseph W. Introduction to Fourier Optics. Roberts and Company publishers, 2005. [2]. Bracewell, Ron, and Peter B. Kahn. "The Fourier transform and its applications." American Journal of Physics 34.8 (1966): 712-712.
參考書目： References	

	[1]. Papoulis, Athanasios. The Fourier integral and its applications. McGraw-Hill, 1967. [2]. Iizuka, Keigo, and Keigo Iizuka. "Electro and Accousto Optics." Engineering Optics (1985): 378-407. [3]. Yu, Franc TS. Optical information processing. Krieger Publishing Co., Inc., 1982.
修課須知： Notice	Python輔助，幫助同學了解傅氏光學背後的物理意義
評量方式： Grading	習題20% 期中考40% 期末考40%。
備註說明： Notes	