

Course Content

Course Title (English)	Fourier Transform and Fourier Optics
Course Title (Chinese)	傅氏轉換與傅氏光學
Credit	3
Instructor	Prof. Yu-Hsiang Cheng 鄭宇翔 教授
Outline	<p>I. Fourier transform and related topics:</p> <ol style="list-style-type: none">1. Definition, basic properties, and theorems of Fourier transforms2. Measure of width, the uncertainty relation, the central limit theorem3. Linear filters and transfer functions, sampling theory, DFT and FFT4. Hilbert transform and other transforms5. Two-dimensional Fourier transforms and two-dimensional systems6. Reconstruction from projections, Abel transform and Radon transform <p>II. Fourier optics:</p> <ol style="list-style-type: none">1. Scalar diffraction theory, angular spectrum of plane waves2. Fresnel and Fraunhofer diffraction3. Fourier transforming and imaging properties of lenses4. Frequency analysis of optical imaging systems5. Spatial filtering and optical information processing6. Introduction to holography (or wavefront-reconstruction imaging)
Goal	In this course, we will investigate the properties of Fourier transform and their physical meaning. Students will learn how to treat problems in the frequency domain and apply the 2D Fourier transform to understand wave propagation, diffraction, imaging, image processing, etc.
English Teaching	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO

Teaching
Material

English

Chinese