

**Module:** **Elective Advanced Lectures:  
Observational Astronomy**

Module No.: astro840

**Course:**



**The Fourier-Transform and its  
Applications (OA)**

Course No.:

Category	Type	Language	Teaching hours	CP	Semester
Elective	Lecture with exercises	English	2+1	4	ST

**Requirements for Participation:**

**Preparation:**

Elementary Physics (Bachelor level); Elementary QM

**Form of Testing and Examination:**

Exercise and written test; or oral examination

**Length of Course:**

1 semester

**Aims of the Course:**

Strengthen insight into how the mathematical principles of Fourier Theory as a common principle affect many areas of physics (optics: diffraction/interference; QM: Heisenberg principle; statistics of noise and drifts; data acquisition: sampling) and other applications (data compression, signal processing).

**Contents of the Course:**

- introduction to the principles of Fourier Transform mathematics
- Delta-function and more general distributions
- diffraction optics and interferometry
- uncertainty principle in QM as application of FT
- theory of noise, drifts and their statistics
- intro to wavelet analysis and data compression

**Recommended Literature:**

Bracewell: The Fourier Transform and its Applications