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

Degree - M.Sc. in Astrophysics (PO von 2014)

Module	**Elective Advanced Lectures: Observational Astronomy**
Module No.	astro840

Course	**The Fourier-Transform and its Applications (OA)**
Course No.	FTA

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