

**Module: Elective Advanced Lectures:  
Modern Astrophysics**

Module No.: astro850

**Course:**  **Physics of Supernovae and  
Gamma-Ray Bursts**

Course No.: astro8502

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

**Requirements for Participation:**

**Preparation:**

Introductory astronomy and cosmology lectures

**Form of Testing and Examination:**

Written or oral examination, successful exercise work

**Length of Course:**

1 semester

**Aims of the Course:**

The student will learn basic physics on supernova and gamma-ray burst, and will have an overview on their applications to various fields of astrophysics.

**Contents of the Course:**

Basic physics on stellar hydrodynamics, radiation processes, and stellar death.

Type Ia supernova: observations and theory. Application to cosmology

Core collapse supernova: observations and theory

Gamma-ray bursts: observations and theory.

Implications for massive star population and star-formation history

Supernova nucleosynthesis and chemical evolution of galaxies

Explosions of the first generations of stars

Some related issues: supernova remnants, neutrinos, shock break-out, etc.

**Recommended Literature:**

Lecture notes with key references for each topic will be provided.