Stars and Stellar Evolution or specific: Stellar Structure and Evolution - astro811

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

Module	**Compulsory Astrophysics I**
Module No.	astro810

Course	**Stars and Stellar Evolution or specific: Stellar Structure and Evolution**
Course No.	astro811

Category	**Type**	**Language**	**Teaching hours**	**CP**	**Semester**
Required	Lecture with exercises	English	3+1	6	WT

Requirements for Participation:

Preparation:

Form of Testing and Examination: Requirements for the examination (written or oral): successful work with the exercises

Length of Course: 1 semester

Aims of the Course: Students will acquire sufficient knowledge to understand stars and their evolution. Study of radiation transport, energy production, nucleosynthesis and the various end phases of stellar evolution shall lead to appreciation for the effects these processes have on the structure and evolution of galaxies and of the universe

Contents of the Course: Historical introduction, measuring quantities, the HRD. Continuum and line radiation (emission and absorption) and effects on the stellar spectral energy distribution. Basic equations of stellar structure. Nuclear fusion. Making stellar models. Star formation and protostars. Brown Dwarfs. Evolution from the main-sequence state to the red giant phase. Evolution of lower mass stars: the RG, AGB, HB, OH/IR, pAGB, WD phases. Stellar pulsation. Evolution of higher mass stars: supergiants, mass loss, Wolf-Rayet stars, P-Cyg stars. Degenerate stars: White Dwarfs, Neutron Stars, Black Holes. Supernovae and their mechanisms. Binary stars and their diverse evolution (massive X-ray binaries, low-mass X-ray binaries, Cataclysmic variables, etc.). Luminosity and mass functions, isochrones. Stars and their influence on evolution in the universe

Recommended Literature: Lecture notes on “Stars and Stellar Evolution” (de Boer & Seggewiss)