Module: Compulsory Astrophysics II

Module No.: astro820

Course: Astrophysics of Galaxies

Course No.: astro821

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

Requirements for Participation:

Preparation:
Introductory astronomy as well as a good understanding of stars and their evolution as well as of the interstellar medium

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

Length of Course:
1 semester

Aims of the Course:
The student shall acquire deep knowledge of the structure of the Milky Way and of other galaxies including their evolution.
This must enable them to understand and evaluate new publications in the field. It should provide the student a quick entry into the research phase of the study programme

Contents of the Course:
Review of stars and stellar evolution, review of the interstellar medium. Solar neighbourhood: observables, differential galactic rotation, Hyades, Goulds Belt, Local Bubble. The Galaxy: size, dynamics of objects, rotation curve, disk and z-distribution. Stellar dynamics: Boltzmann, Jeans drift, Schwarzschild ellipsoid, scale length and height, density wave, mass distribution, age of populations, dark matter concept, evolution. Satellites: the Magellanic Clouds, their structure and evolution, Magellanic Stream, Dwarf spheroidals, Local Group galaxies. Star clusters: stellar dynamics, binary and multiple stars, energy exchange, star-cluster birth and death, origin of galactic field population. Active galactic nuclei: observables, jets, accretion, black holes. Structure and shape of spirals and ellipticals, surface brightness, globular cluster systems. Galaxy clusters: distances, statistics, luminosity function, X-ray halos, virial theorem. Galaxy evolution: chemical enrichment, galactic winds, infall, observables. Galaxy collisions: relaxation, mergers, birth of dwarf galaxies

Recommended Literature:
J. Binney; B. Merrifield; Galactic Astronomy (Princeton University Press 1998)
J. Binney, S. Tremaine; Galactic Dynamics (Princeton University Press 1988)
L. S. Sparke; J. S. Gallagher; Galaxies in the Universe (Cambridge University Press, 2000)
Write-up of the class