



Universität Ulm

Master of Science Physics (PO 2017)

Astrophysics

Code 8812873096

ECTS credits 6

Attendance time 5

Language of instruction German

Duration 1 Semester

Cycle each Semester

Coordinator Dean of Physics Studies

Instructor(s) Dr. Ralf Aurich

Allocation of study programmes M. Sc. Physics, elective module, 1st or 2nd semester

Recommended prerequisites Basic knowledge in nuclear physics, particle physics and astrophysics

Learning objectives In the introductory part of this lecture, students will learn the spectral classification and the state variables for the description of stars. The life evolution of a star will be shown via the Hertzsprung-Russel diagram.

Various astrophysical processes will be discussed, including convection and radiation transport in matter and its application to the stellar atmosphere.

The basic equations of stellar structure will be applied to the different phases of stellar evolution. Homology relations will be obtained and used to determine the position of the Hayashi track in the Hertzsprung-Russel diagram. Furthermore, this lecture will introduce the relevant nuclear fusion processes, the later evolution of a massive star into a supernova and the differences with the evolution of a low-mass star.

Syllabus

- Spectral classification and state variables describing the stellar structure
- Hertzsprung-Russel diagram

- Convection and radiation transport in matter and stellar atmosphere
- Homology relations
- Nuclear fusion processes and evolution of massive stars

Literature -

Teaching and learning methods Lecture (3 h/week)
 Tutorial (2 h/week)

Workload 45 hours Lecture (attendance)
 30 hours Tutorial (attendance)
 105 hours self-study and exam preparation
 Total: 180 hours

Assessment The grade of the module will be the grade of the oral or written [depending on the number of participants] exam. Prerequisite for exam registration is passing the pre-course.

Grading procedure The grade of the module will be the grade of the exam.

Basis for
