Astrophysics I - course description

General information

Course name	Astrophysics I
Course ID	13.7-WF-FizD-Ast-S19
Faculty	Faculty of Physics and Astronomy
Field of study	Physics
Education profile	academic
Level of studies	Second-cycle studies leading to MS degree
Beginning semester	winter term 2020/2021

Course information

Semester	1
ECTS credits to win	6
Available in specialities	Astrofizyka komputerowa
Course type	obligatory
Teaching language	english
Author of syllabus	• dr hab. Wojciech Lewandowski, prof. UZ

Classes forms

The class form	Hours per semester (full-time)	Hours per week (full-time)	Hours per semester (part-time)	Hours per week (part-time)	Form of assignment
Lecture	15	1	-	-	Exam
Class	30	2	-	-	Credit with grade

Aim of the course

An extension of the knowledge about stellar astrophysics, stellar evolution and binary stars evolution, and the final stages of the stellar evolution

Prerequisites

Basic knowledge in the field of astrophysics, namely the structure and evolution of stars. Basic knowledge of celestial mechanics.

Scope

- The strucrure of stars. Basic laws governing the stellar structure.
- Stellar atmospheres.
- The origin of stellar spectra.
- The influence of physical properties of a star on the shape of spectral lines.
- Evolution of stars of various masses.
- Interstellar clouds, proto-stars, circumstellar disks.
- Properities of main sequence stars of various mass and chemical composition.
- Post-main sequence evolution – giants and supergiants.
- Horizontal branch and asymptotic branch.

Teaching methods

Classic lecture. Computational exercises during class plus a project method – an extended study of a selected topic from the lecture area of interest

Learning outcomes and methods of theirs verification

Outcome description	Outcome symbols	Methods of verification	The class form
Student has extended knowledge of the stellar evolution. He can describe the structure of a star during various stages of the evolution, based on the star's and chemical composition. He can explain the process of stellar formation. He is able to point out and explain the differences in the evolution of stars of different mass. Using the acquired theoretical knowledge student can solve simple analytical problems concerning the stellar structure and evolution. He can independently study a chosen topic from the field of stellar evolution using the available literature. He is able to present the results of his research in a written form.	• K2_U01 • K2_U03 • K2_U05 • K2_U07 • K2_U11 • K2_U12 • K2_U13 • K2_K01 • K2_K03	• a project • a test	• Class

Outcome description	Outcome symbols	Methods of verification	The class form
Student can name and explain the basic laws governing teh structure of stars, with the particular focus on the hydrostatic equilibrium. Based on his knowledge of physics and astronomy he can describe the structure of stars of various masses, point out and explain the reasons behind the differences. Student can explain the origin of the stellar spectrum and the influence of various physical properties on the spectral characteristic. Student has extended knowledge of the stellar evolution. He can describe the structure of a star during various stages of the evolution, based on the star's and chemical composition. He can explain the process of stellar formation. He is able to point out and explain the differences in the evolution of stars of different mass.	• K2_W01 • K2_W03	• an exam - oral, descriptive, test and other	• Lecture

Assignment conditions

Lecture: Oral exam, passing condition – positive grade.
Class: Written test – solving computational exercises(passing condition – positive grade), and a positive grade from the written research report.
Final grade: a weighted average of the exam grade (70%) and the class grade (30%).

Recommended reading

[1] F. Shu, Galaktyki, gwiazdy, życie, Prószyński i S_ka, 2003.
[2] M. Kubiak, Gwiazdy i materia międzygwiazdowa, PWN, 1994.

Further reading

1] J. Mullaney, Double & Multiple Stars and how to observe them, Springer 2005.
[2] R. Kippenhann, A. Weigert, Stellar structure and evolution, Springer 1996.

Notes

Modified by dr hab. Piotr Lubiński, prof. UZ (last modification: 09-06-2020 17:02)