

The physics of stars and the scattered matter - opis przedmiotu

Informacje ogólne	
Nazwa przedmiotu	The physics of stars and the scattered matter
Kod przedmiotu	13.7-WF-FizP-IPPOS- 17
Wydział	Wydział Fizyki i Astronomii
Kierunek	Fizyka
Profil	ogólnoakademicki
Rodzaj studiów	pierwszego stopnia z tyt. licencjata
Semestr rozpoczęcia	semestr zimowy 2022/2023

Informacje o przedmiocie	
Semestr	4
Liczba punktów ECTS do zdobycia	6
Występuje w specjalnościach	Astrofizyka komputerowa
Typ przedmiotu	obowiązkowy
Język nauczania	angielski
Sylabus opracował	dr hab. Wojciech Lewandowski, prof. UZ

Formy zajęć					
Forma zajęć	Liczba godzin w semestrze (stacjonarne)	Liczba godzin w tygodniu (stacjonarne)	Liczba godzin w semestrze (niestacjonarne)	Liczba godzin w tygodniu (niestacjonarne)	Forma zaliczenia
Ćwiczenia	30	2	-	-	Zaliczenie na ocenę
Wykład	30	2	-	-	Egzamin

Cel przedmiotu

Consolidation and extension of the basic astrophysical ideas. Presentation of physical theories that are aplicable to astronomical problems, at the level required for basic understanding of the processes governing the structure and evolution of starts, and the properties of the interstellar medium.

Wymagania wstępne

Basic knowledge of physics and astronomy.

Zakres tematyczny

- Basic physical laws and their application to astrophysical problems: gravitation, electrodynamics, thermodynamics, statistical physics, properties of the electromagnetic waves, special relativity.
- The basics of quantum mechanics. The structure of an atom. Nuclear physics, strong and weak interactions. Thermonuclear reactions.
- The structure of stars. Stellar energy sources. Radiation transfer. The basics of stellar atmosphere physics: origin of spectral lines.
- Basic problems of stellar evolution and its final stages: white dwarves, neutron stars, black holes.
- The basics of the interstellar medium physics: gaseous and dust clouds, radiative processes (thermal and non-thermal) in the interstellar medium.

Metody kształcenia

Classic lecture and computational exercises during class

Efekty uczenia się i metody weryfikacji osiągnięcia efektów uczenia się

Opis efektu	Symbole efektów	Metody weryfikacji	Forma zajęć
Student is able to name and describe the basic laws of gravity, electrodynamics, thermodynamics, statistical physics, electromagnetic radiation physics and special relativity. Student knows the basics of quantum mechanics at the level required to describe the structure of atoms and molecules, and atomic nuclei. Student can describe the qualitative properties on weak and strong interactions. He can name and describe the basic thermonuclear reactions happening in stars(the proton-proton cycle, the CNO cycle, 3-alpha reaction). Student knows, understands and is able to describe the basic physical laws governing the structure of stars. He can characterize the structures of stars of various masses, and explain what observational parameters will result from such structure. He can explain the origin of spectral lines, and describe how they can be used to ascertain the basic physical parameters of stars. Student has knowledge about the stellar evolution, and is able to explain how and why stars of different masses will evolve. He can name and describe the final stages of stellar evolution: white dwarves, neutron stars and black holes. He can name and explain the radiative processes applicable to the interstellar medium. He can name the types of various portions of the interstellar medium and point which physical processes are responsible for their observational parameters.	K1A_W01	egzamin - ustny, opisowy, testowy i inne	Wykład

Opis efektu	Symbol e efektów	Metody weryfikacji	Forma zajęć
Based on the acquired knowledge student can perform simple calculations to solve basic astrophysics problems. He is able to interpret the results of simple astronomical observations, and on their basis infer the basic parameters of stars: mass, brightness, size and temperature. He is able to use his knowledge of astronomy to develop a simple observing project.	• K1A_U01 • K1A_U03 • K1A_U05 • K1A_U08	• kolokwium • praca pisemna	• Ćwiczenia

Warunki zaliczenia

Lecture: Oral exam, passing condition – positive grade.

Class: written test – solving computational exercises; passing condition – positive grade.

Before taking the examination the student needs to obtain passing grade in the computational exercises.

Final grade: and average of the exam grade and the class grade

Literatura podstawowa

[1] F. Shu, *Galaktyki, gwiazdy, życie*, Prószyński i S_ka, 2003.

[2] M. Kubiak, *Gwiazdy i materia międzygwiazdowa*, PWN, 1994.

[3] J.M. Kreiner, *Astronomia z astrofizyką*, PWN, 1988.

Literatura uzupełniająca

[1] E. Rybka, *Astronomia ogólna*, PWN, 1983.

Uwagi

Zmodyfikowane przez dr Marcin Kośmider (ostatnia modyfikacja: 04-04-2022 20:47)