COURSE DESCRIPTION CARD - SYLLABUS

Course name
Modern astronomy

Course

Field of study
Aerospace Engineering

Year/Semester
I/1

Area of study (specialization)

Profile of study
general academic

Level of study
Second-cycle studies

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
0

Other (e.g. online)

Tutorials
0

Projects/seminars
0

Number of credit points

2

Lecturers

Responsible for the course/lecturer:
dr Krzysztof Kamiński

Responsible for the course/lecturer:
dr hab. inż. Agnieszka Wróblewska

Prerequisites

1. Has knowledge in mathematics, including algebra, analysis, theory of differential equations, probabilistic, analytical geometry necessary for: description of the operation of discrete mechanical systems, understanding of computer graphics methods, description of the operation of electrical and mechatronic systems [P6S_WG, K1A_W01]

2. Is able to obtain information from literature, Internet, databases and other sources. Can integrate, interpret the information obtained and draw conclusions and create and justify opinions - [[P6S_UW, P6S_UU - K1A_U04]

3. Has the ability to self-study using modern teaching tools, such as remote lectures, websites and databases, teaching programs, e-books [P6S_UW, P6S_UU - K1A_U03]

4. Rozumie potrzebę uczenia się przez całe życie; potrafi inspirować i organizować proces uczenia się innych osób [P7S_UU K2A_K01]

Course objective

Understanding the basic physical laws governing the universe, the properties and evolution of galaxies,

stars, planets, small bodies and other astronomical objects. Understanding the conditions in space in the context of space missions planning.

Course-related learning outcomes

Knowledge

1) Has basic knowledge of the construction of the universe, in particular the stars and solar system, phenomena occurring in them, recognizing the most important objects in the celestial sphere, important issues and problems in satellite technology, as well as space exploration capabilities, principles of operation of basic types of electromagnetic radiation recorders [P7S_WG K2A_W07]

2) Has broadened knowledge necessary for understanding of profile field and specialist knowledge about construction, methods of construction, manufacturing, operation, air traffic management, security systems, impact on the economy, society and the aviation and aerospace environment for the specialty of aerospace engineering [[P7S_WG , P7S_WK K2A_W01]

Skills

1) Can obtain information from literature, Internet, databases and other sources. Can integrate the information obtained and interpret conclusions and create and justify opinions [P7S_UW, P7S_UU; K2A_U04]

2) Has the ability to self-study using modern teaching tools, such as remote lectures, websites and databases, teaching programs, e-books [P7S_UW, P7S_UU; K2A_U03]

3) Is able to communicate using various techniques in a professional environment and other environments using a formal record of construction, technical drawing, concepts and definition of the scope of the studied field of study [P7S_UK; K2A_U02]

Social competences

1. Is ready to critically evaluate his/her knowledge and content received, recognize the importance of knowledge in solving cognitive and practical problems and to consult experts in the event of difficulties in solving the problem independently [P7S_KK K2A_K02]

2. Is able to properly define priorities for the implementation of tasks specified by him or others [P7S_UO K2A_K05]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Written exam of the content processed in the classroom.

Programme content

1. Modern ground-based and space-based astronomical observations (different electromagnetic wavelengths, neutrino observations, gravity waves observations, basic types of astronomical observations, largest modern telescopes)

2. Structure, origin and evolution of Solar System bodies (basic properties and classification of planets, satellites, asteroids, comets and meteoroids, interplanetary matter, solar wind, cosmic rays).

3. Sun and stars (properties of stellar objects, sources of energy, stability of stars, formation and evolution of stars, stellar classification, final stages of stellar evolution: white dwarfs, neutron stars, black holes).

4. Galaxies and universe (properties of galaxies, large scale structures, cosmic microwave background radiation, origin and evolution of universe).

5. Space telescopes and space probes (selected interplanetary missions and astronomical space telescopes).

Teaching methods

Informative (conventional) lecture (providing information in a structured way) - may be of a course (introductory) or monographic (specialist) character

Bibliography

Basic

Helen Johnston, „An Introduction to Astronomy”

http://www.physics.usyd.edu.au/~helenj/IntroductiontoAstronomy.html

Additional

Pankaj Jain, „An Introduction to Astronomy and Astrophysics”

https://archive.org/details/An_Introduction_to_Astronomy_and_Astrophysics_by_Pankaj_Jain/

Breakdown of average student's workload

	Hours	ECTS
Total workload	49	2,0
Classes requiring direct contact with the teacher	34	1,4
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	19	0,6

[1] delete or add other activities as appropriate