GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00069092		
Field of study	Technical Physics, Materials Engineering, Mathematics, Materials Engineering, Nanotechnology, Nanotechnology, Materials Engineering		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2026/2027
Education level	second-cycle studies	Subject group	
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	2	Language of instruction	Polish
Semester of study	3	ECTS credits	1.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Solid State Physics -> Faculty of Applied Physics and Mathematics -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Jarosław Rybicki	
	Teachers	prof. dr hab. inż. Jarosław Rybicki	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	0.0	0.0	15

E-learning hours included: 0.0

Learning activity and number of study hours

Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
Number of study hours	15	2.0	8.0	25

Subject objectives

The objective of the course is to familiarize students with the evolution of ideas about the universe in the whole history of humanity: from the prehistoric times (outline of selected mythologies of peoples, the structure of myth), the ideas of the ancient Greeks; medieval, Renaissance cosmology and cosmography, until the early modern times (Copernicus, Galileo, Kepler, Newton) and further development in the 20th and 21st centuries, up to the present time (the discovery of dark energy and dark matter).

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_K101] acknowledges the importance of knowledge related to the field of study in solving cognitive and practical problems, critically assessing the information obtained	The student is prepared to critically evaluate information concerning astronomy and cosmology and recognizes the importance of scientific knowledge in analysing cognitive problems related to the nature and structure of the Universe, taking into account its limitations and philosophical implications.	[SK3] Assessment of ability to organize work
[K7_W101] is able to make an in-depth identification of key objects and phenomena related to the field of study, as well as theories that describe them and applicable analytical and design methods	The student knows and understands, at an advanced level, key concepts and achievements in astronomy and cosmology, from ancient views of the world to contemporary models of the Universe, and understands the fundamental theories and methods underlying their formulation and verification	[SW1] Assessment of factual knowledge
[K7_U101] is able to formulate complex research problems and adopts appropriate methods, obtaining innovative solutions, cooperating with other people, both as a leader and a team member	The student knows and understands, at an advanced level, key concepts and achievements in astronomy and cosmology, from ancient views of the world to contemporary models of the Universe, and understands the fundamental theories and methods underlying their formulation and verification	[SU3] Assessment of ability to use knowledge gained from the subject

<table>
<tr><td>Subject contents</td><td>Course content – lecture
Main topics:

The structure of myth, the heterogeneity of time and space, the sacred and the profane.

Prehistoric astronomy.

Non-Western ancient cosmographies and cosmologies (Oceania, the Americas, India, Africa) and Western cosmographies and cosmologies (Babylonian, Egyptian, Judeo-Christian, Greco-Roman).

The world of Aristotle and Ptolemy. Achievements of ancient astronomy.

Medieval and Renaissance cosmography. Islamic cosmography.

The Copernican Revolution and its significance.

The beginnings of the modern view of the world (Galileo, Kepler). The essence of the dispute between the new and old astronomy.

Hooke, Newton, Descartes. Astronomy in the 19th century.

The history of modern astronomy and cosmology. The discovery of Hubble's law and its significance.

Astronomical and cosmological implications of the general theory of relativity.

The development of the Big Bang theory and the inflationary universe. The discovery of the cosmic microwave background radiation and its significance.

The beginnings of relativistic cosmology. The birth, life and death of stars and galaxies. The large-scale structure of the cosmos. The discovery of dark energy and dark matter.

Concepts of multiverses and parallel worlds and their philosophical implications.

The anthropic principles. The mathematical nature of the world. Logic as a physical variable.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td></td><td>50.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td>Recommended reading</td><td><table><tr><td>Basic literature</td><td>M. Eliade, Mit, sacrum, historia (wskazane rozdziały) A.K. Wróblewski, Historia fizyki (wskazane rozdziały) M. Hoskin, Historia astronomii (wskazane rozdziały) M. Heller, Ostateczne wyjaśnienie wszechświata (wskazane rozdziały)</td></tr><tr><td>Supplementary literature</td><td>Internet Resources</td></tr><tr><td>eResources addresses</td><td></td></tr></table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>Discuss the concept of myth. Discuss Ptolemy’s model of the universe. Discuss the earliest measurements of distances between celestial bodies. Debates over the sphericity and motion of the Earth. Discuss the essence of the Copernican Revolution. The discovery of background radiation and its impact on the development of cosmology. Lemaitre’s cosmology. Dark matter and dark energy. The discovery of cosmic background radiation and its impact on the development of cosmology.
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<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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