

WROCLAW UNIVERSITY OF TECHNOLOGY – PHD STUDIES

FACULTY OF FPT.....

SUBJECT CARD

Course name in Polish Historia nauk przyrodniczych

Course name in English History of Science

Course language polish

University-wide general course type:

1) basic course (mathematics, physics, chemistry, other)

2) humanity course

3) managerial skills

4) English language

5) other modern language

Departmental course developing professional skills:

1) specialized course

2) interdisciplinary course

3) seminar (interdisciplinary, specialized, departmental)

Type of course (obligatory, optional) optional

Educational effects according to ZW 26/2017:

..... P8U_W, P8S_WG, P8S_WK, P8U_U, P8S_UW, P8S_UK, P8S_KK

Subject code FZP9854

*delete as applicable

	Lecture	Laboratory	Seminar
Number of hours of organized classes in University (ZZU)	30		
Number of hours of total student workload (CNPS)	45		
Form of crediting	Exam **	Exam / crediting with grade*	Oral presentation
Number of ECTS points	2		
including number of ECTS points for practical (P) classes			
including number of ECTS points for direct teacher-student contact (BK) classes	2		

*delete as applicable **In case of didactic courses also inspections and evaluation classes

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

High school knowledge

SUBJECT OBJECTIVES

C1	Learning and understanding of the stages of development of Science.
C2	Understanding the impact of Science on the development of civilization.
C3	Understanding the importance of science and education in creating a solidary society. Improving knowledge and wisdom in the student community.

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SUBJECT EDUCATIONAL EFFECTS**I. Category of knowledge.**

Has a basic knowledge of the sources of science. Can determine the mechanism for the creation and main stages of development of major fields of science. Has knowledge of the major problems facing modern science.

PEK_W01,W02 – has general knowledge about selected historical sources and history of the creation of the number system.

PEK_W03,W04 – has general knowledge about chronological collection of astronomical observations and the main theories of astronomy before Kopernik

PEK_W05– knows and understand the essence of Kopernik contribution to Science, understands that the only drawback of geocentric system is its complexity.

PEK_W06,W07 – has general knowledge about development of physics to the time of Newton

PEK_W8 – understands the genius of Isaac Newton.

PEK_W9 – understands why Newton's „Philosophiae Naturalis Principia Mathematica” has been considered as the foundation of Science and knows all the next phases of its development.

PEK_W10 – knows causes of the development of chemistry, optics and thermodynamics.

PEK_W11 – knows and understands the development of pre-Maxwellian electrodynamics.

PEK_W12 – understands the genius of James Clark-Maxwell, understands the impact of his theory on the emergence of Theory of Relativity and Quantum Mechanics.

PEK_W13 – understands the process of discovery of elementary particles, knows what it is the Standard Model, understands the importance of the discovery of the Higgs boson.

PEK_W14 – has knowledge about the origins of the General Theory of Relativity and the Big Bang theory

PEK_W15 – recognizes the role of theory and experiment in the creation of Science, knows selected directions of contemporary research.

II. Category of skills.

Can individually present issues discussed in the lectures which the content of these learning outcomes in the field of knowledge (PEK_W01÷PEK_W15).

PEK_U01, U02 – is able to list the steps to the number system to explain the order of their succession, associate it with the stages of social development.

PEK_U03, U04 – can justify that the observations movements of the stars and the moon formed the foundation of Science.

PEK_U05 –can describe the heliostatic system of Kopernik and explain the essence of his contribution to Science.

PEK_U06, U07 – is able to formulate the laws of physics before Newton's and make a critical analysis of them.

PEK_U08 – can describe Newton's contribution to Science.

PEK_U09 – can justify the idea that Newton is the creator of the science system.

PEK_U10 – can describe the differences in development of mechanics and other sectors of natural science.

PEK_U11 – is able to list the stages of development of electrodynamics.

PEK_U12 – can describe how much modern civilization owes to the theory of JC Maxwell.

PEK_U13 – can explain the genesis of the modern theory of elementary particles.

PEK_U14 – can explain the origin of the Big Bang theory.

PEK_U15 – can describe the current priorities of Science.

III. Category of social competences.

Fixation of competence in:

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PEK_K01 – search and critical analysis of information, efficient translation and justify their point of view using the knowledge of the history of Science.
PEK_K02 – understanding of the need for self-esteem and self-education, skills, attention to important issues, to apply knowledge and skills, and responsibility for the results of actions taken.
PEK_K03 – independent and creative thinking.
PEK_K04 – respect customs and rules in academia.

PROGRAM CONTENTS		
Form of classes – lecture		Number of hours
Lec 1,2	The beginnings of mathematics. How was created the number system?	4
Lec 3	Ancient astronomy - the first steps of natural science.	2
Lec 4	Geocentric System from Eudoksos to Ptolemy.	2
Lec 5	Kopernik and his work.	2
Lec 6,7	Physics Laws before 1686.	4
Lec 8	„Philosophiae Naturalis Principia Mathematica” by I. Newton.	2
Lec 9	Development of mechanics – introduction of methodology of Science.	2
Lec 10	Thermodynamics and chemistry.	2
Lec 11	Stages of development of electrodynamics.	2
Lec 12	J. Clark Maxwell – union of optics and electrodynamics.	2
Lec 13	The genesis of Quantum Mechanics and particle physics.	2
Lec 14	How was created the Big Bang theory?	2
Lec 15	Modern science. Open questions.	2
	Total hours	30

TEACHING TOOLS USED	
N1	Lectures with audiovisual means and demonstrations of physical phenomena.
N2	Self-study and exam preparation.
N3	Consultations.

EVALUATION OF ACHIEVED SUBJECT EDUCATIONAL EFFECTS		
Evaluation: F – forming (partial) C – concluding	Educational effect number	Way of evaluating achievement of educational effects
C	PEK_W01– PEK_W15 PEK_U01– PEK_U15,PEK_U17 PEK_K01– PEK_K04	written test

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PRIMARY AND SECONDARY LITERATURE**PRIMARY LITERATURE:**

- [1] G. Ifrach, „Histoire universelle des chiffres” , Editions Robert Laffont SA, Paris, 1994
- [2] G. Ifrach, „Les chiffres ou l’histoire d’une invention”, Ed. Robert Laffont SA, Paris, 1985
- [3] A. Drzewiński, J. Wojtkiewicz, „Opowieści z historii fizyki”, PWN Warszawa 1995
- [4] L. Ledermann, D. Teresi, „The God particle”, Leon Lederman and Dick Teresi 1993
- [5] N. Spielberg, B.D. Anderson, „Fizyka, siedem wynalazków, które wstrząsnęły światem”, Wydawnictwo Amber Warszawa 1997
- [6] A.K. Wróblewski, „Historia Fizyki”, PWN Warszawa 2006, (in Polish)

SECONDARY LITERATURE:

- [7] I. Newton, “Philosophiae Naturalis Principia Mathematica”, London, 1687
- [8] A.K. Wróblewski, J.A. Zakrzewski, „Wstęp do fizyki”, PWN Warszawa 1984
- [9] M. Gell-Man, “Kwark i Jaguar”, CIS Warszawa 1996

SUBJECT SUPERVISOR

(NAME AND SURNAME, E-MAIL ADDRESS)

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