DESCRIPTION OF THE COURSE OF STUDY

Course code		0719-2FIZT-C27-2PF
Name of the course in	Polish	**II pracownia fizyczna cz.2**
	English	**Physical laboratory II, part 2**

1. LOCATION OF THE COURSE OF STUDY WITHIN THE SYSTEM OF STUDIES

1.1. Field of study	Technical physics
1.2. Mode of study	Full-time
1.3. Level of study	1st degree
1.4. Profile of study	General academic
1.5. Person/s preparing the course description	Dr hab. Aldona Kubala-Kukuś, prof. UJK
1.6. Contact	aldona.kubala-kukus@ujk.edu.pl

2. GENERAL CHARACTERISTICS OF THE COURSE OF STUDY

2.1. Language of instruction	English
2.2. Prerequisites	Mathematical analysis, Fundamentals of physics, Fundamentals of statistics, Atomic physics, Fundamentals of nuclear physics

3. DETAILED CHARACTERISTICS OF THE COURSE OF STUDY

3.1. Form of classes		Laboratory classes
3.2. Place of classes		Courses in the UJK teaching rooms of the Faculty of Exact and Natural Science
3.3. Form of assessment		credit with grade
3.4. Teaching methods		Laboratory methods (experiments)
3.5. Bibliography	**Required reading**	A. Strzałkowski, Wstęp do fizyki jądra atomowego, PWN, Warszawa, 1978. T. Mayer-Kuckuk, Fizyka jądrowa, PWN, Warszawa, 1986. J. Araminowicz, K. Małuszyńska, M. Przytuła, Laboratorium fizyki jądrowej, PWN, Warszawa. T. Hilczer, Ćwiczenia z fizyki jądrowej, Wydawnictwo Naukowe UAM, Poznań J. B. England, Metody doświadczalne fizyki jądrowej, PWN, Warszawa K. N. Muchin, Doświadczalna fizyka jądrowa, t1. – Fizyka jądra atomowego. B. Dziunikowski, Radiometryczne metody analizy chemicznej H. Haken i H.Ch. Wolf, Atomy i kwanty. Wprowadzenie do współczesnej spektroskopii atomowej. Wydawnictwo Naukowe PWN, wydanie dowolone. M. Skorko, Fizyka, PWN, rok wydania dowolny. St. Chibowski, Ćwiczenia laboratoryjne z chemii jądrowej i radiometrii, Wyd. UMCS B. Dziunikowski, Energy dispersive x-ray fluorescence analysis B. Martin, Nuclear and particle physics : [an introduction]
	Further reading	

4. OBJECTIVES, SYLLABUS CONTENT AND INTENDED LEARNING OUTCOMES

4.1. Course objectives (including form of classes)
Knowledge (lectures and laboratories) C1- familiarizing the student with the basic phenomena of nuclear physics in practice C2 – familiarizing the student with the basic experimental methods and the basic apparatus of nuclear physics

4.2. Detailed syllabus (including form of classes)

Laboratories:
Optionally, according to the schedule of classes, the student carries out some of the following program contents:
- Investigation of the dependence of the gamma radiation intensity on the distance between the cobalt source and the detector.
- Measurement of radioactive contamination of the β type for water and air.
- Determination of the γ radiation absorption curve.
- Determination of the dead time of the Geiger-Muller counter by the method of two sources. Study of the statistical nature of radioactive decay.
- Spectrometry of α radiation spectrometry.
- Neutron activation. Determination of the activation curve and decay half-life of radioactive silver Ag isotopes.
- Measurement and analysis of monoenergetic γ radiation spectra using a scintillation detector with Genie 2000 software.

4.3. Education outcomes in the discipline

Code	A student, who passed the course	Relation to learning outcomes
within the scope of **KNOWLEDGE:**		
W01	Knows the structure of the atomic nucleus and the basic parameters describing the atomic nucleus.	FIZT1_W01 FIZT1_W04
W02	Knows the definition of nuclear radiation and the types of nuclear transformations. Lists the features of nuclear radiation.	FIZT1_W01 FIZT1_W04
W03	Defines the physical laws of nuclear radiation. Distinguishes between the concepts of "contamination" and "irradiation". Knows the natural and artificial sources of radioactive contamination of water and air.	FIZT1_W03 FIZT1_W04 FIZT1_W13
W04	Knows the three basic principles of protection against nuclear radiation	FIZT1_W08 FIZT1_W09
W05	Knows the apparatus used to detection of nuclear radiation.	FIZT1_W08 FIZT1_W09 FIZT1_W15
within the scope of **ABILITIES:**		
U01	Can assess the credibility of the determined values of physical quantities.	FIZT1_U03 FIZT1_U04 FIZT1_U05 FIZT1_U16
U02	Can prepare a report from the laboratory experiments in the form specified for diploma theses (style, edition).	FIZT1_U05 FIZT1_U07 FIZT1_U16
within the scope of **SOCIAL COMPETENCE:**		
K01	Understands the necessity to work with the principles of radiation protection.	FIZT1_K02 FIZT1_K03

4.4. Methods of assessment of the intended learning outcomes

Teaching outcomes *(code)*	Method of assessment (+/-)																				
	Oral answer			Project			Self-study			Group work			Test			Effort in class			Report		
	Form of classes			*Form of classes*			*Form of classes*			*Form of classes*			*Form of classes*			*Form of classes*			*Form of classes*		
	L	*C*	*P*	*L*	*C*	*P*	*L*	*C*	*P*	*L*	*C*	*P*	*L*	*C*	*P*	*L*	*C*	*P*	*L*	*C*	*P*
W01															***X***						
W02															***X***						
W03															***X***						
W04															***X***						
W05															***X***						
U01																					***X***
U02																					***X***
K01																		***X***			

4.5. Criteria of assessment of the intended learning outcomes		
Form of classes	**Grade**	**Criterion of assessment**
Laboratory	**3**	at least 50% and not more than 60% of the total number of available points
	3,5	more than 60% and not more than 70% of the total number of available points
	4	more than 70% and not more than 80% of the total number of available points
	4,5	more than 80% and not more than 90% of the total number of available points
	5	more than 90% of the total number of available points

5. BALANCE OF ECTS CREDITS – STUDENT'S WORK INPUT

Category	**Student's workload**	
	Full-time studies	**Extramural studies**
NUMBER OF HOURS WITH THE DIRECT PARTICIPATION OF THE TEACHER /CONTACT HOURS/	***60***	
Participation in lectures		
Participation in laboratories/project	60	
Preparation for the exam		
Others		
INDEPENDENT WORK OF THE STUDENT/NON-CONTACT HOURS/	***40***	
Preparation for the lecture		
Preparation for the laboratories	15	
Preparation for the exam		
Gathering materials for the project		
Preparation of multimedia presentation		
Others raport preparation*	25	
TOTAL NUMBER OF HOURS	**100**	
ECTS credits for the course of study	**5**	

Accepted for execution *(date and signatures of the teachers running the course in the given academic year)*

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