



COURSE OFFERED IN THE DOCTORAL SCHOOL

Code of the course		Name of the course	Polish	Terapie XXI wieku		
			English	Therapy for the 21 st Century		
Type of the course	specialist					
Course coordinator	Prof. Ewa Bartnik (UW)		Course teacher	Prof. Ewa Bartnik (UW)		
Implementing unit	Center for Advanced Studies WUT	Scientific discipline / disciplines*	chemical sciences, biotechnology, biomedical engineering			
Level of education	Doctoral studies	Semester	Winter 2024			
Language of the course	English					
Type of assessment	Zal.	Number of hours in a semester	30	ECTS credits	2	
Minimum number of participants	10	Maximum number of participants	50	Available for students (BSc, MSc)	Yes	
Type of classes		Lecture	Auditory classes	Project classes	Laboratory	Seminar
Number of hours	in a week	2	-	-	-	
	in a semester	30				

* does not apply to the Researcher's Workshop

1. Prerequisites

High school level biology.

2. Course objectives

The aim of the lectures is to show the students how to distinguish what is and what is not based on science in important decisions pertaining to health – the course is about new therapies and methods such as stem cells, gene therapy and genetic tests.

3. Course content (separate for each type of classes)

Lecture

Part 1. Genetics

Basic concepts of genetics – genes, DNA, RNA, mutations. Regulation of gene expression.

Genetic diseases. Monogenic and multifactorial diseases. Rare diseases.

Therapies for genetic diseases – gene therapies, RNA therapies, drugs affecting protein structure. Precision medicine – drugs targeted at the cause of the disease

Therapies for rare and neglected diseases – what is possible and what is cost effective.

Cost of gene therapy – why is it so high and does it have to be?

Will we have a GATTACA future – modifications, therapy and enhancement.

Part 2. Cancer – what causes it and why there will never be a drug for cancer

Classical therapies – chemotherapy, radiotherapy.

A short introduction to immunotherapy – why the organism does not see the cancer and what can be done to change that

New therapies – targeted drugs, immunotherapies, checkpoint inhibitors.

Prevention and treatment – anti-cancer vaccines.

Part 3 – metabolic diseases

Mitochondrial diseases – types and some (rare) treatments

Obesity – causes and treatments (very new ones)



Diabetes - causes and treatments
 Diseases of the circulatory system and treatments
 Part 4 – vaccines – prevention instead of treatment – from killed microorganisms to mRNA vaccines –mRNA
 Part 5 – choroby neurodegeneracyjne. Leki na chorobę Alzheimera i Parkinsona.
 Part 6 – Stem cells, iPSCs (induced pluripotent stem cells), cloning.
 Part 7– Animals as (potential) organ donors for transplantation
 Part 8– Monoclonal antibodies and their uses (other than treating cancer)
 Part 9- extra– genetic tests, necessary, redundant and nonsensical

Laboratory

4. Learning outcomes

Type of learning outcomes	Learning outcomes description	Reference to the learning outcomes of the WUT DS	Learning outcomes verification methods*
Knowledge			
K01	Has organized knowledge in basic genetics, immunology and cancer biology	SD_W2	test
K02	Has organized knowledge on treatment of genetic diseases	SD_W1	test
K03	Has organized knowledge allowing evaluation of “miraculous treatments” in the media	SD_W1	test
Skills			
S01	Can make decisions pertaining to their own health	SD_U1, SD_U6	test
S02	Can explain why vaccination is necessary	SD_U4, SD_U6	test
S03	Can explain why homeopathy is nonsense	SD_U2, SD_U6	test
S04	Understands what stem cells are and what they can and cannot be used for	SD_U1, SD_U6	test
Social competences			
SC01	Understands the need for continuous learning	SD_K2	active participation during classes
SC02	Understands the need for research on new therapies and the associated ethical problems	SD_K1	active participation during classes

*Allowed learning outcomes verification methods: exam; oral exam; written test; oral test; project evaluation; report evaluation; presentation evaluation; active participation during classes; homework; tests

5. Assessment criteria

Test, Credits on the basis of participation in the lectures. 2 absences are allowed.



6. Literature

The course is mainly based on new publications and some new unpublished data, the references concern the basis of genetics and immunology

Primary references:

- [1] Siddhartha Mukherjee The song of the cell
- [2] Siddhartha Mukherjee The emperor of all maladies
- [3] Siddhartha Mukherjee The gene. An intimate history
- [4] Philipp Dettmer. Immune: A Journey Into the Mysterious System That Keeps You Alive

Secondary references: Nothing in English.

[1] [1] Ewa Bartnik. Co kryje się w naszych genach. Wydawnictwo Zwierciadło, 2020.

[2]

7. PhD student's workload necessary to achieve the learning outcomes**

No.	Description	Number of hours
1	Hours of scheduled instruction given by the academic teacher in the classroom	30
2	Hours of consultations with the academic teacher, exams, tests, etc.	5
3	Amount of time devoted to the preparation for classes, preparation of presentations, reports, projects, homework	5
4	Amount of time devoted to the preparation for exams, test, assessments	10
Total number of hours		50
ECTS credits		2

** 1 ECTS = 25-30 hours of the PhD students work (2 ECTS = 60 hours; 4 ECTS = 110 hours, etc.)

8. Additional information

Number of ECTS credits for classes requiring direct participation of academic teachers	1
Number of ECTS credits earned by a student in a practical course	