

					Syllab	us 201	.8/201	9						
				De	escript	ion of t	the cou	ırse						
Module/Course				lecular lication		ine tec	hnique	s- cl	inical	Gro	up of de ults	etailed	educati	on
										Gro	up	Grou	p name	
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												Precl	inical	
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Faculty			Ме	dicine										
Major			Me	dicine										
Specialties				applic										
Level of studies						er stud	ies X *							
				degree										
			1	degree										
			3 <sup>rd</sup>	degree	studi	es 🗆								
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Form of studies				ull-time	e X	part-ti	me				1			
Year of studies			III-V	III-V Semes			er							
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Type of course			□ obligatory											
				mited (										
						elective	}							
Course	4.1			☐ major X basic ☐ Polish X English ☐ other										
Language of instruc			] ЦР	olish	X Eng	glish L	other							
* mark 🗆 with an 🗎	Χ				Nlive	mbor of	f hours							
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Unit teaching the			asses	lou –	(22) \$	asses	ulate SC)	es wi	Ses –	age C	ation	actice	ndent	
course	3	s (SE)	um cl	asses	Classe	ory Cla	n Sim	Class	t Clas	angu	Educa	nal Pre	dy (Stu	ng (EL
	Lectures (L)	Seminars	Auditorium classes (AC)	Major Classes – not clinical (MC)	Clinical Classes (CC)	Laboratory Classes (LC)	Classes in Simulated Conditions (CSC)	Practical Classes with Patient	(PCP) Specialist Classes – magister	stantes (300%) Foreign language Course (FLC)	Physical Education obligatory (PE)	Vocational Practice (VP)	Self-Study (Student's own work)	E-learning (EL)
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Winter Semester														
									1					
Summer Semester														
						20							6	
TOTAL - C					L									
TOTAL per year:														

		20				6	

## Educational objectives (max. 6 items)

- C1. Knowledge of main trends of genetic and cellular therapy.
- C2. Understanding of actions of DNA vaccines.
- C3. Ability to plan the construction of expression plasmid vector with established therapeutic gene.
- **C4.** Understanding of pharmacogenetics and personal pharmacotherapy. Gaining practical SNP analysis performing skills.
- C5. Understanding epigenetics influence on the level of gene expression and knowledge of molecular techniques for their investigations.
- **C6.** Introduction to cell culture methods.

# Education result matrix for module/course in relation to verification methods of the intended education result and the type of class

Number of course	Number of major	Student who completes the module/course knows/is able to	Methods of verification of intended education	Form of didactic
education result	education result		results (forming and	**enter the abbreviation
K 01	C.W41	knows main trends in development of genetic	summarising) Group project.	LC, SS
KOI	C.VV41	and cellular, and target therapy in specific	Evaluation of student's	10,33
		diseases;	oral response.	
K 02		is able to assess advantages and	orarresponse.	
K 02				
K 03		disadvantages of gene therapy application;		
K 03		describes the mechanism of actions of DNA		
		vaccines;		
K 04		understands RNA interference and is able to		
		use it in gene therapy;		
		understands the concept of pharmacogenetics		
K 05	C.W40	and principles of personal therapy;		
		describes techniques of SNP detection;		
K 06	C.W9	understands principles of DNA cloning,		
K 07		describes following steps of theprocess.		
S 01	B.U11	uses databases, including website databases,	Group project.	LC, SS
		and searches for the necessary information	Evaluation of student's	
		using available tools;	practical competency and	
S 02		recognizes sequences of genomic and	involvement.	
		complementary DNA;		
S 03		is able to design primer sets for PCR;		
S 04		plans and carries out reactions with		
		restriction enzymes, PCR, RT, ligations;		
S 05		understands the real-time PCR method, knows		
		how to use it to DNA genotyping and study of		
		DNA methylation as well as microRNA		
		expression level, makes necessary		
	I .	The state of the s	I .	I .

<sup>\*\*</sup> L - lecture; SE - seminar; AC - auditorium classes; MC - major classes (non-clinical); CC - clinical classes; LC - laboratory classes; SCM - specialist classes (magister studies); CSC - classes in simulated conditions; FLC - foreign language course; PCP



practical classes with patient; PE - physical education (obligatory); VP - vocational practice; SS - self-study, EL - E-learning.

Please mark on scale 1-5 how the above effects place your classes in the following categories:

communication of knowledge, skills or forming attitudes:

Knowledge: 3 Skills: 5

Student's amount of work (balance of ECTS points)

Student Workload (h)
20
6
26
1

**Content of classes** (please enter topic words of specific classes divided into their didactic form and remember how it is translated to intended educational effects)

#### Lectures

- 1.
- 2.
- 3.

#### Seminars

- 1.
- 2.
- 3.

## Practical classes

- 1. Introduction to gene therapy. Stages of gene cloning. Working with gene databases, restrictive analysis, PCR primers designing (3 h)
- 2. Gene therapy application in oncology and cardio-vascular diseases. Construction of expression vector part 1. RNA isolation, RT-PCR (3 h)
- 3. Construction of expression vector part 2. Digestion of PCR product with restriction endonucleases, ligation, transformation (3 h).
- 4. DNA vaccines application. Construction of expression vector part 3.Plasmid DNA isolation from bacteria. Indication of DNA concentration (3 h).
- 5. Cellular therapy. Cell culture basic methods. Methods of DNA delivery into cells. Construction of expression vector part 4 Restrictive analysis of obtained DNA (3 h).
- 6. Epigenetic regulation of gene expression. microRNA application in gene therapy and diagnosis. Algorithms and calculation of gene expression in real-time PCR technique. Construction of expression vector part 5. Electrophoresis, summary of cloning results (3 h)
- 7. Pharmacogenetics. SNP detection methods and analysis of results. Summary of the course (2 h).

### Other

- 1.
- 2.
- 3.

etc. ..

Basic literature (list according to importance, no more than 3 items)

1. Herzog R.W., Zolotukhin S. A guide to human gene therapy. World Scientific Publishing Co, Singapure

#### 2010.

- 2. Lattime E.C, Gerson S.L. Gene therapy of cancer. Elsevier Academic Press, Third edition 2014
- 3. Barnes L.P. *New research on pharmacogenetics*. Nova Science Publishers, Inc, New York 2007 Additional literature and other materials (no more than 3 items)
- 1. Scientific articles- provided by the teacher
- 2.
- 3.

Didactic resources requirements (e.g. laboratory, multimedia projector, other...)

Laboratory, cell culture room, laminar chamber, incubator-CO<sub>2</sub>, fluorescence microscope, multimedia projector, laptops, thermocycler, real-time thermocycler, centrifuge, thermoblok, UV-transiluminator

**Preliminary conditions** (minimum requirements to be met by the student before starting the module/course)

None

Conditions to receive credit for the course (specify the form, criteria and conditions of receiving credit for classes included in the module/course, admission terms to final theoretical or practical examination, its form and requirements to be med by the student to pass it and criteria for specific grades).

Positive grade for the project of expression plasmid vector construction into gene therapy application-prepared by the whole group.

Positive grade for all oral responses and analyzes of experimental results.

Proper execution of all designed experiments as well as active participation in discussion.

Each absence must be made up, including rector's days or dean's hours in the time and form specified by the teacher.

Grade:	Criteria for course			
Very Good (5.0)	Educational and skills objectives achieved completely.			
Good Plus (4.5)	Educational and skills objectives achieved almost completely with			
	minor errors and inaccuracies.			
Good (4.0)	Educational and skills objectives achieved except for some less			
	important aspects and errors.			
Satisfactory Plus (3.5)	Educational and skills objectives achieved except for some important			
	aspects and inaccuracies.			
Satisfactory (3.0)	Educational and skills objectives achieved with the exclusion of som			
	essential aspects and significant inaccuracies.			

Grade:	Criteria for exam (if applicable)
Very Good (5.0)	
Good Plus (4.5)	
Good (4.0)	
Satisfactory Plus (3.5)	
Satisfactory (3.0)	



Name of unit teaching course:	Zakład Technik Molekularnych
Address	ul. M. Skłodowskiej-Curie 52, 50-369 Wrocław
Phone	71 7841588
E-mail	anna.karpiewska@umed.wroc.pl

Person responsible for course:	Dr Malgorzata Malodobra-Mazur	
Phone	71 7841595	
E-mail	malgorzata.malodobra-mazur@umed.wroc.pl	

List of persons conducting specific classes:	degree/scientific or professional title	Discipline	Performer profession	Form of classes
Małgorzata Małodobra- Mazur	PhD	molecular biology	laboratory diagnosticia n	laboratory classes
				A PARTY
		14		

Date of Syllabus development

Syllabus developed by

Dagmara Baczyńska

01.10. 2018

and Małgorzata Małodobra-Mazur

Signature of Head of teaching unit

Uniwersyte medyczny we Wrocławiu Kaledra Medyczny, Sądowej ZAKŁAD TECHNIK MOLEKULARNYCH kierownik prof. dr hab. Tadeusz Dobosz

Signature of Faculty Dean

Wroclaw Medical University
FACULTY OF MEDICINE
DEAN FOR STUDIES IN ENGLISH