



Syllabus 2019/2020

Description of the course

Module/Course	Molecular medicine techniques- clinical applications		Group of detailed education results	
			Group code B, C	Group name Scientific basis of medicine, Preclinical sciences
Faculty	Medicine			
Major	Medicine			
Specialties	Not applicable			
Level of studies	Uniform magister studies X * 1 st degree studies <input type="checkbox"/> 2 nd degree studies <input type="checkbox"/> 3 rd degree studies <input type="checkbox"/> postgraduate studies <input type="checkbox"/>			
Form of studies	X full-time <input type="checkbox"/> part-time			
Year of studies	III-V	Semester	<input type="checkbox"/> Winter X Summer	
Type of course	<input type="checkbox"/> obligatory <input type="checkbox"/> limited choice X free choice / elective			
Course	<input type="checkbox"/> major X basic			
Language of instruction	<input type="checkbox"/> Polish X English <input type="checkbox"/> other			

* mark with an X

Number of hours

Form of education

Unit teaching the course:	Lectures (L)	Seminars (SE)	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 studies (SCM)	Foreign language Course (FLC)	Physical Education obligatory (PEI)	Vocational Practice (VP)	Self-Study (Student's own work)	E-learning (EL)
Winter Semester														
Summer Semester														
Molecular Techniques Unit						20							6	
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 education result	Number of major education result	Student who completes the module/course knows/is able to	Methods of verification of intended education results (forming and summarising)	Form of didactic class <i>**enter the abbreviation</i>
K 01	C.W41	knows main trends in development of genetic and cellular, and target therapy in specific diseases;	Evaluation of student's oral response.	LC, SS
K 02		is able to assess advantages and 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;		
K 05	C.W40	understands the concept of pharmacogenetics and principles of personal therapy;		
K 06	C.W9	describes techniques of SNP detection;		
K 07		understands principles of DNA cloning, describes following steps of the process.		
S 01	B.U11	uses databases, including website databases, and searches for the necessary information using available tools;	Evaluation of student's practical competency and involvement.	LC, SS
S 02		recognizes sequences of genomic and 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 calculations and interprets obtained results..		

** 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's workload (class participation, activity, preparation, etc.)	Student Workload (h)
1. Contact hours:	20
2. Student's own work (self-study):	6
Total student's workload	26
ECTS points for module/course	1
Comments	
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. <i>A guide to human gene therapy</i> . World Scientific Publishing Co, Singapore	



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-CO₂, 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
To receive credit for the course student is obligated to be present at 100% of classes or any absence must be made up by preparing assay discussing the topic chosen by the student. Each absence must be made up, including rector's days or dean's hours.

The course is ended by a one-choice test. The mark received at the end of the course will be estimated based on a number of positive answers as presented in the table below.

Grade:	Criteria for course
Very Good (5.0)	100%-93%
Good Plus (4.5)	92,9%-85%
Good (4.0)	87,9%-78%
Satisfactory Plus (3.5)	77,9%-70%
Satisfactory (3.0)	69,9%-60%

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:	Molecular Techniques Unit
Address	ul. M. Skłodowskiej-Curie 52 , 50-369 Wrocław
Phone	71 7841588
E-mail	anna.karpiewska@umed.wroc.pl

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

<i>List of persons conducting specific classes:</i>	<i>degree/scientific or professional title</i>	<i>Discipline</i>	<i>Performer profession</i>	<i>Form of classes</i>
Małgorzata Małodobra-Mazur	PhD	molecular biology	laboratory diagnostician	laboratory classes

Date of Syllabus development

02.07.2019

Syllabus developed by

Dr Małgorzata Małodobra-Mazur

Signature of Head of teaching unit

Uniwersytet Medyczny we Wrocławiu
Katedra Medycyny Sądowej
ZAKŁAD TECHNIK MOLEKULARNYCH
kierownik

prof. dr hab. Tadeusz Dobosz

Signature of Faculty Dean

Wrocław Medical University
FACULTY OF MEDICINE
VICE-DEAN FOR STUDIES IN ENGLISH
Prof. Andrzej Hendrich, PhD

