



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 <sup>st</sup> degree studies <input type="checkbox"/> 2 <sup>nd</sup> degree studies <input type="checkbox"/> 3 <sup>rd</sup> degree studies <input type="checkbox"/> postgraduate studies <input type="checkbox"/>													
Form of studies	X full-time X 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 <input type="checkbox"/> 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 (PE)	Vocational Practice (VP)	Self-Study (Student's own work)	E-learning (EL)
Winter Semester														
Summer Semester														



Molecular Techniques Unit					20							6	
TOTAL per year:													
Molecular Techniques Unit					20							6	
<p><b>Educational objectives (max. 6 items)</b></p> <p>C1. Knowledge of main trends of genetic and cellular therapy.</p> <p>C2. Understanding of actions of DNA vaccines.</p> <p>C3. Ability to plan the construction of expression plasmid vector with established therapeutic gene.</p> <p>C4. Understanding of pharmacogenetics and personal pharmacotherapy. Gaining practical SNP analysis performing skills.</p> <p>C5. Understanding epigenetics influence on the level of gene expression and knowledge of molecular techniques for their investigations.</p> <p>C6. Introduction to cell culture methods.</p>													
<p><b>Education result matrix for module/course in relation to verification methods of the intended education result and the type of class</b></p>													
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;	Group project. Evaluation of student's oral response.	LC									
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;	Group project. Evaluation of student's practical competency and involvement.	LC									
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..		
<p>** 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 .</p>				
<p>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</p>				
<b>Student's amount of work (balance of ECTS points)</b>				
<b>Student's workload</b> (class participation, activity, preparation, etc.)			<b>Student Workload (h)</b>	
1. Contact hours:			20	
2. Student's own work (self-study):			6	
Total student's workload			26	
ECTS points for module/course			1	
Comments				
<b>Content of classes</b> (please enter topic words of specific classes divided into their didactic form and remember how it is translated to intended educational effects)				
<b>Lectures</b>				
1.				
2.				
3.				
<b>Seminars</b>				
1.				
2.				
3.				
<b>Practical classes</b>				
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. 2. 3.	
Additional literature and other materials (no more than 3 items)	
1. 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 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 met by the student to pass it and criteria for specific grades)	
Preparation of the project of expression plasmid vector construction into gene therapy application-group project.	
Positive assessment of student's attitude during classes (activity, oral response).	
<b>Grade:</b>	<b>Criteria</b> (only for courses/modules ending with an examination)
Very Good (5.0)	
Good Plus (4.5)	
Good (4.0)	
Satisfactory Plus (3.5)	
Satisfactory (3.0)	

**Name and address of module/course teaching unit, contact: telephone and e-mail address**

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**Coordinator / Person responsible for module/course, contact: telephone and e-mail address**

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**List of persons conducting specific classes: full name, degree/scientific or professional title, discipline, performed profession, form of classes.**

Dagmara Baczyńska, PhD, molecular biology, biotechnologist, laboratory classes

**Date of Syllabus development**

20.06.2017

**Syllabus developed by**

Dagmara Baczyńska.

Signature of Faculty Dean

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

**Signature of Head of teaching unit**

Uniwersytet Medyczny we Wrocławiu  
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ZAKŁAD TECHNIK MOLEKULARNYCH  
kierownik

  
prof. dr hab. Tadeusz Dobosz

