



Syllabus for academic year: 2021/2022													
Training cycle: 2021/2022-2025/2026													
Description of the course													
Course	Molecular biology with the basis of genetics										Group of detailed education results		
											Group code	Group name	
											B	Scientific basics of medicine	
											C	Preclinical sciences	
Faculty	Dentistry												
Major	dentistry												
Level of studies	X uniform magister studies												
Form of studies	X full-time												
Year of studies	1 st						Semester:	X winter					
Type of course	X obligatory												
Language of study	X English												
Number of hours													
Form of education													
	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)	Foreign language Course (FLC)	Physical Education (PE)	Vocational Practice (VP)	Directed Self-Study (DSS)	E-learning (EL)
Winter semester: 35													
Department of Biology and Medical Parasitology													
Direct (contact) education	-	-	-	25	-	-	-	-	-	-	-	-	-
Distance learning	10	-	-	-	-	-	-	-	-	-	-	-	-
Educational objectives C1. Providing students with knowledge of modern genetics and its experimental methods. C2. Preparation of the basis for clinical knowledge passed on in subsequent years of studies for understanding issues in the field of epidemiology and pathogenesis of human diseases, clinical genetics, as well as pharmacology and medical diagnostics. C3. Education of students in the basics of medical parasitology, epidemiology and prevention of parasitic diseases.													



Education result for course in relation to verification methods of the intended education result and the type of class:			
Number of detailed education result	Student who completes the course knows/is able to	Methods of verification of intended education results	Form of didactic class <i>*enter the abbreviation</i>
B.W4.	describes the structure and functions of important chemical compounds present in the human body, in particular the properties, functions, metabolism and energy of reactions of proteins, nucleic acids, carbohydrates, lipids, enzymes and hormones;	written test exam (MCQ)	L
B.W14.	defines the basic concepts of biology and ecology;	written test (MCQ) or colloquium, written test exam (MCQ)	MC
B.W15.	describes the interrelationships between organisms in the ecosystem;	written test (MCQ) or colloquium, written test exam (MCQ)	MC
B.W16.	explains interactions in the parasite-host system;	written test (MCQ) or colloquium, written test exam (MCQ)	MC
B.W17.	describes and explains selected issues in the field of genetics and molecular biology;	written test (MCQ) or colloquium, written test exam	MC, L
B.W18.	knows the clinical application of the principles of genetics	written test (MCQ) or colloquium, written test exam	
C.W1.	knows the types and species and the structure of viruses, bacteria, fungi and parasites, their biological characteristics and mechanisms of pathogenicity;	written test or colloquium, written test exam (MCQ)	MC
C.W3.	describes the basics of epidemiology of viral and bacterial infections, fungal and parasitic infections and ways of their spread in the human body;	written test or colloquium, written test exam (MCQ)	MC
C.W6.	describes external and internal pathogens;	written test or colloquium, written test exam (MCQ)	MC, L
C.W13.	explains the concept of health and disease, mechanisms of the formation and development of the disease process at the molecular, cellular, tissue and systemic level, clinical	written test (MCQ) or colloquium,	MC, L

	symptoms of the disease, prognosis and complications of the disease;	written test exam (MCQ)	
B.U4.	can use biological and ecological concepts in the context of human - living environment;	independent solving of tasks prepared by the teacher	MC
B.U5.	uses knowledge of genetics and molecular biology in clinical work;	solving genetic crosswords and explaining issues during classes	MC
	actively cooperates in a group in order to solve problems, taking care of his own safety and of those around him;	observation of the student while working on microscopy classes and making drawings;	MC
	actively participates in searching for materials for classes expanding knowledge and skills, and critically evaluates the source of information	presentation of individually searched information in the group forum during classes;	MC

* L- lecture; SE- seminar; AC- auditorium classes; MC- major classes (non-clinical); CC- clinical classes; LC- laboratory classes; CSC- classes in simulated conditions; PCP- practical classes with patient; FLC- foreign language course; PE- physical education; VP- vocational practice; DSS- directed self-study; EL- E-learning

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

Student's workload (class participation, activity, preparation, etc.)	Student Workload
1. Number of hours of direct contact:	25
2. Number of hours of distance learning:	10
3. Number of hours of student's own work:	45
4. Number of hours of directed self-study	---
Total student's workload	80
ECTS points for course	4.0

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 (10 hours; 5 x 2 h)

Lecture 1. Structure of DNA, RNA, chromosomes, chromatin, human karyotype, mitochondrial genome, X chromosome inactivation

Lecture 2. DNA replication, transcription

Lecture 3. Translation, regulation of gene expression

Lecture 4. DNA variability, mutations, mutagenic factors, DNA repair mechanisms.

Lecture 5. Basic methods of molecular biology and their application

Classes (25 h; 12 x 2 h and 1 x 1 h – last classes)

Parasitology course contents: life cycles, geographical distribution, diagnosis and diagnostic features of the parasites' developmental forms, detection (what form, in what biological material), disease symptoms, pathogenicity, epidemiology, prevention of infection

Class 1. Organization of classes. Health and safety rules. Internal regulations and syllabus. **Introductory class to the parasitological part:** Basic terms used in parasitology. Parasitic arthropods and their role in disease transmission: Arachnids: *Argas reflexus*, *Ixodes ricinus*, *Demodex folliculorum*, *Sarcoptes scabiei*; Insects: *Pthirus pubis*, *Pediculus humanus*, *Pulex irritans*, *Musca domestica*

Class 2. Parasitic protozoa (Protista) - Flagellates: *Trichomonas tenax*, *Trichomonas vaginalis*, *Giardia intestinalis*, *Trypanosoma brucei gambiense*

Class 3. Parasitic protozoa (Protista) - Amoebae: *Entamoeba histolytica/dispar*, *Entamoeba gingivalis*, and Apicomplexans: *Plasmodium* spp., *Toxoplasma gondii*

Class 4. Parasitic flat worms (Trematoda): *Fasciola hepatica*, *Clonorchis sinensis*, *Schistosoma* spp.;

Class 5. Parasitic flat worms (Cestoda): *Taenia saginata*, *Taenia solium*, *Rodentolepis nana*, *Echinococcus granulosus*, *Echinococcus multilocularis*

Class 6. Parasitic round worms (Nematoda): *Ascaris lumbricoides hominis*, *Enterobius vermicularis*, *Trichuris trichiura*, *Trichinella spiralis*

Class 7. TRANSMISSION GENETICS: Basic concepts and definitions of transmission genetics. Mendel's laws. Practical use of the laws of classical genetics in solving tasks related to mono- and dihybrid crosses. Codominance, multiple alleles; Gene cooperation e.g. epistasis, polygenes, complementary genes. Solving problems related to the inheritance of traits conditioned by the interaction of genes.

Class 8. TRANSMISSION GENETICS: The cell's life cycle. The analysis of the stages of the animal cell division. Meiosis and gametogenesis

Class 9. TRANSMISSION GENETICS: Morgan theory of chromosomal inheritance. Practical solving of tasks related to linked genes. Types of sex determination (*Lygaeus*, *Abraxas*, *Protenor*, *Fumea*). Sex determination in humans.

Class 10. Barr body - definition and formation. Lyon hypothesis and examples confirming the presence of an inactive X chromosome in cells of female mammals. Mechanism of X chromosome inactivation

Class 11. HUMAN GENETICS: Types of mutations and the mechanism of their formation. Selected autosomal dominant diseases: Huntington's chorea, Alzheimer's syndrome, achondroplasia, Marfan's syndrome, polydactyly, syndactyly. Selected autosomal recessive diseases: phenylketonuria, alkaptonuria, albinism, cystic fibrosis, galactosemia, hemoglobinopathies (thalassemia, sickle cell anemia).

Class 12. HUMAN GENETICS: Numerical chromosomal aberrations (Down syndrome, z. Edwards, z. Patau, z. Turner, z. Klinefelter) and structural aberrations (Wolf-Hirschhorn syndrome, z. Cri-du-chat, z. Prader-Willi, z. Angelman) . Oral disorders in the course of genetic diseases.

Class 13. Summary of the material; completion of the classes.

Basic literature

1. Cisowska A., Hendrich A., Kicia M., Leszczyński P., Szydłowicz M., Tichaczek-Goska D., Wesółowska M., Wojnicz D. "Medical Biology for students of Medicine and Dentistry English Division", Wrocław Medical University, Wrocław, 2019
2. Bogitsch B.J., Carter C., Oeltmann T „Human parasitology“ 5th edition, Academic Press 2018 or elder,
3. Klug WS, Cummings MR, Spencer ChA, Palladino, Killian D "Concepts of genetics", 12th edition, Pearson, 2019 or elder

Additional literature and other materials

1. McLennan A.G., Bates A.D., Turner P.C., White M.R.H.: BIOS Instant notes: Molecular Biology. Garland Science, NY & London, 2013
2. Tobias E.S, Connor M., Ferguson-Smith M. "Essential medical genetics" 6th edition, Wiley-Blackwell, 2011
3. Campbell NA, Reece JB, Cain ML et al. Biology. A global approach. Pearson, 2016 (11th edition)

Preliminary conditions: Knowledge of genetics and parasitology at the high school level

Conditions to receive credit for the course: The condition for obtaining a credit for the course is passing the partial tests (including classes in parasitology and genetics) and attendance at all classes in accordance with the study regulations. The percentage criteria for passing the partial tests are identical to the examination criteria. In the case of the student's absence from classes, e.g. due to illness, due to another important reason (justified by sick leave or another official document), the student is obliged to make up for the missed classes by preparing a presentation or an essay in an electronic version, on a topic assigned by the teacher, or by participating in classes with another group - if it is possible, and always with the prior consent of the tutor. In the case of cancellation of classes for reasons beyond the control of students, e.g. Rector's day, Dean's hours, etc., at the request of the students, the classes will be conducted on a different date agreed with the person conducting the classes or the students will perform additional work as part of self-study. A student may take the exam if he / she obtains a credit for the classes. A student may be exempted from the examination with a very good grade (5.0) if he/she obtains an average of at least 4.75 in the partial tests. The final exam takes the form of a multiple choice test (MCQ) in genetics and parasitology (lectures and classes). Credits and exams take place in direct contact with an academic teacher or using electronic means of communication.

Grade:	Criteria for courses ending with a grade
Very Good (5.0)	92-100%
Good Above (4.5)	84-91%
Good (4.0)	76-83%
Satisfactory Plus (3.5)	68-75%
Satisfactory (3.0)	60-67%

Grade:	Criteria for exam
Very Good (5.0)	92-100%
Good Above (4.5)	84-91%
Good (4.0)	76-83%
Satisfactory Plus (3.5)	68-75%
Satisfactory (3.0)	60-67%

Unit realizing the course:	Department of Biology and Medical Parasitology
Unit address:	Mikulicza-Radeckiego 9, 50-345 Wrocław
Telephone:	71 784 15 12 (secretariat)
E-Mail:	malgorzata.pekalska-cisek@umed.wroc.pl

Person responsible for the course:	Prof. dr hab. Andrzej Hendrich
Telephone:	71 784 15 11; 71 784 15 12 (secretariat);
E-Mail:	andrzej.hendrich@umed.wroc.pl

List of persons conducting specific classes:

Name and surname	Degree/scientific or professional title	Discipline	Performed profession	Form of classes
Andrzej Hendrich	prof. dr hab.	medical	academic teacher	L



		sciences		
Dorota Wojnicz	dr hab.	medical sciences	academic teacher	MC
Maria Wesołowska	dr hab.	medical sciences	academic teacher	MC
Dorota Tichaczek-Goska	dr	medical sciences	academic teacher	MC
Magdalena Szydłowicz	dr	medical sciences	academic teacher	MC
Przemysław Leszczyński	mgr	medical sciences	academic teacher	MC

Date of Syllabus development

12.07.2021

Syllabus developed by

Dr. Dorota Tichaczek-Goska

Signature of Head(s) of teaching unit(s)

Uniwersytet Medyczny we Wrocławiu
KATEDRA I ZAKŁAD BIOLOGII
I PARAZYTOLOGII LEKARSKIEJ

.....
prof. dr hab. Andrzej Hendrich

Dean's signature

Uniwersytet Medyczny we Wrocławiu
WYDZIAŁ
LEKARSKO-STOMATOLOGICZNY
DZIEKAN

.....
prof. dr hab. Marcin Mikulewicz