Appendix
to Resolution No. 2186
of Senate of Wroclaw Medical University
of 1 July 2020

Syllabus 2020/2021 Teaching cycle: 2020-2025			
Description of the course			
Module/Course	MOLECULAR BIOLOGY, GENETICS	Group of detailed education results Group code B C	Group name The scientific basis of medicine Preclinical sciences
Faculty	Dentistry		
Major	dentistry		
Unit realizing the subject	Department of Biology and Medical Parasitology		
Specialties	Not applicable		
Level of studies	Uniform magister studies □* 1st degree studies □ 2nd degree studies □ 3rd degree studies □ postgraduate studies X		
Form of studies	X full-time □ part-time		
Year of studies	I (first)	Semester	X Winter □ Summer
Type of course	X obligatory □ limited choice □ free choice / elective		
Course	□ major X basic		
Language of instruction	□ Polish X English □ 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 (PE)	Vocational Practice (VP)	Self-Study (Student's own work)	E-learning (EL)
Winter Semester 40														
Direct (contact) education	-	-	-	18	-	-	-	-	-	-	-	-	-	-
Online learning (synchronous)	10	5	-	7	-	-	-	-	-	-	-	-	-	-
Distance learning (asynchronous)	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Summer Semester														
Direct (contact) education	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Online learning (synchronous)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Online learning (asynchronous)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL per year: 40														
Direct (contact) education	-	-	-	18	-	-	-	-	-	-	-	-	-	
Online learning (synchronous)	10	5	-	7	-	-	-	-	-	-	-	-	-	
Online learning (asynchronous)	-	-	-	-	-	-	-	-	-	-	-	-	-	

Educational objectives (max. 6 items)

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 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 ***enter the abbreviation*
W01	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 or colloquium, written test exam	MC, L
W 02	B.W14.	- defines the basic concepts of biology and ecology;	written test or colloquium, written test exam	MC
W03	B.W15.	- describes the interrelationships between organisms in the ecosystem;	written test or colloquium,	MC
W04	B.W16.	- explains interactions in the parasite-host system;	written test or colloquium, written test exam	MC

W05	B.W17.	- describes and explains selected issues in the field of genetics and molecular biology;	written test or colloquium, written test exam	MC, SE, L
W06	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	MC
W07	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	MC
W08	C.W6.	- describes external and internal pathogens;	written test or colloquium	MC, SE, L
U01	B.U4.	- can use biological and ecological concepts in the context of human - living environment;	independent solving of tasks prepared by the teacher	MC, SE
U02	B.U5.	- uses knowledge of genetics and molecular biology in clinical work;	solving genetic crosswords and explaining issues during classes	MC, SE
U03	C.U1.	- explains how to collect a properly selected type of biological material for microbiological (parasitological) examination depending on the location and course of infection;	oral statement during classes;	MC
K01		- creates the need for learning, inspires and organizes the process of self and other people's learning; shows health-promoting behavior	presents a lecture in the group's forum on the basis of self-prepared materials;	SE, MC
K02		- 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
K03		- 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;	SE, MC

** 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: 5

Skills: 3
Social competences: 1

Student's amount of work (balance of ECTS points)	
Student's workload (class participation, activity, preparation, etc.)	**Student Workload (h)**
1. Contact hours:	18
2. Online learning hours (e-learning):	22
3. Student's own work (self-study):	25
Total student's workload	65
ECTS points for module/course	6.0
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: (10 hours – on-line; synchronous mode – by BBB, Microsoft Teams or another platform)

Lecture 1. DNA, RNA, chromatin, chromosomes. Karyotype, organization of human genome, mitochondrial genome (2 h).

Lecture 2. Replication of DNA in Eukaryotes. Transcription, translation. Regulation of gene expression in Eukaryotes (2 h).

Lecture 3. DNA diversity, DNA mutations, mutagens, the influence of medicines, chemicals, physical factors, and environmental pollution. DNA repair mechanisms (2 h).

Lecture 4. Examples of genetic diseases including X-linked diseases (2 h).

Lecture 5. Basic methods of molecular biology and their applications (2 h).

Seminars: (5 hours) – on-line – synchronous mode, by BBB or Microsoft Teams platform)

- **Seminar 1.** (week 12; 2h)

Colloquium – molecular genetics. **HUMAN GENETICS:** Types and mechanism of mutation formation. The correct human karyotype. Chosen diseases caused by **numerical mutations:** Down syndrome, Edwards syndrome, Patau syndrome, Turner syndrome, Klinefelter syndrome; and chosen diseases caused by **structural mutations:** Wolf-Hirschhorn syndrome, Cri-du-chat syndrome, Prader-Willi syndrome, Angelman syndrome.

- **Seminar 2.** (week 13; 2h)

HUMAN GENETICS: Mechanisms of gene mutations. Chosen **autosomal inherited diseases** – **dominant**: Huntington's chorea, Alzheimer's syndrome, achondroplasia, Marfan syndrome, polydactyly, syndactyly; and **recessive**: phenylketonuria, alkaptonuria, albinism, cystic fibrosis, galactosemia, lipidosis hemoglobinopathies.

- **Seminar 3.** (week 14; 1h)

Colloquium – human genetics. Completion of the course.

Practical classes: (25 hours; 18 h - direct (contact) classes; 7 h – on-line – synchronous mode, by BBB or Microsoft Teams platform)

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

- **Practical 1.** (week 1; 2h) direct (contact) classes

Organizational part - reading the internal regulations of the Biology Department; information about the Syllabus content and criteria for passing the subject. **PARASITOLOGY: Protozoa** – Flagellates: *Trichomonas vaginalis, Trichomonas tenax, Giardia intestinalis, Trypanosoma brucei gambiense*

- **Practical 2.** (week 2; 2h) direct (contact) classes

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PARASITOLOGY: Protozoa – Amoebae: *Entamoeba histolytica/dispar, Entamoeba gingivalis,* and Apicomplexans: *Plasmodium* spp.*, Toxoplasma gondii*

• Practical 3. (week 3; 3h) direct (contact) classes
Colloquium – protozoa. PARASITOLOGY – Trematoda: *Fasciola hepatica, Clonorchis sinensis, Schistosoma* spp.;

• Practical 4. (week 4; 2h) direct (contact) classes
PARASITOLOGY – Cestoda: *Taenia saginata, Taenia solium, Hymenolepis nana*, *Echinococcus granulosus, Echinococcus multilocularis*

• Practical 5. (week 5; 2h) direct (contact) classes
PARASITOLOGY – Nematoda: *Ascaris lumbricoides hominis, Enterobius vermicularis, Trichuris trichiura, Trichinella spiralis*

• Practical 6. (week 6; 3h) direct (contact) classes
Colloquium – worms. 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.

• Practical 7. (week 7; 2h) direct (contact) classes
TRANSMISSION GENETICS: The cell's life cycle. The analysis of the stages of the animal cell division. Meiosis and gametogenesis (oogenesis and spermatogenesis).

• Practical 8. (week 8; 2h) direct (contact) classes
TRANSMISSION GENETICS: Morgan theory of chromosomal inheritance. Practical solving of tasks related to linked genes. Sex determination. Barr body and Lyon hypothesis.

• Practical 9. (week 9; 3h) synchronous mode, by BBB or Microsoft Teams platform
Colloquium – transmission genetics. MOLECULAR GENETICS: DNA and RNA structure. Chromatin structure and organization. DNA replication in Prokaryotes.

• Practical 10. (week 10; 2h) synchronous mode, by BBB or Microsoft Teams platform
MOLECULAR GENETICS: The genetic code features and exceptions. Protein synthesis in living organisms (transcription and translation) with the factors and enzymes involved.

• Practical 11. (week 11; 2h) synchronous mode, by BBB or Microsoft Teams platform
MOLECULAR GENETICS: The theory of operon - types of operons and their role in gene expression regulation in Prokaryotes (induction, glucose catabolic repression, repression, attenuation)

Other - - - - - -

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

1. Cisowska A., Hendrich A., Kicia M., Leszczyński P., Szydłowicz M., Tichaczek-Goska D., Wesołowska 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 (no more than 3 items)

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)

Didactic resources requirements (e.g. laboratory, multimedia projector, other…)
Classroom equipped with laptop, multimedia, microscopes. Access to the Internet and a platform enabling virtual teaching in a synchronous version, eg BBB or Microsoft Teams or other

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

Knowledge of genetics and parasitology at the high school level.
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 med by the student to pass it and criteria for specific grades) **Passing 5 partial tests** (transmission genetics, molecular genetics, human genetics, protozoa, helminths) allows for getting credit and enter the final exam. **The attendance at all classes in accordance with the study regulations**. The percentage criteria for passing partial tests are identical to the examination criteria. **A student can be exempted from the final exam with a very good grade (5.0) in two cases:** 1) when obtains an average of at least 4.75 from all (5) partial tests; or 2) when a student fails the colloquium once but receives a very good grade (5.0) from the re-take of this colloquium and very good grades (5.0) from each of the other four colloquiums. **In the absence** of a student resulting e.g. the disease, because of another important reason (justified by the sick leave, or other official document), the student is obliged to make up abandoned classes preparing a presentation or essay in electronic form on a topic given by the teacher covering abandoned classes, or participating in the classes of another group - if possible, and after obtaining the teacher's permission. In case of cancellation of classes for reasons beyond the control of students, e.g. Rector's Day, Dean's hours, etc., at the students' request, the classes will be conducted at another time agreed with the person conducting the classes. **The exam** takes the form of a test (single choice) in the field of genetics (lectures and seminars). **The final mark of the subject** is the sum of points obtained during the exam (max. 80) and points obtained after converting grades from tests in parasitology during the semester (max. 20).

Grade:	**Criteria** (only for courses/modules ending with an examination)
Very Good (5.0)	92-100%
Good Plus (4.5)	84-91%
Good (4.0)	76-83%
Satisfactory Plus (3.5)	68-75%
Satisfactory (3.0)	60-67%
	Criteria (only for courses/modules ending with e credit)
Credit	

Grade:	**Criteria** (examination evaluation criteria)
Very Good (5.0)	92-100%
Good Plus (4.5)	84-91%
Good	76-83%

(4.0)	
Satisfactory Plus (3.5)	68-75%
Satisfactory (3.0)	60-67%
Unit realizing the subject	Department of Biology and Medical Parasitology
Unit address	J. Mikulicza-Radeckiego Street 9, Wroclaw
Telephone	tel. 71 784 15 12 (secretariat)
E-Mail	e-mail: malgorzata.pekalska-cisek@umed.wroc.pl

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

List of persons conducting specific classes

Full name	Degree/scientific or professional title	Discipline	Performed profession	Form of classes
Andrzej Hendrich	Prof. dr. hab.	medical sciences	academic teacher	L
Dorota Wojnicz	Dr. hab.	medical sciences	academic teacher	SE
Agnieszka Cisowska	Dr.	medical sciences	academic teacher	MC
Maria Wesołowska	Dr.	medical sciences	academic teacher	MC
Dorota Tichaczek-Goska	Dr.	medical sciences	academic teacher	MC
Magdalena Szydłowicz	Dr.	medical sciences	academic teacher	MC
Przemysław Leszczyński	MSc.	medical sciences	academic teacher	MC

Date of Syllabus development

30.09.2020

Syllabus developed by

Dr Dorota Tichaczek-Goska

Signature of Head of teaching unit

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Signature of Faculty Dean

UNIWERSYTET MEDYCZNY
IM. PIASTÓW ŚLĄSKICH WE WROCŁAWIU

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