



K04	C.W.5	structures and knows molecular background of mutagenesis - student knows principles of inheritance of different number of traits, quantitative traits, independent inheritance of traits and cytoplasmic inheritance	written exam test, colloquium, written exam	S, L
	C.W.6	- student knows the genetic determination of blood groups	test, colloquium, written exam	S, L
	C.W.7	- student describes autosomal and heterosomal aberrations leading to genetic diseases	test, colloquium, written exam	S, L
	C.W.8	- student knows factors affecting primary and secondary genetic equilibrium of population	test, colloquium, written exam	S, L
	C.W.10	- determines the benefits and threats resulting from the presence of genetically modified organisms (GMOs) in the ecosystem;	written exam	L
K05	C.W.13	- student knows epidemiology of parasitic infections including geographical localization	test, colloquium	MC
	C.W.14	- student knows influence of biotic (parasite) factors on human organism and human population as well as parasite invasion pathways; describes the consequences of parasitic infection and principles of infection prophylaxis	test, colloquium	MC
	C.W.15	- student knows invasive forms or development stages of chosen parasitic protozoa, helminths and arthropods, including their geographical localization	test, colloquium	MC
W06	C.W.16	- student describes the host-parasite relations and knows the basic symptoms of parasitic infection	test, colloquium	MC
	C.W.18	- student knows basic principles of parasite diagnostics	test, colloquium	MC
S 01	C.U.1	- student analyses the genetic crosses and pedigrees of human traits and diseases, estimates the	test, colloquium	S, L



Educational objectives (max. 6 items)				
C1. Students should learn the basics of contemporary genetics, experimental methods used in genetics and become prepared for the course of clinical genetics.				
C2. Students receive knowledge about the mechanisms responsible for the integrity of the individual organism gene pool and for the transfer of genes between the subsequent generations in Prokaryota as well as in Eukaryota.				
C3. Students gain information about the influence of environment pollution by mutagenic and carcinogenic substances on the human organism.				
C4. Students get knowledge about the methods of molecular biology and their application in genetic studies.				
C5. Students learn the fundamentals of medical parasitology.				
C6. Students receive information about the structure and life cycles of human parasites and learn how to recognize the symptoms of parasitic infection				
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>
K01	B.W.13	- student knows the function of nucleotides, DNA and RNA structures, structure of chromatin	test, colloquium, written exam	S, L
	B.W.14	- student knows function of human genome, transcriptome, proteome and knows the basic methods used in their studies, - describes DNA replication, transcription, translation, recombination, repair and degradation of DNA, RNA, knows the processes of gene expression control and regulation	test, written exam	S, L
K02	B.W.22	- student knows cell cycle, processes of proliferation, differentiation and aging of cells, apoptosis, necrosis and their role in organism functioning	test, colloquium, written exam	S, L
K03	C.W.1	- student knows the basic concepts of genetics	test, colloquium, written exam	S, L
	C.W.2	- student describes the gene linkage and interactions	test, colloquium, written exam	S, L
	C.W.3	- student describes normal human karyotype and different types of sex determination	test, colloquium, written exam	S, L
	C.W.4	- student describes chromosome	test, colloquium,	S, L



S 02	C.U.5	risk of birth of a child possessing chromosome aberrations - describes kariotypes of genetic diseases	test, colloquium	S, L
	C.U.7	- student estimates the risk of manifestation of certain genetic disease basing on predispositions of patients family - student recognizes the most common parasites knowing their life cycles, structure and symptoms of infection	test, colloquium	MC
S 03	C.U.9	- student recognizes different parasites under microscope	oral response, credit during classes	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

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

Student's workload (class participation, activity, preparation, etc.)	Student Workload (h)
1. Contact hours:	65
2. Student's own work (self-study):	93
Total student's workload	158
ECTS points for module/course	7.0
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 (Total - 25 hours: 11 x 2 h and 1 x 1 h – the last lecture)

Lecture 1. The organization of human genome; mitochondrial genome (2h)

Lecture 2. The cell cycle and its regulation (2h)

Lecture 3. and Lecture 4. Regulation of gene expression with particular reference to eukaryotic organisms (4 h)

Lecture 5. Genetic determinants of the immune system functioning (2 h)

Lecture 6. DNA diversity, DNA mutations, DNA repair mechanisms (2 h)

Lecture 7. Mutagenesis: mutagens, the influence of medicines, chemicals, physical factors, and environmental pollution (2 h)

Lecture 8. Selected human genetic X-linked diseases (2 h)

Lecture 9. Population genetics (2 h)

Lecture 10. Basic methods of molecular biology and their applications; genetically modified organisms (GMOs) (2 h)



Lecture 11. Fundamentals of genetic engineering and biotechnology; genetically modified organisms (GMOs) (2 h)

Lecture 11. Basics of pharmacogenetics (1 h)

Seminars (25 hours: 8 x 3 h and 1 x 1 h – the last seminar)

Sem. 1. Transmission Genetics (2 h)

Basic concepts and definitions of genetics. Mendelian genetics. Mendel's Laws of inheritance (monohybrid, dihybrid crosses); test cross.

Incomplete dominance, codominance, multiple alleles, lethal genes, gene interactions, pleiotropy.

Sem. 2. Transmission Genetics (3 h)

Cell life cycle, mitosis and meiosis. Human gametogenesis (oogenesis and spermatogenesis).

Extrachromosomal inheritance

Sem. 3. Transmission Genetics (3 h)

Morgan's chromosome theory of heredity. Complete and incomplete linkage of genes. X-linked genes. Sex determination. Lyon hypothesis and Barr body – definition, mechanism of X chromosome inactivation.

Sem. 4. Molecular Genetics (3 h)

Nucleic acids – types and functions. Structure of the eukaryotic genome – the levels of chromatin condensation. Replication of DNA.

Sem. 5. Molecular Genetics (3 h)

The genetic code (features and examples of exceptions). Gene expression in prokaryotes and eukaryotes: Transcription and enzymes participating in the steps of the process.

Sem. 6. Molecular Genetics (3 h)

Gene expression in prokaryotes and eukaryotes: Translation and enzymes participating in the steps of the process. The control of gene expression in prokaryotes. Operon Theory (lactose operon, glucose catabolite repression; tryptophan operon, attenuation).

Sem. 7. Human genetics (3 h)

Mutations – definition, types of mutations (point mutations, structural aberrations, numerical aberrations). Consequences of point mutations. Inheritance of diseases caused by point mutations: single-gene disorders – dominant (Huntington's chorea, Alzheimer's syndrome, achondroplasia, polydactyly, syndactyly, brachydactyly, camptodactyly, Recklinghausen disease, Marfan's syndrome, Ehlers-Danlos syndrome) and recessive (phenylketonuria, alkaptonuria, albinism, cystic fibrosis, galactosemia, mucopolysaccharidosis, lipidosis, glycogenosis, hemoglobinopathies).

Sem. 8. Human genetics (3 h)

Diseases caused by chromosomal numerical mutations (Down syndrome, Edwards syndrome, Patau syndrome, Klinefelter's syndrome, Turner syndrome) and structural mutations (Wolf-Hirschhorn syndrome, Cri-du-chat syndrome, Prader-Willi syndrome, Angelman syndrome, Philadelphia chromosome).

Sem. 9. Completion of the course (1 h)

Practical classes (15 hours: 5 x 3 h)

Practical 1. Parasitic protozoa – Flagellates: *Trichomonas vaginalis*, *Giardia intestinalis*, *Trypanosoma brucei gambiense*, *Leishmania tropica*, *Leishmania donovani*

Practical 2. Parasitic protozoa – Amoebae: *Entamoeba histolytica/dispar*, *Acanthamoeba castellanii*, *Naegleria fowleri*; Apicomplexans – *Plasmodium spp.*, *Toxoplasma gondii*, *Cryptosporidium parvum*

Practical 3. Parasitic worms – Trematoda: *Fasciola hepatica*, *Dicrocoelium dendriticum*, *Schistosoma spp.*, *Paragonimus westermani*, *Clonorchis sinensis*

Practical 4. Parasitic worms – Cestoda: *Diphyllobothrium latum*, *Taenia saginata*, *Taenia solium*,



Echinococcus granulosus, Echinococcus multilocularis, Hymenolepis nana

Practical 5. Parasitic worms – Nematoda: *Ascaris lumbricoides hominis, Enterobius vermicularis, Trichuris trichiura, Trichinella spiralis, Loa loa, Strongyloides stercoralis*

Parasitology course content: life cycles, geographical distribution, diagnosis and diagnostic features of the parasites' developmental forms, symptoms of diseases caused by the parasites, epidemiology, prevention of human parasites.

Other ---

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

1. Pierce BA, Genetics: a conceptual approach, WH Freeman & Co, 2008
2. Klug WS, Cummings MR, Spencer ChA, Palladino MA, Concepts of genetics, Pearson Benjamin Cummings, 2009.
3. Bogitsh BJ, Cheng TC, Human parasitology, Academic Press, 1998 (2nd edition)

Additional literature and other materials (no more than 3 items)

1. A. Cisowska, D. Tichaczek-Goska, M. Wesołowska, D. Wojnicz "Medical biology for students faculty of medicine and faculty of dentistry" University of Medicine in Wrocław 2006, 2007, 2010
2. Turnpenny P, Ellard S, Emery's elements of medical genetics, Elsevier, 2007
3. Campbell NA, Reece JB, Cain ML et al. Biology. A global approach. Pearson, 2015 (10th edition)

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

Classroom equipped with multimedia, microscopes.

Lecture hall equipped with multimedia.

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

Knowledge of genetics and parasitology on 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 met by the student to pass it and criteria for specific grades)

Passing 5 partial tests (transmission genetics, molecular genetics, human genetic diseases, protozoa, helminths) allows for getting credit and enter the final exam. Exam is in the form of single choice test and covers the genetics (seminars and lectures).

Grade:	Criteria (only for courses/modules ending with an examination)
Very Good (5.0)	91-100%
Good Plus (4.5)	82-90%
Good (4.0)	73-81%
Satisfactory Plus (3.5)	64-80%
Satisfactory (3.0)	55-63%

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

Department of Medical Biology and Parasitology, ul. J. Mikulicza-Radeckiego 9, Wrocław,
tel. 71 784 15 12 (secretariat)

e-mail: malgorzata.pekalska-cisek@umed.wroc.pl



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

Prof. dr hab. Andrzej Hendrich

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

LECTURES:

Andrzej Hendrich, prof. dr hab., medical biology

SEMINARS and CLASSES:

Dorota Wojnicz, dr hab., medical biology

Agnieszka Cisowska, dr, medical biology, parasitology

Maria Wesołowska, dr, parasitology

Dorota Tichaczek-Goska, dr, medical biology

Przemysław Leszczyński, mgr, medical biology

Date of Syllabus development

26.06.2017

Syllabus developed by

Dr Dorota Tichaczek-Goska

Signature of Head of teaching unit

Uniwersytet medycyczny we Wroclawiu
KATEDRA ZAKŁAD BIOLOGII
I PARAZYTOLOGII LECZEBNEJ
Kierownik

prof. dr hab. Andrzej Hendrich

Signature of Faculty Dean

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