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| **Syllabus – academic year 2018/2019** |
| **Description of the course** |
| **Module/Course** | **MOLECULAR BIOLOGY, GENETICS** | **Group of detailed education results**  |
| **Group code****B****C** | **Group name**The scientific basis of medicinePreclinical sciences |
| **Faculty** | **Dentistry** |
| **Major**  | dentistry |
| **Specialties** | **Not applicable** |
| **Level of studies** | Uniform magister studies **X** \*1st degree studies 2nd degree studies 3rd degree studies postgraduate studies  |
| **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** |
|  | **10** | **5** | **-** | **25** | **-** | **-** | - | - | - | - | - | - | **25** | - |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Summer Semester** |
|  | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
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| **TOTAL per year: 65** |
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| **Educational objectives** (max. 6 items)**C1.** Students should learn the basics of contemporary genetics, molecular biology and experimental methods used in genetics. **C2.** Students gain information about the influence of environmental pollution by mutagenic and carcinogenic substances on the human organism.**C3.** Students learn the fundaments of medical parasitology, 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*\*\*enter the abbreviation* |
| **W01** | B.W.4 | - describes structure and function of important chemical compounds (nucleic acids-DNA, RNA) present in the human organism- describes chromatin structure | test, colloquium, written exam | SE, LSE |
| **W02** | B.W.14 | - define the basic terms used in genetics; list the genetic factors determining the human traits | test, colloquium, written exam | MC, SE, L |
| **W03** | B.W.16 | - knows the interactions in the parasite-host system | test, colloquium, | MC |
| **W04** | B.W.17 | - has knowledge in the field of genetics and molecular biology (explain the basic processes involved in gene expression and its regulation; such as replication, transcription, translation;- explain the impact of environmental pollution by mutagenic and carcinogenic factors on human organism and to describe the phenotype effects of mutagenesis, chosen genetic diseases and mechanisms of their inheritance) | test, colloquium, written exam | MC, SE, L |
| **W05** | B.W.18 | - knows the clinical application of the principles of genetics | test, colloquium, written exam | MC, L |
| **W06** | C.W.1 | - knows the genera and species of parasites pathogenic to humans; describes the biology and morphology of human parasites (*Protozoa*, *Platyhelminthes,* and *Nemathelminthes*) | test, colloquium | MC |
| **W07** | C.W.3 | - describes the epidemiology and prophylactics of parasitic infections | test, colloquium | MC |
| **W08** | C.W.6 | - knows pathogenic agents (internal and external) | test, colloquium | MC |
| **W09** | C.W.16 | - describes the basic methods used in the diagnosis of parasitic infections | test, colloquium, written exam | MC |
| **U01** | B.U.4 | - uses the biological and ecological terms to analyze the human-environment relations | test, colloquium, | MC |
| **U02** | B.U.5 | - uses the methods of genetics and molecular biology in disease diagnosis | test, written exam | MC, L |
| **U03** | C.U.4 | - recognizes the basic symptoms of parasitic infections and uses the prophylactic methods | test, colloquium, | MC |
| **K01** |  | - student willingly broadens knowledge and skills- understands the need of learning, can inspire and organize the learning process of others | test, colloquium, written exam | SE, MC, L |
| **K02** |  | - student cooperates in a group in order to solve problems- can take care of your own safety and that of people at your doorsteps | observation of a student during classes | MC |
| **K03** |  | - student searches for materials for classes and critically evaluates information sources | test, colloquium, written exam | SE, MC, L |
| \*\* 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: | **40** |
| 2. Student's own work (self-study): | **25** |
| Total student's workload | **65** |
| **ECTS points for module/course** | **6.0** |
| Comments  |  |
| **The 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****Lecture 1.** Structure of genetic material, DNA double helix. Replication, transcription, and translation in *Eukaryotes*. **Lecture 2.** Regulation of gene expression with particular reference to eukaryotic organisms. **Lecture 3.** The organization of human genome; mitochondrial genome. **Lecture 4.** DNA diversity, DNA mutations, DNA repair mechanisms. Mutagenesis: mutagens, the influence of medicines, chemicals, physical factors, and environmental pollution.**Lecture 5.** Basic methods of molecular biology and their applications. |
| **Seminars****Seminar 1.** (week 1) **Organizational part** - reading the internal regulations of the Biology Department; information about the criteria for passing the subject. **MOLECULAR GENETICS:** DNA and RNA structure. Chromatin structure and organization. DNA replication in *Prokaryotes*. **Seminar 2.** (week 2) **MOLECULAR GENETICS:** The genetic code features and exceptions. Protein synthesis in prokaryotic organisms (transcription and translation) with the factors and enzymes involved. Operon theory (lactose and tryptophan operon). |
| **Practical classes*** **Practical 1.** (week 3)

**Colloquium –** molecular genetics. **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. Meiosis and gametogenesis (oogenesis and spermatogenesis). * **Practical 2.** (week 4)

**TRANSMISSION GENETICS:** Morgan theory of chromosomal inheritance. Practical solving of tasks related to linked genes. Sex determination. Baar body and Lyon hypothesis.* **Practical 3.** (week 5)

**Colloquium –** transmission genetics.**HUMAN GENETICS:** Types and mechanism of mutation formation. The correct human karyotype. Mechanisms of chromosomal mutations – numerical mutations: Down syndrome, Edwards syndrome, Patau syndrome, Turner syndrome, Klinefelter syndrome; and structural mutations: Wolf-Hirschhorn syndrome, Cri-du-chat syndrome, Prader-Willi syndrome, Angelman syndrome.* **Practical 4.** (week 6)

**HUMAN GENETICS:** Mechanisms of gene mutations. Chosen autosomal diseases – dominant: Huntington's chorea, Alzheimer's syndrome, achondroplasia, Marfan syndrome, polydactyly, syndactyly; recessive – phenylketonuria, alkaptonuria, albinism, cystic fibrosis, galactosemia, lipidosis, hemoglobinopathies. Examples of X-linked genetic diseases.* **Practical 5.** (week 7)

**Colloquium –** human genetics.**PARASITOLOGY: Protozoa** – Flagellates: *Trichomonas vaginalis, Trichomonas tenax, Giardia intestinalis, Trypanosoma brucei gambiense*, *Leishmania tropica, Leishmania donovani** **Practical 6.** (week 8)

**PARASITOLOGY: Protozoa** – Amoebae: *Entamoeba histolytica/dispar, Entamoeba gingivalis, Acanthamoeba castellanii, Naegleria fowleri*; and Apicomplexans: *Plasmodium* spp*., Toxoplasma gondii, Cryptosporidium parvum** **Practical 7.** (week 9)

**Colloquium –** protozoa.**PARASITOLOGY** – **Trematoda**: *Fasciola hepatica, Paragonimus westermani, Clonorchis sinensis, Schistosoma* spp*.*; **Cestoda**: *Diphyllobothrium latum, Taenia saginata, Taenia solium,* * **Practical 8.** (week 10)

**PARASITOLOGY** – **Cestoda:** *Hymenolepis nana*, *Echinococcus granulosus, Echinococcus multilocularis* and **Nematoda:** *Ascaris lumbricoides hominis, Enterobius vermicularis, Trichuris trichiura, Trichinella spiralis, Loa loa** **Practical 9.** (week 11)

**Colloquium –** worms. Completion of the course.**Parasitology course contents:** life cycles, geographical distribution, diagnosis and diagnostic features of the parasites’ developmental forms, disease symptoms, pathogenicity, epidemiology, prevention of infection |
| **Other ----** |
| **Basic literature** (list according to importance, 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” The University of Medicine in Wroclaw (2006, 2007, 2010)
2. **Klug WS, Cummings MR, Spencer ChA, Palladino MA**, Concepts of genetics, Pearson Benjamin Cummings, 2009.
3. **B.J. Bogitsch, T.C. Cheng** „Human parasitology“ 2nd edition, Academic Press 1998

**Additional literature and other materials** (no more than 3 items)1. **Connor M., Ferguson-Smith M.** “Essential medical genetics” Blackwell Science Ltd 1997
2. **R. Muller “Worms and human disease**” Second edition, CABI Publishing 2002
3. **Campbell NA, Reece JB, Cain ML et al.** Biology. A global approach. Pearson, 2016 (11th edition)
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| **Didactic resources requirements** (e.g. laboratory, multimedia projector, other…)Classroom equipped with laptop, multimedia, microscopes.Lecture hall equipped with laptop and multimedia. |
| **Preliminary conditions** (minimum requirements to be met by the student before starting the module/course)Knowledge of genetics 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 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. **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 who obtains an average of at least 4.75 from partial tests is exempted from the exam with a very good grade (5.0).In the absence resulting e.g. from illness, due to another important reason (justified by medical note or other official document), from the Rector's Day or Dean's Hours, the student is obliged to make up for the abandoned classes by preparing a presentation or an essay in an electronic version on the topic given by the teacher; or participating in classes with another group - if it is possible.**The exam** is in the form of single choice test and covers the genetics (classes, seminars, and lectures). **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% |
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| **Name and address of module/course teaching unit, contact: telephone and e-mail address****Department of Biology and Medical Parasitology** J. Mikulicza-Radeckiego Street 9, Wroclaw, tel. 71 784 15 12 (secretary)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** tel. 71 784 15 12 (secretary); 71 784 15 11e-mail: andrzej.hendrich@umed.wroc.pl**List of persons conducting specific classes: full name, degree/scientific or professional title, discipline, performed profession, a form of classes**.**LECTURES:** Andrzej Hendrich, prof. dr hab., medical biology**SEMINARS:** Dorota Tichaczek-Goska, dr, medical biology**CLASSES:** Przemysław Leszczyński, mgr, medical biologyDorota Wojnicz, dr hab., medical biologyMaria Wesołowska, dr, parasitology Agnieszka Cisowska, dr, parasitology

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| **Date of Syllabus development**  | **Syllabus developed by**  |
| 25.06.2017 | Dr Dorota Tichaczek-Goska |
| **Signature of Head of teaching unit** |
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**Signature of Faculty Dean**  |
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