**description of the course of study**

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| **Course code** |  **0912-7LEK-C3.1-G** |
| **Name of the course in** | Polish | **Genetyka** |
| English | **Genetics** |

1. **LOCATION OF THE course OF STUDY within the system of studies**

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| **1.1. Field of study** | Medicine |
| **1.2. Mode of study** | Full-time |
| **1.3. Level of study** | Uniform master’s studies |
| **1.4. Profile of study\*** | General academic |
| **1.5. Person preparing the course description** | Dr Wioletta Adamus-Białek |
| **1.6. Contact** |  |

1. **General characteristicS of the course of study**

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| **2.1. Language of instruction** | English |
| **2.2. Prerequisites\*** | Biology |

1. **DETAILED CHARACTERISTICS OF THE COURSE OF STUDY**

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| * 1. **Form of classes**
 | LECTURE 15 hours.; CLASSES: 20 hours |
| * 1. **Place of classes**
 | Courses in the teaching rooms of the UJK, |
| * 1. **Form of assessment**
 | LECTURE – L, Cl. Credit with grade |
| * 1. **Teaching methods**
 | Classical and Conversational lecture, discussion, classes |
| * 1. **Bibliography**
 | **Required reading** | 1.Medical Genetics, by Lynn B. Jorde PhD (Author), John C. Carey MD MPH (Author), Michael J. Bamshad MD (Author) 2.Essential Medical Genetics (with FREE Desktop Edition) 6/e, Tobias,Connor,Ferguson-Smith, WILEY, 2011 |
|  **Further reading** | 3.Color Atlas of Genetics (FLEXIBOOK)by Eberhard Passarge (Author)4.DeVita, Hellman and Rosenberg’s Cancer: Principles & Practice of Oncology, 10th Ed. |

1. **Objectives, syllabus CONTENT and intended LEARNING outcomes**

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| * 1. **Course objectives *(including form of classes)***

Lectures:O1. Introduction to the basic knowledge in the field of genetics and its role in human life and health.O2. Acquiring the ability to use the nomenclature of medical genetics.O3. Acquiring the knowledge in the field of genetic counseling, gathering genetic history.O4. Shaping the correct physician's attitude in transmitting genetic information to the patient and his family.O5. Acquainting with genetic determinants of selected diseases with their basic clinical characteristics.Classes:O1. Acquiring the ability to determine the types of inheritance, classification of birth defects and pedigree construction.O2.Acquiring skills in the use of diagnostic tests and their correct interpretation.O3. The ability to use basic knowledge in the analysis of inheritance and diagnosis of genetic diseases.O4. Understanding the mechanisms regulating DNA metabolism, its dysfunction and role in the development of genetic diseases |
| * 1. **Detailed syllabus *(including form of classes)***

Lectures:The cognitive values of the human genome in medical practice. Basic concepts in the field of genetics. Metabolism of DNA (replication, repair, recombination of DNA, transcription, translation, regulation of gene expression). The importance of GMO in medicine. Principles and methods of genetic counseling. Bioethics in genetics. Monogenic disorders. Syndrome with chromosomal instability. Mitochondrial disorders. Epigenetic, multifactorial diseases. Principles of inheriting predisposition to tumors. Molecular analysis of DNA and RNA in detecting inherited predisposition to tumors, genetic mechanisms of drug resistance acquisition by tumor cells. Basic directions of gene therapy development in specific inherited diseasesClasses:Rules and drawing pedigrees. Types of inheritance - determination based on inheritance. Basics of dysmorphology. Cytogenetics and analysis of karyotypes. Determination of sex and inheritance of blood groups in humans. Molecular basis of mutagenesis, DNA sequence analysis, searching for mutations/polymorphisms and evaluation of their pathogenicity. Analysis of genetic crosses and pedigrees of human traits and diseases, risk of a child's birth with chromosomal aberrations, estimation of the risk of a given disease appearing in the offspring based on family predisposition and the environmental factors influence. Probability calculations in pedigrees. The phenomenon of gene linkage and gene interaction. Multigene diseases: association analysis, relative risk, odds ratio. Principles of inheritance of various number of traits, inheritance of quantitative traits, independent inheritance of features and inheritance of non-nuclear genetic information. Genetic balance in the population. |

**4.3 Intended learning outcomes**

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| **Code** | **A student, who passed the course** | **Relation to learning outcomes** |
| within the scope of **knowledge**the graduate knows and understands**:** |
| W1. | the functions of the human genome, transcriptome and proteome and basic methods used in their study; describes the processes of replication, repair and recombination of DNA, transcription and translation and degradation of DNA, RNA; the concept of the regulation of gene expression; | B.W14. |
| W2. | the basic concepts of genetics; | C.W1. |
| W3. |  the phenomenon of linkage and interaction of genes;  | C.W2. |
| W4. | normal human karyotype and various types of sex determination | C.W3. |
| W5. |  the structure of chromosomes and the molecular mechanisms of mutagenesis;  | C.W4. |
| W6. | the principles of inheritance, inheritance of quantitative traits, independent inheritance of traits and inheritance of extranuclear genetic information;  | C.W5. |
| W7. | the genetics of blood groups and serological conflict in Rh system;  | C.W6. |
| W8. | the aberrations of autosomes and heterosomes causing diseases, including cancer oncogenesis; | C.W7. |
| W9. | the factors affecting primary and secondary genetic balance of the population | C.W8. |
| W10. | the foundation for the diagnosis of gene and chromosome mutations responsible for hereditary and acquired diseases, including cancer;  | C.W9. |
| W11. | benefits and risks arising from the presence in the ecosystem of genetically modified organisms (GMOs); | C.W10. |
| W12. | genetic mechanisms, the acquisition of drug resistance by tumor cells; | C.W11. |
| W13. | genetic mechanisms of drug resistance acquisition by cancer cells; | C.W45. |
| within the scope of **ABILITIES**the graduate knows how to: |
| U1. | analyze genetic crossing over, pedigree qualities and human diseases as well as the estimated risk of having a child with chromosomal aberrations;  | C.U1 |
| U2. | identify indications for prenatal diagnosis; | C.U2. |
| U3. | make a decision on the need to perform cytogenetic and molecular tests; | C.U3. |
| U4. | make morphometric measurements, analyzes the developmental profile and records the diseases’ karyotypes; | C.U4. |
| U5. | assess the risk of disclosure of a particular disease in the offspring based on family predisposition and the influence of environmental factors; | C.U5. |

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| within the scope of **SOCIAL COMPETENCE**, the graduate is able to: |
| K01 | recognize his/her own limitations and self-evaluate educational deficiencies and needs; | H.S5 |
| K02 | use reliable information sources; | H.S7 |
| K03 | conclude on the basis of own surveys and observations; | H.S8 |
| K04 | introduce rules of social conduct and teamwork to the group of specialists, including specialists form other medical professions also in the multicultural and multinational environment; | H.S9 |
| K05 | give opinions concerning various aspects of professional activity; | H.S10 |
| K06 | take responsibility for own decisions made during professional activities including own safety and safety of other people; | H.S11 |

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| * 1. **Methods of assessment of the intended learning outcomes**
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| **Teaching** **outcomes*****(code)*** | **Method of assessment (+/-)** |
| **Exam oral/written\*** | **Test\*** | **Project\*** | **Effort** **in class\*** | **Self-study\*** | **Group work\*** | **Others\*****Observation** |
| ***Form of classes*** | ***Form of classes*** | ***Form of classes*** | ***Form of classes*** | ***Form of classes*** | ***Form of classes*** | ***Form of classes*** |
| *L* | *C* | *...* | *L* | *C* | *...* | *L* | *C* | *...* | *L* | *C* | *...* | *L* | *C* | *...* | *L* | *C* | *...* | *L* | *C* | *...* |
| W1; W2; W3; W5; W7; W8; W9; W10; W11; W13 | **+** |  |  |  |  |  |  |  |  |  | **+** |  |  |  |  |  |  |  |  |  |  |
| … W4; W6; W12; W13; U1 – U5 |  |  |  |  | **+** |  |  |  |  |  | **+** |  |  |  |  |  |  |  |  |  |  |
| K01-K06 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **+** | **+** |  |

***\*delete as appropriate***

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| * 1. **Criteria of assessment of the intended learning outcomes**
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| **Form of classes** | **Grade** | **Criterion of assessment** |
|  **lecture (L)** | **3** | 61%- 68%Learning programme content on the basic level, replies chaotic, leading questions necessary.  |
| **3,5** | 69%-76%Learning programme content on the basic level, answers systematized, requires assistance from the teacher. |
| **4** | 77%-84%Mastering course content at the primary level, response systematized, independent.Solving problems in typical situations. |
| **4,5** | 85%-92%The scope of presented knowledge exceeds the basic level based on the supplementary literature provided. Solving of problems in new complex situations |
| **5** | 93%-100%The scope of presented knowledge exceeds the basic level based on independently acquired scientific sources of information.  |
| **classes (C)\*** | **3** | 61%- 68%Learning programme content on the basic level, replies chaotic, leading questions necessary.  |
| **3,5** | 69%-76%Learning programme content on the basic level, answers systematized, requires assistance from the teacher. |
| **4** | 77%-84%Mastering course content at the primary level, response systematized, independent.Solving problems in typical situations. |
| **4,5** | 85%-92%The scope of presented knowledge exceeds the basic level based on the supplementary literature provided. Solving of problems in new complex situations |
| **5** | 93%-100%The scope of presented knowledge exceeds the basic level based on independently acquired scientific sources of information.  |

**Conditions for obtaining credit.**

The prerequisite is to obtain credits for all classes: lectures –mandatory presence, classes– presence in all classes and an active participation in the classes according to the schedule. In case of excused absence – the obligation of making up classes after consultation with an assistant professor.

The exam in the form of a written test with a grade.

1. **BALANCE OF ECTS CREDITS – STUDENT’S WORK INPUT**

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| **Category** | **Student's workload** |
| **Full-time****studies** |
| *NUMBER OF HOURS WITH THE DIRECT PARTICIPATION OF THE TEACHER /CONTACT HOURS/* | **35** |
| *Participation in lectures\** | **15** |
| *Participation in classes, seminars, laboratories\** | **20** |
| *Preparation in the exam/ final test\** |  |
| *Others\** |  |
| *INDEPENDENT WORK OF THE STUDENT/NON-CONTACT HOURS/* | **15** |
| *Preparation for the lecture\** | **10** |
| *Preparation for the classes, seminars, laboratories\** | **5** |
| *Preparation for the exam/test\** |  |
| *Gathering materials for the project/Internet query\** |  |
| *Preparation of multimedia presentation* |  |
| *Others (please specify e.g. e-learning)\** |  |
| *TOTAL NUMBER OF HOURS* | **50** |
| ECTS credits for the course of study | **2** |

***\*delete as appropriate***

***Accepted for execution*** *(date and legible signatures of the teachers running the course in the given academic year)*

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