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| Module name | **Genetics - an extensive course** |
| Module code | B-B.018B |
| ISCED code | 0511: Biology |
| Study cycle | I and II° |
| Semester | Summer semester |
| Responsible for this module | dr hab. Monika Janczarek (e-mail: mon.jan@poczta.umcs.lublin.pl),  tel. (48) 81-537-59-74 |
| Language of instruction | English |
| Website | - |
| Prerequisites | Completed course in biochemistry |
| ECTS | 8 |
| ECTS points hour equivalents | Contact hours (work with an academic teacher)  Lectures – 30 hours; Laboratory – 60 hours  Total number of hours with an academic teacher 120  Number of ECTS points with an academic teacher 4 Non-contact hours (students' own work) 120 Total number of non-contact hours 120  Number of ECTS points for non-contact hours 4  **Total number of ECTS points for the module = 8** |
| Educational outcomes verification methods | Written or oral exam |
| Description | The module covers the knowledge in the area of fundamental genetic definitions, structure, topology and replication of DNA, organization of prokaryotic and eukaryotic genomes, analysis and interpretation of inheritance results of linked and non-linked genes, inheritance of dominant and recessive autosomal and sex-linked diseases (Mendelian genetics), genetic control of transcription (function of promoters in initiation of transcription, transcription termination), organization and expression of prokaryotic genes and eukaryotic genes, mutations and mutagens, transposons, DNA repair systems, genetic recombination. |
| Reading list | 1. T.A. Brown, Genomes  2. J.E. Krebs, E.S. Goldstein, S.T. Kilpatrick, Lewin. Genes  3. Hartwell, Hood, Goldberg, Reynolds, Silver, Veres. Genetics: From Genes to Genomes |
| Educational outcomes | **KNOWLEDGE**  **-** The Mendelian and non-Mendelian modes of inheritance that govern passage of genetic traits across generations  **-** The basic structure, properties and function of DNA, chromosomes, and other genomes as well as how chromosomes are segregated in mitosis and meiosis  - The basics of the molecular processes of DNA replication, recombination, transcription, and translation as well as the important characteristics of the genetic code  **SKILLS**  **-** Use this knowledge of inheritance to track alleles through subsequent generations and categorize and predict genotypes and phenotypes  **-** draw the stages of mitosis and meiosis and explain how the process of mutation occurs and generates phenotypic diversity  **-** draw and name relevant machinery involved in the following processes: DNA replication, transcription, and translation  **ATTITUDES**  Applying the obtained knowledge to solving various genetic problems by utilizing critical thinking, and data analyzing. |
| Practice | - |

**Information about classes in the cycle**

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| Website | - |
| Educational outcomes verification methods | assessment of labs |
| Comments |  |
| Reading list | 1. T.A. Brown, Genomes  2. J.E. Krebs, E.S. Goldstein, S.T. Kilpatrick, Lewin. Genes  3. Hartwell, Hood, Goldberg, Reynolds, Silver, Veres. Genetics: From Genes to Genomes |
| Educational outcomes | **KNOWLEDGE**  -Basic concepts of classical (including Mendelian genetics) and molecular genetics, genetic mapping, mitosis and meiosis, DNA replication and recombination, gene transcription and regulation of gene expression, connection of genotype and phenotype.  **SKILLS**  -Understanding the logic and core concepts of classical and molecular genetics, including: prediction of genotypic and phenotypic ratios for complex  crosses; mechanisms of DNA replication, recombination, transcription and gene expression.  -Explaining how mutations can alter the outcomes of these processes;  **ATTITUDES**  Apply this knowledge to solving genetic problems by utilizing critical thinking, data analyzing and predicting experimental results. |
| A list of topics | 1. Mendelian genetics and probability 2. Extension to Mendelian genetics 3. Gene mapping 4. Genetic terms of classical and molecular genetics 5. Chromosomes, recombination and linkage analysis 6. DNA structure, function and replication 7. Mutations and mutagenesis 8. Using mutation to study gene function 9. Gene expression 10. Plasmids, conjugation, transformation and transduction |
| Teaching methods | Experimental work, presentation, discussion |
| Assessment methods | assessment of labs or written tests |