


KAPITAŁ LUDZKI
 NARODOWA STRATEGIA SPÓJNOŚCI

 Projekt współfinansowany przez
 Unię Europejską w ramach
 Europejskiego Funduszu
 Społecznego

UNIA EUROPEJSKA
 EUROPEJSKI
 FUNDUSZ SPOŁECZNY


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|---------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| Course title | | ECTS code | |
| Graduate study lecture - Molecular genetics | | 13.3.0546 | |
| Name of unit administrating study | | | |
| null | | | |
| Studies | | | |
| faculty | field of study | type | drugiego stopnia |
| Wydział Chemii | Chemia | form | stacjonarne |
| | | specjalty | chemia biomedyczna, chemia i technologia środowiska, analityka i diagnostyka chemiczna, chemia obliczeniowa |
| | | specialization | wszystkie |
| Teaching staff | | | |
| prof. dr hab. Piotr Skowron; dr hab. Agnieszka Żylicz-Stachula, profesor uczelni; dr Joanna Jeżewska-Fraćkowiak | | | |
| Forms of classes, the realization and number of hours | | ECTS credits | |
| Forms of classes | | 3 | |
| Lecture | | classes - 30 h | |
| The realization of activities | | tutorial classes – 25 h | |
| classroom instruction | | student's own work – 10 h | |
| Number of hours | | Total: 75 h - 3 ECTS | |
| Lecture: 30 hours | | | |
| The academic cycle | | | |
| 2022/2023 summer semester | | | |
| Type of course | | Language of instruction | |
| obligatory | | polish | |
| Teaching methods | | Form and method of assessment and basic criteria for evaluation or examination requirements | |
| - discussion | | Final evaluation | |
| - multimedia-based lecture | | Graded credit | |
| | | Assessment methods | |
| | | Written test, essay | |
| | | The basic criteria for evaluation | |
| | | Final grade covers results after written test and essay | |
| | | Discussion participation contributes to the final grade | |
| | | final grade according to the scale of grades given in the Study Regulations | |
| | | supplementary written evaluation for students who did not obtain the required 51% in the first term | |
| Method of verifying required learning outcomes | | | |
| Required courses and introductory requirements | | | |
| A. Formal requirements | | | |
| none | | | |
| B. Prerequisites | | | |
| none | | | |
| Aims of education | | | |
| 1. Presenting the chemical composition and structure of genome and the laws of inheritance. | | | |
| 2. Presenting the gene processing (replication, repair, recombination, transcription, translation, gene expression regulation). | | | |
| 3. Pointing the differences in structures and functions of Procaryotic and Eucaryotic genes. | | | |
| 4. Presenting DNA sequencing techniques and contemporary trends in this field. | | | |
| Course contents | | | |

Chemical composition, structure and physical organisation of genetic material, genetic code, genes versus phenotype, Mendelian laws, bacteriophages, DNA replication, DNA repair, mutations, DNA recombination, DNA transcription, catalytic and regulatory RNA, translation, gene expression regulation, transcriptional switches: inducible and repressible operon, catabolic repression, sources of genetic diversity, structure and function of Eucaryotic genes.

Sanger's DNA sequencing, pyrosequencing, next generation sequencing (NGS), NGS methods applications, genome sequencing, templates preparation, contig assembly, strategies for genome sequencing, first sequenced genome, Human Genome Project, genome mapping, microarrays.

Bibliography of literature

Literature required to pass the course

1. Genomy, Brown T.A., PWN 2009
2. Podstawy Biologii Komórki, Alberts B. i inni, PWN 2009
3. Biochemia, Stryer L. PWN 1999 lub nowsze
4. Genetyka molekularna, red. Węgleński P., PWN 2008

Extracurricular readings

1. Recombinant DNA. Genes and genomes a short course, Watson J.D., Cold Spring Harbour Laboratory Press 2007
2. Genes IX, Lewin B., Jones and Bartlett Publishers 2008

The learning outcomes (for the field of study and specialization)

Knowledge

1. Student knows chemical composition and structure of genome.
2. Student describes topics presented in the course contents, related to gene processing (replication, repair, recombination, transcription, translation, gene expression regulation).
3. Student defines Mendelian laws, genetic code and its meaning.
4. Student lists and describes differences in the structure and function of Prokaryotic and Eucaryotic genes.
5. Student lists and describes DNA sequencing techniques.
6. Student describes possibilities and advantages of modern strategies for genome sequencing.

Skills

Social competence

1. Student understands need of further education.
2. Student carefully and critically expresses own opinions regarding inheritance.
3. Student realizes the relations between nature phenomena observations and the possibility to form general scientific laws.
4. Student realizes and appreciates possibilities offered by contemporary molecular genetics.

Contact

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