

**Coursesylabus – part A**
Molecular Biology and Genetics**48SJ-MBAG****ECTS: 4.0****CYCLE: 2021Z****SUBJECT MATTER CONTENT****LECTURE**

Structure and function of lipids and carbohydrates. Characterization of primary, secondary, tertiary, and quaternary protein structure. Protein modifications and their functions, as well as the regulation of protein degradation. The structure of RNA, DNA and chromatin. DNA replication, repair and recombination, as well as the regulation of nucleic acid degradation. Transcription, translation, and the regulation of gene expression. The human genome, transcriptome, and proteome, including their function and methods of analysis

CLASSES

Construction of prokaryotic and eukaryotic cells, cell cycle. The basic concepts of genetic, chromosomal theory of inheritance and the mechanisms of the division of genetic material in the nucleus as well as the mitochondria. Rules of monogenic inheritance and multifactorial traits (quantitative). The phenomenon of coupling and interaction of genes. Genetic blood groups in humans. Types of sex determination in man, inheritance of sex-linked traits. Structure of chromosomes and rules for description of karyotypes. Aberrations of autosomes and heterosomes, the basis of mutagenesis. The basics of population genetics. Environmental threats from chemical and biological agents. Analysis of the risks of transgenic organisms to humans and the environment. The rules for working in molecular biology. Genetic engineering techniques as a basis for molecular diagnostics. Methods for isolating nucleic acids. Principles and types of PCR. The enzymes used in molecular biology. Gene Therapy. The human genome project. The genetic database. Diagnostic techniques used in medical genetics. The use of stem cells in medicine. Good Laboratory Practice in cell culture. The biological properties of stem cells.

TEACHING OBJECTIVE

Transfer of knowledge of the basis of genetics - the basic concepts and mechanisms of genetic inheritance. Acquire the skills of determining the selected chromosomal aberrations and genetic diseases. Calculating frequency of alleles and genotypes in the population and to determine the reasons that affect their changes. Influence of environmental factors on the body and the environment. Transfer of knowledge of the basic methods used in molecular biology. The basic concepts of simple research, interpretation of results and how to draw conclusions. The acquisition of the ability to use online databases as a source of information. Knowledge of the problems of stem cells and their use in medicine.

DESCRIPTION OF THE LEARNING OUTCOMES OF THE COURSE IN RELATION TO THE DESCRIPTION OF THE CHARACTERISTICS OF THE SECOND LEVEL LEARNING OUTCOMES FOR QUALIFICATIONS AT LEVELS 6-8 OF THE POLISH QUALIFICATION FRAMEWORK IN RELATION TO THE SCIENTIFIC DISCIPLINES AND THE EFFECTS FOR FIELDS OF STUDY:**Symbols for outcomes related to the discipline:**

M/NM+++

Symbols for outcomes related to the

C.U2.+, K.9.+, B.W13.+, C.U5.+, B.W.27.+, C.W6.+, B.U3.+, B.W12.+, C.U4.+, C.W1.+, D.W22.+, C.U1.+, K.5.+, K.7.+,

Legal acts specifying learning outcomes:

672/2020

Disciplines: medical sciences**Status of the course:** Obligatory**Group of courses:** A - basic course**Code:** ISCED 0912**Field of study:** Medicine**Scope of education:****Profile of education:** General academic**Form of studies:** full-time**Level of studies:** uniform master's studies**Year/semester:** 1/1**Types of classes:** Lecture, Classes**Number of hours in semester:**

Lecture: 10.00, Classes: 40.00

Language of instruction: English**Introductory subject:****Prerequisites:****Name of the organisational unit****conducting the course:** Katedra

Biologii Medycznej

Person responsible for the**realization of the course:** prof. dr hab.

Ewa Dzika

e-mail: e.dzika@uwm.edu.pl**Additional remarks:**

field of study:

C.W4.+ , B.U8.+ , C.W10.+ , B.W11.+ , B.W18.+ , C.U3.+ , K.8.+ ,
C.W9.+ , B.W19.+ , B.U10.+ , B.W14.+ , C.W7.+ , C.W2.+ ,
C.W5.+ , B.U13.+ , C.W8.+ , B.W.29.+

LEARNING OUTCOMES:**Knowledge:**

W1 -
W2 -
W3 -
W4 -
W5 -
W6 -
W7 -
W8 -
W9 -
W10 -
W11 -
W12 -
W13 -
W14 -

Skills:

U1 -
U2 -
U4 -
U5 -
U6 -
U7 -
U8 -

Social competence:

K1 -
K2 -
K3 -
K4 -

TEACHING FORMS AND METHODS:**FORM AND CONDITIONS OF VERIFYING LEARNING OUTCOMES:**

Lecture: Written exam - Participation in discussions 1 - assessment of involvement in discussion and ability to solve genetic and molecular biology tasks (W1, W10, W11, W12, W13, W14, W2, W3, W4, W5, W6, U1, U2, U3, K1) (W1;W2;W3;W4;W5;W6;W7;W8;W9;W10;W11;U1;U2;U8;K2;);

Classes: Written test - (W3;W5;W6;W7;W8;W10;W11;U1;U2;U4;U5;U6;U7;U8;K2;);

Classes: Write-up - Written quizzes - Short tests with open ended questions (W6, W7, W8, W9) (W6;W7;W8;W9;W13;U1;U2;K2;K3;K4;);

Classes: Part in the discussion - Participation in discussions 1 - assessment of involvement in discussion and ability to solve genetic and molecular biology tasks (W1, W10, W11, W12, W13, W14, W2, W3, W4, W5, W6, U1, U2, U3, K1) (W10;W11;W12;W13;W14;K3;K4;);

Classes: Colloquium test - Written colloquiums - written test with closed questions (W1, W10, W11, W14, W2, W3, W4, W6, U1, U2, U3, U4, U5, U6, U7, K1) Completion of practical exercises- (U4, U5, U6, U7) Practical colloquium - Completion of practical exercises: (U4, U5, U6, U7) Report 1 - Assessment of tasks and problem solving with work cards (W1, W2, W3, W4, W5, U1, U2) (W3;W5;W6;W7;W8;W9;W10;W11;U1;U2;U8;K1;K2;);

Classes: Colloquium practical - Practical exercises (U4;U5;U6;U7;U8;K2;);

BASIC LITERATURE:

1. A. Buczek, *Medical Biology, Part 1*, Wyd. Koliber, Lublin, R. 2007, s.
2. A. Buczek, *Medical Biology, Part 2*, Wyd. Koliber, Lublin, R. 2007, s.

SUPPLEMENTARY LITERATURE:

1. Jorde, Lynn B., et.al. ,*Medical Genetics 6th edition*, Wyd. Elsevier MOSBY, R. 2019, s.

Detailed description of ECTS credits awarded - part B

48SJ-MBAG

ECTS: 4.0

CYCLE: 2021Z

Molecular Biology and Genetics

The number of ECTS credits awarded consists of:

1. Contact hours with the academic teacher:

- participation in: Lecture	10.0 h
- participation in: Classes	40.0 h
- consultation	4.0
Total:	54.0h.

2. Independent work of a student:

Total: 0h

contact hours + independent work of a student Total: 54.0h

1 ECTS credit = 25-30 h of an average student's work, number of ECTS credit = 54.0 h : 1 h/ECTS = 54.00 ECTS onaverage: 4.0 ECTS

- including the number of ECTS credits for contact hours with the direct participation of an academic teacher: 0,00 ECTS points,

- including the number of ECTS credits for hours of independent work of a student: