

Module name	Molecular biology II
Module code	B-MI.049
ISCED code	0511: Biology
Study cycle	I°
Semester	summer semester
Responsible for this module	prof. Marek Tchórzewski (maro@hektor.umcs.lublin.pl), Tel. +48 815375956
Language of instruction	English
Website	-
Prerequisites	Completed course of biochemistry, genetics
ECTS	7
ECTS points hour equivalents	Contact hours (work with an academic teacher): 30 hrs of lectures and 60 hrs of laboratory Total number of hours with an academic teacher: 100 Number of ECTS points with an academic teacher: 4.0 Non-contact hours (students' own work) 75 Total number of non-contact hours 75 Number of ECTS points for non-contact hours: 3.0 Total number of ECTS points for the module 7.0
Educational outcomes verification methods	written exam, continuous assessment of labs
Description	The module covers the knowledge in the area of: the essential concepts of molecular biology. The student learns the techniques used to analyse DNA, RNA and proteins
Reading list	1. J.E. Krebs, E.S. Goldstein, S.T. Kilpatrick, Lewin's Genes XI 2. L. A. Allison, Fundamental molecular biology 3. T.A. Brown, Genomes 3 4. Research articles from scientific journals recommended by the teacher
Educational outcomes	KNOWLEDGE 1. Student has the knowledge about peptides, protein structure and function. 2. Student can describe regulation of expression of genetic information on the translational level and function of nano-machines such as ribosomes and protein factors involved in that process on the molecular level. 3. Student characterizes the role and function of receptors and extracellular signal transduction mechanisms. 4. Student is able to explain molecular basics of such process such as: oncogenesis, apoptosis and cell cycle. SKILLS 1. Student in cooperation with the group prearranges and perform analysis using

	eukaryotic cell, especially isolation and characterization of intracellular structures. 2. Student can isolate proteins and nucleic acids from eukaryotic cell and is able to run protein and nucleic acid gel electrophoresis and to interpret obtained results. ATTITUDES 1. Student appreciates the importance of understanding biological processes on molecular level and the need to continuously expand biological knowledge. 2. Student is conscious of hazards and responsibility for its own and work place safety during experimental work, using instruments, chemicals and biological materials.
Practice	not concerns

Information about classes in the cycle

Website	-
Educational outcomes verification methods	written exam, continuous assessment of labs
Comments	The classes are carried out in room 19A,
Reading list	as described above
Educational outcomes	KNOWLEDGE as described above SKILLS as described above ATTITUDES as described above
A list of topics	Lecture Principles in protein structure and function; protein folding and tertiary structure acquisition; post-translational modification of proteins; determination of protein structure. From RNA to protein – translation, decoding of the genetic information of the translational level; aminoacyl tRNA synthetases; ribosome structure; decoding a genetic information by translational apparatus; antibiotics affecting translation - function and structure and molecular aspects of translational inhibitors. Protein cross-talk in cells; general principles of cell communication; signaling through G-protein-linked cell-surface receptors; signaling through enzyme-linked cell-surface receptors; programmed cell death (apoptosis). Laboratory Isolation methods of basic molecules: DNA/RNA; PCR amplification of DNA; restriction enzyme digestion of plasmid DNA; bacterial transformation with genetic constructs; DNA sequence analysis; electrophoretic techniques of nucleic acids; isolation of protein from bacterial and eukaryotic cell, analysis of proteins

	including protein concentration and electrophoretic techniques; basics of cell culture handling, transfection of cell lines; basic microscopy techniques in cell observation and visualization.
Teaching methods	Laboratory experiments; panel discussion; lecture
Assessment methods	written exam, continuous assessment of laboratory skills