

FACULTY OF CHEMISTRY					
SUBJECT CARD					
Name of subject in Polish:	Biologia molekularna				
Name of subject in English:	Molecular biology				
Main field of study (if applicable):					
Specialization (if applicable):					
Profile:	academic				
Level and form of studies:	2nd level – supplementary semester , full-time				
Kind of subject:	optional				
Subject code	BTC020013				
Group of courses:	NO				
	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30				
Number of hours of total student workload (CNPS)	60				
Form of crediting	crediting with grade				
For group of courses mark final course with (X)					
Number of ECTS points	2				
including number of ECTS points for practical (P) classes					
including number of ECTS points for direct teacher-student contact (BK) classes	1				
<b>PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES</b> 1. Basic knowledge of organic chemistry 2. Basic knowledge of biology					
<b>SUBJECT OBJECTIVES</b> C1 Basics of nucleic acids biochemistry, DNA and RNA. Structure and function C2 Genetic information flow C3 Methods in genes and genomes research C4 Basic knowledge of evolution, evolution of DNA and protein sequences C5 Basic knowledge of the use of bioinformatics tools for the analysis of the evolution, nucleic acids and proteins sequences C6 Overview of DNA replication, topology, repair and recombination C7 RNA synthesis and processing C8 An overview of the genetic code and protein synthesis C9 Regulation of gene expression in Prokaryotes C10 Regulation of gene expression in Eukaryotes. The role of transcription factors with particular emphasis to nuclear receptors. C11 The molecular determinants of selected diseases and therapies.					
<b>SUBJECT LEARNING OUTCOMES</b> <b>relating to knowledge:</b> PEU_W01 –has general knowledge of DNA and RNA molecular structure and function PEU_W02 – has basic knowledge of structure and function of enzymes involved in DNA and RNA in Prokaryota i Eukaryota PEU_W03 – has knowledge of the genetic information flow PEU_W04 – has basic knowledge of modern methods enabling cloning and genes and genomes research PEU_W05 –has basic knowledge of DNA and protein sequences evolution					

PEU\_W06 – has basic knowledge of bioinformatic tools for DNA and protein sequences analysis  
 PEU\_W07 – has knowledge of DNA replication, recombination and repair processes  
 PEU\_W08 – has knowledge of RNA synthesis and processing  
 PEU\_W09 – has basic knowledge of protein synthesis in Prokaryotes and Eukaryotes, protein activity regulation  
 PEU\_W10 – has knowledge how to read the genetic code and knows the genetic code structure  
 PEU\_W11 – can describe the way of regulation of the expression of genetic information in Prokaryotes  
 PEU\_W12 – can describe the way of regulation of the expression of genetic information in Eukaryotes with particular reference to transcription factors, including nuclear receptors  
 PEU\_W13 –has basic knowledge of molecular determinants of selected diseases and therapies

#### PROGRAM CONTENT

Lectures		Number of hours
Lec 1	Introduction. DNA and RNA: composition and structure	2
Lec 2	Flow of genetic information, introduction to genetic code	1
Lec 3	Exploring genes: restriction enzymes, DNA sequencing, DNA visualization, agarose electrophoresis, hybridization techniques, DNA tagging	2
Lec 4	Exploring genes: PCR, polyacrylamide electrophoresis, cloning, DNA vectors, mutagenesis	3
Lec 5	Exploring evolution, bioinformatic tools, cDNA and genomic libraries	2
Lec 6	DNA replication, recombination, ligation, topology and repair	2
Lec 7	RNA synthesis and processing	2
Lec 8	tRNA structure, composition of Prokaryotes and Eukaryotes ribosomes	1
Lec 9	Protein synthesis in Prokaryotes	2
Lec 10	Protein synthesis in Eukaryotes	2
Lec 11	Control of gene expression in Prokaryotes: lactose operon, tryptophan operon	2
Lec 12	Control of gene expression in Procaryotes: arabinose operon, regulation of $\lambda$ phage replication	2
Lec 13	Control of gene expression in Eucaryotes: structure, organization and function of histones, structure and function of the basal transcription apparatus	2
Lec 14	Control of gene expression in Eucaryotes: structure and function of selected transcription factors comprising nuclear receptors. Discussion of clinical correlations and significance of obtained knowledge.	3
Lec 15	Summary. Final test	2
	Total hours	30

#### TEACHING TOOLS USED

N1. Multimedia presentation  
 N2. Interactive discussion  
 N3. Discussion concerning the tasks and issues presented on the lists

<b>EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT</b>		
<b>Evaluation</b> (F – forming (during semester), P – concluding (at semester end))	Learning outcomes number	Way of evaluating learning outcomes achievement
F1	PEU_W01- PEU_W13	During semester students can collect points for their activity (1 lecture-1 point)
F2	PEU_W01- PEU_W13	Final test
C =F1+F2 3,0 when (F1 + F2) = 60,0 – 67,0 pkt. 3,5 when (F1 + F2) = 67,0 – 75,0 pkt. 4,0 when (F1 + F2) = 75,0 – 82,0 pkt. 4,5 when (F1 + F2) = 82,0 – 92,0 pkt. 5,0 when (F1 + F2) = 92,0 – 100,0 pkt. 5,5 when (F1 + F2) = >100,0 pkt.		
<b>PRIMARY AND SECONDARY LITERATURE</b>		
<b><u>PRIMARY LITERATURE:</u></b>		
[1] Berg, J.M., Stryer, L., Tymoczko, J.L., Gatto J.G., „Biochemistry” W.H. Freeman and Co., New York – 8th edition 2015		
<b><u>SECONDARY LITERATURE:</u></b>		
[1] Voet, D., Voet, J.G. „Biochemistry” Wiley & Sons, Inc., 3rd edition [2] Voet, D., Voet, J.G., Pratt, Ch.W., „Fundamentals of Biochemistry” [3] Stryer L “Biochemistry” 3th or 4th edition [4] ‘Textbook of Biochemistry with clinical correlations” edited by .T.M Devlin, Wiley and Sons, 7th edition 2011		
<b>SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)</b>		
Dr inż. Beata Greb-Markiewicz, beata.greb-markiewicz@pwr.edu.pl		