

COURSE DESCRIPTION CARD

Faculty of Civil Engineering and Environmental Sciences									
Field of study								Degree level and programme type	BSc.
Specialization/ diploma path								Study profile	Academic profile
Course name	Biotechnology							Course code	IS-FCEE-00072-1S
								Course type	Erasmus
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	Summer
	30		30					No. of ECTS credits	4
Entry requirements	Genetics, biochemistry, genetic engineering								
Course objectives	The aim of the course is to familiarize students with the general information on the structure and function of DNA, genes, genes cloning, main mechanisms of gene regulation and genetic manipulation for creation of genetically engineered microorganisms (GEMs) and their application in current biotechnology. The student should acquire the ability to use terminology and nomenclature concerning the types of reporter genes and marker genes in the construction of GEMs. The student should know the basic laboratory equipment and principles of work in the biotechnology laboratory, especially laboratory procedures for the DNA isolation and electrophoresis, plasmid DNA isolation and analysis of reporter gene expression using spectroscopic methods and work with the Glomax® plate reader from Promega.								
Course content	<p>Lecture: DNA, structure and function. Main mechanisms of gene regulation in <i>Procarvota</i> and <i>Eucaryota</i>, vectors and genes manipulation. Gene cloning. Genetically modified microorganisms and their application in environmental analysis. DNA cutting with restriction enzymes.</p> <p>Laboratory: DNA isolation, plasmid DNA isolation, DNA electrophoresis, <i>gfp</i> and <i>lux</i> gene analyse in different conditions.</p>								
Teaching methods	lecture - information and problematic; research laboratory								
Assessment method	Lecture - written test, laboratory - evaluation of reports, written test								
Symbol of learning outcome	Learning outcomes							Reference to the learning outcomes for the field of study	
LO1	has the knowledge to describe analyzes in biotechnology and is able to use it for calculations needed in engineering practice							BT2_K01 BT2_K09	
LO2	has knowledge of the functioning of the ecosystem and the role of biotechnology in supporting activities in the field of environmental protection							BT2_K06	

L03	is able to use basic laboratory equipment, plan and carry out simple laboratory experiments, interpret the obtained results and draw correct conclusions as well as prepare documentation from the realized experiment	BT2_S02 BT2_S04	
L04	is able to search for and creatively use information from literature, databases and other sources and to make a critical analysis of it, as well as to draw conclusions and formulate and justify opinions	BT2_U01	
L05	He is ready to critically assess his knowledge and consult experts in the event of difficulties in solving a technological problem on his own	BT2_C01	
Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed	
L01	written test,	L, LC	
L02	written test,	L, LC	
L03	written test, reports	LC	
L04	written test,	L, LC	
L05	written test,	L, LC	
Student workload (in hours)		No. of hours	
Calculation	Participation in lectures	30	
	Participation in laboratories	30	
	Preparation for the laboratory and preparation of reports	20	
	Preparation for the exam and attendance (25h + 2h)	27	
	Participation in consultation	5	
	TOTAL:	112	
Quantitative indicators		HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation		65	2
Student workload – practical activities		70	2
Basic references	1. Brown T. A. Gene cloning and DNA analysis, 2010. Wiley-Blackwell. 2. Khan F. A. Biotechnology fundamentals, 2020. Francis and Taylor.		
Supplementary references	1. Schmidt R. D. Biotechnology. 2016. Wiley-VCH Verlag GmbH.		
Organisational unit conducting the course	Department of Chemistry, Biology and Biotechnology	Date of issuing the programme	
Author of the programme	Dr Marzena Matejczyk	26-03-2021	

L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW - field work,
S – seminar