Course code	Course group	Volume in ECTS credits	Course hours
BIO 6003	C	6	160

Course type (compulsory or optional)	**Compulsory**
Course level (study cycle)	**MA Courses**
Semester the course is delivered	**3, Autumn**
Study form (face-to-face or distant)	**Face-to-face**

Course title in Lithuanian

GENETIŠKAI MODIFIKUOTI ORGANIZMAI

Course title in English

GENETICALLY MODIFIED ORGANISMS

Short course annotation in Lithuanian

Suteikiamos žinios apie genetiškai modifikuotus organizmus (GMO), pagrindinius principus ir technologijas GMO kūrimui, genų inžinerijos problemas ir pasiekimus genetiškai modifikuotuose gyvūnuose, augaluose ir mikroorganizmuose. Studentai bus supažindinami su GMO rizika ir žala aplinkai.

Short course annotation in English

Provides knowledge about genetically modified organisms (GMO), basic principles and techniques of creating GMOs, occurred problems in genetic engineering and achievements in biotechnology-modified animals, plants and microorganisms. Students also will be introduced an environmental risk assessment of GMO.

Prerequisites for entering the course

General genetics

Course aim

Provide structured knowledge about genetically modified organisms (GMO), basic principles and technology of GMO creation, gene engineering problems and achievements.

Links between course outcomes and criteria of learning achievement evaluation

Course outcomes	Criteria of learning achievement evaluation
Fluently uses GMO terminology, understands fundamental GMO laws. Knows basic use area of GMO and its design methods.	Knows fundamental concepts
	Knows essential methods for transgene organism design;
	Knows use areas of genetically modified organisms (GMO);
Realize GMO control and legal aspects, bioethics. Capable of solving basic GMO problems, analytical thinking.	Define modern GMO problems and possible solutions;
	Describe GMO role in context of economy;
	Describe essence of GMO creation, research methods and principles;
	Analyze, compare, summarize, make conclusions and relate facts with life and profession.

Realize GMO importance in different science and public development context;

Form an opinion about biotechnology products, its importance to economy growth and imminence;

Links between course outcomes and course contents

Couse content (topics)

1. Organism genetic modification (GM). Methods of GMO design. Hybridoma. Hybridization of organisms. Cloning. Vectors.

2. Transgenic organisms (GM microorganisms; GM plants; GM animals).
3. GMO usage in transplantation – xenotransplantation and its problems.
4. GM utilization in agriculture, medicine, veterinary, fuel industry, environment control, biotechnology risks and risk control.
5. Human organism and genetic modification – gene therapy.
6. GM organism control, usage laws.
7. Bioethics and research problems.

Distribution of workload for students (contact and independent work hours)

Lectures – 45 hours, laboratory work– 15 hours, examination – 3 hours, individual work – 97 hours.

Structure of cumulative score and value of its constituent parts

Final assessment sums the assessments of written mid-term examination (30%), assessment of laboratory works (20%) and written final examination (50%), which is evaluated only after student has finished practical and individual work.

Recommended reference materials

Nr.	Publication year	Authors of publication and title	Publishing house	Number of copies in		
				University library	Self-study rooms	Other libraries
Basic materials						
1.	2004	Paulauskas A. Genetiškai modifikuoti organizmai. Vilnius: Petro ofsetas	Vilnius: Petro ofsetas	23		
2.	2001	Yves Tourte, Genetically Modified Organisms. Transgenesis in Plants	Science Publishers, INC.	1		
3.	1999	John Bishop. Transgenic Mammals	Pearson Education Limited.			
4.	2004	Environmental Risk Assessment of Genetically Modified Organisms Volume 1.	CABI Publishing			
5.	2010	A. Paulauskas, D.Lygis, Genetiškai modifikuoti	Vilnius: Petro ofsetas	40	8	

		transgeniniai augalai. Kūrimas, naudojimas, reguliavimas.				
6.	2008	J. Radzijevskaja, A. Paulauskas. Genetiškai modifikuoti organizmai. Genetiškai modifikuotų organizmų nustatymas.	Vytauto Didžiojo universitetas	24		
7.	2007	L. Grinius, D. Matulis, S. Serva, D. Misiūnas, R. Valiokas. Modernios biotechnologijos saugaus naudojimo ir vystymo perspektyvos Lietuvoje	Vilnius: Inforastras	10	6	
8.	2010	R. Lazutka, D. Skučienė. Genetiškai modifikuotų organizmų poveikio socialinei-ekonominei aplinkai Lietuvoje įvertinimas.	Vilnius: Inforastras		4	
9.	2008	V. Stanys.Genetiškai modifikuotų augalų rizikos aplinkai ir žemės ūkiui vertinimo bei rizikos valdymo metodinės rekomendacijos.	Vilnius: Inforastras		9	
10.	2010	D. Lygis, A. Paulauskas, G. Jodinskas. Nacionalinės biosaugos sistemos įgyvendinimas Lietuvoje.	Vilnius: Inforastras	1		
11.	2010	E. Litvinas. Visuomenės švietimo būdai ir priemonės informuojant suinteresuotas visuomenės grupes apie modernios biotechnologijos saugaus naudojimo ir vystymo perspektyvas Lietuvoje.	Vilnius: Ciklonas		9	

Course programme designed by
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