
		UNIVERSITY OF EAST SARAJEVO Faculty of Technology Zvornik					
		Study programme: Chemical Engineering and Technology					
		Cycle I		Year IV			
Course title		TECHNOLOGY OF FERMENTED PRODUCTS					
Department		Department for Food Technology – Faculty of Technology Zvornik					
Course code		Course status		Semester		ECTS	
04-2-123-8		Elective		VIII		5	
Teacher		Milenko Smiljanić, PhD, associate professor; Dragan Vujadinović, PhD, associate professor					
Teaching assistant		Milan Vukić, PhD, assistant professor					
Number of hours/ teaching workload (per week)			Individual student workload (in hours per semester)			Student workload coefficient S₀	
Lectures	Auditory exercises	Laboratory exercises	Lectures	Auditory exercises	Laboratory exercises	S₀	
3	0	2	45	0	30	1.00	
3*15+0*15+2*15=75 hours			(3*15*1.00+0*15*1.00+2*15*1.00)=75 hours				
Total course workload 75 + 75=150 hours per semester							
Learning outcomes		After finishing the course, students will be able to: <ol style="list-style-type: none"> 1. demonstrate and utilize the knowledge of the engineering aspects of biotechnological processes, with special reference to fermentation processes 2. demonstrate and utilize the knowledge of the theory of fermentation, types of fermentation, chemistry, biochemistry and technology of malting, malted and unmalted raw materials, cooking, hop extraction and wort cooling, the ways of conducting the fermentation and the corresponding calculations, the construction and the operation of the fermenter in beer technology 3. understand the chemical processes that take place during the aging and formation of wine, as well as the spoilage process and the appearance of flaws and defects in wine 4. demonstrate and utilize the knowledge of industrial microbiology, enzymology and technological operations in the production of strong alcoholic beverages from various agricultural raw materials 5. understand the role of the main biochemical and microbiological changes that occur during food processing and storage 6. become familiar with the application of enzymes in food technology (enzymes important for bread and dough production, enzymes important for beer and wine production, enzymes important for fruit and vegetable processing technology, enzymes important for milk processing technology, enzymes important for meat processing technology, enzymatic modifications of food proteins, commercial enzymes). 					
Prerequisites							
Teaching methods		Lectures, auditory and laboratory exercises, mid-term tests (colloquia).					
Syllabus outline per week		<ol style="list-style-type: none"> 1. Introduction. Definitions of basic terms. General scheme of the biotechnological process. 2. Overview of microorganisms used in industrial microbiology. Nutrition, growth and reproduction of cells. Environmental conditions. Primary and secondary metabolism. 3. Engineering aspects of biotechnological processes, with special reference to fermentation processes. 4. Beer technology. 5. Wine technology. 6. Alcohol technology. 7. Yeast production technology. 8. Production of commercial enzymes. Knowledge test. 9. Production of vinegar. 10. Production of fermented food. 11. Production of chemicals, biopolymers and bioenergetics. 12. Probiotics and starter cultures. 13. Production technology of antibiotics, vitamins and hormones. 14. "New biotechnology": genomics, proteomics. Enzyme and protein engineering. Biochips and nanotechnology. 15. Biotechnology and economics. Biotechnological procedures in environmental protection. Knowledge test. 					

	Final test.			
	Mid-term tests are taken after the 8th week and the 15th week. Semester verification is required after the 15th week.			
Obligatory reading				
Author	Title, publisher	Year	Pages	
Tratnik Lj., Božančić R.	Mlijeko i mliječni proizvodi, Hrvatska mljekarska udruga, Zagreb.	2012		
Rede R., Petrović Lj.	Tehnologija mesa i nauka o mesu, Tehnološki fakultet, Novi Sad.	1997		
Carić M., Milanović S., Vucelja D.	Standardne metode analize mleka i mlečnih proizvoda, Prometej, Novi Sad.	2000		
Radovanović V.	Tehnologija vina, Građevinska knjiga, Beograd.	1986		
Jazić Lj., Ružić N.	Praktikum za tehnologiju vina (analiza vina), Tehnološki fakultet, Novi Sad.	1982		
Leskošek Č. I.	Tehnologija piva, I deo, Slad i nesladovane sirovine, Poljoprivredni fakultet, Beograd.	2002		
Marić V.	Biotehnologija i sirovine, Stručna i poslovna knjiga, Zagreb.	2000		
Strohl W. R.	Biotechnology of antibiotics, Marcel Dekker, Inc. New York.	1997		
Matošić S., Šušković J.	Proizvodnja enzima i enzimsko inženjerstvo, Interna skripta Prehrambeno-tehnološki fakultet, Zagreb.	1999		
Siezen R. J., Kok J., Abee T., Schaafsma G.	Lactic acid bacteria: genetic, metabolism and applications, Kluwer Academic Publishers, Dordrecht.	2002		
Additional reading				
Author	Title, publisher	Year	Pages	
Obligations, assessment methods and grading system	Type of student evaluation		Grade points	Percentage
	Pre-exam obligations			
		Attendance	6	6 %
		Mid-term test I	17	17 %
		Mid-term test II	17	17 %
		Seminar paper	15	15 %
		Laboratory exercises	15	15 %
	Final examination			
	Final examination (oral)	30	30 %	
Total		100	100 %	
Web page	www.tfzv.ues.rs.ba			
Date	2023			