	UNIVERSITY OF EAST SARAJEVO Faculty of Technology Zvornik	
	Study programme: *Chemical Engineering and Technology*	
	Cycle I / Year IV	

Course title	BIOFUEL TECHNOLOGY
Department	Department for Chemical Technologies– Faculty of Technology Zvornik

Course code	**Course status**	**Semester**	**ECTS**
04-2-067-8	Elective	VIII	4

Teacher	Zoran Petrović, PhD, Assoc. Prof.
Teaching assistant	Zoran Petrović, PhD, Assoc. Prof.

Number of classes/ teaching workload (per week)			**Individual student workload (in hours per semester)**			**Student workload coefficient S_o**
Lectures	**Auditory exercises**	**Laboratory exercises**	**Lectures**	**Auditory exercises**	**Laboratory exercises**	**S_o**
2	0	2	30	0	30	1.00
2*15+0*15+2*15=60 hours			(2*15*1+0*15*1+2+15*1)=60 hours			
Total course workload 60 + 60 = 60 hours per semester						

Learning outcomes	After finishing the course, students will be able to: 1. demonstrate and utilize theoretical knowledge about biofuel production technology, types, and quality in accordance with national and EU standards. 2. demonstrate and utilize knowledge about ecological and economic advantages of biofuels compared to conventional fuels. 3. calculate the material and energy balance. 4. demonstrate and utilize knowledge of parameters for biofuel production in laboratory conditions. 5. demonstrate and utilize the ability to work independently or in a team to solve problems related to the production, characterization and application of biofuels
Prerequisites	
Teaching methods	Lectures, experimental exercises, industrial visits, seminar paper
Syllabus outline per week	1. Biofuels (development of biofuels and reasons for application). EU standards and regulations. 2. Biomass. Chemical composition and characteristics of biomass. Classification of biomass. 3. Biomass as an energy source. Biomass processing. 4. Biomass. Combustion technology. Gasification. Pyrolysis. 5. Biomass. Pyrolysis. 6. Classification of biofuels. First generation biofuels from sugar, starch, vegetable oils or animal fats (vegetable oils, biodiesel, bioethanol, biogas, biobutanol). Second generation biofuels from agricultural and forest waste (biomethanol, biohydrogen, bio-DME, HTU diesel, alcohol mixtures). Third generation biofuels from algae (biohydrogen). 7. Biodiesel. The principle of transesterification. Raw materials for biodiesel production. 8. Biodiesel. Application of biodiesel and impact on the engine. 9. Bioethanol. General facts about bioethanol. Application of bioethanol as biofuel. Raw materials for production. 10. Bioethanol. Technological procedures of production from renewable raw materials. Alcoholic fermentation. 11. Biogas. Characteristics and composition. Raw materials for biogas production. 12. Biogas. Application. Equipment for biogas plants. Biogas as fuel. 13. Biobutanol. Bioethanol from lignocellulosic mass. Biomethanol. Mixtures of alcohol. 14. Biohydrogen. Production of biohydrogen and its application for driving motor vehicles. Hydrogen fuel cells. 15. Advantages and disadvantages of biofuels (biogas, bioethanol and biodiesel).

Obligatory reading

Author	**Title, publisher**	**Year**	**Pages**
Mićić, V., Petrović, Z., Dugić, P.	Biomasa i biogas kao alternativno gorivo, Tehnološki fakultet Zvornik	2015	1-130
Mićić, V.,Aleksić, V., Damjanović, V.	Mogućnosti proizvodnje bioetanola kao alternativnog goriva, Tehnološki fakultet Zvornik	2013	1-157

Additional reading			
Author	**Title, publisher**	**Year**	**Pages**
Letcher, M.T.	Future energy: Improved, Sustainable and clean options for our planet, Elsevier Ltd., Amsterdam	1991	

	Type of student evaluation	**Grade points**	**Percentage**
Obligations, assessment methods and grading system	Pre-exam obligations		
	Attendance	6	6 %
	Mid-term test (colloquium) 1	20	20 %
	Mid-term test (colloquium) 2	20	20 %
	Laboratory exercises	14	14 %
	Seminar paper	10	10 %
	Final examination		
	Final examination (oral)	30	30 %
	Total	100	100 %
Web page	www.tfzv.ues.rs.ba		
Date	2023		