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

Course title	POLYMER MATERIALS - RECYCLING TECHNOLOGY
Department	Department for Chemical Technologies – Faculty of Technology Zvornik

Course code	**Course status**	**Semester**	**ECTS**
04-2-064-8	Elective	VIII	4

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

Number of hours/ 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 the knowledge about polymers (production, characteristics, application), sources and types of polymer waste, impact on human health and the environment. 2. demonstrate and utilize the knowledge about the possibilities of organized management of polymeric waste (collection, identification and characterization, safe disposal), as well as about the legislative regulation about the same, and about the possible economic and ecological effects of the same. 3. demonstrate and utilize the knowledge about the technologies of recycling polymer waste generated in the production and application of some polymer materials (PE, PP, PS, PET, PVC, RET), as well as the application of thermal treatment for the disposal of polymer waste. 4. demonstrate and utilize the ability to work independently and in a team in the processes of polymer waste recycling.
Prerequisites	
Teaching methods	Lectures, experimental exercises, industrial visits, seminar paper.
Syllabus outline per week	1. Types and characteristics of polymers and polymer materials. Application of polymer materials. 2. Polymeric waste generated in production (primary) and application (secondary). Principles of waste management. 3. Principles of degradation of polymeric materials. Characterization of polymer waste and impact on human health and the environment. 4. Legal regulation in the field of polymer waste management. Ecological and economic aspects. 5. Collection, transport and storage of polymeric waste materials. 6. Basic procedures of recycling polymeric waste materials (mechanical, chemical, and incineration for energy purposes). 7. Using polymer waste for energy purposes. 8. Technological procedures of recycling of waste polymer materials by pyrolysis. 9. Technology of recycling polyolefin waste materials (PE, PP). 10. Polystyrene and polyvinyl chloride (PS, PVC) recycling technology. 11. Polyethylene terephthalate (PET) recycling technology (hydrolysis, methanolysis, aminolysis, glycolytic depolymerization). 12. Pulp, paper and textile recycling technology. 13. Technological procedures for recycling rubber and rubber products. 14. Technology of glycolysis of polyurethane materials. 15. Composites based on waste polymer materials.

Obligatory reading

Author	**Title, publisher**	**Year**	**Pages**
Janović, P.	Polimerizacija i polimeri, Kemija u industriji, Zagreb	2005	
Jovanović, S. Jeremić, K.	Karakterisanje polimera, Tehnološko-metalurški fakultet Beograd	2007	

Simić, S.	Tehnologije reciklaže otpada, Mašinski fakultet Univerziteta u Istočnm Sarajevo	2010	
Brandruup, J., Bittner, M., Michaell, W., Menges, G	Recycling and Recovery of Plastics. Hanser, Munich	1996	

Additional reading			
Author	**Title, publisher**	**Year**	**Pages**
Ptiček Sirotić, A.	Recikliranje i zbrinjavanje otpada, interna skripta, Fakultet kemijskog inženjerstva i tehnologije, Zagreb	2012	

	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	24	24 %
	Laboratory exercises	10	10 %
	Seminar paper	10	10 %
	Final examination		
	Final examination (oral)	30	30 %
	Total	100	100 %
Web page	www.tfzv.ues.rs.ba		
Date	2023		