

		UNIVERSITY OF EAST SARAJEVO Faculty of Technology Zvornik					
		Study program: <i>Chemical Engineering and Technology</i>					
		I study cycle		IV year			
Course name		WATER TECHNOLOGY					
Department		Department for Environmental Protection – Faculty of Technology Zvornik					
Course code		Course status		Semester		ECTS	
04-1-038-7		obligatory		7		3	
Professor/s		Slavko Smiljanić, PhD, Associate Professor					
Assistant/s		Jelena Vuković, MSc, Senior Teaching Assistant					
Class fund / teaching load (weekly)			Individual student workload (in hours per semester)			Coefficient of student Workload, So	
Lectures	Auditory exercises	Laboratory exercises	Lectures	Auditory exercises	Laboratory exercises	So	
2	0	1	15	15	0	1,00	
Total teaching load (in hours, per semester) $2*15 + 1*15 + 0*15 = 45$ h			Total student workload (in hours, per semester) $2*15*1.00 + 1*15*1.00 + 0*15*1.0 = 45$				
Total course load (teaching + students): $45 + 45 = 90$ hours per semester							
Learning outcomes		After finishing the course, students will be able to: <ol style="list-style-type: none"> 1. demonstrate and utilize basic knowledge about water quality and treatment processes. 2. understand forms of water. 3. understand basic processes in water. 4. understand and analyse the basic procedures and mechanisms/processes of water treatment. 5. suggest the necessary treatment procedures depending on the composition of water. 					
Conditioning							
Teaching methods		Lectures, auditory practice, seminar paper					
Syllabus outline per week		<ol style="list-style-type: none"> 1. General facts about water. Sources, types, condition and importance of water. Basic properties of water. Water quality parameters. Classification and categorization of watercourses. Basic pollutants in water and their properties. Basic types and properties of waste water. 2. Basic physical-chemical and biochemical processes in water. Basic processes, operations, lines and systems for water treatment. Basics of water preparation for drinking, industry and energy sector. 3. Basics of wastewater treatment. Preliminary (previous) treatment. Primary treatment. Secondary treatment. Tertiary treatment. 4. Mechanical processing techniques: Grids and sieves. Micro strainers. Crushers. Sand traps. Grease and oil separators. 5. Sedimentation in water treatment. Basics of sedimentation. Types of precipitators. 6. Filtration in water treatment. Basics of filtration. Types of water filters. 7. Coagulation and flocculation. Coagulants and flocculants. 8. Chemical precipitation. Oxidation. Aeration. Adsorption and sorption. 9. Softening. Decarbonization. Demineralization. Ion exchange processes. 10. Deferrization and demanganization. Degassing. 11. Basics of biological treatment. Aerobic biological processes of water treatment. 12. Basics of biological treatment. Anaerobic biological processes of water treatment. 13. Nutrient removal from wastewater. Nitrogen removal processes. Phosphorus removal processes. 14. Disinfection. Reagents and no-reagent processes of disinfection. Disinfectants. 15. Sludge treatment in wastewater treatment processes. Dewatering. Conditioning. Stabilization. 					
Obligatory literature							
Author/s		Publication name, Publisher			Year		Pages
Spellman, F.R.		Handbook of Water and Wastewater Treatment Plant Operations, Lewis Publishers			2003		1-653
Gray, N.F.		Water Technology, Elsevier Science & Technology Books			2005		1-645

Povrenović, D., Knežević, M.	Osnove tehnologije prečišćavanja otpadnih voda, Univerzitet u Beogradu, Tehnološko-metalurški fakultet	2013	1-501	
Ljubisavljević D., Đukić A., Babić, B.	Prečišćavanje otpadnih voda, Univerzitet u Beogradu, Građevinski fakultet Beograd	2004	1-251	
Đuković, J., Đukić, B., Lazić, D., Marsenić, M.	Tehnologija vode, Tehnološki fakultet Zvornik	2000	1-278	
Đukić, B., Gligorić, M., Smiljanić, S.	Priprema vode za industriju i energetiku, Tehnološki fakultet Zvornik	2011	1-403	
Liu, D.H.F., Liptak, B.G.	Environmental Engineering's Handbook, CRC, Press LLC, Second Edition	1999	1-1454	
Howe, K.J., Hand, D.W., Crittenden, J.C., Trussell, R.R., Tchobanoglous, G.	Principles of Water Treatment, John Wiley & Sons.	2012	139-584	
Additional literature				
Author/s	Publication name, Publisher	Year	Pages	
Weiner, E.R.	Applications of environmental chemistry: a practical guide for environmental professionals, Lewis Publishers, CRC Press, LLC.	2010	1-288	
Cheremisnoff, N.P.	Handbook of water and wastewater treatment technologies, Butterworth Heinemann.	2002	1-651	
C.C. Lee, Dar Lin, S.	Handbook of environmental engineering calculations, McGraw-Hill	2007	1449-1709	
Baruth, E.E.	Water Treatment Plant Design, 4 th Edition, McGraw-Hill,	2005	1-971	
Obligations, assessment methods and grading system	Type of evaluation of the student		Grade points	Percentage
	Pre-exam obligations			
	Attendance		6	6 %
	Seminar paper		14	14 %
	Mid-term test (Colloquium) 1		25	25 %
	Mid-term test (Colloquium) 2		25	25 %
	Final exam			
	Final exam (oral)		30	30 %
TOTAL			100 %	
			0	
Web page	www.tfzv.ues.rs.ba			
Date	2023			