
	UNIVERSITY OF EAST SARAJEVO Faculty of Technology Zvornik					
	<i>Study programme: Chemical Engineering and Technology</i>					
	Cycle I	Year IV				
Course title	FERTILIZER TECHNOLOGY					
Department	Department for Chemical Technology – Faculty of Technology Zvornik					
Course code	Course status	Semester	ECTS			
04-2-046-7	Elective	VII	5			
Teacher	Dr Dragana Kešelj, Associate Professor					
Teaching assistant	Dr Dragana Kešelj, Associate Professor					
Number of classes/ 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
2	0	2	45	0	45	1.5
$2 \cdot 15 + 0 \cdot 15 + 2 \cdot 15 = 60$ hours			$2 \cdot 15 \cdot 1,5 + 0 \cdot 15 \cdot 1,5 + 2 \cdot 15 \cdot 1,5 = 90$ hours			
Total course workload 60 + 90=150 hours per semester						
Learning outcomes	<p>After finishing the course, students will:</p> <ol style="list-style-type: none"> 1. be able to demonstrate basic knowledge of fertilizer technologies 2. have the ability to calculate the material and energy balances of artificial fertilizer technology 3. be able to demonstrate skills in controlling and managing optimal parameters of given technological processes 4. master the process simulation in laboratory conditions. 					
Prerequisites						
Teaching methods	Lectures, auditory and laboratory exercises, mid-term tests (colloquia).					
Syllabus outline per week	<ol style="list-style-type: none"> 1. History and distribution of fertilizers; 2. Basic operations and procedures in the production of artificial fertilizers; 3. Raw materials in the production of artificial fertilizers (ammonia, carbon dioxide, nitric acid, phosphoric acid, sulphuric acid, phosphorite, apatite, etc.); 4. Simple nitrogen fertilizers (ammonium sulphate, ammonium nitrate, calcium cyanamide); Material and energy balance; 5. Urea (urea); Technological procedure for obtaining urea; Material and energy balance; 6. Simple nitrogen fertilizers (Calcium nitrate, Ammonium chloride, Sodium nitrate); Material and energy balance; 7. Ammonium sulphonitrate; Phosphorous fertilizers; Natural phosphorus fertilizers (guano, bone meal, phosphorite); 8. Artificial phosphorus fertilizers - ordinary (simple) superphosphate; 9. Artificial phosphorus fertilizers - triple superphosphate; 10. Artificial phosphorus fertilizers - enriched superphosphate; 11. Potassium fertilizers; Production of KAN; 12. Production of liquid fertilizers and fertilizers with microelements; 13. Complex fertilizers; Complex fertilizers; Ammonium phosphate; Nitro ammonium phosphate; 14. Production of nitro-phos by nitrous-sulphuric acid process; Fertilizer antagonism; 15. Environmental protection in the production of artificial fertilizers. <p>Mid-term tests are taken after the 8th week and the 15th week. Semester verification is required after the 15th week.</p>					
Obligatory reading						
Author	Title, publisher	Year	Pages			
Kostić-Gvozdrenović LJ., Ninković R.	Neorganska hemijska tehnologija, Univerzitet u Beogradu, Tehnološko-metalurški fakultet	1997	241-385			

Lazić, D, Penavin-Škundrić J., Vasiljević, L.J.	Materijalni i energetski bilans baza i soli, Univerzitet u Istočnom Sarajevu, Tehnološki fakultet Zvornik	2007	208-344	
Isaković, M.	Tehnologija mineralnih đubriva, skripta, Visoka tehnološka škola strukovnih studija u Šapcu	2009	1-40	
Đokić, D., Knežić, L.	Praktikum iz neorganske hemijske tehnologije, Veštačka đubriva, Univerzitet u Beogradu, Tehnološko-metalurški fakultet	1972	1-63	
Ninković R., Knežić, L., Kostić-Gvozdrenović L.J., Blagojević, N., Božović, B., Pavićević, V.	Neorganska hemijska tehnologija praktikum, Univerzitet u Beogradu, Tehnološko-metalurški fakultet	1986	1-179	
Additional reading				
Author	Title, publisher	Year	Pages	
Ninković R., Todorović, M., Miladinović, J., Radovanović, D.	Teorijski osnovi neorganske hemijske tehnologije, Univerzitet u Beogradu, Tehnološko-metalurški fakultet	2003	1-401	
Ivić, S.	Anorganska kemijska tehnologija, Univerzitet u Sarajevu	1968	1-718	
Obligations, assessment methods and grading system	Type of student evaluation		Points	Percentage
	Pre-exam obligations			
	Attendance		6	6 %
	Laboratory exercises		10	10%
	Mid-term test (Colloquium) 1		27	27%
	Mid-term test (Colloquium) 2		27	27%
	Final examination			
	Final examination (oral)		30	30 %
Total		100	100 %	
Web page	www.tfzv.ues.rs.ba			
Date	2023			