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

Course title	Mechanical Process Engineering
Department	Department for Process Engineering– Faculty of Technology Zvornik

Course code	**Course status**	**Semester**	**ECTS**
04-1-026-5	Compulsory	V	7

Teacher	Radislav Filipović, PhD, full professor
Teaching assistant	Duško Kostić, MSc, senior teaching assistant

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**
3	1	2	60	20	40	1.33
3*15+1*15+2*15=90 hours			(3*15*1.33+1*15*1.33+2+15*1.33)=120 hours			
Total course workload 90 + 120=210 hours per semester						

Learning outcomes	After finishing the course, students will be able to: 1. demonstrate and utilize the knowledge of the phenomena and laws of the process of momentum transfer in fluids 2. define the properties of the dispersed phase and methods of display and particle size distribution 3. analyze mechanical separation processes and perform independent calculation of basic separation processes 4. analyze the mixing of homogeneous and heterogeneous systems 5. analyze the energetic and kinetic aspect of the grinding operation 6. demonstrate and utilize experimental skills required for work and analysis of mechanical operations.
Prerequisites	Mass and Energy Transfer Phenomena, Engineering Thermodynamics, Material and Energy Balances, Physical Chemistry 1
Teaching methods	Lectures, auditory and laboratory exercises, mid-term tests (colloquia).
Syllabus outline per week	**Lectures** 1. Introduction to chemical engineering: concept, history, description and content. What is a Chemical Engineer? Process chemical engineering. 2. Fluid mechanics (fluid properties, statics, Pascal's law, description of flow, types of fluids) Fluid dynamics (flow, continuity equation, Bernoulli's equation, local flow velocity measurement, measurement of average velocity, universal velocity distribution) 3. Fluid mechanics (hydraulic radius and equivalent diameter, losses due to longitudinal friction, local resistances and inertial resistances, hydraulic characteristics of pipelines, heterogeneous systems fluid-particle) 4. Transport of fluids. Transport of liquid fluids. Transportation of gaseous fluids. 5. Basic hydrodynamic operations (classification, separation and thickening) 6. Systematics and analysis of previously covered material 7. Filtration 8. Centrifugation 9. Separation of particles from gases 10. Mixing 11. Grinding 12. Sifting. Transport of solids. 13. Agglomeration 14. Flotation 15. **Systematics and analysis of previously covered material** **II Practical exercises** **III Laboratory exercises** 1.-6. Fluid mechanics* **7. Laboratory mid-term test I**

	8. Granulometry 9. Filtration 10. Sedimentation 11. Mixing 12. **Laboratory mid-term test II** 13. Visit to the factory I 14. Visit to the factory II 15. Systematization of materials. Attendance verification. Laboratory colloquiums I and II (repeat appointment) *In the period from the 1st to the 6th week, students are required to complete 6 of the 11 exercises listed: 1. Determination of the flow regime (Osborne-Reynold's Demonstration) 2. Bernoulli's Theorem Demonstration 3. Energy losses in pipes 4. Loss of energy in bends 5. Free-flow flow measurement 6. Flow measurement using a venturi tube 7. Flow measurement using a throttle plate 8. Simulation of flows in an open channel 9. Examination of the characteristics of series and parallel connected pumps 10. Characteristics of a centrifugal pump 11. Demonstration of cavitation 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
Grbavčić, Ž., Kaluđerović Radoičić, T.	Mehaničko procesno inženjerstvo, Tehnološko-metalurški fakultet, Beograd	2016	1-236
McCabe, W.K., Smith, J.C., Harriot, P.	Unit Operations of Chemical Engineering, McGraw-Hill, New York	2005	1-293, 967-1079
Cvijović, S.D., Bošković Vragolović, N., Pjanović, R.	Mehaničke operacije-Zadaci sa izvodima iz Teorije	2007	1-113
Vuličević, D.	Tehnološke operacije-dijagrami, nomogrami i tabele, Tehnološko-metalurški fakultet, Beograd	1997	

Additional reading

Author	Title, publisher	Year	Pages
Hraste, M	Mehaničko procesno inženjerstvo, HINUS, Zagreb	2003	11-170

	Type of student evaluation	Grade points	Percentage
Obligations, assessment methods and grading system	Pre-exam obligations		
	Attendance	6	6 %
	Mid-term test I	25	25 %
	Mid-term test II	25	25 %
	Seminar paper	14	14 %
	Final examination		
	Final examination (oral)	30	30 %
	Total	100	100 %
Web page	www.tfzv.ues.rs.ba		
Date	2023		