CYCLE I	YEAR III

Course title	**OPERATIONS IN FOOD ENGINEERING**
Department	**Department of Process Engineering**

Course code	Status	Semester	ECTS
04-1-098-5	Compulsory	V	3

Teacher	Vladan Mićić, PhD, full professor
Teaching Assistant	Duško Kostić, MSc, assistant

Class fund/ teaching load (weekly)			Individual student workload (in semester hours)			Student load factor
Lectures	Auditory exercises	Laboratory exercises	Lectures	Auditory exercises	Laboratory exercises	S_o
3	1	2	60	20	40	1.33

total teaching load (in hours, per semester) 3*15 + 1*15 +2*15 = 90	total student workload (in hours, per semester) 3*15*1.33 + 1*15*1.33 + 2*15*1.33 = 120

| Total course load (teaching + student): 45+ 45 = 90 semester hours | |

Learning outcomes	After finishing the course, students will be able to: 1. demonstrate and utilize the knowledge of the phenomena and laws of transfer of the amount of movement in fluids 2. analyze mechanical separation processes, mixing of homogeneous and heterogeneous systems 3. analyze the energetic and kinetic aspects of the shredding and sieving operation 4. demonstrate and utilize the knowledge of the phenomena and laws of heat and mass transfer 5. understand how various parameters affect the degree of separation and efficiency of various thermal and diffusion operations 6. demonstrate and utilize the skills needed to solve engineering problems related to the design and operation of thermal and diffusion operations.
Prerequisites	Phenomena of Mass and Energy Transfer, Engineering Thermodynamics, Material and Energy Balances, Physical Chemistry 1
Teaching methods	Lectures, auditory exercises, laboratory exercises, exercises in factories
Syllabus outline per week	**I Lectures** **1**. Introduction, Chemical Engineering, Food Engineering 2. Fluid mechanics 3. Fluid transport. Hydrodynamic operations 4. Filtration. Centrifugation. 5. Shredding. Sifting. Mixing 6. Systematics and analysis of previously covered material 7. Heat exchange 8. Heat exchangers. Solution and dissolution 9. Evaporation. Crystallization 10. Drying 11. Distillation and rectification 12. Absorption. Adsorption 13. Extraction 14. Membrane operations 15. Systematics and analysis of previously covered material **II Practical exercises** **III Laboratory exercises** 1. Osborne-Reynold's Demonstration 2. Bernoulli's Theorem Demonstration 3. Energy losses in pipes 4. Granulometry 5. Filtration 6. Mixing **7. Laboratory colloquium I**

	8. Distillation 9. Absorption 10. Adsorption 11. Liquid-liquid extraction 12. Solid-liquid extraction 13. Laboratory colloquium II 14. Factory visit 15. Systematization of materials. Attendance verification. **Laboratory colloquium I and II**

Mandatory literature

Author	Title of publication, publisher	Year	Pages (from-to)
Grbavčić, Ž., Kaluđerović-Radoičić, T.	Mehaničke operacije, Tehnološko-metalurški fakultet, Beograd	2016	1-236
Đorđević, B., Šerbanović, S., Tasić, A., Živković, E., Kijevčanin, M., Valent, V.	Toplotne operacije, Tehnološko-metalurški fakultet, Beograd	2013	1-63; 99-122; 125-177; 321-342
Ahmetović , E.	Toplinske operacije u procesnom inženjerstvu, Tehnološki fakultet, Tuzla	2010.	103-214
Sovilj , M.	Difuzione operacije, Tehnološki fakultet, Novi Sad	2004	1-320

Supplementary literature

Author	Title of publication, publisher	Year	Pages (from-to)
McCabe, W.K., Smith, J.C., Harriot, P.	Unit Operations of Chemical Engineering, McGraw-Hill, New York	2005.	299-928

Obligations, assessment methods and grading system	**Type of student work evaluation**	**Grade points**	**Percentage**
	Pre-exam obligations		
	Attendance at lectures/exercises	6	6 %
	Laboratory exercises	10	10%
	Mid-term test/Colloquium 1	27	27%
	Mid-term test/Colloquium 2	27	27%
	Final exam		
	Final exam	30	30%
	TOTAL	100	100 %
Date of certification	2023		