Biotechnical Faculty / FOOD SAFETY / TECHNOLOGY OF BY PRODUCTS AND AGRIC. WASTEWATHER

Course:	TECHNOLOGY OF BY PRODUCTS AND AGRIC. WASTEWATHER			
Course ID	**Course status**	**Semester**	**ECTS credits**	**Lessons** (Lessons+Exercises+Laboratory)
13412	Optional	3	5	2+2+0
Programs	FOOD SAFETY			
Prerequisites	There is no conditioning to other subjects.			
Aims	The aim of the course is to provide theoretical and practical knowledge about the modern processes of using by-products and purifying agricultural waste water.			
Learning outcomes	1. Explain the basic characteristics of different types of water and the procedures for preparing water for many purposes. 2. Understands the importance and role of ensuring the required quality of water and wastewater, as well as controlling their quality. 3. Knowledge of quality assurance methods (monitoring, preparation and purification processes).			
Lecturer / Teaching assistant	Biljana Damjanović-Vratnica Full Prof.; Milena Tadić Assoc. Prof.			
Methodology	Lectures, exercises, seminar work, office hours.			
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	Introduction. Agriculture and environmental protection.			
I week exercises	Introduction – material and energy balances.			
II week lectures	Animal origin by-products			
II week exercises	Calculation exercises - energy balances			
III week lectures	Biomass as a source of energy.			
III week exercises	Field exercises - company visit			
IV week lectures	Biowaste - anaerobic processing techniques			
IV week exercises	Field exercises - company visit			
V week lectures	Biowaste - aerobic processing techniques.			
V week exercises	Presentation of the seminar work.			
VI week lectures	Production of ethyl alcohol from agricultural by-products.			
VI week exercises	Presentation of the seminar work.			
VII week lectures	Specific processing of agricultural by-products.			
VII week exercises	Presentation of the seminar work.			
VIII week lectures	Characteristics of agricultural wastewater. Origin and dynamics of wastewater generation.			
VIII week exercises	Development of a conceptual solution for the purification of agricultural waste water.			
IX week lectures	Objectives and aspects of agricultural wastewater treatment (legal framework, ecological aspect, techno-economic aspect.			
IX week exercises	Development of a conceptual solution for the purification of agricultural waste water.			
X week lectures	Processes and systems for the purification of agricultural wastewater.			
X week exercises	Development of a conceptual solution for the purification of agricultural waste water.			
XI week lectures	Mechanical processes of purification of agricultural wastewater.			
XI week exercises	Presentation of the seminar work.			
XII week lectures	Chemical processes of agricultural wastewater treatment.			
XII week exercises	Presentation of the seminar work.			
XIII week lectures	Biological processes of agricultural wastewater treatment.			
XIII week exercises	Exercises - visit companies			
XIV week lectures	Wastewater monitoring. Legal regulations for the field of wastewater.			

XIV week exercises	Midterm exam.
XV week lectures	Makeup midterm exam.
XV week exercises	Exercises - visit companies
Student workload	Weekly: 5 ECTS x 40/30 hour = 6 h 40 min The total load for the semester = 106 h 40 min

Per week	**Per semester**
5 credits x 40/30=6 hours and 40 minuts 2 sat(a) theoretical classes 0 sat(a) practical classes 2 excercises **2 hour(s) i 40 minuts** of independent work, including consultations	Classes and final exam: **6 hour(s) i 40 minuts x 16 =106 hour(s) i 40 minuts** Necessary preparation before the beginning of the semester (administration, registration, certification): **6 hour(s) i 40 minuts x 2 =13 hour(s) i 20 minuts** Total workload for the subject: **5 x 30=150 hour(s)** Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) **30 hour(s) i 0 minuts** Workload structure: **106 hour(s) i 40 minuts (cources), 13 hour(s) i 20 minuts (preparation), 30 hour(s) i 0 minuts (additional work)**
Student obligations	Students are required to attend lectures, exercises, present a seminar paper, do midterm exams and final exam.
Consultations	12:00 - 13:00, Friday
Literature	1. Ed. L.K. Wang, Y. Hung, H. Lo, C. Yapijakis, Waste Treatment in the Food Processing Industry, CRC Press, 2005. 2. Ed. A.G.H. Lea, J.R. Piggott, Fermented Beverage Production, Kluwer Academic, 2003. 3. N. P. Cheremisinoff, Handbook of Water and Wastewater Treatment Technologies, Elsevier, Butterworth – Heinemann, 2002. 4. S. Gaćeša i M. Klašnja, 1994: Tehnologija vode i otpadnih voda, Beograd. 5. D. Ljubisavljević, et all, 2004: Prečišćavanje otpadnih voda, Građevinski fakultet Univerziteta u Beogradu, Beograd. 6. N. P. Cheremisinoff, Handbook of Chemical Processing Equipment, Elsevier, Butterworth – Heinemann, 2000.
Examination methods	- Activity during exercise , submitted reports: (0 - 15 points), - Seminar paper: (0 - 15 points), - Midterm exam: (0 - 20 points), - Final exam: (0 - 50 points), A passing grade is obtained if at least 50 points are accumulated cumulatively.
Special remarks	/
Comment	/

Grade:	F	E	D	C	B	A
Number of points	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points