VELEUČILIŠTE U KARLOVCU
Karlovac University of Applied Sciences

COURSE SYLLABUS

General information

Course title:	**UTILIZATION OF FOOD INDUSTRY BYPRODUCTS**
ISVU course code:	266821
Course instructor:	
Course assistant:	
Study programme and specialization in which the course is taught:	Undergraduate Professional Study of Food Technology
ECTS credits:	4.0
Semester of the course execution:	V.
Exam prerequisites:	None
Course objectives:	To provide students with a comprehensive understanding of technologies and strategies for utilizing by-products specific to various segments of the food industry. Enable them to recognize the potential and propose ways to utilize specific by-products of the food industry, taking into account legal frameworks, ethical, and environmental aspects. Foster awareness of the economic, environmental, and social aspects of by-product utilization and the application of innovative approaches to waste reduction and sustainable practices in the food industry.

Course structure

Teaching mode	**Number of contact hours per semester:**	**Student's requirements per teaching mode**
Lectures:	30	Completed with at least 80% attendance
Exercises (auditory, linguistics):		
Exercises (laboratory, practical):	30	Completed with at least 80% attendance
Field work:		
Other:		
TOTAL:	60	

Monitoring of students' work and knowledge evaluation during the course

OUTCOMES		**Written exam**	**Oral exam**	**Practical work**	**Total**	**Pass**	**Time frame for the recognition of the outcome**
Outcome 1	Identify and classify by-products specific to various segments of the food industry.	10%	2%	2%	14%	7%	End of the first examination period
Outcome 2	Interpret and apply legal regulations concerning the utilization of by-products in the food industry.	15%	2%	2%	19%	9,5%	End of the first examination period
Outcome 3	Describe technologies and processes for	10%	2%	2%	14%	7%	End of the first examination period

	utilizing by-products in different sectors of the food industry.						
Outcome 4	Propose technological procedures for effectively utilizing by-products in specific contexts of food technology.	10%	4%	5%	19%	9,5%	End of the first examination period
Outcome 5	Apply technologies for utilizing by-products of the food industry and their conversion into renewable sources of energy.	15%	2%	2%	19%	9,5%	End of the first examination period
Outcome 6	Describe innovative approaches, new technologies, and sustainable practices in the utilization of by-products in the food industry.	10%	3%	2%	15%	7,5%	End of the first examination period
Total % grade points		70%	15%	15%	100%	50%	
Share in ECTS		2,8	0,6	0,6	4		

Knowledge evaluation on exams

Exam prerequisites					
OUTCOMES		**Written exam**	**Oral exam**	**Total**	**Pass**
Outcome 1	Identify and classify by-products specific to various segments of the food industry.	10%	5%	15%	7,5%
Outcome 2	Interpret and apply legal regulations concerning the utilization of by-products in the food industry.	15%	5%	20%	10%
Outcome 3	Describe technologies and processes for utilizing by-products in different sectors of the food industry.	10%	5%	15%	7,5%
Outcome 4	Propose technological procedures for effectively utilizing by-products in specific contexts of food technology.	10%	5%	20%	10%
Outcome 5	Apply technologies for utilizing by-products of the food industry and	15%	5%	15%	7,5%

	their conversion into renewable sources of energy.				
Outcome 6	Describe innovative approaches, new technologies, and sustainable practices in the utilization of by-products in the food industry.	10%	5%	15%	7,5%
Total % of grade points		70%	30%	100%	50%
Share in ECTS		2,8	1,2	4	

Review of units per week with associated learning outcomes

Week	Lecture course content and learning outcomes:	Outcome	Exercises course content and learning outcomes:	Outcome
1.	Introduction to the Utilization of By-Products in the Food Industry	O1	Introduction, Safety Measures, and General Guidelines	O1, O2
2.	Legal Framework for By-Product Utilization	O1, 12	Physicochemical Analysis of Fruit Processing By-Products	O1
3.	Ethical and Environmental Aspects of By-Product Utilization and Promotion of Sustainable Practices	O2, O6	Selected Methods for Utilizing of Fruit Processing By-Products	O3, O4, O5
4.	Utilization of By-Products in Fruit and Vegetable Technology	O3, O4	Physicochemical Analysis of Vegetable Processing By-Products	O1
5.	Utilization of By-Products in Grain Processing	O3, O4	Selected Methods for Utilizing Vegetable Processing By-Products	O3, O4, O5
6.	Utilization of By-Products in the Confectionery Industry	O3, O4	Physicochemical Analysis of Grain Technology By-Products	O1
7.	Utilization of By-Products in Oil and Fat Technology	O3, O4	Selected Methods for Utilizing Grain Technology By-Products	O3, O4, O5
8.	Utilization of By-Products in Milk and Dairy Product Technology	O3, O4	Physicochemical Analysis of By-Products from Oil and Fat Technology	O1
9.	Utilization of By-Products in Wine Technology	O3, O4	Selected Methods for Utilizing By-Products in Oil and Fat Technology in Wine Technology	O3, O4, O5
10.	Utilization of By-Products in Beer Technology	O3, O4	Physicochemical Analysis of Dairy Technology By-Products	O1
11.	Utilization of By-Products in Spirits Technology	O3, O4	Selected Methods for Utilizing Dairy Technology By-Products	O3, O4, O5
12.	Utilization of By-Products of Animal Origin	O3, O4	Physicochemical Analysis of Beer Technology By-Products	O1
13.	Biogas Production from Food Technology By-Products in	O5, O6	Selected Methods for Utilizing Beer Technology By-Products	O3, O4, O5
14.	Biofuel Production from Food Technology By-Products	O5, O6	Physicochemical Analysis of Wine Technology By-Products	O1
15.	Innovations in Utilization of Food Technology By-Products	O6	Selected Methods for Utilizing Wine Technology By-Products	O3, O4, O5

References (compulsory / additional)

Compulsory literature: (Selected Chapters)	
1. Šubarić, D. (Ed.). (2017). Neke mogućnosti iskorištenja nusproizvoda prehrambene industrije. Prehrambeno-tehnološki fakultet., ISBN: 978-953-7005-51-1 2. Neke mogućnosti iskorištenja nusproizvoda prehrambene industrije - Knjiga 2. / Šubarić, Drago ; Babić, Jurislav (ur.), Osijek: Prehrambeno tehnološki fakultet Sveučilišta Josipa Jurja Strossmayera u Osijeku, 2019, ISBN: 978-953-7005-64-1	

3. Neke mogućnosti iskorištenja nusproizvoda prehrambene industrije - Knjiga 3. / Šubarić, Drago ; Miličević, Borislav (ur.) Osijek: Prehrambeno tehnološki fakultet Sveučilišta Josipa Jurja Strossmayera u Osijeku ; Velečilište u Požegi, 2021., ISBN: 978-953-7005-74-0
4. Neke mogućnosti iskorištenja nusproizvoda prehrambene industrije – knjiga 4. / Šubarić, Drago ; Jozinović, Antun ; Panjičko, Mario (ur.), Osijek: Prehrambeno tehnološki fakultet Sveučilišta Josipa Jurja Strossmayera u Osijeku, 2022, ISBN: 978-953-7005-81-8
5. Sustainable Food Processing Brijesh K. Tiwari (Editor), Tomas Norton (Editor), Nicholas M. Holden (Editor) ISBN: 978-0-470-67223-5 600 pages December 2013, Wiley-Blackwell
6. Zandona, E., Blažić, M., & Režek Jambrak, A. (2021). Whey utilization: Sustainable uses and environmental approach. Food Technology and Biotechnology, 59(2), 147-161. https://doi.org/10.17113/ftb.59.02.21.6968