SYLLABUS

REGARDING THE QUALIFICATION CYCLE FROM 2024/2025 TO 2027/2028

ACADEMIC YEAR 2026/2027

1. BASIC COURSE/MODULE INFORMATION

Course/Module title	**Technology of production of fermented milk beverages**
Course/Module code *	
Faculty (name of the unit offering the field of study)	Faculty of Technology and Life Sciences
Name of the unit running the course	Faculty of Technology and Life Sciences Institute of Food Technology and Nutrition Department of Dairy Technology
Field of study	Food Technology and Human Nutrition
Qualification level	1st
Profile	General academic
Study mode	Full-time
Year and semester of studies	III year, 6 semester
Course type	Specialized/Fermentation processes in food production
Language of instruction	English/Polish
Coordinator	dr hab. inż. Agata Znamirowska-Piotrowska, prof. UR
Course instructor	dr hab. inż. Agata Znamirowska-Piotrowska, prof. UR, dr inż. Katarzyna Szajnar, dr inż. Małgorzata Pawlos, dr inż. Magdalena Buniowska-Olejnik

* - as agreed at the faculty

1.1.Learning format – number of hours and ECTS credits

Semester (no.)	Lectures	Classes	Laboratories	Seminars	Practical classes	Internships	others	**ECTS credits**
6	10		20					2

1.2. Course delivery methods

☒ conducted in a traditional way

☐ involving distance education methods and techniques

1.3. Course/Module assessment (exam, pass with a grade, pass without a grade)

Pass with grade

2. PREREQUISITES

Animal raw material production, chemistry, food biochemistry, food microbiology, general food technology and preservation

3. OBJECTIVES, LEARNING OUTCOMES, COURSE CONTENT, AND INSTRUCTIONAL METHODS

3.1. Course/Module objectives

O1	To familiarize students with production technologies of fermented milk beverages.
O2	To develop proper attitudes regarding hygiene in food production.

3.2. COURSE/MODULE LEARNING OUTCOMES

Learning Outcome	The description of the learning outcome defined for the course/module	Relation to the degree programme outcomes
LO_01	Has advanced knowledge of the production technologies of selected fermented milk beverages, including the selection of appropriate machines and equipment	K_W11
LO_02	Is able to critically analyse and identify ethical aspects of the impact of technologies used in the production of fermented milk beverages on the natural environment and the health of humans and animals	K_U07
LO_03	Is able to solve practical engineering tasks and select appropriate methods of processing, packaging, and storage of fermented milk beverages in accordance with applicable regulations	K_U09
LO_04	Is prepared to uphold and respect the heritage and traditions of the profession of food technologist and nutrition specialist, with particular emphasis on traditions related to the production of fermented milk beverages	K_K05

3.3. Course content

A. Lectures

Content outline
Historical background. Classification and nomenclature of fermented milk beverages.
Raw materials and additives used in the production of fermented milk beverages.
Starter cultures and fermentation processes.
Principles of fat and dry matter standardization.
Defects of fermented milk beverages.

B. Laboratories

Content outline
Yogurt and probiotic fermented milk production technology.
Kefir and premium kefir production technology.
Sour milk production technology.
Buttermilk production technology.
Felisowka production technology
Skyr production technology.
Lactorol production technology.
Milk champagne production technology.
Whey champagne production technology.

3.4. Methods of Instruction

Lecture: a lecture supported by a multimedia presentation
Laboratories: experimental work, practical classes

4. Assessment techniques and criteria

4.1 Methods of evaluating learning outcomes

Learning outcome	Methods of assessment of learning outcomes (e.g. test, oral exam, written exam, project, report, observation during classes)	Learning format (lectures, classes,...)
LO_01	TEST	LECTURES
LO_02	OBSERVATION DURING CLASSES	LABORATORIES
LO_03	OBSERVATION DURING CLASSES, REPORT, TEST	LABORATORIES
LO_04	CONTINUOUS OBSERVATION	LABORATORIES

4.2 Course assessment criteria

Achieving all intended learning outcomes is a prerequisite for passing the course. Lecture: test. Laboratories: Graded credit based on the following components: preparation of reports, execution of laboratory experiments, presentation of results, and passing the test. The final grade is determined based on the average of partial assessments. Grading scale: grade 5.0: 90-100 % correct answers, grade 4.5: 80-89 %, grade 4: 70-79 %, grade 3.5: 61 – 69 %, grade 3: 51 – 60 %.

5. Total student workload needed to achieve the intended learning outcomes – number of hours and ECTS credits

Activity	Number of hours
Course hours	30/1,0
Other contact hours involving the teacher (consultation hours, examinations)	10/0,33

Non-contact hours - student's own work (preparation for classes or examinations, projects, etc.)	20/0,67
Total number of hours	60
Total number of ECTS credits	2

* One ECTS point corresponds to 25-30 hours of total student workload

6. Internships related to the course/module

Number of hours	-
Internship regulations and procedures	-

7. Instructional materials

Compulsory literature:

1. Ziajka S. (red). Mleczarstwo, Wyd. UMW, Olsztyn 2008.
2. Pijanowski E. Zarys chemii i technologii mleczarstwa. T1,2,3. PWRiL, Warszawa.
3. Pieczonka W., Znamirowska A. Przetwórstwo mleka. Rzeszów 2001.
4. Dzwolak W., Ziajka S., Chmura S., Baranowska M. Produkcja mlecznych napojów fermentowanych. Biblioteczka Majstra Mleczarskiego. Wyd. Oficyna wydawnicza „Hoża", Warszawa 2000.
5. Zander L., Zander Z. Mleczarstwo. Technika i technologia. Wyd. Tetra Pak Sp. z o.o., Warszawa 2013.
5. Przewodnik do ćwiczeń dostępny na MS Teams

Complementary literature:

Przegląd mleczarski, Przemysł Spożywczy and

1. Pawlos M., Znamirowska A. , Szajnar K., Kalicka D. The influence of the dose of calcium bisglycinate on physicochemical properties, sensory analysis and texture profile of kefirs during 21 days of cold storage. Acta Sci. Pol. Technol. Aliment. 15(1) 2016, 37–45.
2. Szajnar K., Znamirowska A., Kalicka D., Zaguła G. 2017. Fortification of yoghurts with calcium compounds. J. Elem., 22(3): 869 - 879.
3. Znamirowska A., Rożek P., Buniowska M., Kalicka D.: Dynamika fermentacji serwatki niskolaktozowej przez *Saccharomyces bayanus* (BAYANUS G995) oraz jakość napojów serwatkowych. Żywność. Nauka. Technologia. Jakość. 2017, 3(112), 109-120
4. Znamirowska A., Rożek P., Kalicka D., Buniowska M., Pawlos M.: Zastosowanie drożdży winiarskich w produkcji napojów serwatkowych naturalnie nasyconych CO2. Zeszyty Problemowe Postępów Nauk Rolniczych (ZPPNR) 590, 2017, 83–92.
5. Szajnar K., Znamirowska A., Kalicka D., Kuźniar P., Najgebauer-Lejko D. 2018. Quality of yoghurts fortified magnesium lactate. Acta Sci. Pol. Technol. Aliment. 17(3) 2018, 247-255.
6. Szajnar K., ZnamirowskaA., KalickaD. Effects of various magnesium salts for the production of milk fermented by *Bifidobacterium animalis* ssp. *lactis* Bb-12. International Journal of Food Properties, 2019, 22, 1, 1087–1099.
7. Znamirowska A., Szajnar K., Pawlos M. Organic magnesium salts fortification in fermented goat's milk. International Journal of Food Properties, 2019, 22, 01, 1615–1625,

8. Znamirowska A., Buniowska M., Szajnar K. Zastosowanie koncentratu i izolatu białek serwatkowych w produkcji mleka fermentowanego przez *Bifidobacterium animalis* ssp. *lactis* BB-l2. ŻYWNOŚĆ. Nauka. Technologia. Jakość, 2019, 26, 4 (121), 77 – 88.
9. Znamirowska A., Szajnar K., Pawlos M. Effect of Vitamin C Source on Its Stability during Storage and the Properties of Milk Fermented by *Lactobacillus rhamnosus*. Molecules 2021, 26, 6187.
10. Szajnar K., Pawlos M., Znamirowska A. The Effect of the Addition of Chokeberry Fiber on the Quality of Sheep's Milk Fermented by *Lactobacillus rhamnosus* and *Lactobacillus acidophilus*. International Journal of Food Science, 2021, 7928745, 1-9.
11. Pawlos M., Szajnar K., Kowalczyk M., Znamirowska-Piotrowska A. Probiotic Milk Enriched with Protein Isolates: Physicochemical, Organoleptic, and Microbiological Properties. Foods 2024, 13, 3160.

Approved by the Head of the Department or an authorised person