SYLLABUS

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

Academic year 2026/2027

1. BASIC COURSE/MODULE INFORMATION

Course/Module title	**Carbohydrate raw materials**
Course/Module code *	
Faculty (name of the unit offering the field of study)	Faculty of Technology and Natural Sciences
Name of the unit running the course	Faculty of Technology and Natural Sciences Institute of Food Technology and Nutrition Department of Food Technology and Human Nutrition
Field of study	Food technology and human nutrition
Qualification level	first degree
Profile	general academic
Study mode	stationary
Year and semester of studies	year III, semester 5
Course type	speciality / Fermentation processes in food production
Language of instruction	English
Coordinator	EngD Karolina Pycia
Course instructor	EngD Karolina Pycia

* - as agreed at the faculty

1.1.Learning format – number of hours and ECTS credits

Semester (no.)	Lectures	Classes	Colloquia	Lab classes	Seminars	Practical classes	Internships	others	**ECTS credits**
5	15			30					3

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)

Lecture - exam, laboratory classes – pass with a grade

2.PREREQUISITES

Subjects: Chemistry, Food biochemistry, Food analysis, Production of vegetable raw materials General technology and food preservation, Assessment of the quality of raw materials and plant products, Refrigeration and food storage.

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

3.1. Course/Module objectives

O1	To acquaint students with the characteristics of the main carbohydrate raw materials used in fermentation industries
O2	Presentation of basic technologies for obtaining and processing carbohydrate raw materials used especially in the fermentation industry
O3	Organizing knowledge on the use of carbohydrate raw materials in the fermentation industry

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	Knows and characterizes to an advanced degree basic carbohydrate raw materials and technological processes along with the selection of machines and devices within which they are processed	K_W10, K_W11
LO_02	Knows and understands the sugar industry technology and starch technology along with the methods of starch processing and the production of modified starches. Characterizes the by-products of the carbohydrate industry. He knows hydrocolloids, cyclodextrins and sweeteners.	K_W11
LO_03	Can examine the quality of raw materials and products of the carbohydrate industry and connect the quality of the raw material with the quality of the product	K_U07
LO_04	Can recognize and analyze unit processes in the technologies of processing carbohydrate raw materials used in the fermentation industry	K_U09
LO_05	Is ready to take action in the profession of food technologist in the field of fermentation technology	K_K05

3.3 Course content

A. Lectures

Content outline
Characteristics of the carbohydrate industry.
Characteristics of potatoes and their technological usefulness.
Structure and physicochemical properties of starch of various botanical origin.
Characteristics of starch from potato and other plant materials.
Processing of starch in the direction of obtaining starch modifications and hydrolysates.
Sugar industry. Characteristics of sugar beet as a raw material in the carbohydrate industry.
Sugar production process. Side products.
Characteristics of cereal grains. Grain mill
Natural and synthetic sweeteners
Polysaccharide hydrocolloids and their role in the food industry. Structure and properties of cyclodextrins

B. Laboratory classes

Content outline
Isolation of starch from potato and evaluation of selected physicochemical properties of starch.
Cereal starches - analysis of physicochemical and rheological properties
Modified starch - obtaining laboratory preparations
Analysis of rheological properties of natural and modified starch
Maltodesctrins as products of enzymatic starch hydrolysis
Sucrose inversion reaction, production of artificial honey in laboratory conditions
Sugar and its types
Molasses - a by-product of the sugar industry
Acidic and enzymatic hydrolysis of starch

3.4 Methods of Instruction

Lecture: lecture with multimedia presentation.
Laboratory classes: laboratory work, group work, problem solving, discussion, report.

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	WRITTEN EXAM, COLLOQUIUM	LECTURE, CLASSES
LO-02	WRITTEN EXAM, TEST, REPORT, OBSERVATION DURING CLASSES	LECTURE, CLASSES

LO-03	COLLOQUIUM, REPORT, OBSERVATION DURING CLASSES	CLASSES
LO-04	COLLOQUIUM, REPORT, OBSERVATION DURING CLASSES	CLASSES
LO-05	OBSERVATION DURING CLASSES	CLASSES

4.2 Course assessment criteria

Lecture: exam in the form of a test Laboratory classes: Knowledge: grades from three tests Skills - completion of reports on all exercises; Social competences - evaluation of group work Establishing a final grade on the basis of the average of the partial grades. The condition for passing the lecture and exercises is achieving all the assumed learning outcomes in the field of knowledge, skills and social competences. The number of points obtained is decisive for the positive evaluation of the lecture and exercises (> 50% of the maximum number of points, the average of the marks): E 51% -62%, D 63% -75%, C 76% -86%, B 87 % -95%, A 96% -100%

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

Activity	Number of hours
Scheduled course contact hours	15+30/1,5
Other contact hours involving the teacher (consultation hours, examinations)	consultation: 3/0,1 EXAM: 2/0,07
Non-contact hours - student's own work (preparation for classes or examinations, projects, etc.)	Preparation for classes: 15/0,5 PREPARATION FOR EXAM: 25/0,83
Total number of hours	90
Total number of ECTS credits	3

* 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. Nickel S. Sugar industry. WSiP, Warsaw 1983. 2. Pałasiński M. Technology of carbohydrate processing. Ed. PTTŻ-O / Małopolski, Krakow 1999.

Complementary literature:

1. Becket S. Industrial chocolate manufacturing and use. Wiley 2008.
2. Lisińska G. et al. Exercises in carbohydrate processing technology. Ed. AR in Wrocław 2002.
3. Lisińska G., Leszczyński W. Potato Science and Technology. W. Appl. Science Publishers London, New York 1989.
4. Lusas E.W., Rooney L.W. Snack Food Processing, CRC Press, Boca Raton, London, New York, Washington 2001.
5. Pycia K., Juszczak L., Gałkowska D., Witczak M. Physicochemical properties of starches obtained from Polish potato cultivars. Starch / Stärke, 2012, 64, 105-114.
6. Pycia K. Chemically modified starches and their application in the food industry. Bakery, 2013, 3, 46-48.
7. Pycia K., Juszczak L., Gałkowska D., Witczak M., Jaworska G. Maltodextrins from chemically modified starches. Selected physicochemical properties. Carbohydrate Polymers, 2016, 146, 301-309.
8. Pycia K., Juszczak L. (2021). The Influence of the Addition of Nuts on the Thermal and Rheological Properties of Wheat Flour. Molecules, 26, 3969.
9. Warner K., White P.J. Frying technology and practices. Grupa M.K., AOCS, Press Champaign, Illinois 2004.
10. Witczak T., Stępień A., Pycia K., Witczak M., Bednarz A., Grzesik M. Effect of chemical modification of starch and the degree of hydrolysis on water vapor sorption isotherms of hydrolysates. Food. Science. Technology. Quality, 2017, 24, 1 (110), 78-88.

Approved by the Head of the Department or an authorised person