



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Advanced methods of processing biomaterials [S2|ChiP1-IBiB>ZTPB]

### Course

Field of study	Year/Semester
Chemical and Process Engineering	1/2
Area of study (specialization)	Profile of study
Bioprocesses and Biomaterials Engineering	general academic
Level of study	Course offered in
second-cycle	Polish
Form of study	Requirements
full-time	compulsory

### Number of hours

Lecture	Laboratory classes	Other
15	0	0
Tutorials	Projects/seminars	
0	0	

### Number of credit points

1,00

### Coordinators

dr inż. Kinga Rajewska  
kinga.rajewska@put.poznan.pl

### Lecturers

### Prerequisites

The student starting the course: has basic knowledge of physics, chemistry, chemical engineering, and the construction of process apparatus, acquired during the 1st degree classes, enabling understanding and interpretation of phenomena and processes occurring during the discussed processing operations; is able to acquire and supplement information from academic textbooks and other books; has the ability to self-study; understands the need for continuous training and setting ambitious goals on the way to higher education.

### Course objective

The aim of the course is to present the general characteristics of biological materials of plant origin and basic and advanced methods of their processing, with particular emphasis on modern and sustainable technologies.

### Course-related learning outcomes

Knowledge:

1. has knowledge of complex chemical processes, including the appropriate selection of materials, raw materials, apparatus and devices for the implementation of chemical processes and the characterization

of the obtained products (k\_w04).

2. has a well-established and expanded knowledge of the selected specialization (k\_w12).

Skills:

1. has the ability to acquire and critically evaluate information from literature, databases and other sources, and to formulate opinions and reports on this basis (k\_u01).

2. can use English phrases and terms used in the subject literature (k\_u03)

3. can independently determine the directions of further education and pursue self-education (k\_u05).

Social competences:

1. understands the need for lifelong learning; is able to inspire and organize the learning process of other people; is aware of the importance and non-technical aspects and effects of engineering activities, including its impact on the environment, and the related responsibility for decisions (k\_k01)

2. is aware of the importance and understands the non-technical aspects and effects of engineering activities, including its impact on the environment and the related responsibility for decisions (k\_k02).

## Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:

The grade for the lectures is determined on the basis of the final test result, consisting of at least 40 questions of various types (single / multiple choice, supplement, calculation, marking on a drawing / diagram, simple accounting task, etc.), assessed according to the scale: 51 % -60% (3.0), 61% -70% (3.5); 71% -80% (4.0), 81% -90% (4.5), 91% -100% (5.0). The test will be carried out stationary or remotely via the Ekursy platform.

Program content

The lecture covers the following topics: general characteristics of biological materials of plant origin, their composition and structure; the occurrence and role of moisture (water) in biological materials; influence of water activity on the durability and quality of biological materials; basic and advanced techniques of processing raw materials of plant origin, including methods: thermal and non-thermal, high-pressure, pulsed electric field, electromagnetic radiation; the concept of "minimal processing" and "sustainable production"; biomass - production and processing

## Programme content

Issues relating to biological materials of plant origin and basic and advanced methods of their processing.

## Course topics

The lecture covers the following topics: general characteristics of biological materials of plant origin, their composition and structure; the occurrence and role of moisture (water) in biological materials; influence of water activity on the durability and quality of biological materials; basic and advanced techniques of processing raw materials of plant origin, including methods: thermal and non-thermal, high-pressure, pulsed electric field, electromagnetic radiation; the concept of "minimal processing" and "sustainable production"; biomass - production and processing

## Teaching methods

Multimedia presentation supported by examples presented on the board.

## Bibliography

Basic

1. Ogólna Technologia Żywności. Pijanowski E., Dłużewski M., Dłużewska A., Jarczyk A., WNT, 1996, Warszawa.

2. Technologia produktów owocowych i warzywnych. Jarczyk A. i Płocharski W., WSE-H, 2010, Skierniewice.

3. Nowoczesne technologie pozyskiwania i energetycznego wykorzystania biomasy. Bocian P., Golec T., Rakowski J., Inst. Energetyki, 2010, Warszawa.

Additional

1. Emerging technologies for food processing (wyd. 2-gie). Da-Wen S. (ed.), Elsevier Ltd., 2014, Londyn

2. Technologie rynkowe przetwarzania biomasy lignocelulozowej do biopaliw stałych, ciekłych i gazowych. Gołaszewski J. et al., UWM, 2020, Olsztyn.

3. Inżynieria procesowa i aparatura przemysłu spożywczego. Lewicki P.P., Lenart A., Kowalczyk R., Pałacha Z., Wydawnictwo Naukowe PWN, 2017, Warszawa.

### Breakdown of average student's workload

	Hours	ECTS
Total workload	25	1,00
Classes requiring direct contact with the teacher	15	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	10	0,50