A COURSE SYLLABUS – DOCTORAL SCHOOL

REGARDING THE QUALIFICATION CYCLE FROM 2021 TO 2025.

GENERAL INFORMATION ABOUT COURSE	
Course title	Food engineering development trends
Name of the unit running the course	Doctoral School at the University of Rzeszow
Type of course *(obligatory, optional)*	optional
Year and semester of studies	III/V
Discipline	Food technology and nutrition
Language of Course	Polish
Name of Course coordinator	Grzegorz Zaguła
Name of Course lecturer	Grzegorz Zaguła
Prerequisites	Basic knowledge of manufacturing process engineering

BRIEF DESCRIPTION OF COURSE
(100-200 words)

The subject covers the trends in the development of modern techniques for the production and processing of food, along with the protection of food from the effects of storage. Modern production techniques concerning both the processing of raw materials into semi-finished products and products, and functional enrichment of finished products. Innovations in the field of techniques fortifying and modeling the functional arrangement of food products. Enrichment of food matrices with new and modified ingredients to create a product with functional and convenience food potential. Innovative techniques from the field of food preservation including new generation pasteurization techniques. Application of fixation techniques with the use of microwave energy, ultrasonic energy, as well as high temperature and high pressure. The use of modern packaging from the range including doped with nanoparticles.

COURSE LEARNING OUTCOMES AND METHODS OF EVALUATING LEARNING OUTCOMES

Learning outcome	The description of the learning outcome defined for the course	Relation to the degree programme outcomes (symbol)	Learning Format (Lectures, classes,...)	Method of assessment of learning outcomes (e.g. test, oral exam, written exam, project,...)
Knowledge (no.)	**(Knows and understands)**			
1	To the extent that the revision of existing paradigms - a worldwide body of work, including theoretical basis and general issues and selected specific issues appropriate to a given scientific discipline	P8S_WG/1	L, C	colloquium
2	The main development trends of the scientific disciplines in which the training takes place.	P8S_WG/2	L, C	colloquium
3	Scientific research methodology	P8S_WG/3	L, C	colloquium
Skills (no.)	**(Able to)**			
1	Use knowledge from different fields of science orfield of art to creatively identify and	P8S_UW/1	C	Colloquium, discussion

	innovatively solve complex problems or perform tasks of a research nature, and in particular. in particular: - define the purpose and object of scientific research, formulate a research hypothesis, - develop methods, techniques research tools and creatively apply them, - make conclusions based on scientific research.			
2	Critically analyze and evaluate the results of scientific research, expert activities and other works of a creative nature and their contribution to the development of knowledge	P8S_UW/2	C	Colloquium, discussion
3	Communicate on topics specialized topics to a degree Be able to actively participate in the international environment scientific	P8S_UK/1	C	discussion
4	Disseminate the results of scientific activities, including in popular forms	P8S_UK/2	C	discussion
5	Initiate debate	P8S_UK/3	C	discussion
6	Participate in scientific discourse	P8S_UK/4	C	discussion
7	Speak a foreign language at B2 level of the European System of Language Education System to a degree ability to participate in an international scientific and professional environment	P8S_UK/5	C	Discussion in English
Social competence (no.)	(Ready to)			
1	Critical evaluation of achievements within a particular scientific discipline	P8S_KK/1	C	discussion
2	Recognize the importance of knowledge in solving problems cognitive and practical	P8S_KK/3	C	discussion
3	Initiate activities in the public interest	P8S_KO/2	C	discussion

LEARNING FORMAT – NUMBER OF HOURS

Semester (no.)	Lectures	Seminars	Lab classes	Internships	others	ECTS
V	5	10				0

METHODS OF INSTRUCTION

Lecture - multimedia presentation and discussion

Classes - case analysis with discussion

COURSE CONTENT

Lectures:
1. modern techniques of functional food production
2. fortification and specialty foods
3. innovative food preservation techniques

Classes:
1. fortified foods
2. innovative food product vs. dietary supplement
3. techniques of innovative food preservation
4. technologies of modern food admixture
5. methods of modern food preservation
6. smart packaging

COURSE ASSESSMENT CRITERIA

Lecture - credit based on attendance and activity based on the scheme:- pass (pass) - > 80% attendance and > 60% activity through discussion; fail (fail) - < 80% attendance and < 60% activity through discussion Classes - credit on the basis of the final colloquium according to the scheme:very good (5.0) - passing the colloquium with >90% of the points; good plus (4.5) 85-90%; good (4.0) 80-85%; sufficient plus (3.5) 70-80%; sufficient (3.0) 60-70%; insufficient (2.0) <60%.

TOTAL PhD STUDENT WORKLOAD REQUIRED TO ACHIEVE THE INTENDED LEARNING OUTCOMES – NUMBER OF HOURS AND ECTS CREDITS

Activity	Number of hours
Scheduled course contact hours	15
Other contact hours involving the teacher (consultation hours, examinations)	5
Non-contact hours – student`s own work (preparation for classes or examinations, project, etc.)	25
Total number of hours	45
Total number of ECTS credits	0

INSTRUCTIONAL MATERIALS

Compulsory literature:

1. Inżynieria produkcji żywności : zagadnienia wybrane / redakcja naukowa Dorota Klensporf-Pawlik, Wojciech Zmudziński ; [autorzy: Anna Dankowska, Iwona Jasińska Kuligowska, Dorota Klensporf-Pawlik, Inga Klimczak, Urszula Samotyja, Maria Sielicka-Różyńska, Wojciech Zmudziński] ; Uniwersytet Ekonomiczny w Poznaniu Autorzy : Dankowska, Anna Jadwiga Jasińska-Kuligowska, Iwona Klimczak, Inga Samotyja, Urszula Sielicka, Maria Uniwersytet Ekonomiczny (Poznań) Współtwórcy : Klensporf-Pawlik, Dorota. Redaktor Autor Zmudziński, Wojciech. Redaktor Autor Uniwersytet Ekonomiczny (Poznań). Wydawnictwo. Wydawca Temat : Produkcja żywności Żywność - badanie Żywność – technologia Rok wydania : 2020 Wydawca : Poznań : Wydawnictwo Uniwersytetu Ekonomicznego
2. Inżynieria procesowa i aparatura przemysłu spożywczego / pod redakcją Piotra P. Lewickiego ; [autorzy: Piotr P. Lewicki, Andrzej Lenart, Roman Kowalczyk,

	Zbigniew Pałacha] Autorzy : Lewicki, Piotr P. (1937-2011) Lenart, Andrzej (1949-) Kowalczyk, Roman (technologia żywności) Pałacha, Zbigniew Współtwórcy : Wydawnictwo Naukowe PWN. Wydawca Temat : Żywność Technologia żywności Inżynieria i technika Rolnictwo i leśnictwo Rok wydania : 2017 Wydawca : Warszawa : Wydawnictwo Naukowe PWN
Complementary literature:	1. Biotechnologia żywności : praca zbiorowa / pod redakcją Włodzimierza Bednarskiego, Arnolda Repsa ; autorzy: Marek Adamczak, Andrzej Babuchowski, Włodzimierz Bednarski, Lucjan Jędrychowski, Jadwiga Kowalewska-Piontas, Jacek Leman, Arnold Reps, Anna Sałek, Tomasz Twardowski, Wiesław Wzorek Autorzy : Adamczak, Marek Babuchowski, Andrzej (biotechnologia) Jędrychowski, Lucjan Kowalewska-Piontas, Jadwiga Leman, Jacek Sałek, Anna Teresa Twardowski, Tomasz (1949-) Wzorek, Wiesław Współtwórcy : Bednarski, Włodzimierz (1943-). Redaktor Autor Reps, Arnold. Redaktor Autor Wydawnictwo Naukowe PWN. Wydawca Temat : Biotechnologia Technologia żywności Biologia Chemia Inżynieria i technika Rolnictwo i leśnictwoRok wydania : 2017 Wydawca : Warszawa : Wydawnictwo Naukowe PWN 2. Czasopisma branżowe min.: Przemysł Spożywczy, Portal Spożywczy, Technologia Żywności Jakość Nauka.