UNIWERSYTET
PRZYRODNICZY
WE WROCŁAWIU

Program studiów

Kierunek: Food Technology

Spis treści

Charakterystyka kierunku

Informacje podstawowe

Nazwa kierunku:	Food Technology
Poziom:	studia drugiego stopnia (magister inżynier)
Profil:	ogólnoakademicki
Forma:	Stacjonarne
Tytuł zawodowy nadawany absolwentom:	magister inżynier
Czas trwania studiów (liczba semestrów):	3
Liczba punktów ECTS konieczna do ukończenia studiów na danym poziomie:	102
Liczba godzin (w tym realizowanych z wykorzystaniem metod i technik kształcenia na odległość):	1362
Liczba godzin z wychowania fizycznego[*]:	0

[*]) - dotyczy studiów pierwszego stopnia i jednolitych studiów magisterskich realizowanych w formie stacjonarnej

Przyporządkowanie kierunku do dziedzin oraz dyscyplin, do których odnoszą się efekty uczenia się:

Dyscyplina wiodąca	Udział procentowy	ECTS
Technologia żywności i żywienia	100%	102

Sylwetka absolwenta

Studia II stopnia kierunku Food technology są studiami wspólnymi realizowanymi we współpracy z Miguel Hernández University z Elche (Hiszpania)

Absolwent studiów II stopnia kierunku Food technology ma pogłębioną wiedzę i umiejętności z zakresu: innowacyjnych metod produkcji żywności, a także analizy surowców i produktów żywnościowych, systemów zarządzania jakością i bezpieczeństwem żywności, procesów biotechnologicznych w produkcji żywności, wytwarzania żywności o cechach funkcjonalnych, innowacyjnych technik pakowania żywności. Jest przygotowany do projektowania i prowadzeni eksperymentów badawczych z wykorzystaniem nowoczesnych metod analitycznych, technik, technologii, i narzędzi matematycznych. Potrafi zinterpretować oraz opracować uzyskane wyniki doświadczalne.

Absolwent kierunku Human nutrition jest przygotowany do podjęcia pracy na różnych stanowiskach, w tym kierowniczych w: zakładach przemysłu spożywczego i fermentacyjnego, zakładach żywienia zbiorowego i gastronomii, stacjach sanitarno-epidemiologicznych, laboratoriach i placówkach badawczych. Może również podjąć naukę w szkole doktorskiej lub na studiach podyplomowych.

Wymiar (liczba godz. i punktów ECTS), zasady i forma odbywania praktyk

Program studiów nie obejmuje praktyk zawodowych.

Zasady/organizacja procesu dyplomowania

Pracę magisterską student wykonuje pod opieką dwóch opiekunów naukowych posiadających stopień co najmniej doktora – nauczycieli akademickich z Uniwersytetu Przyrodniczego we Wrocławiu (UPWr) oraz Miguel Hernández University z Elche (MHU).
Temat pracy magisterskiej powinien być ustalony najpóźniej rok przed końcem studiów. Po zaliczeniu wszystkich przedmiotów realizowanych w ostatnim semestrze studiów, w wyłączeniem przedmiotu Final master project, student wprowadza pracę magisterską do systemu APD. Promotor z UPWr sprawdza plik wprowadzonej do systemu pracy i zatwierdza ją lub odrzuca. Jeżeli praca została odrzucona student po uzgodnieniu z promotorem poprawia pracę i wprowadza ponownie do systemu APD.
Zatwierdzona praca magisterska kierowana jest do oceny oryginalności w Jednolitym Systemie Antyplagiatowym, którego

wynikiem są Raporty z badania antyplagiatowego. Na podstawie w.w raportów promotor ocenia czy praca nie zawiera nieuprawnionych zapożyczeń lub czy zawarte w niej prawidłowo oznaczone zapożyczenia (cytaty) nie budzą wątpliwości co do samodzielności pracy dyplomowej przygotowanej przez studenta.

Jeżeli raporty nie budzą zastrzeżeń, opiekun pracy magisterskiej zatwierdza je i przekazuje pracę do recenzji. Jeżeli w pracy zostały przekroczone dopuszczalne współczynniki podobieństwa zostaje wszczynana procedura antyplagiatowa zgodna z obowiązującym Zarządzeniem Rektora.

Oceny pracy magisterskiej dokonuje każdy z opiekuów pracy i jeden recenzent z UPWr lub MHU. Spośród osób oceniających pracę co najmniej jedna musi posiadać tytuł profesora lub stopień naukowy doktora habilitowanego.

Termin egzaminu wyznacza dziekan.

Egzamin magisterski odbywa się przed komisją egzaminacyjną powołaną przez dziekana. W skład komisji wchodzą przewodniczący (dziekan lub prodziekan), opiekunowie i recenzent pracy magisterskiej. Dziekan może rozszerzyć skład komisji o specjalistów z przedmiotów kierunkowych oraz przedstawiciela otoczenia gospodarczego zainteresowanego tematem pracy. Egzamin magisterski jest egzaminem ustnym, który może być przeprowadzony w trybie zdalnym. Student prezentuje przed komisją ogólne założenia i wnioski swojej pracy oraz odpowiada na trzy wylosowane pytania z zakresu przedmiotów realizowanych podczas studiów, spośród zestawu zatwierdzanego przez komisję programową kierunku studiów.

Ostateczny wynik studiów jest obliczany zgodnie z zasadami określonymi w obowiązującym Regulaminie studiów.

ECTS

Liczba punktów ECTS, którą student uzyska na zajęciach wymagających bezpośredniego udziału nauczycieli akademickich lub innych osób prowadzących zajęcia i studentów	54
Liczba punktów ECTS, którą student uzyska w ramach zajęć z dziedziny nauk humanistycznych lub nauk społecznych [**]	10
Liczba punktów ECTS, którą student uzyska za zajęcia wybieralne	39
Liczba punktów ECTS przyporządkowana zajęciom związanym z prowadzoną w uczelni działalnością naukową w dyscyplinie lub dyscyplinach, do których przyporządkowany jest kierunek studiów	77
Liczba punktów ECTS przyporządkowana zajęciom kształtującym umiejętności praktyczne	

[**]) - dotyczy kierunków innych niż przypisane do dyscyplin nauk humanistycznych lub nauk społecznych

Dopuszczalny deficyt punktów ECTS po poszczególnych semestrach

Semestr	Deficyt	Komentarz
1	0	
2	0	
3	0	

Sekwencje przedmiotów

Semestr	Nazwa przedmiotu realizowanego	Nazwa przedmiotu poprzedzającego

Efekty uczenia się

Wiedza

Kod	Treść
NT_P7S_WG01	Absolwent zna i rozumie zagadnienia z zakresu produkcji i technologii żywności umożliwiające zapewnienie doradztwa naukowego i technicznego producentom i konsumentom.
NT_P7S_WG02	Absolwent zna i rozumie osiągnięcia w biotechnologii rolno-spożywczej i wskazuje ich praktyczne zastosowania.
NT_P7S_WG03	Absolwent zna i rozumie główne wskaźniki pogorszenia jakości żywności i wykorzystuje je w celu dostosowania technologii pakowania i utrwalania do strategii marketingowych produktów rolno-spożywczych.
NT_P7S_WG04	Absolwent zna i rozumie rozumie postęp naukowy w produkcji i przygotowaniu żywności, pozwalający na poprawę jej jakości i funkcjonalności.
NT_P7S_WG05	Absolwent rozumie i wdraża postęp naukowy w produkcji żywności oraz wykorzystuje go w projektach badawczo-rozwojowych z zakresu przemysłu spożywczego.
NT_P7S_WK06	Absolwent zna i rozumie narzędzia do wyszukiwania informacji naukowej i prawnej w technologii rolno-spożywczej.
NT_P7S_WK07	Absolwent rozumie informacje na temat ogłaszanych konkursów badawczo-rozwojowych, prawodawstwa w zakresie własności intelektualnej i przemysłowej oraz praw związanych z technologiami rolno-spożywczymi.

Umiejętności

Kod	Treść
NT_P7S_UK07	Absolwent potrafi porozumiewać się ze specjalistami z brażny związanej z produkcją żywności, również w języku obcym na poziomie B2 + Europejskiego Systemu Opisu Kształcenia oraz posługiwania się w stopniu zaawansowanym specjalistyczną terminologią.
NT_P7S_UK08	Absolwent potrafi zaplanować proces ciągłego doskonalenia i uczenia się przez całe życie w dziedzinie rolno-spożywczej.
NT_P7S_UO06	Absolwent potrafi zaplanować i opracować projekty badawcze związane z jakością i bezpieczeństwem żywności w technologii rolno-spożywczej.
NT_P7S_UW01	Absolwent potrafi korzystać z narzędzi do wyszukiwania istotnych i wiarygodnych informacji w celu rozwiązywania problemów, opracowywania strategii i doradztwa dla przemysłu rolno-spożywczego.
NT_P7S_UW02	Absolwent potrafi tworzyć raporty i opracowywać procedury zarządzania jakością i bezpieczeństwem żywności.
NT_P7S_UW03	Absolwent potrafi opracować innowacyjne strategie w zakresie kontroli surowców, wpływające na poprawę jakości wyrobów gotowych.
NT_P7S_UW04	Absolwent potrafi opracować i wykorzystać procedury dodawania do żywności składników o właściwościach funkcjonalnych i odżywczych oraz oceniać ich potencjał rynkowy pod kątem akceptacji konsumentów
NT_P7S_UW05	Absolwent potrafi rozwijać i wykorzystywać narzędzia do oceny produktów ubocznych w przemyśle rolno-spożywczym.

Kompetencje społeczne

Kod	Treść
NT_P7S_KK01	Absolwent jest gotów do krytycznej i samokrytycznej oceny, analizy i decydowania o postępie naukowym w zakresie technologii i jakości rolno-spożywczej.
NT_P7S_KO02	Absolwent jest gotów do wykorzystywania zdobytej wiedzy i formułowania opinii, obejmujących refleksję nad społeczną i etyczną odpowiedzialnością w dziedzinie przemysłu rolno-spożywczego.
NT_P7S_KOR3	Absolwent jest gotów do wykorzystywania potencjału innowacyjności i kreatywności w dziedzinie rolno-spożywczej dla podnoszenia jakości życia społeczeństwa.

Sylabusy

UNIWERSYTET PRZYRODNICZY WE WROCŁAWIU

Diploma seminary
Educational subject description sheet

Basic information

Field of study Food Technology	**Education cycle** 2022/23
Speciality -	**Subject code** WBiNoZNFT-AMS.MI1BO.3648.22
Department The Faculty of Biotechnology and Food Science	**Lecture languages** English
Study level Second-cycle (engineer) programme	**Mandatory** mandatory
Study form Full-time	**Block** major subjects (conducted) in foreign languages
Education profile General academic	**Subject related to scientific research** Yes
	Subject shaping practical skills No

Period Semester 1	**Examination** graded credit **Activities and hours** laboratory classes: 30	**Number of ECTS points** 2.0

Goals

C1	The aim of the course is the analysis and presentation of the actual knowledge and the requirements of the MSc thesis of each student
C2	Control of students progress in master thesis preparation and evaluation of its proceedings.

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge – Student knows and understands:			

W1	Typical technologies used in different food products production	NT_P7S_WK07	observation of student's work, active participation, presentation
W2	Methods for solving problems in food production including the legislation requirements	NT_P7S_WG01, NT_P7S_WG04, NT_P7S_WG05, NT_P7S_WK07	observation of student's work, active participation, presentation
Skills – Student can:			
U1	made the literature research connected with the topic of the master thesis	NT_P7S_UW01, NT_P7S_UW02	observation of student's work, active participation, presentation
U2	Analyze the results of its own rersearch	NT_P7S_UW02, NT_P7S_UW03	observation of student's work, active participation, presentation
U3	Student is able to use specialist nomenclature in a foreign language	NT_P7S_UK07	active participation
Social competences – Student is ready to:			
K1	Criticly analyze the results of its own rersearch	NT_P7S_KK01, NT_P7S_KOR3	observation of student's work, active participation

Study content

No.	Course content	Activities
1.	1. The determination of the reqirements for prezentation preparation and grading of the course 2. The deteremination of the formal reuiremants for the preparation master thesis dissertaion and apropriate bibliography 3-7. Student presentations of the theoretical part of the master thesis 8-12. Student presentations of the practical part and conducted research	laboratory classes

UNIWERSYTET PRZYRODNICZY we WROCŁAWIU

Diploma laboratory
Educational subject description sheet

Basic information

Field of study Food Technology	**Education cycle** 2022/23
Speciality -	**Subject code** WBiNoZNFT-AMS.MI1BO.3649.22
Department The Faculty of Biotechnology and Food Science	**Lecture languages** English
Study level Second-cycle (engineer) programme	**Mandatory** mandatory
Study form Full-time	**Block** major subjects (conducted) in foreign languages
Education profile General academic	**Subject related to scientific research** Yes
	Subject shaping practical skills Yes

Period Semester 1	Examination graded credit Activities and hours laboratory classes: 120	Number of ECTS points 5.0

Goals

C1	The aim of the course is the evaluation of the progress in research made by the student and support in the preparation of the master thesis

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge – Student knows and understands:			
W1	the topics of modern techniques in food processing and analysis, human nutrition and systems of food quality management	NT_P7S_WG03, NT_P7S_WG04, NT_P7S_WK06	observation of student's work

W2	the rules of experoimant planning and their verification methods	NT_P7S_WG02, NT_P7S_WG04	observation of student's work
Skills – Student can:			
U1	plan and conduct research for master thesis preparation	NT_P7S_UO06, NT_P7S_UW01	observation of student's work
U2	use modern analytical methods for the thesis preparation	NT_P7S_UW01	observation of student's work
U3	perform the statistical analysis of obtained results	NT_P7S_UW01	observation of student's work
U4	Student is able to use specialist nomenclature in a foreign language	NT_P7S_UK07	observation of student's work
Social competences – Student is ready to:			
K1	critical analysis of of obtained results in context of the scientific literature	NT_P7S_KK01	observation of student's work
K2	present a repsonsible social and ethical attitude to the conducted reseach	NT_P7S_KO02	observation of student's work

Study content

No.	Course content	Activities
1.	Plan of indywidual project. Research methodology. Evaluation and presentation of research date.	laboratory classes

Entry requirements

finished first cycle of study

Biotechnology of plant products
Educational subject description sheet

Basic information

Field of study Food Technology	**Education cycle** 2022/23
Speciality -	**Subject code** WBiNoZNFT-AMS.MI1BO.3225.22
Department The Faculty of Biotechnology and Food Science	**Lecture languages** English
Study level Second-cycle (engineer) programme	**Mandatory** mandatory
Study form Full-time	**Block** major subjects (conducted) in foreign languages
Education profile General academic	**Subject related to scientific research** Yes
	Subject shaping practical skills No

Period Semester 1	Examination graded credit Activities and hours lecture: 20, laboratory classes: 10	Number of ECTS points 4.0

Goals

C1	The aim of the course is to introduce students to issues related to the biotechnological processes in the production of food of plant origin
C2	Learning about technical and technological solutions used in distilling, brewing, winemaking and baking
C3	Getting to know the fermentation processes of raw materials of plant origin
C4	Getting to know the enzymatic processes used in the biotechnological processing of food ingredients of plant origin

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods

Knowledge – Student knows and understands:			
W1	The student knows and understands the biotechnological processes used in the processing of food of plant origin	NT_P7S_WG04	written credit, test
W2	The student knows and understands the most important processes, procedures, materials and equipment used on a laboratory and industrial scale in biochemical processes	NT_P7S_WG04	observation of student's work, active participation, report, performing tasks
Skills – Student can:			
U1	The student is able to use advanced research techniques and uses laboratory equipment and devices	NT_P7S_UW03	observation of student's work, active participation, performing tasks
U2	The student is able to analyze, synthesize and present information on fermentation processes obtained during research and from literature databases, including intellectual protection procedures.	NT_P7S_UW01	written credit, report, test
U3	The student is able to use professional terminology in a foreign language	NT_P7S_UK07	observation of student's work, active participation
Social competences – Student is ready to:			
K1	The student is ready to propose a practical solution based on the results of his own research or literature data	NT_P7S_KOR3	observation of student's work, active participation, report
K2	The student is ready to interpret and combine the obtained information into a coherent whole	NT_P7S_KK01	written credit, observation of student's work, active participation, test, performing tasks

Study content

No.	Course content	Activities

1.	1. Health value of fermented food of plant origin. Technology of fermented plant raw materials and fermented beverages; Fermented oriental foods (kimchi, miso, tempeh, tofu). 2. Raw materials, bioreactants (wine yeast) and auxiliary materials used in winemaking; Technology of production of white and red wines (stages, technical and technological solutions). 3. Biochemical basis of the alcoholic fermentation process; substrates and products of ethanol fermentation. 4. Distilling - raw materials, auxiliary materials, methods and stages of production; 5. Beer Brewing - microorganisms, raw materials, methods and stages of malt and beer production, technical solutions, basic beer classification; 6. Fermentation processes in baking technology: Characteristics of bakery raw materials in terms of fermentation properties; Diagram of bread production technology; The process of fermentation of wheat dough on yeast; The fermentation process of rye and mixed dough 7. Characteristics of the microflora of baker's leaven; Bakery starter cultures 8. Biotechnological production of biomass. Biopolymers of microbial origin. 9. Biosynthesis of dyes and vitamins. 10. Biosynthesis of organic acids: acetic, citric and lactic acid.	lecture
2.	1. Beer Brewing 2. Lactic acid fermentation	laboratory classes

UNIWERSYTET PRZYRODNICZY we WROCŁAWIU

Forms of intellectual and industrial property
Educational subject description sheet

Basic information

Field of study Food Technology	**Education cycle** 2022/23
Speciality -	**Subject code** WBiNoZNFT-AMS.MI1HS.0739.22
Department The Faculty of Biotechnology and Food Science	**Lecture languages** English
Study level Second-cycle (engineer) programme	**Mandatory** mandatory
Study form Full-time	**Block** humanities and social sciences
Education profile General academic	**Subject related to scientific research** No
	Subject shaping practical skills Yes

Period Semester 1	**Examination** graded credit **Activities and hours** lecture: 15	**Number of ECTS points** 1.0

Goals

C1	To acquaint students with intellectual property law, Make students aware of the value of intellectual property. To acquaint students with legal possibilities to protect intellectual property

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge – Student knows and understands:			
W1	The student knows and understands the concepts and principles in the field of protection of industrial property and copyright and the need to manage intellectual property resources; can use patent resources	NT_P7S_WK06, NT_P7S_WK07	written credit, presentation

	Skills – Student can:		
U1	The student is able to search and creatively use information from various fields of science with proper protection rights, including copyright.	NT_P7S_UW01	written credit, presentation
U2	The student is able to communicate with professionals also in English at the B2 + level of the European Educational Description System and use specific terminology in the field of intellectual property law	NT_P7S_UK07	written credit, presentation
	Social competences – Student is ready to:		
K1	The student is ready to apply the acquired knowledge to obtain protection of his intellectual property and use someone else's intellectual property rights in accordance with the law.	NT_P7S_KO02	written credit, presentation

Study content

No.	Course content	Activities
1.	The concept of intellectual property, general background and sources: legislation 2.-3. Forms of intellectual property under international law 4.-5. Copyright in Polish law: Different categories of protected works, special categories of works, works excluded of protection 5.-6. Entity copyright (ownership), conditions of protection, content of copyright 7.-9. The concept of plagiarism, piracy, permitted personal and public use, criminal and civil law enforcement of copyright 10. Protection of industrial property law. Legislation, conditions of protection, formal requirements, the role of Polish Patent Office 11. Protection of trademarks (national, European and international) 12. Inventions, patents, industrial designs 13.-14. Design patterns, geographical indications of agricultural products and foodstuffs 15. Protection of biotechnological inventions	lecture

UNIWERSYTET PRZYRODNICZY we WROCŁAWIU

Biotechnological advances in food production
Educational subject description sheet

Basic information

Field of study Food Technology	**Education cycle** 2022/23
Speciality -	**Subject code** WBiNoZNFT-AMS.MI2BO.3226.22
Department The Faculty of Biotechnology and Food Science	**Lecture languages** English
Study level Second-cycle (engineer) programme	**Mandatory** mandatory
Study form Full-time	**Block** major subjects (conducted) in foreign languages
Education profile General academic	**Subject related to scientific research** No
	Subject shaping practical skills No

Period Semester 2	**Examination** exam **Activities and hours** lecture: 20, laboratory classes: 10	**Number of ECTS points** 3.0

Goals

C1	This course provides insight into biotechnological techniques for preparing foods and food additives. It highlights advances in biotechnology, as well as the range of possibilities in the field of food production. The course presents production methods of specific food compounds for the preparation of functional foods and diverse applications of biotechnology in the fields of fermented foods of both animal and plant origin.

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge – Student knows and understands:			
W1	biological and enzymatic methods used in various agri-food industries	NT_P7S_WG01, NT_P7S_WG02	written exam

W2	the effects of modification of food components on their functional, technological organoleptic and health properties	NT_P7S_WG04	written exam
W3	the legal basis for the use of enzymes in food production	NT_P7S_WK06	written exam
Skills – Student can:			
U1	conrast and interpret advances in agro-food biotechnology and their practical applications	NT_P7S_UW03	practical training report
U2	select a biocatalyst for specific applications from the range of commercial preparations	NT_P7S_UW04	practical training report
U3	incorporate scientific advances in food production and preparation that enable improving its quality and functionality	NT_P7S_UW04	practical training report
U4	is able to use professional terminology in a foreign language	NT_P7S_UK07	practical training report
Social competences – Student is ready to:			
K1	for innovative approach and creativity in the agro-food field	NT_P7S_KOR3	practical training report

Study content

No.	Course content	Activities
1.	Classical and modern biotechnology in food processing, legal aspects of the use of biocatalysis in food production. Food additives obtention through biotechnological techniques Cellular factories for the production of enzymes and biopreservatives Shaping the functional properties of proteins Bioactive peptides Enzymes in the dairy industry Enzymes in the dairy industry Enzymes in a bakery The use of biocatalysis in brewing Enzymes in juice technology	lecture
2.	Optimization of sucrose hydrolysis with immobilized β-fructofuranosidase	laboratory classes

Entry requirements

microbiology, biochemistry, enzymology

UNIWERSYTET PRZYRODNICZY we WROCŁAWIU

Biotechnology of animal production
Educational subject description sheet

Basic information

Field of study Food Technology	**Education cycle** 2022/23
Speciality -	**Subject code** WBiNoZNFT-AMS.MI2BO.3227.22
Department The Faculty of Biotechnology and Food Science	**Lecture languages** English
Study level Second-cycle (engineer) programme	**Mandatory** mandatory
Study form Full-time	**Block** major subjects (conducted) in foreign languages
Education profile General academic	**Subject related to scientific research** Yes
	Subject shaping practical skills Yes

Period	Examination	Number of
Semester 2	graded credit	**ECTS points** 3.0
	Activities and hours lecture: 20, laboratory classes: 10	

Goals

C1	This course examines biotechnological techniques for preparing foods and food additives from quality raw materials. It delves into scientific advances in biotechnology, highlighting the range of possibilities in the field of food production that has been expanded by applying genetic engineering techniques. In this sense, the course presents production methods of specific additives for the preparation of new foods using biotechnology, and the diverse applications of biotechnology in the fields of fermented foods of both animal and plant origin. In addition, students are afforded knowledge so they become capable of optimizing preparation processes of new foods with biotechnology.

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge – Student knows and understands:			

W1	Understand and incorporate scientific advances in food production and preparation that enable improving its quality and functionality. Understand and apply scientific advances in animal production to be used in R&D of animal production industries. Categorize the main deterioration indices of food and use them to adapt packaging and conservation technology following agro-food marketing strategies. Conrast and interpret advances in agro-food biotechnology and their practical applications.	NT_P7S_WG01, NT_P7S_WG02, NT_P7S_WG04, NT_P7S_WG05, NT_P7S_WK06	written credit

Skills – Student can:

U1	Use tools to search for relevant and reliable information to resolve problems, develop strategies, and advise agro-food industries. Integrate knowledge in food production and technology to provide scientific and technical advice to producers and consumers.	NT_P7S_UW01, NT_P7S_UW05	written credit
U2	Student is able to use specialist nomenclature in a foreign language	NT_P7S_UK07	written credit

Social competences – Student is ready to:

K1	Develop autonomous and lifelong learning in the agro-food field. Apply knowledge acquired and form judgments that include reflection on social and ethical repsonsibilies in the agro-food field. Capacity for innovation and creativity in the agro-food field.	NT_P7S_KO02, NT_P7S_KOR3	written credit

Study content

No.	Course content	Activities
1.	Classical and modern biotechnology in food processing Food additives obtention through biotechnological techniques Cellular factories for the production of enzymes and biopreservatives Practical applications in food processing Biotechnological advances in industries of animal origin (The role of the biotechnologist in industries of animal origin, Bioconservation of foods of animal origin, Pro and symbiotics, Microencapsulation of probiotic microorganisms, Animal cell cultures intended for human consumption, - "In vitro meat", Marine biorefineries, Advances in applied enzymology in the preparation of foods of animal origin, Biotechnological applications in the elaboration process of mimetics foods (analogues)of animal-based food.)	lecture
2.	Technological Innovation in Acquiring and Processing Raw Materials	laboratory classes

Entry requirements

General technology, dairy/meat/egg and poultry technology

Uniwersytet Przyrodniczy we Wrocławiu

Biotic and abiotic contamination of food
Educational subject description sheet

Basic information

Field of study Food Technology	**Education cycle** 2022/23
Speciality -	**Subject code** WBiNoZNFT-AMS.MI2BO.3228.22
Department The Faculty of Biotechnology and Food Science	**Lecture languages** English
Study level Second-cycle (engineer) programme	**Mandatory** mandatory
Study form Full-time	**Block** major subjects (conducted) in foreign languages
Education profile General academic	**Subject related to scientific research** Yes
	Subject shaping practical skills Yes

Period Semester 2	Examination exam Activities and hours lecture: 30, laboratory classes: 15	Number of ECTS points 4.5

Goals

C1	This course addresses controlling food contamination, both due to its consequences upon human health as well as the economic losses that it may cost the food industry. Reducing losses from food contamination is a worldwide priority today, and this contamination can have microbial as well as chemical origin. Because of this, this course is divided into two blocks. Its first treats food as a microbial ecosystem, where a natural microbiota is present, related with the system of food production, processing, and transformation that can be modified by both intrinsic and extrinsic factors. This block places particular emphasis on the microorganisms that cause food deterioration in addition to diseases. The factors that affect the presence, survival, and growth of these microorganisms in food and detection systems are examined. The course's second block looks at controlling metals in food products, because although some metals provide unquestionable nutritional value, they can also be toxic, depending upon the concentrations in which they are found. Monitoring the chemical safety of foods can be defined as an analysis and assessment tool of the risks to health that derive from the presence of potentially dangerous substances in foods, which enables prioritizing control activities, even comparing the risks with others that we have to deal with on a daily basis.

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge – Student knows and understands:			
W1	Know the tools for scientific and legal information searches in agro-food technology. Know the biotic and abiotic contamination occuring in food Integrate knowledge in food production and technology to provide scientific and technical advice to producers and consumers.	NT_P7S_WG01, NT_P7S_WG03, NT_P7S_WG05	written exam
Skills – Student can:			
U1	Develop and produce reports and procedures to manage food quality and safety based on continuous improvement. Develop autonomous and lifelong learning in the agro-food field. Plan research projects related to food quality and safety in agro-food technology. Formulate innovation strategies to control the raw materials that influence improvements in the quality of finished products. Create procedures for incorporating ingredients into foods with functional and nutritional properties and evaluate their market potential for acceptance by consumers. Assess indicators of biotic and abiotic contamination, and the factors that affect them in improving food safety.	NT_P7S_UK08, NT_P7S_UO06, NT_P7S_UW01, NT_P7S_UW02, NT_P7S_UW05	written exam
U2	Student is able to use specialist nomenclature in a foreign language	NT_P7S_UK07	written exam
Social competences – Student is ready to:			
K1	Understand and incorporate scientific advances in food production and preparation that enable improving its quality and functionality. Apply knowledge acquired and form judgments that include reflection on social and ethical repsonsibilities in the agro-food field.	NT_P7S_KK01, NT_P7S_KO02, NT_P7S_KOR3	written exam

Study content

No.	Course content	Activities

| 1. | 1. Microbial food intereactions

2. Microbial pathogens, emergent pathogens and detection techniques
3. Spoilage microbiota and their detection

4 ECOLOGICAL SYSTEMS AND POLLUTION. 1. Introduction. 2. Definition and classification of pollutants. 3. Bioaccumulators and biomagnification. 4. Mixtures of polluting compounds. 5. Lethal and sublethal effects. 6. Environmental factors that affect toxicity

5. FOOD CHEMICAL CONTAMINATION. 1. Introduction. 1.1 Background. 1.2 Biogeochemistry of metals. 2. Factors that influence the toxicity of heavy metals. 3. Dietary intake of trace metals. 3.1. Ways of incorporation into food.3.2. Toxicological effects.4. Intake estimates. Total Diet Studies.4.1 Toxicological reference values.4.2. Determination of intakes of contaminants in the diet.5. Chemical food safety group.5.1. Surveillance and control areas.
6. METALS TRAIL IN FOODS.
1. Cadmium. 1.1. Ingestion of cadmium in the diet. 1.2 Toxicity of cadmium. 1.3 Treatment of cadmium. 2. Lead 2.1. Ingestion of lead in the diet. 2.2 Toxicity of lead. 2.3 Treatment of lead. 3. Mercury. 3.1 Ingestion of mercury in the diet. 3.2 Toxicity of mercury. 3.3 Treatment of mercury. 4. Arsenic. 4.1 Arsenic intake in the diet. 4.2 Toxicity of arsenic. 4.3 Arsenic treatment. 5. Other metals trace contaminants. 6. Measures to reduce pollution. | lecture |
| 2. | 1. Predictive microbiology

2. Food microbiology lab, rapid methods in food microbiology

3. Preparation and digestion of food samples.

4. Description and tuning of the atomic absorption technique with hydride generation.

5. Description and tuning of the technique of speciation with fluorescence. | laboratory classes |

Entry requirements

Microbiology

UNIWERSYTET PRZYRODNICZY we WROCŁAWIU

Innovation in meat, dairy and fish production
Educational subject description sheet

Basic information

Field of study Food Technology	**Education cycle** 2022/23
Speciality -	**Subject code** WBiNoZNFT-AMS.MI2BO.3229.22
Department The Faculty of Biotechnology and Food Science	**Lecture languages** English
Study level Second-cycle (engineer) programme	**Mandatory** mandatory
Study form Full-time	**Block** major subjects (conducted) in foreign languages
Education profile General academic	**Subject related to scientific research** Yes
	Subject shaping practical skills Yes

Period Semester 2	**Examination** exam **Activities and hours** lecture: 30, laboratory classes: 15	**Number of ECTS points** 4.5

Goals

C1	To know the innovation strategies that adapt to the new trends in food To evaluate new strategies in the innovation of meat, dairy and fishing products To know the trends in the development of healthier animal products To evaluate foods of animal origin in view of the latest scientific advances and trends in research

Subject's learning outcomes

Code	Outcomes in terms of		Effects	Examination methods
Knowledge – Student knows and understands:				
W1		Capacity for innovation and creativity in the agro-food field.	NT_P7S_WG01	active participation, presentation, participation in discussion

W2	Conrast and interpret advances in agro-food biotechnology and their practical applications	NT_P7S_WG02	written exam, active participation, participation in discussion
W3	Create procedures for incorporating ingredients into foods with functional and nutritional properties and evaluate their market potential for acceptance by consumers.	NT_P7S_WG04, NT_P7S_WG05, NT_P7S_WK06	written exam, active participation, report
W4	Categorize the main deterioration indices of food and use them to adapt packaging and conservation technology following agro-food marketing strategies.	NT_P7S_WG03	written exam, active participation, participation in discussion
W5	Understand and incorporate scientific advances in food production and preparation that enable improving its quality and functionality.	NT_P7S_WG05	written exam, active participation, participation in discussion
W6	Understand and apply scientific advances in animal production to be used in R&D of animal production industries.	NT_P7S_WG05, NT_P7S_WK07	written exam, participation in discussion
Skills – Student can:			
U1	Use tools to search for relevant and reliable information to resolve problems, develop strategies, and advise agro-food industries.	NT_P7S_UW01	active participation, participation in discussion
U2	Develop autonomous and lifelong learning in the agro-food field.	NT_P7S_UK08	active participation, participation in discussion
U3	Apply knowledge acquired and form judgments that include reflection on social and ethical repsonsibilities in the agro-food field.	NT_P7S_UW03	active participation, participation in discussion
U4	Integrate knowledge in food production and technology to provide scientific and technical advice to producers and consumers.	NT_P7S_UW03	active participation, participation in discussion
Social competences – Student is ready to:			
K1	Critical and self-critical capacity to assess, contrast, and decide upon scientific advances in agro-food technology and quality.	NT_P7S_KK01	active participation, presentation, participation in discussion
K2	Taking professional actions regarding social and ethical repsonsibilities in the agro-food field.	NT_P7S_KO02	active participation, presentation, participation in discussion
K3	Is able to think creatively and responsibly	NT_P7S_KOR3	active participation, presentation, participation in discussion

Study content

No.	Course content	Activities

1.	Innovations in the processing and preservation of meat products Design of healthier meat products Innovations in the processing of dairy products Development of dairy products Innovations in the processing and preservation of fishery products Development of new products from fishing sector	lecture
2.	Production of meat products with low salt content Production of meat products with healthy fats Fermented milks: effect of processing on the development of defects and detection Quality control in the development and evaluation of new products Characterization and evaluation of the technological aptitude of different products derived from fishing Preparation of new products from fishing raw materials	laboratory classes

Entry requirements

meat, dairy and fish production and technology, food engeneering, (bio)chemistry,

Managment and funding of public and private research
Educational subject description sheet

Basic information

Field of study Food Technology	**Education cycle** 2022/23
Speciality -	**Subject code** WBiNoZNFT-AMS.MI2HS.3231.22
Department The Faculty of Biotechnology and Food Science	**Lecture languages** English
Study level Second-cycle (engineer) programme	**Mandatory** mandatory
Study form Full-time	**Block** humanities and social sciences
Education profile General academic	**Subject related to scientific research** No
	Subject shaping practical skills Yes

Period Semester 2	**Examination** graded credit **Activities and hours** lecture: 20, laboratory classes: 10	**Number of ECTS points** 3.0

Goals

C1	Provide a knowledge about basic and applied research of agro-food technology
C2	Present the funding agencies at the national and international level
C3	Provide an up-to-date information about calls for proposals
C4	Provide a knowledge about project proposal preparation
C5	Aware the students about the evaluation criteria for projects evaluation in dependence of the type of funding agency
C6	Provide a knowledge about project proposal management

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge – Student knows and understands:			
W1	know the basic principle of project management	NT_P7S_WG01	participation in discussion
W2	know how to construct a project proposal	NT_P7S_WG02, NT_P7S_WK06	observation of student's work, active participation, presentation
W3	know the possibilities of applying for the funding of public and private research	NT_P7S_WK07	observation of student's work, active participation
W4	know how to find sources of public and private financing for scientific project	NT_P7S_WK06	observation of student's work
W5	to gain knowledge about the management of the granted proposals (reporting, evaluation)	NT_P7S_WG02, NT_P7S_WG04	observation of student's work, participation in discussion
Skills – Student can:			
U1	has the ability to prepare project proposal, create a hypotheses and aim	NT_P7S_UK08, NT_P7S_UO06	observation of student's work, presentation
U2	has the ability to search for the funding agency in dependence on the type of research	NT_P7S_UW01	participation in discussion
U3	has the ability to construct the project proposal for agri-food research	NT_P7S_UO06, NT_P7S_UW01	observation of student's work
U4	has ability to manage the project, when granted	NT_P7S_UW02	observation of student's work, active participation
U5	has an ability to use a specific terminology in English	NT_P7S_UK07	observation of student's work, active participation, presentation, participation in discussion
Social competences – Student is ready to:			
K1	able to prepare independently project proposal including critical and self-critical evaluation of scientific advances	NT_P7S_KK01	observation of student's work, presentation, participation in discussion
K2	able to plan the research project	NT_P7S_KOR3	observation of student's work, active participation
K3	able to manage the project	NT_P7S_KO02	active participation, participation in discussion

Study content

No.	Course content	Activities

1.	(1) The possibilities to find funds for scientific research (2) General rules of project proposal writing – the structure of the project proposal, the requirements of the individual funding agency (3) Construction of the project proposal elements: abstract, research plan, budget, formation of the research team (4) General rules of the project proposals' online submission (5) Rules of the evaluation of the project proposals in dependence of the funding agency (6) The criteria of the proposal evaluations (7) Management of the project	lecture
2.	Preparation of the project proposal elements: • abstract, • research plan, • budget, • formation of the research team, • data menagement plan	laboratory classes

Pre/post harvest eco-innovative treatments
Educational subject description sheet

Basic information

Field of study Food Technology	**Education cycle** 2022/23
Speciality -	**Subject code** WBiNoZNFT-AMS.MI2BO.3234.22
Department The Faculty of Biotechnology and Food Science	**Lecture languages** English
Study level Second-cycle (engineer) programme	**Mandatory** mandatory
Study form Full-time	**Block** major subjects (conducted) in foreign languages
Education profile General academic	**Subject related to scientific research** No
	Subject shaping practical skills Yes

Period Semester 2	**Examination** graded credit **Activities and hours** lecture: 20, laboratory classes: 10	**Number of ECTS points** 3.0

Goals

C1	This course, which addresses two different parts on improving the quality of plant products, has as principal condition that the plant techniques, products, and handling is natural, which will make it into an organic tool or one susceptible to becoming one. This course's contents present the latest advances in research on pre-harvest factors, including deficit irrigation techniques, exogenous treatment with natural hormones, application of natural compounds, and modifications in cultivation techniques that influence the quality at harvest time and during subsequent post-harvest conservation. Likewise, the latest research on post-harvest tool use for maximizing and/or maintaining plant quality for longer periods is an object of study, and others include the use of natural compounds, essential oils, and physical treatments (ozone, carbon dioxide, low oxygen, etc.).

Subject's learning outcomes

Code	Outcomes in terms of		Effects	Examination methods
Knowledge – Student knows and understands:				

W1	integrate knowledge in food production and technology to provide scientific and technical advice to producers and consumers. categorize the main deterioration indices of food and use them to adapt packaging and conservation technology following agro-food marketing strategies. understand and incorporate scientific advances in food production and preparation that enable improving its quality and functionality.	NT_P7S_WG01, NT_P7S_WG03, NT_P7S_WG04	written credit, active participation, presentation, participation in discussion, practical training report
Skills – Student can:			
U1	develop autonomous and lifelong learning in the agro-food field. plan research projects related to food quality and safety in agro-food technology. formulate innovation strategies to control the raw materials that influence improvements in the quality of finished products.	NT_P7S_UK08, NT_P7S_UO06, NT_P7S_UW03	active participation, participation in discussion, practical training report
Social competences – Student is ready to:			
K1	Critical and self-critical capacity to assess, contrast, and decide upon scientific advances in agro-food technology and quality. Capacity for innovation and creativity in the agro-food field.	NT_P7S_KK01, NT_P7S_KOR3	project, active participation, presentation, participation in discussion, practical training report

Study content

No.	Course content	Activities
1.	Effect of mineral nutrition and plant development. Effect of calcium and mineral deficiencies in the quality of the fruits. Effect of the state of maturation on quality. Effect of variety on quality. Objectives of the pre-harvest treatments in the quality of fruits and vegetables. Effect of plant hormones and treatments with plant hormones in post-harvest quality of fruits and vegetables. Effect of pre-harvest treatments with organic acids on the quality of fruits and vegetables.	lecture
2.	Analysis of basic chemical components of storage fruits and vegetables. Effect of technological treatment on quality fruits and vegetables.	laboratory classes

Entry requirements

Technologial Innovation in Food Production

Aromatic profile in food and its relationship with quality
Educational subject description sheet

Basic information

Field of study Food Technology	**Education cycle** 2022/23
Speciality -	**Subject code** WBiNoZNFT-AMS.MI2BO.3285.22
Department The Faculty of Biotechnology and Food Science	**Lecture languages** English
Study level Second-cycle (engineer) programme	**Mandatory** optional
Study form Full-time	**Block** major subjects (conducted) in foreign languages
Education profile General academic	**Subject related to scientific research** Yes
	Subject shaping practical skills No

Period Semester 2	**Examination** exam **Activities and hours** lecture: 20, laboratory classes: 10	**Number of ECTS points** 3.0

Goals

C1	This course permits students to attain maximum information on the smell and aroma of raw materials and commercial products, in addition to evaluating the effect of each unit operation on the odoriferous or aromatic quality of foods. However, volatile compounds are very sensitive, and can undergo many reactions that generate artifacts (oxidation, dehydration, Maillard reactions, polymerization, and isomeric changes) during their extraction and analysis. Therefore, controlling and dominating the processes of isolation, identification, and quantification of these sensitive and delicate compounds is necessary. This course details the main methods for isolating volatile compounds and those that are most appropriate for the main food matrices. Furthermore, analytical techniques are advancing rapidly, but a thorough understanding of gas chromatography and its various types of detectors is essential for knowing whether their use in identifying or quantifying volatile compounds is possible. For example, gas chromatography with a mass spectrometry detector (in scan mode) is not an appropriate technique for quantifying these types of compounds although in the literature there are hundreds of papers that have used them for that.

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge – Student knows and understands:			
W1	integrate knowledge in food production and technology to provide scientific and technical advice to producers and consumers	NT_P7S_WG01	written exam
W2	understand and incorporate scientific advances in food production and preparation that enable improving its quality and functionality.	NT_P7S_WG04	written exam
W3	categorize the main deterioration indices of food and use them to adapt packaging and conservation technology following agro-food marketing strategies.	NT_P7S_WG03	written exam
Skills – Student can:			
U1	know the tools for scientific and legal information searches in agro-food technology.	NT_P7S_UW01	written exam, observation of student's work, report
U2	formulate innovation strategies to control the raw materials that influence improvements in the quality of finished products.	NT_P7S_UW03	written exam, observation of student's work, report
U3	develop and use tools to assess co-products in the agro-food industry.	NT_P7S_UW05	written exam, observation of student's work, report
U4	The graduate can communicate abilities with professionals also in foreign language at B2 + level of the European Training Description System and to a higher degree use a specific terminology	NT_P7S_UK07	written exam, observation of student's work, report
Social competences – Student is ready to:			
K1	critical and self-critical capacity to assess, contrast, and decide upon scientific advances in agro-food technology and quality.	NT_P7S_KK01	observation of student's work
K2	apply knowledge acquired and form judgments that include reflection on social and ethical repsonsibilities in the agro-food field.	NT_P7S_KO02	observation of student's work
K3	capacity for innovation and creativity in the agro-food field.	NT_P7S_KOR3	observation of student's work

Study content

No.	Course content	Activities

1.	Extraction of volatile compounds 1. Extraction with organic solvents of different polarityDistillation techniques: i) Steam distillation distillation: Clevenger and Deryng devices, ii) Simultaneous distillation-extraction: Likens Nickerson equipment, and iii) Vacuum distillation 2. Head space techniques: i) Dynamic head space: intact fruits, ii) HS-SPME (solid phase microextraction for headspace) and iii) SPME (solid phase microextraction) 3. Evaluation of the creation of artifacts during the extraction process Identification and quantification of volatile compounds 4. Identification: Gas chromatography with mass spectrometry detector: GC-MS in scan mode; GC-MS with sniffing port: identification of active odorant compounds; and artifacts. 5. Quantification: GC-MS in SIM mode (single ion monitoring); GC-FID with internal standard users and calibratge rectes	lecture
2.	Extraction of volatile compounds 1. Extraction of volatile compounds with Deryng apparatus and analysis by GC-MS, and Likens-Nickerson and analysis by GC-MS 2. Extraction of volatile compounds with HS-SPME and by vacuum distillation, and analysis by GC-MS Identification and quantification of volatile compounds 3. Processing of a chromatogram of a fresh food and another processed. 4. Realization of calibrated lines of standards by chemical families (aldehydes, ketones, esters, etc.)	laboratory classes

Entry requirements

biochemistry, organic and inorganic chemistry, food technology

UNIWERSYTET PRZYRODNICZY we WROCŁAWIU

Chromatographic analysis of volatiles in food, agricultural and pharmacy
Educational subject description sheet

Basic information

Field of study Food Technology	**Education cycle** 2022/23
Speciality -	**Subject code** WBiNoZNFT-AMS.MI2BO.3286.22
Department The Faculty of Biotechnology and Food Science	**Lecture languages** English
Study level Second-cycle (engineer) programme	**Mandatory** optional
Study form Full-time	**Block** major subjects (conducted) in foreign languages
Education profile General academic	**Subject related to scientific research** Yes
	Subject shaping practical skills No

Period Semester 2	**Examination** exam **Activities and hours** lecture: 20, laboratory classes: 10	**Number of ECTS points** 3.0

Goals

C1	To acquaint students with the methods of isolation of volatile compounds from the material.
C2	To make the audience aware of the problems associated with the identification and quantification of isolated volatile compounds.
C3	Providing students with knowledge on methods and parameters of chromatographic separation of volatile compounds.
C4	To make the audience aware of sensory quality issues depending on the volatile compound profile.

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods

	Knowledge – Student knows and understands:		
W1	the methods of isolation of volatile compounds from raw materials.	NT_P7S_WG01, NT_P7S_WG02	written exam, oral exam
W2	how to interpret the chromatograms and mass spectra obtained from the analyses.	NT_P7S_WG04	written exam, oral exam
W3	the theoretical basis of gas chromatography and mass spectrometry techniques.	NT_P7S_WG01	written exam, oral exam
Skills – Student can:			
U1	to search in scientific sources for information necessary to confirm the results of the analysis of the results.	NT_P7S_UW01	observation of student's work, report
U2	plan an experiment involving the isolation of volatile compounds from raw materials and conduct GC-MS analysis.	NT_P7S_UO06	observation of student's work, report
U3	prepare a comprehensive report presenting the results of GC-MS analysis of volatile compounds and translate the results into information on the quality of the raw material.	NT_P7S_UW02	observation of student's work, report
U4	can solve difficulties and optimize the process of chromatographic analysis.	NT_P7S_UW01	observation of student's work, report
U5	use correct analytical nomenclature, related to gas chromatography and mass spectrometry	NT_P7S_UK07	observation of student's work, report
Social competences – Student is ready to:			
K1	present his results to the group, including the explanation of individual elements of the project.	NT_P7S_KK01	observation of student's work
K2	take responsibility for the reliability of the analyses performed and the interpretation of the prepared results.	NT_P7S_KO02	observation of student's work
K3	take initiative in designing analyses and experiments so that the technological problems posed can be solved.	NT_P7S_KOR3	observation of student's work

Study content

No.	Course content	Activities
1.	1. Essential oils and volatile organic compounds: properties, technology and production. 2. Volatile compounds isolation: methods, procedures and optymalization 3. Gas chromatography and mass spectrometry 4. GC-MS analytical method development 5. GC-MS analysis results interpretation	lecture

2.	1. Isolation of volatile compounds: SPME, hydrodistillation, solvent extraction 2. GC-MS method development and samples analysis 3. Chromatograms interpretation and results reporting.	laboratory classes

Bioactive compounds with antioxidant proporties
Educational subject description sheet

Basic information

Field of study Food Technology	**Education cycle** 2022/23
Speciality -	**Subject code** WBiNoZNFT-AMS.MI2BO.3239.22
Department The Faculty of Biotechnology and Food Science	**Lecture languages** English
Study level Second-cycle (engineer) programme	**Mandatory** optional
Study form Full-time	**Block** major subjects (conducted) in foreign languages
Education profile General academic	**Subject related to scientific research** Yes
	Subject shaping practical skills No

Period	Examination	Number of
Semester 2	exam	**ECTS points** 3.0
	Activities and hours lecture: 20, laboratory classes: 10	

Goals

C1	Provide a knowledge about bioactive compounds and antioxidants
C2	Present the methods used for determination of in vitro antioxidant capacity of agri-food products
C3	Provide an information about quantification and identification techniques for bioactive compounds in food products
C4	Provide a knowledge about influence of the processing on bioactive compounds and antioxidants in foods
C5	Provide knowledge about the connection between bioactive compounds and human health

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods

	Knowledge – Student knows and understands:		
W1	acquire the knowledge about natural source of bioactive compounds and antioxidants	NT_P7S_WG01	written exam
W2	know the analytical techniques to identify and quantify bioactive compounds	NT_P7S_WG02, NT_P7S_WK06	written exam
W3	know the mechanisms of the methods used for determination of in vitro antioxidant capacity of agri-food products	NT_P7S_WG01, NT_P7S_WG02	written exam
W4	know the influence of processing on bioactive compounds and antioxidants in the maintenance of functional properties	NT_P7S_WG04, NT_P7S_WG05	written exam
Skills – Student can:			
U1	has the ability to extract bioactive compounds	NT_P7S_UW02, NT_P7S_UW05	performing tasks
U2	has the ability to evaluate the content of selected groups of bioactive compounds	NT_P7S_UW03, NT_P7S_UW05	performing tasks
U3	has the ability to differentiate the methods for determination of antioxidant capacity	NT_P7S_UW01	test, performing tasks
U4	has the ability to determine antioxidant capacity of agri-food products by common methods	NT_P7S_UW03, NT_P7S_UW05	test, performing tasks
U5	has an ability to use a specific terminology in English	NT_P7S_UK07	written exam, test, performing tasks
Social competences – Student is ready to:			
K1	Able to adjust the extraction process in dependence of the type of bioactive compounds	NT_P7S_KK01	test
K2	Able to perform analytical determination of bioactive compounds and antioxidant capacity	NT_P7S_KK01	test
K3	Able to design process parameters in order to maintain the content of bioactive compounds and antioxidants	NT_P7S_KO02	test

Study content

No.	Course content	Activities
1.	(1) Characterisation of bioactive compounds and antioxidant in agri-food products (2) Extraction methods (3) Analytical techniques to determine bioactive compounds (4) Analytical techniques for determination of antioxidant capacity (5) Functional foods and nutraceuticals (6) Changes in compounds bioactives during its development, post-harvest and process of fruits and vegetables (7) Innovations in design of agri-food products with improved content of bioactives and antioxidants	lecture
2.	(1) Determination of major groups of bioactive compounds (2) Evaluation of antioxidant capacity of agri-food products (3) Influence of the processing on the bioactive compounds and	laboratory classes

UNIWERSYTET PRZYRODNICZY we WROCŁAWIU

Nutraceuticals and functional food ingredients
Educational subject description sheet

Basic information

Field of study Food Technology	**Education cycle** 2022/23
Speciality -	**Subject code** WBiNoZNFT-AMS.MI2BO.3240.22
Department The Faculty of Biotechnology and Food Science	**Lecture languages** English
Study level Second-cycle (engineer) programme	**Mandatory** optional
Study form Full-time	**Block** major subjects (conducted) in foreign languages
Education profile General academic	**Subject related to scientific research** Yes
	Subject shaping practical skills Yes

Period Semester 2	**Examination** exam **Activities and hours** lecture: 20, laboratory classes: 10	**Number of ECTS points** 3.0

Goals

C1	The students who pass this subject will be able to carry out in an autonomous way a bibliographic search that allows them to determine which tools in pre and post-harvest are susceptible to increase the quality and useful life of the fruits and vegetables with which they work, being able to put in Innovation and Development in the industry march to improve it

Subject's learning outcomes

Code	Outcomes in terms of		Effects	Examination methods
Knowledge – Student knows and understands:				

W1	- integrate knowledge in food production and technology to provide scientific and technical advice to producers and consumers. - understand and incorporate scientific advances in food production and preparation that enable improving its quality and functionality.	NT_P7S_WG01, NT_P7S_WG04	active participation, participation in discussion, case study, exam
Skills – Student can:			
U1	- communication abilities with professionals also in foreign language at B2 + level of the European Training Description System and to a higher degree use a specific terminology -create procedures for incorporating ingredients into foods with functional and nutritional properties and evaluate their market potential for acceptance by consumers.	NT_P7S_UK07, NT_P7S_UW04	active participation, presentation, participation in discussion, case study, exam
Social competences – Student is ready to:			
K1	- critical and self-critical capacity to assess, contrast, and decide upon scientific advances in agro-food technology and quality. - capacity for innovation and creativity in the agro-food field.	NT_P7S_KK01, NT_P7S_KOR3	active participation, report, presentation, participation in discussion, case study

Study content

No.	Course content	Activities
1.	1. Isolation and purification some bioactive compounds: polyphenols 2. Analysis bioactive compounds by UPLC or LC-MS techniques.	laboratory classes
2.	1. Nutraceuticals - definitions and classification 2-3. Bioactive compounds contained in food of plant origin - polyphenols 4-5. Bioactive compounds contained in food of plant and animal origin - vitamins 6-7. Bioactive compounds contained in food of plant and animal origin - sterols and stanols, fatt acids, omega 3, 6, 9 8-9. Bioactive compounds contained in food - prebiotics, probiotics, synbiotic 10. Other bioactive compounds contained in food. 11-13. Sources of bioactive components – plants (vegetable, fruits, mushrooms), herbs, 14-15. Superfruits 16-18.Technological solutions in the production of functional food and supplements. 19-20. Overview of functional foods and plant-derived nutraceuticals available on the market.	lecture

Entry requirements

This course addresses the determination of biochemical components that are found in foods and that are considered compounds with beneficial properties for human health due their antioxidant capacity. Included among this group of compounds are polyphenols, phytosterols, vitamins, especially carotenoids and tocopherols and others as minerals. Students examine different analytical techniques used in determining biochemical components of foods, such as absorption

spectroscopy (AS), gas chromatography (GS), high-performance liquid chromatography (HPLC), and gas chromatography-mass spectrometry (GC-MS). Once the theoretical knowledge is assimilated, students complete their training by establishing a practical program in which they carry out determined extractions of compounds, their subsequent purification, and qualitative and quantitative determinations by using either the internal or external standard, as well as preparing calibration lines of chemically pure compounds.

UNIWERSYTET PRZYRODNICZY we WROCŁAWIU

Eddible coatings
Educational subject description sheet

Basic information

Field of study Food Technology	**Education cycle** 2022/23
Speciality -	**Subject code** WBiNoZNFT-AMS.MI2BO.3242.22
Department The Faculty of Biotechnology and Food Science	**Lecture languages** English
Study level Second-cycle (engineer) programme	**Mandatory** optional
Study form Full-time	**Block** major subjects (conducted) in foreign languages
Education profile General academic	**Subject related to scientific research** Yes
	Subject shaping practical skills No

Period Semester 2	**Examination** graded credit **Activities and hours** lecture: 20, laboratory classes: 10	**Number of ECTS points** 3.0

Goals

C1	The aim of the course is to provide, verify and consolidate the knowledge and skills and the acquisition of social competences in the lastest developments in biobased edible materials and their applications in food packaging.

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge – Student knows and understands:			
W1	integrate knowledge in food production and technology to provide scientific and technical advice to producers and consumers.	NT_P7S_WG01	written credit, observation of student's work, test

W2	categorize the main deterioration indices of food and use them to adapt packaging and conservation technology following agro-food marketing strategies.	NT_P7S_WG03	written credit, active participation, test
Skills – Student can:			
U1	use tools to search for relevant and reliable information to resolve problems, develop strategies, and advise agro-food industries.	NT_P7S_UW01	written credit, report, test
U2	develop and produce reports and procedures to manage food quality and safety based on continuous improvement.	NT_P7S_UW02	observation of student's work, report, test
U3	develop autonomous and lifelong learning in the agro-food field.	NT_P7S_UK08	observation of student's work, report
U4	formulate innovation strategies to control the raw materials that influence improvements in the quality of finished products.	NT_P7S_UW03	written credit, report, test
U5	plan research projects related to food quality and safety in agro-food technology.	NT_P7S_UO06	written credit, active participation, report, test
U6	create procedures for incorporating ingredients into foods with functional and nutritional properties and evaluate their market potential for acceptance by consumers.	NT_P7S_UW04	report
Social competences – Student is ready to:			
K1	critical and self-critical capacity to assess, contrast, and decide upon scientific advances in agro-food technology and quality.	NT_P7S_KK01	written credit, active participation, report
K2	capacity for innovation and creativity in the agro-food field.	NT_P7S_KOR3	written credit, active participation, report

Study content

No.	Course content	Activities
1.	1. Interaction phenomena between packaging and product 2. Advantages and disadvantages of packaging materials in products 3. Edible materials for food packaging 4. Edible films and coatings production 5. Edible films and coatings for fruits and vegetables 6. Edible films and coatings for meat and poultry 7. Edible films and coatings for flavor encapsulation 8. Delivery of flavor and active ingredients using edible films and coatings 9. Delivery of food additives and antimicrobials using dible films and coatings 10. Testing methods for edible packaging materials	lecture

2.	1. Edible films and coatings - concept and production. 2. Testing of edible films and coatings - physicochemical properties. 3. Credit - test.	laboratory classes

Entry requirements

General food microbiology
Food storage
Mechanics science of food industry
General and food microbiology
Food hygiene and toxicology

UNIWERSYTET PRZYRODNICZY we WROCŁAWIU

Innovative packaging
Educational subject description sheet

Basic information

Field of study Food Technology	**Education cycle** 2022/23
Speciality -	**Subject code** WBiNoZNFT-AMS.MI2BO.3243.22
Department The Faculty of Biotechnology and Food Science	**Lecture languages** English
Study level Second-cycle (engineer) programme	**Mandatory** optional
Study form Full-time	**Block** major subjects (conducted) in foreign languages
Education profile General academic	**Subject related to scientific research** Yes
	Subject shaping practical skills No

Period	Examination	Number of
Semester 2	graded credit	**ECTS points** 3.0
	Activities and hours lecture: 20, laboratory classes: 10	

Goals

C1	The aim of the course is to provide, verify and consolidate the latest knowledge and skills and the acquisition of social competences in the field of innovative food packaging techniques about their way of preservative action, effectiveness and suitability in various types of foods.

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge – Student knows and understands:			
W1	integrate knowledge in food production and technology to provide scientific and technical advice to producers and consumers.	NT_P7S_WG01	written credit, active participation, report, test

W2	categorize the main deterioration indices of food and use them to adapt packaging and conservation technology following agro-food marketing strategies.	NT_P7S_WG03	written credit, report, test
W3	understand and incorporate scientific advances in food production and preparation that enable improving its quality and functionality.	NT_P7S_WG04	observation of student's work, report
W4	know the tools for scientific and legal information searches in agro-food technology.	NT_P7S_WK06	written credit, active participation, test
Skills – Student can:			
U1	formulate innovation strategies to control the raw materials that influence improvements in the quality of finished products.	NT_P7S_UW03	written credit, report, test
U2	plan research projects related to food quality and safety in agro-food technology.	NT_P7S_UO06	written credit, report, test
U3	develop and use tools to assess co-products in the food industry.	NT_P7S_UW02	observation of student's work, report
U4	categorize the main deterioration indices of food and use them to adapt packaging and conservation technology following agro-food marketing strategies.	NT_P7S_UW03	active participation, test
Social competences – Student is ready to:			
K1	capacity for innovation and creativity in the food packaging technology.	NT_P7S_KOR3	written credit, active participation, report
K2	apply knowledge acquired and form judgments that include reflection on social and ethical responsibilities in the food packaging.	NT_P7S_KO02	written credit, active participation, report

Study content

No.	Course content	Activities
1.	1. Basic function of packaging 2. Active packaging 3. Intelligent packaging 4. Bioactive packaging 5. Innovative packaging technologies 6. Interactions of active/intelligent packaging with supply chain 7. Nanotechnologies in food packaging 8. Food safety issues 9. Environmental issues (biosourced, biodegradable, recyclable) 10. Future trends	lecture

2.	1. Innovative natural packaging materials - concept and production. 2. Synthetic or natural packaging materials - which has better physicochemical properties? 3. Modified atmospheres packaging of fresh food - obtaining and calculating. 4. Vacuum or modified atmosphere packaging? - study. 5. Credit - test.	laboratory classes

Entry requirements

General food microbiology,
Mechanics science of food industry,
General and food microbiology,
Food storage,
Food hygiene and toxicology

UNIWERSYTET PRZYRODNICZY we WROCŁAWIU

Production of food enriched in dietary fiber
Educational subject description sheet

Basic information

Field of study Food Technology	**Education cycle** 2022/23
Speciality -	**Subject code** WBiNoZNFT-AMS.MI2BO.3245.22
Department The Faculty of Biotechnology and Food Science	**Lecture languages** English
Study level Second-cycle (engineer) programme	**Mandatory** optional
Study form Full-time	**Block** major subjects (conducted) in foreign languages
Education profile General academic	**Subject related to scientific research** No
	Subject shaping practical skills No

Period Semester 2	**Examination** graded credit **Activities and hours** lecture: 20, laboratory classes: 10	**Number of ECTS points** 3.0

Goals

C1	Participation in the course allows you to obtain knowledge related to the meaning of dietary fiber, its different types and its composition, health benefits that are associated with the consumption of fiber-rich foods. This course strives for is to establish the scientific basis for the development of foods fortified with dietary fiber.

Subject's learning outcomes

Code	Outcomes in terms of		Effects	Examination methods
Knowledge – Student knows and understands:				

W1	knows in depth the unit operations of technological processes as well as development trends used in production of food enriched in dietary fiber to provide scientific and technical advice to producers and consumers	NT_P7S_WG01	written credit, observation of student's work, report
W2	know the tools for scientific and legal information searches in high fiber-food technology	NT_P7S_WK06	written credit, observation of student's work, report
W3	understand and incorporate scientific advances in high-fibre food production and preparation that enable improving its quality and functionality.	NT_P7S_WG04	written credit, observation of student's work, report
Skills – Student can:			
U1	know the tools for scientific and legal information searches in high fibre-food technology.	NT_P7S_UW01	written credit, observation of student's work, report
U2	create procedures for incorporating dietary fiber preparations into foods with functional and nutritional properties and evaluate their market potential for acceptance by consumers.	NT_P7S_UW04	written credit, observation of student's work, report
Social competences – Student is ready to:			
K1	capacity for innovation and creativity in the high fibre-food field	NT_P7S_KOR3	written credit, observation of student's work, report

Study content

No.	Course content	Activities
1.	Lecture 1. Definition, classification and composition of dietary fiber. Lecture 2. Determination methods of dietary fiber in foods. Lecture 3. Physiological and metabolic effects of dietary fiber 1. Lecture 4. Physiological and metabolic effects of dietary fiber 2. Lecture 5. Dietary Fiber in the prevention and treatment of disease. Lecture 6. Sources of dietary fiber to application in foods. Lecture 7. Technofunctional properties of dietary fibers to application in foods. Lecture 8. Development and characterizaction of fiber-enriched foods. Lecture 9. Quality criteria and regulation applied to fiber-enriched foods.	lecture
2.	Laboratory. Study of the effects of dietary fiber on the rheological properties, efficiency and quality of fortified food. Laboratory. Study of the effect of fiber on the shelf life of food products. Laboratory. Determination of various fractions of dietary fiber in food.	laboratory classes

Entry requirements

General food technology

Uniwersytet Przyrodniczy we Wrocławiu

Quality and nutritional value of food products enriched with dietary fiber
Educational subject description sheet

Basic information

Field of study Food Technology	**Education cycle** 2022/23
Speciality -	**Subject code** WBiNoZNFT-AMS.MI2BO.3246.22
Department The Faculty of Biotechnology and Food Science	**Lecture languages** English
Study level Second-cycle (engineer) programme	**Mandatory** optional
Study form Full-time	**Block** major subjects (conducted) in foreign languages
Education profile General academic	**Subject related to scientific research** No
	Subject shaping practical skills No

Period	Examination	Number of
Semester 2	graded credit **Activities and hours** lecture: 20, laboratory classes: 10	**ECTS points** 3.0

Goals

C1	Participation in the course allows you to obtain knowledge related to the meaning of dietary fiber, its different types and its composition, health benefits that are associated with the consumption of fiber-rich foods and influence on the quality of enriched products. This course strives for is to establish the scientific basis for the development of foods fortified with dietary fiber.

Subject's learning outcomes

Code	Outcomes in terms of		Effects	Examination methods
Knowledge – Student knows and understands:				

W1	knows in depth the unit operations of technological processes as well as development trends used in production of food enriched in dietary fiber to provide scientific and technical advice to producers and consumers	NT_P7S_WG01	written credit, observation of student's work, report
W2	know the tools for scientific and legal information searches in high fiber-food technology	NT_P7S_WK06	written credit, observation of student's work, report
W3	understand and incorporate scientific advances in high-fibre food production and preparation that enable improving its quality and functionality.	NT_P7S_WG04	written credit, observation of student's work, report
Skills – Student can:			
U1	know the tools for scientific and legal information searches in high fibre-food technology.	NT_P7S_UW01	written credit, observation of student's work, report
U2	create procedures for incorporating dietary fiber preparations into foods with functional and nutritional properties and evaluate their market potential for acceptance by consumers.	NT_P7S_UW04	written credit, observation of student's work, report
Social competences – Student is ready to:			
K1	capacity for innovation and creativity in the high fibre-food field	NT_P7S_KOR3	written credit, observation of student's work, report

Study content

No.	Course content	Activities
1.	Laboratory. Study of the effects of dietary fiber on the rheological properties, efficiency and quality of fortified food. Laboratory. Study of the effect of fiber on the shelf life and nutritional value of food products. Laboratory. Determination of various fractions of dietary fiber in food.	laboratory classes
2.	Lecture 1. Definition, classification and composition of dietary fiber. Lecture 2. Determination methods of dietary fiber in foods. Lecture 3. Physiological and metabolic effects of dietary fiber 1. Lecture 4. Physiological and metabolic effects of dietary fiber 2. Lecture 5. Dietary Fiber in the prevention and treatment of disease. Lecture 6. Sources of dietary fiber to application in foods. Lecture 7. Technofunctional properties of dietary fibers to application in foods. Lecture 8. Development and characterizaction of fiber-enriched foods. Lecture 9. Quality criteria and regulation applied to fiber-enriched foods.	lecture

UNIWERSYTET PRZYRODNICZY we WROCŁAWIU

Final project - Food quality and functionality research
Educational subject description sheet

Basic information

Field of study Food Technology	**Education cycle** 2022/23
Speciality -	**Subject code** WBiNoZNFT-AMS.MI2BO.3283.22
Department The Faculty of Biotechnology and Food Science	**Lecture languages** English
Study level Second-cycle (engineer) programme	**Mandatory** optional
Study form Full-time	**Block** major subjects (conducted) in foreign languages
Education profile General academic	**Subject related to scientific research** Yes
	Subject shaping practical skills No

Period Semester 2	Examination graded credit Activities and hours lecture: 30, project classes: 120	Number of ECTS points 12.0

Goals

C1	planning the structure of research project related to food quality
C2	constructing the project proposal
C3	formulating the objectives and hypothesis of the study, materials and methodology
C4	carrying out the project
C5	calculate and present the results

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge – Student knows and understands:			

W1	understand and incorporate scientific advances in food production and preparation that enable improving its quality and functionality.	NT_P7S_WG04	project, report
W2	contrast and interpret advances in agro-food biotechnology and their practical applications.	NT_P7S_WG02	project, report
W3	categorize the main deterioration indices of food and use them to adapt packaging and conservation technology following agro-food marketing strategies	NT_P7S_WG03	project, report
Skills – Student can:			
U1	plan research projects related to food quality and safety in agro-food technology	NT_P7S_UO06	project
U2	formulate innovation strategies to control the raw materials that influence improvements in the quality of finished products.	NT_P7S_UW03	project
U3	create procedures for incorporating ingredients into foods with functional and nutritional properties and evaluate their market potential for acceptance by consumers.	NT_P7S_UW04	project
U4	use tools to search for relevant and reliable information to resolve problems, develop strategies, and advise agro-food industries.	NT_P7S_UW01	project
U5	the student is able to use professional terminology in a foreign language	NT_P7S_UK07	project, report
Social competences – Student is ready to:			
K1	critical and self-critical capacity to assess, contrast, and decide upon scientific advances in agro-food technology and quality.	NT_P7S_KK01	project, report
K2	capacity for innovation and creativity in the agro-food field.	NT_P7S_KOR3	project, report

Study content

No.	Course content	Activities
1.	Choice of the subject matter of the project in the area of food quality Plan and structure the project Development of the project Presentation of the project	lecture
2.	Choice of the subject matter of the project Plan and structure the project Development of the project (carrying out) Preparation of the project results Presentation and defense of the project	project classes

Entry requirements

food technology
food quality
food chemisty

Final project - Innovation and development of food quality and safety
Educational subject description sheet

Basic information

Field of study Food Technology	**Education cycle** 2022/23
Speciality -	**Subject code** WBiNoZNFT-AMS.MI2BO.3284.22
Department The Faculty of Biotechnology and Food Science	**Lecture languages** English
Study level Second-cycle (engineer) programme	**Mandatory** optional
Study form Full-time	**Block** major subjects (conducted) in foreign languages
Education profile General academic	**Subject related to scientific research** Yes
	Subject shaping practical skills Yes

Period Semester 2	**Examination** graded credit **Activities and hours** lecture: 30, project classes: 120	**Number of ECTS points** 12.0

Goals

C1	planning the structure of food research project
C2	constructing the project proposal
C3	formulating the objectives and hypothesis of the study, materials and methodology
C4	carrying out the project
C5	calculate and present the results
C6	To know how to incorporate scientific advances in the field of agri-food technology that help solve problems of production, quality and functionality of food

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge – Student knows and understands:			
W1	Integrate knowledge in food production, quality and technology to provide scientific and technical advice to producers and consumers.	NT_P7S_WG01	project, report
W2	Know the tools for scientific and legal information searches in agro-food technology.	NT_P7S_WK06	project, report
W3	Categorize the main deterioration indices of food and use them to adapt packaging and conservation technology following agro-food marketing strategies.	NT_P7S_WG03	project, report
W4	Understand and incorporate scientific advances in food production and preparation that enable improving its quality and functionality.	NT_P7S_WG04	project, report
Skills – Student can:			
U1	Use tools to search for relevant and reliable information to resolve problems, develop strategies, and advise agro-food industries.	NT_P7S_UW01	project, report
U2	Develop autonomous and lifelong learning in the agro-food field.	NT_P7S_UW02	project, report
U3	Plan research projects related to food quality and safety in agro-food technology.	NT_P7S_UO06	project, report
U4	Formulate innovation strategies to control the raw materials that influence improvements in the quality of finished products.	NT_P7S_UW03	project, report
Social competences – Student is ready to:			
K1	Critical and self-critical capacity to assess, contrast, and decide upon scientific advances in agro-food technology and quality.	NT_P7S_KK01	project, report
K2	Capacity for innovation and creativity in the agro-food field.	NT_P7S_KOR3	project, report
K3	Apply knowledge acquired and form judgments that include reflection on social and ethical repsonsibilities in the agro-food field.	NT_P7S_KO02	project, report

Study content

No.	Course content	Activities
1.	Choice of the subject matter of the prject in the area of food technology Plan and structure the project Development of the project Presentation of the project	lecture

2.	Choice of the subject matter of the project Plan and structure the project Development of the project (carrying out) Preparation of the project results Presentation of the project	project classes

Entry requirements

Food technology, food chemistry, biochemistry, physics, engineering

UNIWERSYTET PRZYRODNICZY WE WROCŁAWIU

Advanced methodologies in food quality and safety
Educational subject description sheet

Basic information

Field of study Food Technology	**Education cycle** 2022/23
Speciality -	**Subject code** WBiNoZNFT-AMS.MI4BO.3247.22
Department The Faculty of Biotechnology and Food Science	**Lecture languages** English
Study level Second-cycle (engineer) programme	**Mandatory** mandatory
Study form Full-time	**Block** major subjects (conducted) in foreign languages
Education profile General academic	**Subject related to scientific research** No
	Subject shaping practical skills No

Period Semester 3	**Examination** graded credit **Activities and hours** lecture: 30, laboratory classes: 15	**Number of ECTS points** 4.5

Goals

C1	For many companies, the best-known standards of food quality and safety are a step further in the fight for achieving total quality. Improving the agro-food industry in these terms depends largely upon the proximity of companies to R&D on quality and safety. This course covers the knowledge for evaluating risks from foods using advanced analytical tools and methodologies for monitoring food quality and safety. With this expertise, the student becomes capable of evaluating with advanced tools the influence of ingredients, processes, packaging, and other aspects of food production upon the quality and safety of foods.

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge – Student knows and understands:			

W1	the current problems related to the food quality and safety and the emergent risks derivent from them.	NT_P7S_WG05	written credit
W2	the basis of the analytical techniques developed to control quality and food safety; methodologies of risk assessment, highlighting those that allow improving the risk assessment process in food.	NT_P7S_WK06	written credit
W3	the importance of selecting the right ingredients to achieve a better quality and safety in food.	NT_P7S_WG04	written credit
W4	the standards for food quality and safety certification; know how to implement quality management and food safety systems in the agri-food industry.	NT_P7S_WK06	written credit
Skills – Student can:			
U1	develop and produce reports and procedures to manage food quality and safety based on continuous improvement.	NT_P7S_UW02	project
Social competences – Student is ready to:			
K1	innovation and creativity in the agro-food field.	NT_P7S_KOR3	written credit, project
K2	apply knowledge acquired and form judgments that include reflection on social and ethical repsonsibilities in the agro-food field.	NT_P7S_KO02	project

Study content

No.	Course content	Activities
1.	Food safety in concept of consumers and supervising units. Food safety insurance law regulations. Characteristics of basics hygienic regulations of food stuffs according to Codex Alimentarius. Health hazards - traceability, and disposition of nonconforming product in food production chain. The characteristics of Rapid Alert System for Food and Feed (RASFF). Methods for risk estimation and analysis systems (obligatory) GMP/GHP, HACCP, and facultative (ISO 22000, BRC, IFS). Procedure Food Defence acc. to PAS 96:2014.	lecture
2.	Designing the HACCP system and GMP/GHP standards for selected branch of food industry. Designing the traceability procedure for selected branch of food industry, nonconforming product and it's withdrawall from market. Methods of risk estimation and analysis in developing the food.	laboratory classes

Entry requirements

Basic knowledge about food technology, microbiology and food toxicology

UNIWERSYTET PRZYRODNICZY WE WROCŁAWIU

Advanced in animal well-being and food safety in raw materials
Educational subject description sheet

Basic information

Field of study Food Technology	**Education cycle** 2022/23
Speciality -	**Subject code** WBiNoZNFT-AMS.MI4BO.3248.22
Department The Faculty of Biotechnology and Food Science	**Lecture languages** English
Study level Second-cycle (engineer) programme	**Mandatory** mandatory
Study form Full-time	**Block** major subjects (conducted) in foreign languages
Education profile General academic	**Subject related to scientific research** No
	Subject shaping practical skills No

Period Semester 3	**Examination** exam **Activities and hours** lecture: 30, laboratory classes: 15	**Number of ECTS points** 4.5

Goals

C1	Knowing the role of animal welfare in the quality and safety of foods and analyze the factors that influence it Know the Spanish food safety and animal welfare law in force Know how to manage livestock production by complying with the requirements established in the current regulations on food safety and animal welfare. Describe the methods of evaluation and control of animal welfare and food safety To Know the protocol of action in the diagnosis and alerts generated for reasons of food safety

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge – Student knows and understands:			

W1	Integrate knowledge in food production and technology to provide scientific and technical advice to producers and consumers.	NT_P7S_WG01, NT_P7S_WK06	written exam, participation in discussion
W2	Assess indicators of biotic and abiotic contamination, and the factors that affect them in improving food safety.	NT_P7S_WG01, NT_P7S_WG04, NT_P7S_WK06	written exam, participation in discussion
W3	Understand and apply scientific advances in animal production to be used in R&D of animal production industries.	NT_P7S_WG05	written exam, participation in discussion
Skills – Student can:			
U1	Develop and produce reports and procedures to manage food quality and safety based on continuous improvement.	NT_P7S_UW02	active participation, participation in discussion
U2	Develop autonomous and lifelong learning in the agro-food field.	NT_P7S_UK08	active participation, participation in discussion
U3	Plan research projects related to food quality and safety in agro-food technology.	NT_P7S_UO06	active participation, participation in discussion
U4	Formulate innovation strategies to control the raw materials that influence improvements in the quality of finished products.	NT_P7S_UW03	active participation, presentation, participation in discussion
Social competences – Student is ready to:			
K1	Critical and self-critical capacity to assess, contrast, and decide upon scientific advances in agro-food technology and quality.	NT_P7S_KK01	active participation, participation in discussion
K2	Capacity for innovation and creativity in the agro-food field.	NT_P7S_KOR3	active participation, participation in discussion
K3	Apply knowledge acquired and form judgments that include reflection on social and ethical repsonsibilities in the agro-food field.	NT_P7S_KO02	active participation, participation in discussion

Study content

No.	Course content	Activities
1.	The role of livestock in food security Risk factors in primary production Legislation in force Control mechanisms in production and products	lecture
2.	Visit to Agency for Consumer Affairs, Food Safety and Nutrition and animal industry Collection of information, preparation of a report, exhibition and debate on two current topics related to the food safety of foods of animal origin.	laboratory classes

Entry requirements

basic and food chemistry, food analysis, animal food products safety, food law

UNIWERSYTET PRZYRODNICZY we WROCŁAWIU

Biosustainability and assesment of food industry co-products
Educational subject description sheet

Basic information

Field of study Food Technology	**Education cycle** 2022/23
Speciality -	**Subject code** WBiNoZNFT-AMS.MI4BO.3249.22
Department The Faculty of Biotechnology and Food Science	**Lecture languages** English
Study level Second-cycle (engineer) programme	**Mandatory** mandatory
Study form Full-time	**Block** major subjects (conducted) in foreign languages
Education profile General academic	**Subject related to scientific research** No
	Subject shaping practical skills No

Period Semester 3	Examination graded credit Activities and hours lecture: 20, laboratory classes: 10	Number of ECTS points 3.0

Goals

C1	This course focuses on techniques used for assessment and valorization of co-products generated at agro-food industries, including residues of animal and plant origin. Effective and sustainable management of these high volume of products may be achieved through taking advantage of composition and availability of residues, as well as implementation of innovative processing technologies.

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge – Student knows and understands:			
W1	concept of sustainability in the food industry	NT_P7S_WG02	written credit

W2	the generation and valorisation of co-products in the food industry	NT_P7S_WG05	written credit
Skills – Student can:			
U1	identify the most current strategies on the use of co-products	NT_P7S_UW01	practical training report
U2	evaluate the most appropriate valorization technologies for selected co-products	NT_P7S_UW05	practical training report
U3	develop and use tools to assess co-products in the agro-food industry	NT_P7S_UW05	practical training report
U4	is able to use professional terminology in a foreign language	NT_P7S_UK07	practical training report
Social competences – Student is ready to:			
K1	critical and self-critical capacity to assess, contrast, and decide upon scientific advances in agro-food technology and quality	NT_P7S_KK01	practical training report

Study content

No.	Course content	Activities
1.	Sustainability in the agri-food industry Trends in environmental aspects and legislative novelties Current technologies for the use of co-products Innovative technologies to valorization of co-products Co-products as source of bioactive compounds with added-value Valorization of vegetable co-products Valorization of co-products of animal origin	lecture
2.	Valorization of ligno-cellulosic residues Valorization of protein-rich agro-industrial residues	laboratory classes

Entry requirements

microbiology, enzymology

UNIWERSYTET PRZYRODNICZY we WROCŁAWIU

Development and new packing technologies
Educational subject description sheet

Basic information

Field of study Food Technology	**Education cycle** 2022/23
Speciality -	**Subject code** WBiNoZNFT-AMS.MI4BO.3250.22
Department The Faculty of Biotechnology and Food Science	**Lecture languages** English
Study level Second-cycle (engineer) programme	**Mandatory** mandatory
Study form Full-time	**Block** major subjects (conducted) in foreign languages
Education profile General academic	**Subject related to scientific research** Yes
	Subject shaping practical skills No

Period Semester 3	Examination graded credit Activities and hours lecture: 20, laboratory classes: 10	Number of ECTS points 3.0

Goals

C1	The aim of the course is to provide, verify and consolidate the latest knowledge and skills and the acquisition of social competences in the field of new and innovative food packaging techniques about their way of preservative action, effectiveness and suitability in various types of foods.

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge – Student knows and understands:			
W1	integrate knowledge in food production and technology to provide scientific and technical advice to producers and consumers.	NT_P7S_WG01	written credit, active participation, report, test

W2	categorize the main deterioration indices of food and use them to adapt packaging and conservation technology following agro-food marketing strategies.	NT_P7S_WG03	written credit, report, test
W3	understand and incorporate scientific advances in food production and preparation that enable improving its quality and functionality.	NT_P7S_WG04	observation of student's work, report
W4	know the tools for scientific and legal information searches in agro-food technology.	NT_P7S_WK06	written credit, active participation, test
Skills – Student can:			
U1	formulate innovation strategies to control the raw materials that influence improvements in the quality of finished products.	NT_P7S_UW03	written credit, report, test
U2	plan research projects related to food quality and safety in agro-food technology.	NT_P7S_UO06	written credit, report, test
U3	develop and use tools to assess co-products in the food industry.	NT_P7S_UW05	observation of student's work, report
U4	categorize the main deterioration indices of food and use them to adapt packaging and conservation technology following agro-food marketing strategies.	NT_P7S_UW03	active participation, test
Social competences – Student is ready to:			
K1	capacity for innovation and creativity in the food packaging technology.	NT_P7S_KOR3	written credit, active participation, report
K2	apply knowledge acquired and form judgments that include reflection on social and ethical responsibilities in the food packaging.	NT_P7S_KO02	written credit, active participation, report

Study content

No.	Course content	Activities
1.	1. Basic function of packaging. 2. Food shelf life. 3. Modified Atmosphere Packaging. 4. Intelligent food packaging. 5. Active food packaging. 6. Nanotechnologies in food packaging. 7. New materials for food packaging. 8. Food safety issues. 9. Environmental issues (biosourced, biodegradable, recyclable). 10. Future trends.	lecture

2.	1. Manufacture of new natural packaging materials.	laboratory classes
	2. Comparative analysis of the physicochemical properties of synthetic and new natural packaging materials.	
	3. Obtaining and calculating modified atmospheres to pack fresh food.	
	4. Comperative study of vacuum and modified atmosphere packaging.	
	5. Credit - test.	

Entry requirements

General food microbiology,
Mechanics science of food industry,
General and food microbiology,
Food storage,
Food hygiene and toxicology

Market opportunity analysis and direction of agro-food marketing
Educational subject description sheet

Basic information

Field of study Food Technology	**Education cycle** 2022/23
Speciality -	**Subject code** WBiNoZNFT-AMS.MI4HS.3251.22
Department The Faculty of Biotechnology and Food Science	**Lecture languages** English
Study level Second-cycle (engineer) programme	**Mandatory** mandatory
Study form Full-time	**Block** humanities and social sciences
Education profile General academic	**Subject related to scientific research** No
	Subject shaping practical skills No

Period Semester 3	**Examination** graded credit **Activities and hours** lecture: 20, laboratory classes: 10	**Number of ECTS points** 3.0

Goals

C1	The course serves to deepen knowledge and skills in marketing, especially in the food production. The course is based on familiarizing students with consumer needs, products, classification and characteristics of food markets, factors affecting demand and price level, theory of consumer behavior, marketing research methodology, marketing management

Subject's learning outcomes

Code	Outcomes in terms of		Effects	Examination methods
Knowledge – Student knows and understands:				
W1		the range of new trends of marketing in the agri-food sector	NT_P7S_WG04, NT_P7S_WK07	written credit

W2	the role and place of food sector in the scope of national food safety.	NT_P7S_WK06, NT_P7S_WK07	written credit
W3	relations between selected players, structures and systems of food economy.	NT_P7S_WK06, NT_P7S_WK07	written credit
W4	the new trends of consumption and future forecasts about food.	NT_P7S_WG01	written credit
Skills – Student can:			
U1	proper commercial information sources to solve the problems in the food industries	NT_P7S_UW01	test
U2	develop commercial strategies that allow to properly direct food products to the market	NT_P7S_UW02	test
U3	apply the basic methods of marketing and food market opportunities	NT_P7S_UW01	test
Social competences – Student is ready to:			
K1	to proper digital marketing strategies to the target segment in the field of the food industry	NT_P7S_KOR3	written credit, test
K2	formulate innovation strategies to control the raw materials that influence improvements in the quality of finished products.	NT_P7S_KOR3	written credit, test

Study content

No.	Course content	Activities
1.	1. The introduction. The specificity of EU food industry. Spatial analysis of food. Indicators of the location, the variability of the distribution and the effectiveness of the changes. 2. Product, Price, and Place. Methods and management styles. 3. Promotion 4. Market Opportunities 5. SWOT analysis 6. Marketing of agri-food products. 7. Organization of food industry. Factors driving raw materials base. Forecasting of supply of raw materials. 8. Production capacity in the food industry. The rules for determining the production capacity and analysis of its use in selected industries. Investments in the food industry. 9. Types of Businesses & Business Ownership 10. Government Agencies and Private Organizations in the Agriculture, Food, and Lecture Natural Resources Industry 11. World Food Supply	lecture

2.	1. Spatial variability of food production 2. Spatial variability of food processing 3. Organization of food sales 4. Market opportunities – case study 5. SWOT analysis 6. Marketing mix of agri-food products 7. Forecasting and trends 8. Role of government agencies 9. Impact of EU funds for production and processing. 10. Food trade – World trends.	laboratory classes

UNIWERSYTET PRZYRODNICZY we WROCŁAWIU

Research oriented at improving animal product quality and safety
Educational subject description sheet

Basic information

Field of study Food Technology	**Education cycle** 2022/23
Speciality -	**Subject code** WBiNoZNFT-AMS.MI4BO.3254.22
Department The Faculty of Biotechnology and Food Science	**Lecture languages** English
Study level Second-cycle (engineer) programme	**Mandatory** optional
Study form Full-time	**Block** major subjects (conducted) in foreign languages
Education profile General academic	**Subject related to scientific research** Yes
	Subject shaping practical skills No

Period Semester 3	**Examination** graded credit **Activities and hours** lecture: 20, project classes: 10	**Number of ECTS points** 3.0

Goals

C1	The students will learn about the latest researches oriented at improving the quality and safety of animal products.
C2	The students will learn about researches oriented at improving the quality and safety of animal products developed on WUELS.

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge – Student knows and understands:			

W1	The student understands and incorporates scientific advances in foods of animal origin that enable improving its quality and safety.	NT_P7S_WG04	written credit, project
W2	The student understands and applies scientific advances in animal production which can be used in R&D of animal production industries	NT_P7S_WG05	written credit, project
Skills – Student can:			
U1	The student is able to use tools to search for relevant and reliable information to resolve problems.	NT_P7S_UW01	project, presentation
U2	The student is able to develop and produce reports and procedures to manage food quality and safety based on continuous improvement.	NT_P7S_UW02	project, presentation
U3	the student is able to use professional terminology in a foreign language	NT_P7S_UK07	written credit, project, presentation
Social competences – Student is ready to:			
K1	The student is ready to critical and self-critical evaluate scientific advances in agro-food technology.	NT_P7S_KK01	project, presentation
K2	the student is ready to apply knowledge acquired and form judgments that include reflection on social and ethical repsonsibilities in the agro-food field.	NT_P7S_KO02	project, presentation

Study content

No.	Course content	Activities
1.	Global trends in animal based foods production. Research projects aimed at improving the quality and safety of meat and meat products. Research projects aimed at improving the quality and safety of poultry meat and eggs. Research projects aimed at improving the quality and safety of milk and dairy products.	lecture
2.	Quality and safety of the selected product of animal origin-case study. Improving animal product quality and safety-project and problem based learning. Presentation and defense of projects.	project classes

Entry requirements

basic knowledge of animal production
basic knowledge of animal products technology
basic knowledge of animal products quality and safety

UNIWERSYTET PRZYRODNICZY we WROCŁAWIU

Challenges and innovations in foods of animal-origin
Educational subject description sheet

Basic information

Field of study Food Technology	**Education cycle** 2022/23
Speciality -	**Subject code** WBiNoZNFT-AMS.MI4BO.3255.22
Department The Faculty of Biotechnology and Food Science	**Lecture languages** English
Study level Second-cycle (engineer) programme	**Mandatory** optional
Study form Full-time	**Block** major subjects (conducted) in foreign languages
Education profile General academic	**Subject related to scientific research** Yes
	Subject shaping practical skills No

Period Semester 3	**Examination** graded credit **Activities and hours** lecture: 20, project classes: 10	**Number of ECTS points** 3.0

Goals

C1	The students will learn about the latest scientific advances in products of animal origin.
C2	The students will learn about latest trends and perspectives for the future for foods of animal orgin that tend to satisfy and adapt to consumer needs.

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge – Student knows and understands:			
W1	The student knows, understands and incorporates scientific advances in animal based foods that enable improving its quality and functionality.	NT_P7S_WG04	written credit, project

W2	The student understands and applies scientific advances in animal based foods production to be used in R&D.	NT_P7S_WG05	written credit, project
Skills – Student can:			
U1	The student is able to use tools to search for relevant and reliable information to resolve problems, develop strategies, and advise agro-food industries.	NT_P7S_UW01	project, presentation
U2	The student is able to formulate innovation strategies to control the raw materials that influence improvements in the quality of finished products.	NT_P7S_UW03	project, presentation
U3	The student is able to create procedures for incorporating ingredients into foods with functional and nutritional properties and evaluate their market potential for acceptance by consumers	NT_P7S_UW04	project, presentation
U4	the student is able to use professional terminology in a foreign language	NT_P7S_UK07	written credit, project, presentation
Social competences – Student is ready to:			
K1	The student is ready to be innovativy and creativity in the agro-food field.	NT_P7S_KOR3	project, presentation
K2	The student is ready to apply knowledge acquired and form judgments that include reflection on social and ethical repsonsibilies in the agro-food field.	NT_P7S_KO02	project, presentation

Study content

No.	Course content	Activities
1.	Consumer's vs. innovations in foods of animal-origin. Challenges and innovations in meat products. Challenges and innovations in dairy products.	lecture
2.	Consumer evaluation of the selected product of animal origin-case study. Innovations and development in meat and dairy products-project and problem based learning. Presentation and defense of projects.	project classes

UNIWERSYTET PRZYRODNICZY we WROCŁAWIU

Innovation in processed and minimaly proceessed plant-based foods
Educational subject description sheet

Basic information

Field of study Food Technology	**Education cycle** 2022/23
Speciality -	**Subject code** WBiNoZNFT-AMS.MI4BO.3230.22
Department The Faculty of Biotechnology and Food Science	**Lecture languages** English
Study level Second-cycle (engineer) programme	**Mandatory** mandatory
Study form Full-time	**Block** major subjects (conducted) in foreign languages
Education profile General academic	**Subject related to scientific research** Yes
	Subject shaping practical skills No

Period	Examination	Number of ECTS points
Semester 3	graded credit **Activities and hours** lecture: 30, laboratory classes: 15	4.5

Goals

C1	Provide a knowledge about latest advances in the production and preservation of fresh fruits and vegetables
C2	Present the food classification systems
C3	Provide a knowledge about fundamentals of the industry handling minimally processed products
C4	Aware the students about the indicators for evaluation of minimally processed products

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge – Student knows and understands:			

W1	to acquire the knowledge about food classification systems	NT_P7S_WG01, NT_P7S_WG02, NT_P7S_WG03	written credit
W2	to gain knowledge about new technologies or new applications of traditional technologies to preserve the quality of agri-food products	NT_P7S_WG04, NT_P7S_WG05, NT_P7S_WK06	written credit, participation in discussion
W3	to gain knowledge about leading preservation factors for minimally processed foods	NT_P7S_WG04, NT_P7S_WK07	written credit
Skills – Student can:			
U1	know the principles of the metabolism and the physiology of the horticultural products	NT_P7S_UK08, NT_P7S_UW03	report
U2	know the tools for obtainment of minimally-processed foods	NT_P7S_UW03, NT_P7S_UW04, NT_P7S_UW05	observation of student's work, performing tasks
U3	has the ability to adjust the technique used for preservation of minimally processed products	NT_P7S_UW03, NT_P7S_UW04	observation of student's work
U4	know the latest technological advances and research related to minially processed foods	NT_P7S_UW02	report, participation in discussion
U5	has an ability to use a specific terminology in English	NT_P7S_UK07	written credit, observation of student's work, report, participation in discussion, performing tasks
Social competences – Student is ready to:			
K1	able to classify food in terms of processing	NT_P7S_KK01	written credit, performing tasks
K2	able to propose newest solution for preservation of particular minimally processed foods	NT_P7S_KO02	written credit
K3	able to apply different solution for preparation of minimally processed food	NT_P7S_KOR3	written credit

Study content

No.	Course content	Activities
1.	(1) Characterisation of horticultural products (2) Characterisation of food classification systems (3) Latest advances in the production and fresh preservation of fruits and vegetables (4) New techniques and solutions used for minimally-processed foods preservation	lecture
2.	(1) Indicators of minimally processed foods (2) Evaluation of the quality of minimally processed foods (3) Novel solution for minimally-processed horticultural products	laboratory classes

UNIWERSYTET PRZYRODNICZY we WROCŁAWIU

Planning and preparation of scientific papers
Educational subject description sheet

Basic information

Field of study Food Technology	**Education cycle** 2022/23
Speciality -	**Subject code** WBiNoZNFT-AMS.MI4HS.3232.22
Department The Faculty of Biotechnology and Food Science	**Lecture languages** English
Study level Second-cycle (engineer) programme	**Mandatory** mandatory
Study form Full-time	**Block** humanities and social sciences
Education profile General academic	**Subject related to scientific research** No
	Subject shaping practical skills Yes

Period Semester 3	**Examination** graded credit **Activities and hours** lecture: 20, laboratory classes: 10	**Number of ECTS points** 3.0

Goals

C1	Provide a knowledge about bibliometrics indexes and leading publishers
C2	Provide an information about databases of scientific publications
C3	Provide a knowledge about preparation of the scientific manuscript and review article in a particular scientific journal
C4	Aware the students about the submission systems and requirements in dependence of the publisher
C5	Provide a knowledge about evaluation process of scientific manuscripts

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods

	Knowledge – Student knows and understands:		
W1	acquire the knowledge about bibliometrics indexes and the leading publishers	NT_P7S_WK06	presentation
W2	know how to prepare a scientific manuscript in particular journal	NT_P7S_WG01	presentation
W3	know the types of open access publishing possibilities	NT_P7S_WK06, NT_P7S_WK07	active participation
W4	know how to submit manuscript to a particular journal and how to prepare cover letter	NT_P7S_WG02, NT_P7S_WG04, NT_P7S_WK06, NT_P7S_WK07	active participation
W5	gain knowledge about the evaluation or revision of a research paper	NT_P7S_WK06, NT_P7S_WK07	presentation
W6	is familiarize with the editor and reviewer's role	NT_P7S_WK07	performing tasks
	Skills – Student can:		
U1	has the ability to prepare scientific manuscript for a particular journal in dependence of the publisher requirements for manuscript preparation	NT_P7S_UK07, NT_P7S_UW01, NT_P7S_UW02	active participation
U2	has the ability to construct the scientific manuscript, review article, congress paper and book chapter for agri-food research	NT_P7S_UW01, NT_P7S_UW02, NT_P7S_UW03, NT_P7S_UW05	active participation
U3	has ability to submit the manuscript for the review process	NT_P7S_UO06, NT_P7S_UW01	active participation
U4	has the ability to respond to the editor and reviewer's comments	NT_P7S_UW05	active participation
U5	has an ability to use a specific terminology in English	NT_P7S_UK07	active participation, report, presentation, performing tasks
	Social competences – Student is ready to:		
K1	Able to plan and prepare a manuscript for publishing in scientific journal, book chapter, conference proceedings	NT_P7S_KO02, NT_P7S_KOR3	report
K2	Able to choose the publisher and journal for a special purpose of the studies	NT_P7S_KK01	active participation
K3	Able to submit the manuscript for evaluation and respond to the reviewers	NT_P7S_KK01	performing tasks

Study content

No.	Course content	Activities

1.	(1) Description of the main bibliometric indicators (2) Characterisation of leading publishers (3) Description of the general rules for preparation of scientific articles (4) Preparation of individual parts of scientific article, i.e., abstract, introduction, hypotheses, results and discussion, conclusions (5) Scientific papers and review articles (6) Cover letter – form, style (7) Description of on-line systems for submission of manuscripts (8) Review process of scientific articles	lecture
2.	(1) preparation of an abstract (2) review of the abstract (3) preparation of cover letter	laboratory classes

UNIWERSYTET PRZYRODNICZY we WROCŁAWIU

Sensory analysis as a tool for food innovation
Educational subject description sheet

Basic information

Field of study Food Technology	**Education cycle** 2022/23
Speciality -	**Subject code** WBiNoZNFT-AMS.MI4BO.3233.22
Department The Faculty of Biotechnology and Food Science	**Lecture languages** English
Study level Second-cycle (engineer) programme	**Mandatory** mandatory
Study form Full-time	**Block** major subjects (conducted) in foreign languages
Education profile General academic	**Subject related to scientific research** Yes
	Subject shaping practical skills No

Period Semester 3	**Examination** exam **Activities and hours** lecture: 30, laboratory classes: 15	**Number of ECTS points** 4.5

Goals

C1	This course will allow the student to delve into advanced and completely practical aspects of sensory analysis. Transfer of knovledge in the field of formation of descriptive panels and in the realization of consumer studies for companies in the agri-food sector as well as transfer practical and real experience with companies to the student who is beginning his career in this sector.

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge – Student knows and understands:			
W1	The student knows and understands at an advanced level the concepts and issues related to the sensory analysis of food.	NT_P7S_WG01	written exam, test

W2	The student knows and understands what the descriptive sensory analysis tests are	NT_P7S_WG04	written exam, test
W3	The student knows and understands what the affective (consumers) studies are.	NT_P7S_WG01	written exam, test
Skills – Student can:			
U1	The student is able to develop specific lexicons for specific products and create a database of "general" reference products of wide use.	NT_P7S_UW03, NT_P7S_UW05	observation of student's work, active participation, report, test
U2	The student is able to train and "certify" panels of tasters for private companies.	NT_P7S_UK08	observation of student's work, active participation, report, test
U3	The student is able to estimate the shelf life of foods using sensory analysis.	NT_P7S_UK07	observation of student's work, active participation, report, test
U4	The student is able to design a specific affective study for a national and / or international market and determine the factors that control the acceptance of national and international consumers as well as estimate the willingness to pay of national and international consumers for a new product.	NT_P7S_UO06, NT_P7S_UW04	observation of student's work, active participation, report, test
U5	The student is able to evaluate the new techniques that arise in sensory analysis and determine its practical application.	NT_P7S_UW01	observation of student's work, active participation, report, test
Social competences – Student is ready to:			
K1	The student is ready to use the knowledge and skills in the field of sensory analysis of food in solving problems in agro-food field.	NT_P7S_KOR3	observation of student's work, active participation
K2	The student is ready to critically assess knowledge and skills as well consult with experts in the event of difficulties in solving the problem on your own.	NT_P7S_KK01	observation of student's work, active participation

Study content

No.	Course content	Activities

1.	1. Development of sensory lexicons (development: definitions, reference products and method of preparation; spectrum method). 2. Training of quality panels in agri-food companies (control of the functioning of the panel and each panelist; motivation). 3. Training of Research and Development panels in agri-food companies (control of the operation of the panel and each panelist; motivation) 4. Evaluation of the sensory shelf-life of food. 5. Accreditation of sensory panels. 6. Advances statistics for descriptive sensory studies. 7. Organization and realization of affective studies (implementation of the results and preparation of reports: hedonic scales; JAR type questions (just about right); purchase intent; CATA questions) 8. Focus groups. 9. Willingness to pay. 10. Advanced statistics for consumer studies (PCA, PLS, preference maps, CATA data analysis, and clustering).	lecture
2.	1. Lexicon development for a specific product. 2. Development of a new product based on chocolate. 3. Certification of the sensory panel: verification of the documents and sensory tools. 4. Evaluation of different statistical computer packages for use in research on quality control studies. 5. Conducting a focus group on a specific food group. 6. Evaluation of the availability to pay in European markets for a new product: on-line study. 7. Design, execution and interpretation of an affective study for a new product. 8. Statistical computer studies for use in research on consumer studies.	laboratory classes

Entry requirements

The basic knovledge and skills of food quality assessment, sensory analysis of food and food products.

UNIWERSYTET PRZYRODNICZY we WROCŁAWIU

Final master project - Innovation and development of food quality and safety

Educational subject description sheet

Basic information

Field of study Food Technology	**Education cycle** 2022/23
Speciality -	**Subject code** WBiNoZNFT-AMS.MI4BO.3279.22
Department The Faculty of Biotechnology and Food Science	**Lecture languages** English
Study level Second-cycle (engineer) programme	**Mandatory** optional
Study form Full-time	**Block** major subjects (conducted) in foreign languages
Education profile General academic	**Subject related to scientific research** Yes
	Subject shaping practical skills No

Period Semester 3	**Examination** exam **Activities and hours** lecture: 30, laboratory classes: 120	**Number of ECTS points** 12.0

Goals

C1	The aim of education is to enable students to get skills preparing for professional or scientific work in the field of food production, including food product design, quality assessment and food safety, the use of advanced technological processes.
C2	The aim of the course is to prepare the diploma thesis, including the development of the results obtained and their analysis and comparison with the available data in the scientific literature in consultation with the promoter. The subject is adapted individually for each student.

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods

Knowledge – Student knows and understands:			
W1	integrate knowledge in food production and technology	NT_P7S_WG01	oral exam, project, active participation, report, participation in discussion, diploma paper
W2	advances in agro-food biotechnology and their practical applications	NT_P7S_WG02	oral exam, project, participation in discussion, diploma paper
W3	scientific advances in food production and preparation	NT_P7S_WG04	project, report, presentation, participation in discussion, diploma paper
W4	currently discussed problems in the scientific literature in the field food technology, food quality management systems and issues related to food commodity science	NT_P7S_WK06	project, participation in discussion, diploma paper
Skills – Student can:			
U1	communication abilities with professionals also in foreign language	NT_P7S_UK07	active participation, presentation
U2	develop autonomous and lifelong learning	NT_P7S_UK08	observation of student's work, active participation, presentation
U3	use tools to search for relevant and reliable information to resolve problems	NT_P7S_UW01	project, active participation, report, presentation, diploma paper
Social competences – Student is ready to:			
K1	critical capacity to assess scientific advances in food technology and quality	NT_P7S_KK01	oral exam, observation of student's work, active participation, presentation, participation in discussion, diploma paper
K2	capacity for innovation and creativity in the food technology	NT_P7S_KOR3	oral exam, observation of student's work, active participation, presentation, diploma paper

Study content

No.	Course content	Activities
1.	Detailed program adjusted individually to each student: Choice of the subject matter of the final project in the area of food technology Plan and structure the project Development of the project Presentation of the project	lecture

2.	Detailed program adjusted individually to each student: Implementation of project assumptions - carrying out research Preparation of research results Preparation of the thesis	laboratory classes

Entry requirements

Inorganic and organic chemistry, Biochemistry, Food chemistry, General and food microbiology, Food analysis, selected food technologies

UNIWERSYTET PRZYRODNICZY we WROCŁAWIU

Final master project - Food quality and functionality research
Educational subject description sheet

Basic information

Field of study Food Technology	**Education cycle** 2022/23
Speciality -	**Subject code** WBiNoZNFT-AMS.MI4B.3280.22
Department The Faculty of Biotechnology and Food Science	**Lecture languages** English
Study level Second-cycle (engineer) programme	**Mandatory** optional
Study form Full-time	**Block** major subjects
Education profile General academic	**Subject related to scientific research** No
	Subject shaping practical skills No

Period Semester 3	**Examination** exam **Activities and hours** lecture: 30, laboratory classes: 120	**Number of ECTS points** 12.0

Goals

C1	The aim of education is to enable students to get skills preparing for professional or scientific work in the field of food quality and functionality, with the use of advanced technical and technological processes.
C2	The aim of the course is to prepare the diploma thesis, including the development of the results obtained and their analysis and comparison with the available data in the scientific literature in consultation with the promoter. The subject is adapted individually for each student.

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge – Student knows and understands:			

W1	interpret advances in agro-food biotechnology and their practical applications	NT_P7S_WG02	oral exam, project, report, presentation, participation in discussion, diploma paper
W2	scientific progress in the production and preparation of food, ensuring the improvement of quality in production	NT_P7S_WG04	oral exam, project, report, presentation, participation in discussion, diploma paper
W3	the tools for scientific and legal information searches in agro-food technology	NT_P7S_WK06	oral exam, project, report, presentation, participation in discussion, diploma paper
W4	integrate knowledge in food production and quality to provide scientific and technical advice	NT_P7S_WG01	oral exam, project, report, presentation, participation in discussion, diploma paper

Skills – Student can:

U1	communicate abilities with professionals also in foreign language at B2 + level of the European Training Description System and to a higher degree use a specific terminology	NT_P7S_UK07	observation of student's work, active participation, report, presentation
U2	develop autonomous and lifelong learning in the agrofood field	NT_P7S_UK08	observation of student's work, active participation, report, presentation
U3	plan research projects related to food quality and safety in agro-food technology	NT_P7S_UW04	observation of student's work, active participation, report, presentation
U4	create procedures for incorporating ingredients into foods with functional and nutritional properties and evaluate their market potential for acceptance by consumers	NT_P7S_UW04	observation of student's work, active participation, report, presentation

Social competences – Student is ready to:

K1	critical and self-critical capacity to assess, contrast, and decide upon scientific advances in agro-food technology and quality	NT_P7S_KK01	project, observation of student's work, presentation, participation in discussion
K2	capacity for innovation and creativity in the agro-food field	NT_P7S_KOR3	project, observation of student's work, presentation, participation in discussion

Study content

No.	Course content	Activities

1.	Detailed program adjusted individually to each student: Choice of the subject matter of the final project in the area of food quality and functionality Plan and structure the project Development of the project Presentation of the project	lecture
2.	Detailed program adjusted individually to each student: Implementation of project assumptions - carrying out research Preparation of research results Preparation of the thesis	laboratory classes