



SZKOŁA GŁÓWNA  
GOSPODARSTWA  
WIEJSKIEGO

# Study programme

## Sustainable Horticulture

<b>Faculty:</b>	Faculty of Horticulture
<b>Level of study:</b>	second cycle (post bachelor's degree)
<b>Education profile:</b>	General academic
<b>Form of study:</b>	full-time studies
<b>Academic year:</b>	2023/24

## Table of contents

3  
4  
7  
8  
10  
15  
68  
72

## Basic information

Faculty name:	Faculty of Horticulture
Major name:	Sustainable Horticulture
Level of study:	second cycle (post bachelor's degree)
Profile of study:	General academic
Form of study:	full-time studies
Duration of studies (number of semesters):	4
Number of ECTS required to complete the studies:	120
The number of ECTS points a student obtains during classes conducted with the direct participation of academic teachers or other persons conducting classes:	60
Professional title awarded to graduates:	
ISCED code:	0812
Language of study:	angielski

### Assigning the major to the fields and disciplines to which the learning outcomes relate

Agriculture and horticulture	100%
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## Major characteristics

### Major characteristics

The second-degree course in Sustainable Horticulture is an extension and complementation of the knowledge of horticultural and related first-degree studies pursued at foreign and Polish universities, lasting 6 semesters and ending with a minimum of a Bachelor/License degree.

Graduates of natural sciences, understood in a broad sense, i.e. biology, environmental protection, forestry, agriculture, horticulture and related disciplines, will be able to get acquainted with horticultural sciences thanks to the fact that the construction of the study programme in the scope of compulsory subjects includes content systematising knowledge of horticultural sciences, which is implemented during the first three semesters.

In particular, **the first semester** allows students to become familiar with the versatility of applications of the results of scientific work in horticultural science, e.g. in the cultivation, care, welfare and production of horticultural plants, the impact of this production on the environment. The content of the individual modules allows students to become broadly familiar with the variety of research carried out in horticultural science and the results of this research in scientific and application - implementation. An extremely important element of the study programme of the first semester is to familiarise students with issues of sustainable development in the aspect of horticultural sciences, the role of horticultural sciences in shaping pro-environmental CSR - ESG attitudes and the impact of horticultural sciences on environmental policy and levelling the effects of environmental degradation. This content is covered in the definitional scope in the module *Impact of environmental degradation and climate changes on sustainable horticulture* and in the in-depth scope in the individual modules in the first semester as well as in the remaining semesters.

During **the second semester**, the student is introduced to horticultural production issues. Horticulture in the 21st century is a response to the challenges posed by a growing human population and the associated growing demand for food, the form of which, due to ongoing negative environmental and climate changes, is changing towards an increasing proportion of plant products in the diet. For this reason, so much emphasis is placed in the second semester modules on environmentally sustainable horticultural production.

During **the third semester**, the student is introduced to the control and influence on the quality of the horticultural product. The intensification of horticultural production must be linked to a high quality product. Therefore, the third semester of the Sustainable Horticulture degree programme is devoted to the identification of methods to influence the quality and productivity of horticultural production and the control of the horticultural product.

**The fourth semester** is devoted to the diploma thesis and subjects that enhance humanistic and social skills and competences.

The offer is aimed at those who want to become specialists in horticultural sciences pursued in the context of *The Sustainable Development Goals* and *The New Green Deal*, to understand the nature of climate change and environmental challenges, to explore modern horticultural production systems, innovative crops and new - experimental trends in horticulture, to broaden their knowledge of vegetable, fruit, ornamental and landscape plant protection, integrated and organic fruit and vegetable production systems and organic, urban horticulture.

The realisation of the thesis allows the student to select a thesis topic corresponding to the future professional plans of the graduate. In the realisation of the thesis, the student can, among other things, plan his/her future farm: a vineyard, a fruit orchard, vegetable or flower production.

In the course of the study programme, graduates can benefit from Erasmus mobility abroad and thus acquire knowledge and skills in other countries.

The study programme comprises 43% compulsory subjects (54 ECTS) and 57% optional subjects (66 ECTS), which the student can tailor to his/her interests and development plans. The study programme is delivered over 4 semesters (the student earns 28 credits ECTS credits during first semester, 32 ECTS credits during second semester and 30 ECTS credits during each third and fourth semester, for a total of 120 ECTS credits).

Student mobility within programmes, e.g. ERASMUS +, is possible in the 2nd and 3rd semester.

Optional subjects are scheduled, inter alia, in 3 semesters in modules (module 1 covering directional subjects in semester 2, module 2 covering directional subjects in semester 3, module 3 covering humanities and social sciences in semester 4). Within the individual modules, the student selects subjects according to his/her interests with the following number of ECTS credits: in the first module (15 ECTS), the second module (15 ECTS) and the third module (8 ECTS).

The student achieves learning outcomes through non-module activities, so that the range of information in the optional subjects is a deepening of knowledge. The list of elective subjects is open and can be modified and adapted to the students'

needs. The list of elective subjects allows the student to realise a focused pathway of deepening knowledge and familiarity with the selected topics chosen for them.

### **Learning objectives**

The primary task of academic staff in the faculty is to educate and nurture based on the best models. This task is fulfilled in particular through the staff's research, internationalisation of activities and building relationships with the socio-economic environment. The main objective of the teaching process in the second-cycle studies of the Sustainable Horticulture major is to provide education so that graduates: possess knowledge, skills and competences at the highest level and are prepared to compete in today's labour market and function in a knowledge-based society.

In particular, this concerns the shaping of competences in linking horticultural science and practice in the context of climate and environmental change, the ability to anticipate impacts and to forecast and create policies for the development of horticulture in the next decades in line with **The Sustainable Development Goals**, and **Corporate Social Responsibility** [CSR], a concept whereby companies take into account social and environmental interests at the strategy-building stage, as well as relations with different stakeholder groups.

### **Education concept**

The educational concept for the second-degree studies in Sustainable Horticulture (conducted in English) at Warsaw University of Life Sciences has been developed taking into account the provisions of the common law, the University's internal regulations and the recommendations contained in the Standards and Guidelines for Quality Assurance in the European Higher Education Area and is consistent with the University's Strategy. During this study, Sustainable Horticulture, students acquire comprehensive knowledge and skills in horticultural science, including: Sustainable Development Goals in the context of horticultural science and implementation of their findings, horticultural production technology, sustainable horticulture, landscaping and conservation, and issues related to the implementation of the New Green Deal, Sustainable Development, Common Reporting Standard - the factors on which non-financial ratings and assessments of, among others, horticultural companies and other organisations are based, i.e.: E - Environment (environmental), S - Social Responsibility (social responsibility) and G - Corporate Governance (corporate governance). For this reason, issues from economic science, management and production quality control are included in the study programme.

Students of the Sustainable Horticulture degree programme acquire the necessary modern practical skills in the use of IT tools, a foreign language that allows them to use specialist literature and to communicate at the B2+ level of the Common European Framework of Reference for Languages.

In addition, they acquire skills in the so-called soft skills of working in a team and leading teams of horticultural specialists and transdisciplinary teams.

### **Indication of the socio-economic needs of creating a major**

N/A

### **Indication of compliance of learning outcomes with socio-economic needs**

The teaching concept for Sustainable Horticulture is that the graduate will be prepared to an advanced degree to carry out research and analytical work, and will be able to use the skills acquired in adapting to the labour market.

Graduates of Sustainable Horticulture receive a broad professional background in both the various branches of horticulture and other horticultural-related activities in the context of sustainability issues and the adaptation of horticulture to changing environmental conditions and climate change.

As the study programme includes elements of horticulture's connection with the environment and urban areas, graduates can also work in design offices, urban greening companies and similar. Sustainable Horticulture graduates are prepared to run their own businesses in the horticultural sector: nurseries for ornamental trees and shrubs and fruit plants, berry plantations, orchard, ornamental and vegetable production, companies offering green services in public and private spaces, horticultural consultancy, garden establishment.

Graduates have the opportunity to develop competence in interior decoration, wedding decoration design and floristry.

Graduates will be able to work in professional associations, scientific and research institutions as a specialist, raw material and cosmetic laboratories, education at various levels.

Upon graduation and taking into account the knowledge acquired in the first degree, the graduate will have obtained an

horticultural qualification and will be entitled to apply (after fulfilling other statutory requirements) for the granting of professional entitlements, such as the Polish equivalents:

1. agricultural entitlements pursuant to the Act on Shaping the Agricultural System (Act of 11 April 2003 on Shaping the Agricultural System, Dz.U. 2003 No. 64 item 592 as amended).
2. inspector's competence in food quality systems: GlobaGAP, BioSuisse, integrated production, organic farming, regional and traditional products and others.
3. powers of inspector of the Commercial Inspection for Agricultural and Food Quality.
4. entitlement to use plant protection products.
5. entitlements in the field of plant production, issuing of plant passports, seed certification.

## Potrzeby społeczno-gospodarcze

### Indication of the socio-economic needs of creating a major

Specialists in horticultural sciences in the broadest sense, particularly in terms of climate change and the environment, are in demand on the labour market because of their skills and competences in operating under dynamically changing environmental conditions and the concomitant changing legislation and requirements for food production.

Horticulture graduates therefore find employment in Poland in:

- state administration (in the equivalent Polish institutions e.g. the Agency for Restructuring and Modernisation of Agriculture, the National Agricultural Support Centre, the Plant Protection and Seed Inspection, the Agricultural and Food Quality Inspection, Environmental Protection Directorates, the Polish Agency for Enterprise Development, the National Rural Network),
- European Union institutions and administration, e.g. Committee of Agricultural Organisations in the European Union (COPA),
- research centres, such as the Institute of Horticulture, the Plant Protection Institute, the Institute of Technology and Life Sciences, the Institute of Cultivation, Fertilisation and Soil Science, the Institute of Natural Fibres and Herbaceous Plants,
- private companies producing nursery stock of ornamental plants, vegetables, fruit trees and shrubs, in vitro production and micro seedlings,
- sectoral companies: manufacturers of fertilisers, agricultural preparations, plant protection products, seed companies, trading companies, logistic companies,
- financial and audit institutions - CRS-ESG specialists in non-financial reporting and analysis of credit and grant applications in the above-mentioned area.

### Indication of compliance of learning outcomes with socio-economic needs

The learning outcomes developed for the Sustainable Horticulture major meet socio-economic needs. They are the result of consultations with the economic environment, and take into account changes taking place both in the social sphere - associated with changes in the demographic structure of towns and villages, changes in eating habits, economic - associated with the entry into force of the CRS-ESG procedures, economization of solutions, technological - the application of the latest research results from the field of horticultural sciences and the interface between horticultural sciences and other sciences - biological, technical, etc. and the development of new methods used in broadly understood horticultural production and environmental protection. The learning outcomes of KNOWLEDGE [e.g. P7S\_WG, P7Z\_WT\_2, P7Z\_WZ, P7Z\_WO], in the sphere of environmental awareness [P7S\_KO].

It should also be emphasised that in the learning process emphasis is placed on the development of professional competences in the field of industrial property and copyright protection principles in the field of professional activity [P7Z\_WT\_3] and developing organisational solutions in the field of professional activity in the context of solutions applied in other fields [P7Z\_WO], communicating on specialised topics with diverse audiences, leading debate [P7S\_UK\_1].

The Sustainable Horticulture degree programme is designed to enable the graduate to formulate and solve complex and unusual problems and perform tasks innovatively in unpredictable conditions by: appropriate selection of sources and information from them, making evaluation, critical analysis, synthesis and creative interpretation and presentation of this information; selecting and applying appropriate methods and tools, including advanced information and communication technology (ICT) [P7S\_UW]. The study programme enables the student to gain competences enabling him/her to manage a research team in the field of horticultural sciences or a task team in the field of horticultural works, develop a strategic plan for an employee team / organisation in the field of professional activity, perform complex and unusual professional tasks in variable and unpredictable conditions, lead an employee team / organisation performing complex and atypical professional tasks under variable and unpredictable conditions, analyse and evaluate the conducted professional activity in the perspective of development trends in the professional activity field [P7S\_UO, P7Z\_KP, P7S\_KR, P7Z\_KW, P7Z\_KO].

## Learning outcomes

### Knowledge

Code	Content	PRK
SH_K2_W01	Graduate knows and understands of the advanced knowledge of botany, environmental protection, biodiversity and the complexity of the natural world, relevant to horticultural science, influencing the planning and realisation of sustainable plant production and will understand the interdependencies arising from a holistic approach to horticultural production.	P7S_WG
SH_K2_W02	Graduate knows and understands to an in-depth degree trends in the development of horticultural sciences, taking into account the context of changes taking place in all spheres, including economic, environmental, social, research and application trends in technologies used in sustainable horticulture, theoretical foundations of methods and technologies used in horticulture in relation to other fields.	P7S_WG
SH_K2_W03	Graduate knows and understands, to a deeper degree, selected technical, technological and methodical aspects used in sustainable horticultural production, also in the context of solutions applied in other fields.	P7S_WG
SH_K2_W04	Graduate knows and understands, to an in-depth degree, the theories relating to phenomena and processes that make it possible to overcome the limitations imposed by the properties of the materials, methods and technologies used, relating to sustainable horticultural production and the quality of the horticultural product.	P7S_WG
SH_K2_W05	Graduate knows and understands, to a deeper degree, the fundamental dilemmas of modern civilisation: economic, legal and other conditions of various types of horticultural production activities, including the principles of protection of industrial property and copyright.	P7S_WK
SH_K2_W06	Graduate knows and understands in depth the principles of establishment and development of entrepreneurship in horticultural science and practice.	P7S_WK

### Skills

Code	Content	PRK
SH_K2_U01	Graduate is able to plan and carry out research work in the broadly understood horticultural sciences, including reviewing, experimental work, interpreting the obtained results and drawing conclusions; formulate and solve complex and unusual problems and perform tasks in an innovative manner under unpredictable conditions by: appropriately selecting sources and information from them, evaluating, critically analysing, synthesising and creatively interpreting and presenting this information; selecting and applying appropriate methods and tools, including advanced information and communication technology (ICT).	P7S_UW
SH_K2_U02	Graduate is able to refer critically to the current state of knowledge on the subject undertaken in the research, the functioning of technical solutions applied in sustainable horticulture and to make an objective evaluation of the solutions applied, also in relation to the context of environmental changes.	P7S_UW
SH_K2_U03	Graduate is able to solve tasks, design and construct simple devices, objects, systems or carry out processes, using appropriately selected methods, techniques, tools and materials applied in the broad field of horticultural sciences, modify methods and technologies and procedures in scientific or professional work.	P7S_UW
SH_K2_U04	Graduate is able to formulate and test hypotheses related to simple research problems within the horticultural sciences and related in terms of the hypotheses tested.	P7S_UW



<b>Code</b>	<b>Content</b>	<b>PRK</b>
<b>SH_K2_U05</b>	Graduate is able to communicate on specialised topics with a variety of audiences, to debate.	P7S_UK
<b>SH_K2_U06</b>	Graduate is able to use a foreign language at B2+ level of the Common European Framework of Reference for Languages and a higher level of specialised terminology.	P7S_UK
<b>SH_K2_U07</b>	Graduate is able to manage a research team and collaborate with others in teamwork in the field of horticultural sciences or a task force in the field of horticultural works, develop a strategic plan for a team of workers / organisation in the field of professional activity, perform complex and unusual professional tasks under variable and unpredictable conditions, manage a team of workers / organisation performing complex and unusual professional tasks under variable and unpredictable conditions, analyse and evaluate the conducted professional activity in the perspective of development trends in the field of professional activity.	P7S_UO
<b>SH_K2_U08</b>	Graduate is able to plan and carry out his/her own lifelong learning and to guide others in this respect; to guide the development of the professional competences of subordinate staff and to transfer professional knowledge in various forms; to monitor the development of the field of professional activity and related fields as well as its international conditions and contexts.	P7S_UU

## **Social competence**

<b>Code</b>	<b>Content</b>	<b>PRK</b>
<b>SH_K2_K01</b>	Graduate is ready to critically evaluate information, perceived content, recognise the importance of knowledge in solving cognitive and practical problems in research and professional work in the field of sustainable horticulture, in particular in the context of environmental problems, the use of natural environmental resources and the impact of horticultural activities on the environment.	P7S_KK
<b>SH_K2_K02</b>	Graduate is ready to use the research achievements of horticultural sciences and the scientific results of related and associated fields in solving cognitive and practical problems related to sustainable horticulture.	P7S_KK
<b>SH_K2_K03</b>	Graduate is ready to maintain and create proper relations in the professional environment, to promote a culture of pro-quality in the field of sustainable horticultural activity and to make decisions in high-risk situations requiring others to comply with the rules in force in the field of professional activity, concerning the maintenance of the quality of conducted activity and the culture of cooperation and competition.	P7S_KO
<b>SH_K2_K04</b>	Graduate is ready to think and act in an entrepreneurial way, taking into account social obligations, inspiring and organising activities for the benefit of the social environment.	P7S_KO
<b>SH_K2_K05</b>	Graduate is ready to fulfil professional roles responsibly, taking into account changing social needs, including: developing the achievements of the profession, upholding the ethos of the profession, observing and developing the principles of professional ethics and acting to uphold these principles in the context of sustainable horticultural activity under conditions of climate and environmental change and economic and social conditions.	P7S_KR

## Study plan

### Semester 1

In semester 1, students complete library training and a health and safety course on a platform available at <https://szkolenia.sggw.pl>

Subject	Number of hours	ECTS points	Form of verification
OHS training	OHS training: 4	0	Pass O
Foreign language I	Language course: 30	2	Pass with grade G
English language I	Language course: 30	2	Pass with grade F
German language I	Language course: 30	2	Pass with grade F
Polish language I	Language course: 30	2	Pass with grade F
Spanish language I	Language course: 30	2	Pass with grade F
Advanced issues in sustainable pomology	Lecture: 15 Laboratory exercises: 30	3	Exam O
Medicinal and aromatic plants	Lecture: 15 Laboratory exercises: 15	2	Exam O
Advanced issues in sustainable production of vegetables	Lecture: 15 Laboratory exercises: 30	3	Exam O
Advanced issues in sustainable production of ornamental plants	Lecture: 15 Laboratory exercises: 30	3	Exam O
Arboriculture	Lecture: 15 Laboratory exercises: 30	3	Pass with grade O
Plant functioning under environmental stresses	Laboratory exercises: 30	2	Pass with grade O
Impact of environmental degradation and climate changes on sustainable horticulture	Lecture: 15 Laboratory exercises: 15	2	Pass with grade O
Aspects of plant pathology in sustainable horticulture	Lecture: 15 Laboratory exercises: 30	3	Pass with grade O
Pest control in sustainable horticulture	Lecture: 15 Laboratory exercises: 30	3	Exam O
Intellectual properties	Lecture: 15	1	Pass with grade O
Advanced information technologies	Lecture: 15	1	Pass with grade O
<b>Sum</b>	<b>424</b>	<b>28</b>	

## Semester 2

Subject	Number of hours	ECTS points	Form of verification	
Breeding and sustainable propagation of fruit plants	Lecture: 15 Laboratory exercises: 30	3	Exam	O
Sustainable methods of seed production and propagation of vegetable and medicinal plants	Lecture: 15 Laboratory exercises: 30	3	Exam	O
Breeding and sustainable propagation of ornamental plants	Lecture: 15 Laboratory exercises: 30	3	Exam	O
Environmental monitoring and detection of plants pests	Lecture: 10 Laboratory exercises: 20	2	Exam	O
Role of plants diseases detection in sustainable horticulture production	Lecture: 10 Laboratory exercises: 20	2	Exam	O
Module 1- Facultative subjects	Laboratory exercises: 150	15	Pass with grade	G
Student chooses 5 modules				
Nutritional properties of fruits from organic production	Laboratory exercises: 30	3	Pass with grade	F
Pruning and training of trees and shrubs	Laboratory exercises: 30	3	Pass with grade	F
Plant physiology aspects in sustainable production of herbs and vegetables	Laboratory exercises: 30	3	Pass with grade	F
Wild-growing medicinal, food and cosmetic plants	Laboratory exercises: 30	3	Pass with grade	F
Indoor flower arrangements	Laboratory exercises: 30	3	Pass with grade	F
Practicum of phytopathological research	Laboratory exercises: 30	3	Pass with grade	F
Insect behaviour	Laboratory exercises: 30	3	Pass with grade	F
Foreign language II	Language course: 30	2	Pass with grade	G
English language II	Language course: 30	2	Pass with grade	F
German language II	Language course: 30	2	Pass with grade	F
Polish language II	Language course: 30	2	Pass with grade	F
Spanish language II	Language course: 30	2	Pass with grade	F

<b>Subject</b>	<b>Number of hours</b>	<b>ECTS points</b>	<b>Form of verification</b>
Diploma seminar I	Laboratory exercises: 30	2	Pass with grade G
In the first half of the semester the student learns about the principles of writing a master's thesis, in the second half of the semester the student chooses the topic of the thesis.			
<b>Sum</b>	<b>405</b>	<b>32</b>	

## Semester 3

<b>Subject</b>	<b>Number of hours</b>	<b>ECTS points</b>	<b>Form of verification</b>
Fruit quality	Lecture: 15 Laboratory exercises: 15	3	Exam O
Postharvest treatment of vegetable and medicinal plants	Lecture: 15 Laboratory exercises: 15	3	Exam O
Evaluation and shaping of ecological structure in landscape	Lecture: 15 Laboratory exercises: 30	3	Exam O
Phytoremediation	Laboratory exercises: 30	2	Exam O
Economics, management, marketing in horticulture	Lecture: 30	2	Pass with grade O
Diploma seminar II	Laboratory exercises: 30	2	Pass with grade G
Continuation from Semester 1			
Diploma seminar II	Laboratory exercises: 30	2	Pass with grade F
Module 2- Facultative subjects	Laboratory exercises: 150	15	Pass with grade G
Student chooses 5 modules			
Ecotoxicology	Laboratory exercises: 30	3	Pass with grade F
Decision support systems in fruit production and storage	Laboratory exercises: 30	3	Pass with grade F
Quality evaluation of plant products	Laboratory exercises: 30	3	Pass with grade F
Essential oils application in sustainable horticulture	Laboratory exercises: 30	3	Pass with grade F
Plants' mysteries under microscope	Laboratory exercises: 30	3	Pass with grade F
Ornamental plants in human environment	Laboratory exercises: 30	3	Pass with grade F

<b>Subject</b>	<b>Number of hours</b>	<b>ECTS points</b>	<b>Form of verification</b>
Integrated methods pests management	Laboratory exercises: 30	3	Pass with grade F
The microworld of fungi	Laboratory exercises: 30	3	Pass with grade F
Plants in human diet	Laboratory exercises: 30	3	Pass with grade F
<b>Sum</b>	<b>345</b>	<b>30</b>	

## Semester 4

<b>Subject</b>	<b>Number of hours</b>	<b>ECTS points</b>	<b>Form of verification</b>
Diploma seminar III	Laboratory exercises: 30	2	Pass with grade G
Continuation from Semester 3			
Diploma seminar III	Laboratory exercises: 30	2	Pass with grade F
Diploma thesis	Diploma thesis: 0	20	Pass with grade G
Diploma thesis	Diploma thesis: 0	20	Pass with grade F
Module 3- Facultative subjects Humanities/social subject	Lecture: 30 Auditorium exercises: 60	8	Pass with grade G
Student chooses one elective for 4 ECTS and two for 2 ECTS each.			
Humanities/social subject: A man in a bussines	Lecture: 15 Auditorium exercises: 30	4	Pass with grade F
Humanities/social subject: Cultural heritage of the gardens	Lecture: 15 Auditorium exercises: 30	4	Pass with grade F
Humanities/social subject: Ethnobotany	Lecture: 15 Auditorium exercises: 30	4	Pass with grade F
Humanities/social subject: Protection of cultural heritage in rural areas	Lecture: 15 Auditorium exercises: 30	4	Pass with grade F
Humanities/social subject: Law and sociological aspects of landscape and ecological infrastructure protection	Lecture: 15 Auditorium exercises: 30	4	Pass with grade F
<b>Sum</b>	<b>120</b>	<b>30</b>	

*O - Obligatory subjects*  
*G - Mandatory group*  
*F - Elective subjects*

**Description of the learning outcomes assigned to the subjects and the curriculum content ensuring the achievement of these outcomes**

Subject name:		English language I	ECTS: 2
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
<p>Knowledge: (In terms of knowledge, the graduate knows and understands)</p> <p>Skills: (In terms of skills, the graduate can)</p> <p>Social competences: (Within the scope of competence, the graduate is ready to)</p>	W1	vocabulary of the specialist language for the field of study.	SH_K2_W01
	U1	describe phenomena, processes and procedures.	SH_K2_U05, SH_K2_U06
	U2	conduct correspondence and take notes.	SH_K2_U05, SH_K2_U06
	U3	give explanations, give reasons, express opinions or make plans.	SH_K2_U05, SH_K2_U06
	K1	preparing and delivering presentations.	SH_K2_K01, SH_K2_K05
	K2	conducting interviews and discussions.	SH_K2_K01, SH_K2_K05
	K3	communicate correctly in most situations of professional life using specialised linguistic resources.	SH_K2_K01, SH_K2_K05
Course content ensuring the achievement of learning outcomes:		<p>Mastering a specialist foreign language at B2+ level of the Common European Framework of Reference for Languages.</p> <p>Language learning, effective use of a foreign language in the area of field of study in the four skills (listening, speaking, writing and reading) in professional and scientific communication. Vocabulary in the field of language specialised language for the field of study. Language functions: describing phenomena, processes, procedures, conducting correspondence, interviews, discussions, taking notes, preparing and delivering presentations. Lexical functions: development and correct use of specialised linguistic resources. Practising oral and written communication.</p>	
Examination methods:		Presentation, Assessment of activity during classes	

Subject name:		German language I	ECTS: 2
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
<p>Knowledge: (In terms of knowledge, the graduate knows and understands)</p> <p>Skills: (In terms of skills, the graduate can)</p> <p>Social competences: (Within the scope of competence, the graduate is ready to)</p>	W1	vocabulary of the specialist language for the field of study.	SH_K2_W01
	U1	describe phenomena, processes and procedures.	SH_K2_U05, SH_K2_U06
	U2	conduct correspondence and take notes.	SH_K2_U05, SH_K2_U06
	U3	give explanations, give reasons, express opinions or make plans.	SH_K2_U05, SH_K2_U06
	K1	preparing and delivering presentations.	SH_K2_K01, SH_K2_K05
	K2	conducting interviews and discussions.	SH_K2_K01, SH_K2_K05
	K3	communicate correctly in most situations of professional life using specialised linguistic resources.	SH_K2_K01, SH_K2_K05
Course content ensuring the achievement of learning outcomes:		<p>Mastering a specialist foreign language at B2+ level of the Common European Framework of Reference for Languages.</p> <p>Language learning, effective use of a foreign language in the area of field of study in the four skills (listening, speaking, writing and reading) in professional and scientific communication. Vocabulary in the field of language specialised language for the field of study. Language functions: describing phenomena, processes, procedures, conducting correspondence, interviews, discussions, taking notes, preparing and delivering presentations. Lexical functions: development and correct use of specialised linguistic resources. Practising oral and written communication.</p>	
Examination methods:		Presentation, Assessment of activity during classes	



Subject name:		Polish language I	ECTS: 2
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
<p>Knowledge: (In terms of knowledge, the graduate knows and understands)</p> <p>Skills: (In terms of skills, the graduate can)</p> <p>Social competences: (Within the scope of competence, the graduate is ready to)</p>	W1	vocabulary of the specialist language for the field of study.	SH_K2_W01
	U1	describe phenomena, processes and procedures.	SH_K2_U05, SH_K2_U06
	U2	conduct correspondence and take notes.	SH_K2_U05, SH_K2_U06
	U3	give explanations, give reasons, express opinions or make plans.	SH_K2_U05, SH_K2_U06
	K1	preparing and delivering presentations.	SH_K2_K01, SH_K2_K05
	K2	conducting interviews and discussions.	SH_K2_K01, SH_K2_K05
	K3	communicate correctly in most situations of professional life using specialised linguistic resources.	SH_K2_K01, SH_K2_K05
Course content ensuring the achievement of learning outcomes:		<p>Mastering a specialist foreign language at B2+ level of the Common European Framework of Reference for Languages.</p> <p>Language learning, effective use of a foreign language in the area of field of study in the four skills (listening, speaking, writing and reading) in professional and scientific communication. Vocabulary in the field of language specialised language for the field of study. Language functions: describing phenomena, processes, procedures, conducting correspondence, interviews, discussions, taking notes, preparing and delivering presentations. Lexical functions: development and correct use of specialised linguistic resources. Practising oral and written communication.</p>	
Examination methods:		Presentation, Assessment of activity during classes	

Subject name:		Spanish language I	ECTS: 2
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
<p>Knowledge: (In terms of knowledge, the graduate knows and understands)</p> <p>Skills: (In terms of skills, the graduate can)</p> <p>Social competences: (Within the scope of competence, the graduate is ready to)</p>	W1	vocabulary of the specialist language for the field of study.	SH_K2_W01
	U1	describe phenomena, processes and procedures.	SH_K2_U05, SH_K2_U06
	U2	conduct correspondence and take notes.	SH_K2_U05, SH_K2_U06
	U3	give explanations, give reasons, express opinions or make plans.	SH_K2_U05, SH_K2_U06
	K1	preparing and delivering presentations.	SH_K2_K01, SH_K2_K05
	K2	conducting interviews and discussions.	SH_K2_K01, SH_K2_K05
	K3	communicate correctly in most situations of professional life using specialised linguistic resources.	SH_K2_K01, SH_K2_K05
Course content ensuring the achievement of learning outcomes:		<p>Mastering a specialist foreign language at B2+ level of the Common European Framework of Reference for Languages.</p> <p>Language learning, effective use of a foreign language in the area of field of study in the four skills (listening, speaking, writing and reading) in professional and scientific communication. Vocabulary in the field of language specialised language for the field of study. Language functions: describing phenomena, processes, procedures, conducting correspondence, interviews, discussions, taking notes, preparing and delivering presentations. Lexical functions: development and correct use of specialised linguistic resources. Practising oral and written communication.</p>	
Examination methods:		Presentation, Assessment of activity during classes	

Subject name:		Advanced issues in sustainable pomology	ECTS: 3
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	the biological processes and specificity of fruit plants.	SH_K2_W01
	W2	the principles of different types of fruit production.	SH_K2_W02, SH_K2_W03, SH_K2_W06
Skills: (In terms of skills, the graduate can)	U1	apply the principles of nature to modern fruit production technology.	SH_K2_U01, SH_K2_U02, SH_K2_U03
	U2	protect plants as against biotic and abiotic stresses.	SH_K2_U01, SH_K2_U02
	U3	present current scientific achievements used in horticultural production.	SH_K2_U01, SH_K2_U02, SH_K2_U04, SH_K2_U05
	U4	correctly analyse the results of research.	SH_K2_U02, SH_K2_U04, SH_K2_U05
Social competences: (Within the scope of competence, the graduate is ready to)	K1	relate to the current state of knowledge of horticulture.	SH_K2_K01, SH_K2_K02, SH_K2_K04
	K2	carry out horticultural production and management independently.	SH_K2_K02, SH_K2_K04, SH_K2_K05
Course content ensuring the achievement of learning outcomes:		<p>Review of temperate zone orchard species: origin, characteristics, biology (flower biology), pomological, morphological and commercial characteristics of cultivars, nutritional values of different fruit species.</p> <p>Fruit trees and shrubs cultivation structure in Poland and in the world.</p> <p>Discussion of the specific characteristics of orchard plants as perennial species.</p> <p>Modern fruit production: possibilities and technologies of cultivation, types of production, principles of setting up and running orchards and plantations, climatic and soil requirements of individual orchard species, nutrition of orchard plants.</p> <p>Biotic and abiotic risks of orchard crops and methods of their protection. Methods of protecting against frost damage to plants in orchards and plantations.</p> <p>Modern technologies of fruit harvesting and storage.</p>	
Examination methods:		Test (written or computer based)	

Subject name:		Medicinal and aromatic plants	ECTS: 2
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	the diversity of MAPs and herbal raw materials obtained from these plants and understand the factors influencing their development, cultivation and quality.	SH_K2_W01, SH_K2_W04
	W2	the groups of main biologically active compounds occurring in MAPs and understand the direction of their application.	SH_K2_W01, SH_K2_W02
	W3	basic methods of herbal raw materials evaluation and utilization and understand how to apply these methods.	SH_K2_W01, SH_K2_W03
Skills: (In terms of skills, the graduate can)	U1	identify the most important species of MAPs and raw materials obtained from these plants.	SH_K2_U01, SH_K2_U05
	U2	carry out a preliminary evaluation of the quality of herbal raw materials.	SH_K2_U01, SH_K2_U03, SH_K2_U04, SH_K2_U05
	U3	produce seedlings of selected MAPs species, to start their cultivation and carry out basic treatments during the cultivation, to harvest herbal raw materials and properly prepare them for the use.	SH_K2_U01, SH_K2_U05, SH_K2_U06, SH_K2_U07, SH_K2_U08
Social competences: (Within the scope of competence, the graduate is ready to)	K1	aware of the need to act in accordance with the principles of ethics in MAPs production.	SH_K2_K02, SH_K2_K05
Course content ensuring the achievement of learning outcomes:		Diversity of medicinal and aromatic plants (MAPs), their origin and application in various industries. Classification of herbal raw materials. Biologically active compounds of MAPs. Factors influencing the quality of herbal raw materials. Cultivation of MAPs. Basic methods of identification and quality evaluation of herbal raw materials.	
Examination methods:		Written exam, Test (written or computer based), Assessment of activity during classes	

Subject name:		Advanced issues in sustainable production of vegetables	ECTS: 3
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	the principles of sustainable vegetable production in the field and under cover.	SH_K2_W01
	W2	the processes and factors that affect the yield and quality of plants and fungi grown in specialty rooms and in the field.	SH_K2_W02
	W3	the use of facilities, equipment and tools used in the sustainable cultivation of vegetables and mushrooms.	SH_K2_W03
	W4	the nutritional values of substances contained in selected species of plants and fungi grown hydroponically in special enclosures.	SH_K2_W04
Skills: (In terms of skills, the graduate can)	U1	plan sustainable indoor and field cultivation of plants and fungi.	SH_K2_U01
	U2	evaluate the suitability of technical solutions and modern technologies used in sustainable horticultural production in specialised premises.	SH_K2_U02
	U3	use scientific literature and online databases to obtain information on detailed cultivation methodologies for specific species, innovative solutions to increase the efficiency of sustainable crops.	SH_K2_U08
Social competences: (Within the scope of competence, the graduate is ready to)	K1	be ready for new technological solutions to improve the efficiency of sustainable cultivation, quality and safety of horticultural production.	SH_K2_K01
	K2	aware of the responsibility for the quality of food produced and the state of the environment.	SH_K2_K04
Course content ensuring the achievement of learning outcomes:		Principles of operation and management of sustainable vegetable crops with hydroponic system and in the field. Technologies, equipment, lamps, tools used in vertical cultivation. Principles and methods of preparing media and substrates for growing vegetables and mushrooms. Methods and ways of care and control of sustainable cultivation under cover and in the field. Cultivation requirements and nutritional value of selected vegetable species. Influence of factors and growing conditions on the yield and quality of horticultural production carried out in the field and indoors.	
Examination methods:		Written exam, Presentation, Test (written or computer based), Assessment of activity during classes	

Subject name:		Advanced issues in sustainable production of ornamental plants	ECTS: 3
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
<p>Knowledge: (In terms of knowledge, the graduate knows and understands)</p> <p>Skills: (In terms of skills, the graduate can)</p> <p>Social competences: (Within the scope of competence, the graduate is ready to)</p>	W1	in-depth knowledge of botany, environmental protection, understands the complexities of the natural world affecting ornamental plant production.	SH_K2_W01
	W2	bases of integrated and ecological plant production.	SH_K2_W02
	W3	basic methods of horticultural plant production.	SH_K2_W03
	W4	phenomena and processes occurring in plants during growth.	SH_K2_W04
	U1	to choose methods of plant protection used in ecological production.	SH_K2_U01
	U2	to choose ornamental plants useful in urban greenery, which do not need pesticides during vegetation.	SH_K2_U02
	K1	recognise the importance of modern methods of integrated production ornamental plants.	SH_K2_K01
	K2	solve problems associated with the technology of integrated and ecological production.	SH_K2_K02
Course content ensuring the achievement of learning outcomes:		Principles of integrated and pro-ecological cultivation of ornamental plants. Registration of plant protection products. The modern production of ornamental plants combining traditional solutions with a more rational and environmentally friendly use of natural resources. Light, temperature and humidity are essential factors in maintaining plants. Substrates, fertilisers, plant growth regulators (PGRs) and environmentally friendly biostimulants - an important role in modernizing ornamental crop production. Biostimulants - an alternative to growth regulators in ornamental plant production. Water - and energy-saving methods of production of ornamental plants under covers. Ornamental plant species with low water or thermal requirements and relatively good resistance to diseases and pests.	
Examination methods:		Written exam, Presentation, Written compilation of experimental and observational results.	

Subject name:		Arboriculture	ECTS: 3
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	the principles of selection of tree and shrub species to suit the habitat conditions and function.	SH_K2_W01, SH_K2_W02, SH_K2_W03
	W2	the principles of assessing the condition of trees and evaluating the risks that trees can cause in the human environment.	SH_K2_W01, SH_K2_W02, SH_K2_W03, SH_K2_W04, SH_K2_W05
	W3	the principles of tree and shrub care.	SH_K2_W01, SH_K2_W02, SH_K2_W03, SH_K2_W04
Skills: (In terms of skills, the graduate can)	U1	recognise selected tree and shrub species.	SH_K2_U01, SH_K2_U02
	U2	assess the condition of the tree and suggest maintenance treatments and other arboricultural methods to improve the condition of the tree and to increase the safety of people and property in the field of the tree.	SH_K2_U01, SH_K2_U02, SH_K2_U03, SH_K2_U04, SH_K2_U05, SH_K2_U07
	U3	how to select methods to secure trees in different functional-spatial situations.	SH_K2_U01, SH_K2_U02, SH_K2_U03, SH_K2_U04, SH_K2_U05, SH_K2_U07
Social competences: (Within the scope of competence, the graduate is ready to)	K1	perform a visual inspection of the tree and assess its condition.	SH_K2_K01, SH_K2_K02, SH_K2_K03, SH_K2_K05
	K2	design tree care works.	SH_K2_K01, SH_K2_K02, SH_K2_K03, SH_K2_K05
Course content ensuring the achievement of learning outcomes:		The cultivation, management, and study of individual trees, shrubs, vines, and other perennial woody plants. The science of arboriculture studies how these plants grow and respond to cultural practices and to their environment. The practice of arboriculture includes cultural techniques such as selection, planting, training, fertilization, pest and pathogen control, pruning, shaping, and removal.	
Examination methods:		Presentation, Project	

Subject name:		Plant functioning under environmental stresses	ECTS: 2
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	the sources and types of abiotic stresses.	SH_K2_W01, SH_K2_W02, SH_K2_W04
	W2	the most important mechanisms of acclimatization and adaptation to abiotic stresses.	SH_K2_W01, SH_K2_W02, SH_K2_W04
	W3	of plant responses to abiotic stresses.	SH_K2_W01, SH_K2_W03, SH_K2_W04
Skills: (In terms of skills, the graduate can)	U1	accurately recognize abiotic stress through symptom analysis.	SH_K2_U01, SH_K2_U02, SH_K2_U04, SH_K2_U08
	U2	evaluate the level of stress intensity using cutting-edge research techniques and effectively apply this knowledge in practical applications.	SH_K2_U01, SH_K2_U04, SH_K2_U05, SH_K2_U08
Social competences: (Within the scope of competence, the graduate is ready to)	K1	exhibit readiness to make informed decisions, whether autonomously or in collaboration, that aim to enhance the quality of plant production conducted in challenging environments.	SH_K2_K01, SH_K2_K02, SH_K2_K03
	K2	display enthusiasm for deepening their expertise in cutting-edge research techniques.	SH_K2_K01, SH_K2_K02, SH_K2_K03
Course content ensuring the achievement of learning outcomes:		One of the primary challenges in plant production today is mitigating the detrimental effects of unfavorable environmental factors. Despite the application of modern agrotechnical techniques, crops' genetic potential is often underutilized. The negative consequences of stress and growing anthropogenic pressure can result in insufficient plant defense mechanisms, which may decrease yield, quality, and commercial value. Nevertheless, plants have developed mechanisms that enable them to withstand and overcome adverse environmental conditions. The course will cover the most significant abiotic stresses and contemporary techniques for minimizing their adverse effects on plants. Students will learn how to characterize plant responses to unfavorable environmental factors and evaluate the extent of damage caused by various stresses.	
Examination methods:		Written credit, Assessment of work in the laboratory	



Subject name:		Impact of environmental degradation and climate changes on sustainable horticulture	ECTS: 2
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	the importance of the need to adapt horticultural and agricultural production to the ecological space determined by the stability of basic natural and ecological processes as well as the implementation of the requirements of the environmental protection law.	SH_K2_W01
	W2	the importance of appropriate actions in horticultural production for achieving the goals of climate policy and achieving the goals of ecological policy at various levels: global, national, local and horticultural farm.	SH_K2_W02
Skills: (In terms of skills, the graduate can)	U1	indicate organizational and legal solutions as well as in the field of cultivation techniques, the implementation of which is necessary to achieve environmental and climate goals.	SH_K2_U02
	U2	work in a team in solving tasks in the field of implementing environmental and climate protection objectives in the practice of horticultural production.	SH_K2_U07
Social competences: (Within the scope of competence, the graduate is ready to)	K1	use knowledge to design horticultural activities in such a way as to take into account the need to protect the environment and climate.	SH_K2_K01
	K2	aware of the importance of social, professional and ethical responsibility for climate protection and the shaping and condition of the natural environment.	SH_K2_K05
Course content ensuring the achievement of learning outcomes:		The basic problems of environmental protection at the local, regional and global level. Overview of the main sources of environmental pollution, with particular emphasis on the impact of horticulture and agriculture on the natural environment. Selected issues of environmental protection as a task of public authorities. Ecological policy and climate policies. Classification and evaluation criteria. Environmental protection and protection in enterprises and farms. ISO 14 000, CSR and other environmental management systems. Selected problems of environmental protection in agricultural production (GHG emission, eutrophication, soil degradation, landscape simplification, impact on biodiversity). Reasons in relation to different models of agricultural production. Procedures, legal requirements and technical solutions. Public participation in environmental protection. In search of sustainable development. A new approach to development.	
Examination methods:		Written credit, Report	

Subject name:		Aspects of plant pathology in sustainable horticulture	ECTS: 3
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	biology of main plant pathogens caused losses in sustainable horticulture productions.	SH_K2_W01
	W2	diagnosing of the serious plant diseases based on pathogens etiology and disease symptoms.	SH_K2_W03
	W3	many different methods of control of the most important plant diseases and has knowledge about the organization of plant protection processes.	SH_K2_W04, SH_K2_W06
Skills: (In terms of skills, the graduate can)	U1	diagnose plant diseases on the basis of symptoms and etiological signs.	SH_K2_U01, SH_K2_U03
	U2	apply the knowledge of etiology and epidemiology to select a method of plant disease prevention.	SH_K2_U04
Social competences: (Within the scope of competence, the graduate is ready to)	K1	readiness to identify cases of failure to comply with the proper rules of plant protection.	SH_K2_K01, SH_K2_K02
Course content ensuring the achievement of learning outcomes:		The aim of the course is to expand the knowledge of phytopathology by introducing the students to the methods of detecting and identifying the causal agents of infectious plant diseases. Correct diagnosis allows for the application of appropriate methods of disease control.	
Examination methods:		Test (written or computer based)	

Subject name:		Pest control in sustainable horticulture	ECTS: 3
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	in the extended range, methods of plant protection against pests.	SH_K2_W03
	W2	the impact of various methods of pest control on the environment and non-target organisms.	SH_K2_W02
	W3	ways to protect plants from pests that support biodiversity.	SH_K2_W01
Skills: (In terms of skills, the graduate can)	U1	predict the risk of the application of various plant protection methods against pests.	SH_K2_U01, SH_K2_U02
	U2	choose methods of pest control in a way that reduces the impact on the environment and non-target organisms.	SH_K2_U03
	U3	assess the usefulness of various methods of plant protection against pests in sustainable plant production.	SH_K2_U05
Social competences: (Within the scope of competence, the graduate is ready to)	K1	plan sustainable plant protection against pests.	SH_K2_K01, SH_K2_K02, SH_K2_K05
Course content ensuring the achievement of learning outcomes:		Specificity of pest control in sustainable horticulture; an adaptation of methods of pest control to sustainable plant production; risk assessment of the application of particular methods of pest control for environment and biodiversity; the importance of pollinators and natural enemies for sustainable crop production; good practice for pesticide application in sustainable pest control. The efficiency of selected pest control methods; biopesticides available for pest control; beneficial macroorganisms commercially available for pest control; abundance of natural enemies of pests on plants surrounding crops.	
Examination methods:		Written exam, Assessment of work in the laboratory	

Subject name:		Intellectual properties	ECTS: 1
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
<p>Knowledge: (In terms of knowledge, the graduate knows and understands)</p> <p>Skills: (In terms of skills, the graduate can)</p> <p>Social competences: (Within the scope of competence, the graduate is ready to)</p>	W1	concepts and principles concerning the protection of intellectual property.	SH_K2_W05, SH_K2_W06
	U1	independently plan and implement their own lifelong learning in order to improve their professional competence.	SH_K2_U07
	K1	use knowledge of intellectual property protection to shape ethical and professional professional relationships and entrepreneurial decisions.	SH_K2_K03, SH_K2_K04, SH_K2_K05
Course content ensuring the achievement of learning outcomes:		Sources of national and international law on the protection of intellectual property. Subject and object of copyright law. Copyright personal and property rights - national and international legislation. Plagiarism - types and examples. Permitted personal and public use in national jurisprudence. Protection of image in the media and the Internet. Intellectual property in an enterprise. Types and functions of trademarks in business. Protection of a business trade name. Inventions, utility models, industrial designs and geographical indications- examples. Intellectual property law in social media.	
Examination methods:		Written credit	

Subject name:		Advanced information technologies	ECTS: 1
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
<p>Knowledge: (In terms of knowledge, the graduate knows and understands)</p> <p>Skills: (In terms of skills, the graduate can)</p> <p>Social competences: (Within the scope of competence, the graduate is ready to)</p>	W1	the aspects of e-commerce use and project management tools in gardening.	SH_K2_W03
	U1	to build an e-commerce solution.	SH_K2_U03
	U2	to plan and execute a project, using proper IT tool.	SH_K2_U03
	K1	to use IT technology in gardening activities.	SH_K2_K05
Course content ensuring the achievement of learning outcomes:		<p>(1) To systematise and enhance the skills of practical application of IT knowledge related to its use in horticulture and agricultural activities.</p> <p>(2) To acquire skills in the use of e-commerce techniques,</p> <p>(3) To acquire skills in the use of Webservice, JSON techniques for the integration of farm data.</p>	
Examination methods:		Written credit, Project	

Subject name:		Breeding and sustainable propagation of fruit plants	ECTS: 3
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	up-to-date methods of fruit breeding and propagation and their importance in developing sustainable production of horticultural crops	SH_K2_W01, SH_K2_W02, SH_K2_W03, SH_K2_W04
	W2	biological processes that occur within a plant, especially during its generative and vegetative propagation, and their potential outcomes	SH_K2_W01, SH_K2_W04
Skills: (In terms of skills, the graduate can)	U1	propagate fruit plants using efficient and sustainable methods that are well-fitted to the specific cultivar or species' needs	SH_K2_U02
	U2	based on cutting-edge knowledge choose professional tools and facilities as well as plan and supervise the propagation process of fruit plants and evaluate the outcomes for further improvements of techniques that were used	SH_K2_U01, SH_K2_U02, SH_K2_U03, SH_K2_U07
Social competences: (Within the scope of competence, the graduate is ready to)	K1	carry out sustainable horticultural production with deep knowledge of its side effects and methods that help to reduce the negative environmental impact of this activity	SH_K2_K01, SH_K2_K02
	K2	solve complicated issues based on gathered experience and knowledge	SH_K2_K01
Course content ensuring the achievement of learning outcomes:		Definition and specific traits of fruit plants. Advanced issues of fruit plants reproduction. Floral and fertilisation biology. Sexual reproduction as a source of the variability in progeny population. Mutation and chimeras - bud sports selection and establishing. Breeding methods and selection for specific traits: breeding for resistance to pest, disease and abiotic stress. Step by step description of classical fruit breeding method: selecting parents, pollen collection and viability assessing, crossing, seed handling, seedling selection, and fruit evaluation. Review of propagation methods of fruit plants: specific methods for trees, shrubs, and other types of fruit plants. Advantages and disadvantages of non-sexual (vegetative) propagation of fruit plants. Physiological background of grafting and chip-budding, rooting, and other methods of fruit plant propagation. Planning commercial propagation of chosen fruit species.	
Examination methods:		Written exam, Project	

Subject name:		Sustainable methods of seed production and propagation of vegetable and medicinal plants	ECTS: 3
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	the processes occurring in the seeds.	SH_K2_W01, SH_K2_W04
	W2	the principles of seed production.	SH_K2_W02, SH_K2_W03
Skills: (In terms of skills, the graduate can)	U1	recognize seeds of horticultural plants.	SH_K2_U03
	U2	evaluate seed quality.	SH_K2_U01, SH_K2_U02, SH_K2_U07
Social competences: (Within the scope of competence, the graduate is ready to)	K1	work in a team.	SH_K2_K05
Course content ensuring the achievement of learning outcomes:		Principles of propagation and seed production of selected vegetable and medicinal plants (agronomy, harvesting, storage, methods of improving seed quality). Seed recognition, seed quality control.	
Examination methods:		Written exam, Presentation, Test (written or computer based), Assessment of work in the laboratory	

Subject name:		Breeding and sustainable propagation of ornamental plants	ECTS: 3
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	the sources of biodiversity of ornamental plants.	SH_K2_W01
	W2	the methods applied in ornamental plants breeding.	SH_K2_W02, SH_K2_W03
	W3	the specific methods of propagation of woody plants in Polish nurseries.	SH_K2_W03
	W4	the conditions suitable for propagation ornamental shrubs and trees.	SH_K2_W03, SH_K2_W04
Skills: (In terms of skills, the graduate can)	U1	to apply methods of overcoming crossing barriers occurring in ornamental plant breeding.	SH_K2_U02, SH_K2_U03
	U2	introduce new traits into ornamental plants.	SH_K2_U03
	U3	to present detailed issues related to the breeding and propagation of ornamental plants in the form of an oral presentation supported by multimedia presentation.	SH_K2_U05, SH_K2_U06
	U4	how to make a cuttings, perform a grafting and create conditions suitable for seed sowing and to perform different presuming treatments.	SH_K2_U03
	U5	to work creatively in a team.	SH_K2_U07
Social competences: (Within the scope of competence, the graduate is ready to)	K1	to apply new technological solutions.	SH_K2_K02
	K2	critically evaluate methods and technologies for the breeding and propagation of ornamental plants in relation to the current state of knowledge and environmental risks.	SH_K2_K01
Course content ensuring the achievement of learning outcomes:		Current status of ornamental plant breeding. Biodiversity of ornamental plants. Methods used in ornamental creative plant breeding and maintenance breeding methods. The latest achievements in obtaining and introducing new sources of variability in ornamentals. Principles of ornamental plant propagation in vegetative and generative ways. Techniques for making stem cuttings, grafting of ornamental shrubs and trees and sowing the seeds.	
Examination methods:		Written exam, Project, Assessment of work in the laboratory	



Subject name:		Environmental monitoring and detection of plants pests	ECTS: 2
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	the morphology, anatomy and biology of the most important insect species.	SH_K2_W01
	W2	tools and methods of modern entomological identification.	SH_K2_W02
Skills: (In terms of skills, the graduate can)	U1	recognize and identify species of insects.	SH_K2_U01
	U2	recognize presence of insects based on specific symptoms.	SH_K2_U03
Social competences: (Within the scope of competence, the graduate is ready to)	K1	develop and share with other people knowledge gained during the course.	SH_K2_K05
Course content ensuring the achievement of learning outcomes:		Students will have practical classes where they focus on morphological traits that can help to name the species. They will be given various insect species from different orders as task to deal with - from very general level (orders) to more specific (families and species). Symptoms of insect activities will be presented. Besides morphological traits, genetic based (barcoding) identification will be discussed, and if possible, carried out in practice. The course will be carried out as lectures, during which various other topics, related to insects identification will be discussed.	
Examination methods:		Test (written or computer based), Case	

Subject name:		Role of plants diseases detection in sustainable horticulture production	ECTS: 2
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	the elements of etiology and symptomatology necessary to detect and identify the causal agents of infectious plant diseases.	SH_K2_W01
	W2	the application of techniques and tools used in diagnosing plant diseases.	SH_K2_W03
Skills: (In terms of skills, the graduate can)	U1	recognise the causal agent of a disease.	SH_K2_U03
	U2	find the necessary information in the literature, databases and other available sources.	SH_K2_U01
Social competences: (Within the scope of competence, the graduate is ready to)	K1	correctly identify the causal agents of infectious plant diseases.	SH_K2_K02
Course content ensuring the achievement of learning outcomes:		Presentation of the basic methods of detecting and identifying viruses and bacteria pathogenic to plants, as well as macroscopic and microscopic methods of identifying fungi pathogenic to plants and diagnosing the diseases caused by them. The diverse etiology of diseases requires the use of different techniques for detecting the pathogens. The student will also learn about rules of phytopathological diagnosis.	
Examination methods:		Test (written or computer based), Report, Assessment of work in the laboratory	

Subject name:		Nutritional properties of fruits from organic production	ECTS: 3
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	the presence of nutritional and non-nutritive compounds in fruits.	SH_K2_W01
	W2	differences in the nutritional and health-promoting properties of fruits from conventional, sustainable and organic crops.	SH_K2_W03
Skills: (In terms of skills, the graduate can)	U1	indicate fruits included in the category of super fruit or functional food. He knows research methods for the isolation of chemical compounds.	SH_K2_U02
Social competences: (Within the scope of competence, the graduate is ready to)	K1	promoting knowledge about the role of fruit in a healthy, balanced diet and undertaking work in this area.	SH_K2_K01
Course content ensuring the achievement of learning outcomes:		Bioactive compounds of fruit in health promotion and disease prevention. Metabolism of bioactive compounds. Comparison of the quality and health-promoting properties of fruits from organic versus conventional production.	
Examination methods:		Report	

Subject name:		Pruning and training of trees and shrubs	ECTS: 3
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	the physiological basis of the plant response to pruning and the physiological reasons for pruning a tree or shrub.	SH_K2_W01, SH_K2_W03
	W2	the types of pruning of trees and shrubs, the principles of pruning and the choice of pruning for a specific situation.	SH_K2_W01, SH_K2_W03
	W3	the health and safety rules for carrying out this type of work.	SH_K2_W01, SH_K2_W03
Skills: (In terms of skills, the graduate can)	U1	choose the right type of pruning for the situation, select the tools and carry out the pruning of a tree or shrub.	SH_K2_U01, SH_K2_U02, SH_K2_U03, SH_K2_U04, SH_K2_U05
	U2	design the work of the team and supervise the execution of the tree surgery work.	SH_K2_U01, SH_K2_U02, SH_K2_U03, SH_K2_U04, SH_K2_U05, SH_K2_U07
Social competences: (Within the scope of competence, the graduate is ready to)	K1	work independently and as part of a tree care team.	SH_K2_K05
Course content ensuring the achievement of learning outcomes:		Pruning as a factor responsible for health and yield. Pruning and yield - mutual correlation. Pruning and healthiness Every type of pruning is accompanied by a sanitary pruning. In addition to reducing the size of the crown, screening or rejuvenating, we facilitate the access of spray to the inside of the crown. By doing so, we make it easier for the crown to dry out through the wind, which inhibits the growth of pathogens. When caring for the health of the tree, it is important to remember to carefully protect pruning wounds. This is done with chemicals which prevent pathogens from penetrating the tree tissue. Timing and pruning methods for trees and shrubs. Pruning technique. Pruning systems. Protection of fruit trees and shrubs after pruning.	
Examination methods:		Presentation	

Subject name:		Plant physiology aspects in sustainable production of herbs and vegetables	ECTS: 3
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	the control mechanisms of herbs and vegetables physiology in sustainable production system.	SH_K2_W01, SH_K2_W04
	W2	the influence of external and internal factors in the regulation of physiological processes in herbs and vegetables sustainable production.	SH_K2_W03, SH_K2_W04
Skills: (In terms of skills, the graduate can)	U1	plan and carry out an experiment designed to determine the influence of various factors on the yield and quality of herbs and vegetables.	SH_K2_U01, SH_K2_U03, SH_K2_U07
	U2	discuss the possibilities of improvement of herbs and vegetables yield and quality in the sustainable production system.	SH_K2_U02, SH_K2_U03
Social competences: (Within the scope of competence, the graduate is ready to)	K1	act in accordance with ethical.	SH_K2_K03, SH_K2_K05
	K2	cooperate within the group.	SH_K2_K03
Course content ensuring the achievement of learning outcomes:		In the subject, students will be provided with the knowledge of herbs and vegetables growth and development mechanisms, responsible for their productivity both in the field and under covers. The influence of external and internal factors in the regulation of physiological processes in the herbs and vegetables sustainable production will be presented. Special emphasis will be paid on the relationship between photosynthesis, respiration, photorespiration, mineral nutrition, assimilates distribution patterns and plant's productivity in the sustainable production system. Students will learn how to regulate and control herbs and vegetables productivity both on vegetative and generative stage of plants development, under various environmental conditions. Current problems of the sustainable production of herbs and vegetables will be presented.	
Examination methods:		Report, Presentation, Assessment of work in the laboratory	

Subject name:		Wild-growing medicinal, food and cosmetic plants	ECTS: 3
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	the most important species of wild-growing medicinal, cosmetic and food plants in Europe, knows where these plants occur and how to recognize them; the student knows methods of their sustainable collection and postharvest treatment of herbal raw materials, is aware of threats concerning these plants and knows the conservation methods, international conventions (CBD) and organizations dealing with the protection of natural resources of wild plants; the student knows how the organization of the purchase of these plants looks like and how the plants are used.	SH_K2_W01, SH_K2_W02, SH_K2_W03, SH_K2_W06
Skills: (In terms of skills, the graduate can)	U1	to recognize the most important wild-growing medicinal, cosmetic and food plants and raw materials collected from them, is able to find the plants on natural sites, to collect the herbal raw materials properly and carry out postharvest treatment of the raw materials; the student is able to carry out a preliminary evaluation of the quality of plant raw materials; the student is able to apply methods of protection of selected wild-growing plants; the student is able to use the plants to produce simple extracts, cosmetics and food products.	SH_K2_U02, SH_K2_U04, SH_K2_U05, SH_K2_U07, SH_K2_U08
Social competences: (Within the scope of competence, the graduate is ready to)	K1	represent active attitude in the process of learning; the student is aware of the need to act in accordance with the principles of ethics in wild-growing plants production.	SH_K2_K01, SH_K2_K02, SH_K2_K03, SH_K2_K05
Course content ensuring the achievement of learning outcomes:		Characteristics of the most important wild-growing medicinal, food and cosmetic plants in Europe, their threats and conservation; the occurrence of wild-growing plants in different habitats; sustainable wild collection of plants; trade of wild-growing plants and usage of raw materials obtained from these plants.	
Examination methods:		Test (written or computer based), Assessment of activity during classes	

Subject name:		Indoor flower arrangements	ECTS: 3
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	a proper plants for a given type of decoration and their vase life and the method of storage.	SH_K2_W01, SH_K2_W02
	W2	a proper technique to make a flower arrangement.	SH_K2_W03, SH_K2_W04
Skills: (In terms of skills, the graduate can)	U1	design an indoor flower arrangement according to plant size, shape and color.	SH_K2_U01, SH_K2_U03
	U2	choose right pot plants and propose a form of their presentation in a given room, according to plants' environmental requirements as well as a room style and its destination	SH_K2_U03, SH_K2_U07, SH_K2_U08
Social competences: (Within the scope of competence, the graduate is ready to)	K1	to new creative solutions.	SH_K2_K01, SH_K2_K02, SH_K2_K04
Course content ensuring the achievement of learning outcomes:		The importance of cut flowers and the role of floral arrangements in culture and people's lives. Types of floral compositions, choice of the right technique for selected plants, use of floral accessories (foams, wires, ribbons, paper). The role of potted plants in interiors and possibilities for arrangement. Creative work and the ability to work in a group as a success in making of large floral arrangements.	
Examination methods:		Project, Presentation, Assessment of activity during classes	

Subject name:		Practicum of phytopathological research	ECTS: 3
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	the scope of phytopathological research methods necessary to detect plant pathogens.	SH_K2_W03
	W2	the advanced tools and techniques used in phytopathological diagnostics.	SH_K2_W02
Skills: (In terms of skills, the graduate can)	U1	use Internet and library databases in an advanced manner.	SH_K2_U01
	U2	on their own, critically evaluate the results of their experiments and prepare a written paper related to the different methods of pathogen detection and identification.	SH_K2_U03
Social competences: (Within the scope of competence, the graduate is ready to)	K1	select an appropriate method to detect a plant pathogen.	SH_K2_K01
Course content ensuring the achievement of learning outcomes:		Theoretical and practical acquaintance of the students with the various methods used in research with phytopathogens. During the course, the student will acquire the skills to work with phytopathogens.	
Examination methods:		Report	



Subject name:		Insect behaviour	ECTS: 3
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	the basic mechanisms and functions of insect behaviour and their applied significance.	SH_K2_W01, SH_K2_W02, SH_K2_W03, SH_K2_W04
	W2	basics of ethology and behavioural ecology.	SH_K2_W01, SH_K2_W02, SH_K2_W03
Skills: (In terms of skills, the graduate can)	U1	write a report and multimedia presentation referring investigations on insect behaviour.	SH_K2_U01, SH_K2_U02, SH_K2_U03, SH_K2_U07, SH_K2_U08
	U2	use the professional sources of information in the printed and electronic form.	SH_K2_U01, SH_K2_U02, SH_K2_U03, SH_K2_U06, SH_K2_U08
Social competences: (Within the scope of competence, the graduate is ready to)	K1	new solutions in plant protection.	SH_K2_K01, SH_K2_K02, SH_K2_K05
	K2	be responsible for the condition of the environment.	SH_K2_K01, SH_K2_K05
Course content ensuring the achievement of learning outcomes:		Molecular, neuronal and hormonal control of insect behaviour.	
Examination methods:		Report, Presentation	

Subject name:		English language II	ECTS: 2
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
<p>Knowledge: (In terms of knowledge, the graduate knows and understands)</p> <p>Skills: (In terms of skills, the graduate can)</p> <p>Social competences: (Within the scope of competence, the graduate is ready to)</p>	W1	vocabulary of the specialist language for the field of study.	SH_K2_W01
	U1	describe phenomena, processes and procedures.	SH_K2_U05, SH_K2_U06
	U2	conduct correspondence and take notes.	SH_K2_U05, SH_K2_U06
	U3	give explanations, give reasons, express opinions or make plans.	SH_K2_U05, SH_K2_U06
	K1	preparing and delivering presentations.	SH_K2_K01, SH_K2_K05
	K2	conducting interviews and discussions.	SH_K2_K01, SH_K2_K05
	K3	communicate correctly in most situations of professional life using specialised linguistic resources.	SH_K2_K01, SH_K2_K05
Course content ensuring the achievement of learning outcomes:		<p>Mastering a specialist foreign language at B2+ level of the Common European Framework of Reference for Languages.</p> <p>Language learning, effective use of a foreign language in the area of field of study in the four skills (listening, speaking, writing and reading) in professional and scientific communication. Vocabulary in the field of language specialised language for the field of study. Language functions: describing phenomena, processes, procedures, conducting correspondence, interviews, discussions, taking notes, preparing and delivering presentations. Lexical functions: development and correct use of specialised linguistic resources. Practising oral and written communication.</p>	
Examination methods:		Presentation, Assessment of activity during classes	

Subject name:		German language II	ECTS: 2
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
<p>Knowledge: (In terms of knowledge, the graduate knows and understands)</p> <p>Skills: (In terms of skills, the graduate can)</p> <p>Social competences: (Within the scope of competence, the graduate is ready to)</p>	W1	vocabulary of the specialist language for the field of study.	SH_K2_W01
	U1	describe phenomena, processes and procedures.	SH_K2_U05, SH_K2_U06
	U2	conduct correspondence and take notes.	SH_K2_U05, SH_K2_U06
	U3	give explanations, give reasons, express opinions or make plans.	SH_K2_U05, SH_K2_U06
	K1	preparing and delivering presentations.	SH_K2_K01, SH_K2_K05
	K2	conducting interviews and discussions.	SH_K2_K01, SH_K2_K05
	K3	communicate correctly in most situations of professional life using specialised linguistic resources.	SH_K2_K01, SH_K2_K05
Course content ensuring the achievement of learning outcomes:		<p>Mastering a specialist foreign language at B2+ level of the Common European Framework of Reference for Languages.</p> <p>Language learning, effective use of a foreign language in the area of field of study in the four skills (listening, speaking, writing and reading) in professional and scientific communication. Vocabulary in the field of language specialised language for the field of study. Language functions: describing phenomena, processes, procedures, conducting correspondence, interviews, discussions, taking notes, preparing and delivering presentations. Lexical functions: development and correct use of specialised linguistic resources. Practising oral and written communication.</p>	
Examination methods:		Presentation, Assessment of activity during classes	

Subject name:		Polish language II	ECTS: 2
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
<p>Knowledge: (In terms of knowledge, the graduate knows and understands)</p> <p>Skills: (In terms of skills, the graduate can)</p> <p>Social competences: (Within the scope of competence, the graduate is ready to)</p>	W1	vocabulary of the specialist language for the field of study.	SH_K2_W01
	U1	describe phenomena, processes and procedures.	SH_K2_U05, SH_K2_U06
	U2	conduct correspondence and take notes.	SH_K2_U05, SH_K2_U06
	U3	give explanations, give reasons, express opinions or make plans.	SH_K2_U05, SH_K2_U06
	K1	preparing and delivering presentations.	SH_K2_K01, SH_K2_K05
	K2	conducting interviews and discussions.	SH_K2_K01, SH_K2_K05
	K3	communicate correctly in most situations of professional life using specialised linguistic resources.	SH_K2_K01, SH_K2_K05
Course content ensuring the achievement of learning outcomes:		<p>Mastering a specialist foreign language at B2+ level of the Common European Framework of Reference for Languages.</p> <p>Language learning, effective use of a foreign language in the area of field of study in the four skills (listening, speaking, writing and reading) in professional and scientific communication. Vocabulary in the field of language specialised language for the field of study. Language functions: describing phenomena, processes, procedures, conducting correspondence, interviews, discussions, taking notes, preparing and delivering presentations. Lexical functions: development and correct use of specialised linguistic resources. Practising oral and written communication.</p>	
Examination methods:		Presentation, Assessment of activity during classes	

Subject name:		Spanish language II	ECTS: 2
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
<p>Knowledge: (In terms of knowledge, the graduate knows and understands)</p> <p>Skills: (In terms of skills, the graduate can)</p> <p>Social competences: (Within the scope of competence, the graduate is ready to)</p>	W1	vocabulary of the specialist language for the field of study.	SH_K2_W01
	U1	describe phenomena, processes and procedures.	SH_K2_U05, SH_K2_U06
	U2	conduct correspondence and take notes.	SH_K2_U05, SH_K2_U06
	U3	give explanations, give reasons, express opinions or make plans.	SH_K2_U05, SH_K2_U06
	K1	preparing and delivering presentations.	SH_K2_K01, SH_K2_K05
	K2	conducting interviews and discussions.	SH_K2_K01, SH_K2_K05
	K3	communicate correctly in most situations of professional life using specialised linguistic resources.	SH_K2_K01, SH_K2_K05
Course content ensuring the achievement of learning outcomes:		<p>Mastering a specialist foreign language at B2+ level of the Common European Framework of Reference for Languages.</p> <p>Language learning, effective use of a foreign language in the area of field of study in the four skills (listening, speaking, writing and reading) in professional and scientific communication. Vocabulary in the field of language specialised language for the field of study. Language functions: describing phenomena, processes, procedures, conducting correspondence, interviews, discussions, taking notes, preparing and delivering presentations. Lexical functions: development and correct use of specialised linguistic resources. Practising oral and written communication.</p>	
Examination methods:		Presentation, Assessment of activity during classes	

Subject name:		Fruit quality	ECTS: 3
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	theories to counteract constraints related to the availability of technologies for the sustainable production of quality fruit.	SH_K2_W03, SH_K2_W04
	W2	the impact of development trends in horticultural sciences and technologies used in sustainable cultivation on the production of high-quality fruit.	SH_K2_W01, SH_K2_W02, SH_K2_W03, SH_K2_W04
Skills: (In terms of skills, the graduate can)	U1	assess the quality requirements and plan the process of fruit production and storage depending on the requirements and direction of distribution.	SH_K2_U01, SH_K2_U02, SH_K2_U03
	U2	carry out research work, evaluate and analyze the results and present this information.	SH_K2_U01, SH_K2_U02, SH_K2_U05, SH_K2_U07
Social competences: (Within the scope of competence, the graduate is ready to)	K1	critically evaluate information and the use of natural environmental resources and the impact of gardening activities on the natural environment.	SH_K2_K01, SH_K2_K02
	K2	act in an entrepreneurial way with activities for the benefit of the social environment.	SH_K2_K02, SH_K2_K04
Course content ensuring the achievement of learning outcomes:		Technologies and methods used in sustainable production of fruit, quality determinants of fruit intended for consumption and processing from traditional cultivation and sustainable orchards, experimental work with evaluation of fruit quality determinants, interpretation of results and presentation of conclusion.	
Examination methods:		Written exam, Presentation, Assessment of activity during classes	

Subject name:		Postharvert treatment of vegetable and medicinal plants	ECTS: 3
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	plant material stabilisation phenomena and processes.	SH_K2_W01, SH_K2_W04
	W2	the principles of the equipment currently used to stabilise plant material.	SH_K2_W02, SH_K2_W03, SH_K2_W04
Skills: (In terms of skills, the graduate can)	U1	how to choose the right stabilisation method and parameters depending on the plant material.	SH_K2_U02
	U2	carry out stabilisation of plant material in order to keep the raw material fully valuable for further use.	SH_K2_U03
	U3	prepare and carry out the experiment and interpret the results obtained.	SH_K2_U01
Social competences: (Within the scope of competence, the graduate is ready to)	K1	carry out the stabilisation of plant material in order to obtain a high-quality product.	SH_K2_K01, SH_K2_K02
Course content ensuring the achievement of learning outcomes:		Modern physical, chemical and biological methods for plant material stabilisation, which will result in a raw material with the right content of value-determining compounds, ready for storage and further processing. Packaging selection, storage and shelf life control of ready-to-use raw materials. Contemporary methods to achieve repeatability in the production process.	
Examination methods:		Written exam, Test (written or computer based), Assessment of work in the laboratory	

Subject name:		Evaluation and shaping of ecological structure in landscape	ECTS: 3
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	types of ecological infrastructure and most valuable natural plant habitats.	SH_K2_W02
	W2	flora and fauna of countryside and understands mutual relationships occurring between the world of plants, animals and farmers.	SH_K2_W01
	W3	increase of knowledge about elements of ecological structure.	SH_K2_W01
Skills: (In terms of skills, the graduate can)	U1	do evaluation of ecological structure in landscape (big scale) and the current state of ecological infrastructure of farms (local scale) together with their immediate surroundings.	SH_K2_U01, SH_K2_U02, SH_K2_U07
	U2	optimize the ecological infrastructure of farms and their immediate surroundings.	SH_K2_U02, SH_K2_U07
Social competences: (Within the scope of competence, the graduate is ready to)	K1	The student has increased sensitivity to the problems associated with biodiversity.	SH_K2_K05
Course content ensuring the achievement of learning outcomes:		Term of landscape evaluation, ecosystem, elements of landscape, types of plant communities, role of ecological structure in rural areas, climate changes, green infrastructure, evaluation as a proper method usefulness for management of ecological structure in rural areas. Analysis of ecological structure of selected rural commune and formulated directions for keeping biodiversity and shaping the studies area. The most important types of ecological infrastructure (hedges, conservation headlands, wildflower strips and rotational fallows), the methods of their establishment and improvement. Pollinators, especially wild species (solitary bees and bumblebees), their habitat and food (honey and pollen plants) preferences, biology of development.	
Examination methods:		Written exam, Project	



Subject name:		Phytoremediation	ECTS: 2
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
<p><b>Knowledge:</b> (In terms of knowledge, the graduate knows and understands)</p> <p><b>Skills:</b> (In terms of skills, the graduate can)</p> <p><b>Social competences:</b> (Within the scope of competence, the graduate is ready to)</p>	W1	knowledge and comprehension of the physiological and environmental foundations that serve as the basis for phytoremediation.	SH_K2_W01, SH_K2_W04
	W2	knowledge and comprehension of the primary pollutants found in soil, water, and air.	SH_K2_W02
	W3	knowledge and comprehension of the benefits and drawbacks of utilizing plants for phytoremediation purposes.	SH_K2_W01, SH_K2_W03, SH_K2_W04
	U1	utilize horticultural plants for phytoremediation purposes.	SH_K2_U01, SH_K2_U02, SH_K2_U04
	U2	capable of customizing the most effective phytoremediation technique for a contaminated site.	SH_K2_U03, SH_K2_U05, SH_K2_U08
	K1	display a willingness to exhibit responsibility in evaluating environmental risks while considering the overall social welfare.	SH_K2_K01, SH_K2_K03
	K2	demonstrate a willingness to enhance their expertise and explore novel technological advancements.	SH_K2_K03, SH_K2_K05
Course content ensuring the achievement of learning outcomes:		<p>Urbanization, industrialization, and transportation contribute to the pollution of soil, air, and water, with trace elements and organic compounds being major sources of environmental contamination. Despite this, a large number of potentially contaminated sites around the world remain unremediated, with only a fraction having been addressed, as seen in the 2011-2012 data from 33 EU countries. Conventional remediation methods, which involve removing or containing pollutants, often carry high costs and environmental risks due to soil excavation and the application of chemicals or high-pressure water or air. In response to these drawbacks, researchers have been developing more environmentally-friendly and cost-effective remediation methods. Phytoremediation, a section of environmental biotechnology that utilizes plants (as well as bacteria and fungi as partners) to remove, contain, or neutralize harmful environmental substances, has been shown to have a high efficiency in cleaning up contaminated sites in Europe, the USA, and other countries.</p>	
Examination methods:		Written exam, Assessment of work in the laboratory	

Subject name:		Economics, management, marketing in horticulture	ECTS: 2
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
<p>Knowledge: (In terms of knowledge, the graduate knows and understands)</p> <p>Skills: (In terms of skills, the graduate can)</p> <p>Social competences: (Within the scope of competence, the graduate is ready to)</p>	W1	in-depth trends related to issues of economics and management in the horticultural sector.	SH_K2_W02
	U1	critically address the current state of knowledge in economics and management in relation to aspects of the horticultural industry, also in relation to the context of environmental change.	SH_K2_U02
	U2	communicate using elements of economic knowledge apply management principles to the organisation of work.	SH_K2_U05, SH_K2_U07, SH_K2_U08
	K1	think critically and analytically and act entrepreneurially.	SH_K2_K01, SH_K2_K02, SH_K2_K04
	K2	cooperate and collaborate in business, respecting professional and ethical standards.	SH_K2_K03, SH_K2_K05
Course content ensuring the achievement of learning outcomes:		Issues in micro and macro economics, finance and banking pertaining to the operation of sub-entities in the horticultural sector and issues in business management, including managerial functions and marketing pertaining to such sub-entities.	
Examination methods:		Written credit, Assessment of speeches during classes	

Subject name:		Diploma seminar II	ECTS: 2
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	the specifics undertaken in the thesis, which research methods to choose and which sources to use.	SH_K2_W01, SH_K2_W02, SH_K2_W03, SH_K2_W04
Skills: (In terms of skills, the graduate can)	U1	conduct research and analyse source materials in accordance with the accepted work plan.	SH_K2_U01, SH_K2_U02, SH_K2_U03, SH_K2_U04, SH_K2_U05
Social competences: (Within the scope of competence, the graduate is ready to)	K1	work independently under the supervision of the thesis supervisor.	SH_K2_K01, SH_K2_K02, SH_K2_K03, SH_K2_K04, SH_K2_K05
Course content ensuring the achievement of learning outcomes:		A student starting this subject should have the basic knowledge, skills and competences acquired in earlier years of study, enabling him/her to carry out an individual or team work.	
Examination methods:		Presentation	

Subject name:		Ecotoxycology	ECTS: 3
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	the negative effects of environmental pollution on plants and human health.	SH_K2_W01, SH_K2_W03
	W2	environmental pollutants most commonly found in urban areas, knows what their sources and fate in the environment are.	SH_K2_W03
Skills: (In terms of skills, the graduate can)	U1	how to plan and conduct phytotoxicity tests on environmental samples and interpret the results obtained.	SH_K2_U01
	U2	how to, basing on the reaction of plant bioindicators, assess the toxicity of environmental samples.	SH_K2_U01, SH_K2_U02
	U3	how to correctly assess the degree of environmental pollution based on the samples taken for analysis.	SH_K2_U07, SH_K2_U08
Social competences: (Within the scope of competence, the graduate is ready to)	K1	set priorities for action and implementing them responsibly.	SH_K2_K04
	K2	social, professional and ethical responsibility for the state of the environment.	SH_K2_K05
Course content ensuring the achievement of learning outcomes:		Characteristics of selected environmental pollutants (gaseous pollutants, PCBs, PCDD/Fs, PAHs, metals), their sources and fate and effects in the environment and in organisms: uptake, bioaccumulation, biomagnification, biodegradation, toxic effects. Standard toxicity tests (with special emphasis on plants as bioindicators) and their application in practice: assessment of air pollution using the lichen scale, toxicity assessment of environmental samples (water, soils) using the Phytotoxkit test and Root Tip Assays root growth cone tests.	
Examination methods:		Project, Assessment of work in the laboratory	

Subject name:		Decision support systems in fruit production and storage	ECTS: 3
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
<p>Knowledge: (In terms of knowledge, the graduate knows and understands)</p> <p>Skills: (In terms of skills, the graduate can)</p> <p>Social competences: (Within the scope of competence, the graduate is ready to)</p>	W1	the definitions of DSS and fruit smart farming.	SH_K2_W02, SH_K2_W03
	U1	to list the advanced technologies (sensors, artificial intelligence, programming, etc.) used in the creation of DSS.	SH_K2_U02, SH_K2_U05
	K1	to work with modern technologies, is able to propagate knowledge about DSS and use it in professional work.	SH_K2_K02, SH_K2_K05
Course content ensuring the achievement of learning outcomes:		Identifying barriers to sustainable and organic apple production. Definition of models and decision support systems. Models and DSSs to optimize nutrient management, irrigation, apple thinning, crop protection. A hybrid expert system for the diagnosis of post-harvest diseases of apple.	
Examination methods:		Report	

Subject name:		Quality evaluation of plant products	ECTS: 3
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	methods of quality evaluation of plant products	SH_K2_W04
	W2	physicochemical traits of some phytochemicals, useful for their determination in plant products	SH_K2_W01, SH_K2_W04
Skills: (In terms of skills, the graduate can)	U1	detect/determine some biologically active compounds in plant products	SH_K2_U01
	U2	use the scientific literature for choosing proper methods of quality evaluation of plant products, finding data useful for interpretation of the results of analyses	SH_K2_U01, SH_K2_U02
Social competences: (Within the scope of competence, the graduate is ready to)	K1	understand the importance of quality evaluation of plant products for the safety and health of the consumer	SH_K2_K01
Course content ensuring the achievement of learning outcomes:		Quality parameters of vegetables and seasonings. Factors affecting the quality of plant products. Microscopic evaluation of powdered plant raw materials. Characteristics of chosen groups of biologically active plant constituents and methods of their determination. Checking the presence or determination of some biologically active compounds in plant products. Characteristics of the methods of sensory evaluation of plant products.	
Examination methods:		Report, Assessment of work in the laboratory	

Subject name:		Essential oils application in sustainable horticulture	ECTS: 3
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	characteristics of essential oils, their origin, chemical variability, biological activity, economic importance and applications in sustainable production of horticultural plants.	SH_K2_W01, SH_K2_W02, SH_K2_W04
	W2	advanced methods of essential oils analysis.	SH_K2_W03, SH_K2_W04
Skills: (In terms of skills, the graduate can)	U1	identify and characterize selected essential oils, their chemical composition and application.	SH_K2_U02
	U2	present factors affecting essential oils content and composition in plant raw materials.	SH_K2_U01, SH_K2_U02
	U3	apply methods of essential oil analysis.	SH_K2_U01
Social competences: (Within the scope of competence, the graduate is ready to)	K1	work creatively in the group.	SH_K2_K04, SH_K2_K05
	K2	act in accordance with ethical principles.	SH_K2_K04, SH_K2_K05
Course content ensuring the achievement of learning outcomes:		In the subject, a comprehensive characteristic of plant essential oils as biopesticides will be given. Students will be provided with the knowledge of essential oil-bearing plants and raw materials, chemical variability of essential oils, factors affecting essential oils accumulation and composition in raw materials, physiological functions of essential oils and their location in plant's tissues. Special attention will be paid on the biological properties of essential oils, especially mode of antibacterial and antifungal actions. The information on essential oils extraction methods, followed by the advanced instrumental techniques of qualitative and quantitative analysis will be provided.	
Examination methods:		Report, Presentation, Assessment of work in the laboratory	

Subject name:		Plants' mysteries under microscope	ECTS: 3
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	how to use bright field, fluorescence and confocal microscopy.	SH_K2_W01
	W2	which fixative to use to each living material.	SH_K2_W01
	W3	what kind of stains may be used to observe particular tissues and cells.	SH_K2_W01
Skills: (In terms of skills, the graduate can)	U1	how to choose proper microscope to observations.	SH_K2_U01
	U2	to choose a proper method of fixing and staining laboratory material.	SH_K2_U01, SH_K2_U02, SH_K2_U03
Social competences: (Within the scope of competence, the graduate is ready to)	K1	discuss about obtained results of microscopic observations.	SH_K2_K01, SH_K2_K02
	K2	cooperate in a group.	SH_K2_K03
Course content ensuring the achievement of learning outcomes:		Students will be familiar with the basis of microscopy use in biological sciences. They will meet basic and most useful techniques of fixing, staining and observing plant material tissues and cells.	
Examination methods:		Project	



Subject name:		Ornamental plants in human environment	ECTS: 3
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	in-depth knowledge of botany, environmental protection, biodiversity and the complexity of the natural world, relevant to ornamental plants, influencing the human environment and lifestyle.	SH_K2_W01
	W2	trends in the development of horticultural sciences, taking into account the context of changes taking place in all spheres, including economic, environmental, social, research and application trends of ornamental plants in relation to human health and quality of life.	SH_K2_W02
	W3	to a deeper degree, the fundamental problems connected with the ornamental plant application.	SH_K2_W03
	W4	in depth the principles of establishment and development of entrepreneurship in horticultural science and practice in relations to the ornamental plants.	SH_K2_W04
Skills: (In terms of skills, the graduate can)	U1	solve tasks, design and construct simple devices, objects, systems or carry out processes, using appropriately selected methods, techniques, tools and materials applied in the broad field of ornamental plants use in relations to their function in human environment.	SH_K2_U03
	U2	formulate and test related to the use of ornamental plants in indoor, urban and private greenery to improve the quality of life.	SH_K2_U04
Social competences: (Within the scope of competence, the graduate is ready to)	K1	promote the use of the ornamental plants and horticulture practice to improve people's health and quality of life.	SH_K2_K04
	K2	solve the pro is prepared to use the research achievements of horticultural sciences and the scientific results of related and associated fields in solving cognitive and practical problems related to ornamental plant application to improve people's health and quality of life.	SH_K2_K02
Course content ensuring the achievement of learning outcomes:		The importance of ornamental horticulture as a new lifestyle, in terms of the economic, environmental and social benefits of contact with ornamental plants. Beneficial effects of potted plants on the environment and the use of plants for interior decoration. Functions and forms of applications of ornamental plants in urban greenery, including modern forms. Plant material for urban planting and community gardens. Elements of knowledge in socio-horticulture and horticulture. Selected examples of urban greenery.	
Examination methods:		Presentation, Description of a selected park or indor area	

Subject name:		Integrated methods pests management	ECTS: 3
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	the assumptions of the integrated method of plant protection.	SH_K2_W02, SH_K2_W03, SH_K2_W04, SH_K2_W05
	W2	the biology of the most important pests of agricultural plants and their natural enemies and understand the interactions between these organisms.	SH_K2_W01
	W3	methods of pests control in agricultural crops and understand the need for their combined application.	SH_K2_W02, SH_K2_W03, SH_K2_W04
Skills: (In terms of skills, the graduate can)	U1	carry out pests monitoring, recognize pests and beneficial organisms found in horticulture crops.	SH_K2_U02, SH_K2_U03
	U2	choose the methods of protection depending on the structure of harmful organisms.	SH_K2_U01, SH_K2_U03
Social competences: (Within the scope of competence, the graduate is ready to)	K1	design protection of agricultural crops in an integrated system.	SH_K2_K01, SH_K2_K02, SH_K2_K03, SH_K2_K04, SH_K2_K05
Course content ensuring the achievement of learning outcomes:		Pest management relying on a combination of effective and environmentally friendly practices; forecasting and monitoring in pests management; control treatment planning based on the principles of integrated production of horticultural plants.	
Examination methods:		Project	

Subject name:		The microworld of fungi	ECTS: 3
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
<p>Knowledge: (In terms of knowledge, the graduate knows and understands)</p> <p>Skills: (In terms of skills, the graduate can)</p> <p>Social competences: (Within the scope of competence, the graduate is ready to)</p>	W1	biology and fungi.	SH_K2_W01
	U1	explain the importance of fungi.	SH_K2_U02
	K1	put knowledge of fungi into practice in different areas of the economy.	SH_K2_K01
Course content ensuring the achievement of learning outcomes:		Fungal anatomy, sex and parasexual processes in fungi, fungal secondary metabolites, hiperparasitism among fungi, microfungi of various plant environments, plant & fungi associations and interactions, fungi as bioreactors significance of fungi in biotechnology.	
Examination methods:		Report	

Subject name:		Plants in human diet	ECTS: 3
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	health-promoting properties of plant products and their active substances.	SH_K2_W01
	W2	mechanisms of action of plant antioxidants and their potential role in reducing the risk of lifestyle diseases.	SH_K2_W01
Skills: (In terms of skills, the graduate can)	U1	critically analyse source texts concerning health-promoting properties of plant substances and products, and prepare a presentation on this subject.	SH_K2_U01, SH_K2_U02
	U2	determine some nutritive and non-nutritive plant substances.	SH_K2_U01
Social competences: (Within the scope of competence, the graduate is ready to)	K1	understand the responsibility of plant and food producers for the quality and safety of plant products for the consumer.	SH_K2_K05
Course content ensuring the achievement of learning outcomes:		Plant products as sources of nutritive components of diet. Dietary value of plant oils. Risk factors and prevention of some lifestyle diseases, including dietary recommendations. Nutritive and non-nutritive plant substances with antioxidant activity: chemical structure, mechanism of action, importance in reducing the risk of lifestyle diseases, main plant sources of these compounds in the diet. Potential risk related to the consumption of plant products. Students' presentations concerning chosen health-promoting plants or groups of plant products, with special regard to the presence of nutritive and non-nutritive substances, their role in the reduction of the risk of lifestyle diseases, and forms of consumption. Comparison of the content of selected nutritive and non-nutritive substances in chosen plant products.	
Examination methods:		Presentation, Test (written or computer based), Assessment of activity during classes	

Subject name:		Diploma seminar III	ECTS: 2
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
<p>Knowledge: (In terms of knowledge, the graduate knows and understands)</p> <p>Skills: (In terms of skills, the graduate can)</p> <p>Social competences: (Within the scope of competence, the graduate is ready to)</p>	W1	the principles of creating a research paper.	SH_K2_W01, SH_K2_W02, SH_K2_W03, SH_K2_W04
	U1	how to plan research work in the field of collection and analysis of literature source materials, research work.	SH_K2_U01, SH_K2_U02, SH_K2_U03, SH_K2_U04, SH_K2_U05, SH_K2_U07
	U2	to formulate research questions, hypotheses, carry out activities related to their proving, and develop the obtained results.	SH_K2_U01, SH_K2_U02, SH_K2_U03, SH_K2_U04, SH_K2_U05, SH_K2_U07
	U3	to prepare a diploma thesis in a coherent manner, with a logical division of content.	SH_K2_U01, SH_K2_U02, SH_K2_U03, SH_K2_U04, SH_K2_U05
	U4	to refer to source materials in accordance with the rules and regulations of law.	SH_K2_U07
	U5	how to prepare a presentation of the results.	SH_K2_U01, SH_K2_U02, SH_K2_U03, SH_K2_U04, SH_K2_U05, SH_K2_U07
	K1	present the obtained results and to confront other researchers and specialists.	SH_K2_K03, SH_K2_K05
Course content ensuring the achievement of learning outcomes:		Monitor the stages of the master's thesis on the basis of presentations prepared by individual students. To develop the ability to use the knowledge acquired throughout the studies, to use different sources of information, to analyse them and to use them critically and creatively. Implementing the search for and use of scientific literature.	
Examination methods:		Presentation	

Subject name:		Diploma thesis	ECTS: 20
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	the principles of preparing a diploma thesis.	SH_K2_W01, SH_K2_W02, SH_K2_W03, SH_K2_W04
	W2	the rules of work in the facilities of the Faculty (laboratories, workshops, greenhouse, experimental field) in which he/she performs the diploma thesis.	SH_K2_W01, SH_K2_W02, SH_K2_W03, SH_K2_W04
Skills: (In terms of skills, the graduate can)	U1	use the apparatus, equipment and programs necessary to complete the diploma thesis.	SH_K2_U01, SH_K2_U02, SH_K2_U03, SH_K2_U04, SH_K2_U05
	U2	use professional and scientific literature in order to solve problems related to the implementation of the diploma thesis.	SH_K2_U01, SH_K2_U02, SH_K2_U03, SH_K2_U04, SH_K2_U05, SH_K2_U07
Social competences: (Within the scope of competence, the graduate is ready to)	K1	undertake scientific work, choose a research workshop and self-improvement.	SH_K2_K01, SH_K2_K02, SH_K2_K03
	K2	work in a scientific team.	SH_K2_K05
Course content ensuring the achievement of learning outcomes:		Implementation of research planned as part of the diploma thesis. Developing the student's ability to use knowledge in the field of biological and economic foundations of horticulture, the ability to use research infrastructure, apply analytical methods, use scientific literature. Elaboration of the obtained results. Confrontation of the obtained results with data from the literature.	
Examination methods:		Written credit, Assessment of work in the laboratory	

Subject name:		Humanities/social subject: A man in a bussines	ECTS: 4
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
<p>Knowledge: (In terms of knowledge, the graduate knows and understands)</p> <p>Skills: (In terms of skills, the graduate can)</p> <p>Social competences: (Within the scope of competence, the graduate is ready to)</p>	W1	a basic knowledge of the economic, social and cultural conditions of people's functioning in the economic environment.	SH_K2_W05, SH_K2_W06
	U1	analyse and evaluate conditions and solutions related to social and economic aspects of human functioning.	SH_K2_U07
	U2	plan continuous education and professional or scientific training and to guide others in this area.	SH_K2_U08
	K1	proper interpersonal communication.	SH_K2_K03
	K2	knowledge of interpersonal skills and methods of their development.	SH_K2_K04
	K3	aware of social, professional and ethical business.	SH_K2_K05
Course content ensuring the achievement of learning outcomes:		Issues related to the social, psychological and managerial conditions associated with human functioning in business including topics related to interpersonal skills, communication, stress, motivation, self-development.	
Examination methods:		Written credit, Report, Presentation	

Subject name:		Humanities/social subject: Cultural heritage of the gardens	ECTS: 4
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
<p>Knowledge: (In terms of knowledge, the graduate knows and understands)</p> <p>Skills: (In terms of skills, the graduate can)</p> <p>Social competences: (Within the scope of competence, the graduate is ready to)</p>	W1	the importance and role of historic gardening due to the importance of the cultural landscape.	SH_K2_W02, SH_K2_W05
	U1	analyse a park facility in terms of the compatibility of the materials and plants used with the historical era and style.	SH_K2_U01, SH_K2_U02, SH_K2_U03
	U2	cooperate with specialists from other fields and disciplines in collaborating on the revaluation of historical park and garden objects.	SH_K2_U05, SH_K2_U07
	K1	work as part of a multidisciplinary team in the revaluation of historic parks and gardens.	SH_K2_K01, SH_K2_K03, SH_K2_K05
Course content ensuring the achievement of learning outcomes:		<p>During lectures and exercises, the student is introduced to the social impact of horticulture in terms of historical horticulture, history of garden art, and horticultural traditions. To familiarise the student with the analysis of historical materials and sources, the workshop of revaluation of historical gardens.</p> <p>An overview of the most historically important European gardens and parks.</p> <p>A visit to selected parks and historical gardens of Warsaw.</p>	
Examination methods:		Written credit, Oral credit, Presentation	



Subject name:		Humanities/social subject: Ethnobotany	ECTS: 4
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	the role and importance of plants in the tradition, household, culture and art, both in the past and nowadays.	SH_K2_W01, SH_K2_W02
	W2	the species used in the past and current culture, including culinary, medicinal and ritual species.	SH_K2_W01, SH_K2_W02
Skills: (In terms of skills, the graduate can)	U1	to describe the role of plants in human life, their symbolism and usage.	SH_K2_U01
	U2	to recognize selected edible, medicinal and ritual plants wild-growing in Central Europe.	SH_K2_U02
	U3	to prepare plant-based products traditionally applied in the household.	SH_K2_U01
Social competences: (Within the scope of competence, the graduate is ready to)	K1	to cooperate within the group.	SH_K2_K03
	K2	to respect the human-nature relations.	SH_K2_K03
Course content ensuring the achievement of learning outcomes:		In the subject, students will be provided the general knowledge on the meaning of plants in human life, in the past and nowadays. The symbolism and usage of plants in the historical perspective will be presented. Students will be introduced into topics concerning the role and importance of plants in the traditional household, medicine, folklore, culture and art. The information on wild-growing plants, both edible, medicinal, as well as provided natural pigments and fibre will be given. The problems of current ethnobotany will be presented.	
Examination methods:		Test (written or computer based), Presentation, Assessment of activity during classes	

Subject name:		Humanities/social subject: Protection of cultural heritage in rural areas	ECTS: 4
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	attributes of cultural heritage in rural areas and its role in sustainable development.	SH_K2_W05
	W2	the use of cultural values for needs of tourism and diversification of economic activity in rural areas.	SH_K2_W05
Skills: (In terms of skills, the graduate can)	U1	recognize main elements of cultural heritage in rural areas and use them for needs of tourism and other economic activity.	SH_K2_U08
Social competences: (Within the scope of competence, the graduate is ready to)	K1	entrepreneurial thinking and acting, using cultural values as an additional support in sustainable and socially important economic activity.	SH_K2_K04
Course content ensuring the achievement of learning outcomes:		Cultural heritage in rural areas - definition, legal tools of protection, classification and regionalization - subject's learning outcomes: W1, U1 Old folk architecture, traditions, regional products - as the factors of tourism development and possibility of diversification of economic activity in rural areas, stimulating sustainable development - W1, W2, K1 Project: Specific features of cultural heritage in selected rural areas and possibilities of their use for sustainable tourism (presentation) - W2, U1, K1	
Examination methods:		Test (written or computer based), Presentation	

Subject name:		Humanities/social subject: Law and sociological aspects of landscape and ecological infrastructure protection	ECTS: 4
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
<p>Knowledge: (In terms of knowledge, the graduate knows and understands)</p> <p>Skills: (In terms of skills, the graduate can)</p> <p>Social competences: (Within the scope of competence, the graduate is ready to)</p>	W1	legal tools for landscape protection, with special emphasis on natural values, at national, EU and international level.	SH_K2_W02, SH_K2_W05
	W2	important role of protected areas in sustainable development of regions and improvement of social conditions, including social cohesion and identity of the place.	SH_K2_W05
	U1	benefit opportunities resulting from the occurrence and management in protected areas and make adjustment of activity to the protection requirements.	SH_K2_U08
	K1	cooperate with others in promotion of environmental values and adjustment of economic activity to natural potential leading to sustainable development.	SH_K2_K05
Course content ensuring the achievement of learning outcomes:		<p>Study content and subject's learning outcomes:</p> <p>Review of legal tools for landscape and its ecological structure protection at national, EU and international level, including usefulness of these tools for different types and rank of values occurring in an area - W1</p> <p>Possibilities and limits for economic activity conducted in different types of protected areas, including benefits resulting from localization in protected area - W2, U1, K1</p> <p>Project: Analysis of documents of sustainable development strategies for rural communes, including the role of protected areas. Students work in teams. Presentations, discussion - U1, K1</p>	
Examination methods:		Test (written or computer based), Project	

# Learning outcomes matrix

2023/24/S\_D/2/OGR/SH/all

Subject	Specialty	Mandatory	Semester	SH_K2_W01	SH_K2_W02	SH_K2_W03	SH_K2_W04	SH_K2_W05	SH_K2_W06	SH_K2_U01	SH_K2_U02	SH_K2_U03	SH_K2_U04	SH_K2_U05	SH_K2_U06	SH_K2_U07	SH_K2_U08	SH_K2_K01	SH_K2_K02	SH_K2_K03	SH_K2_K04	SH_K2_K05
English language I		F	1	x										x	x			x				x
German language I		F	1	x										x	x			x				x
Polish language I		F	1	x										x	x			x				x
Spanish language I		F	1	x										x	x			x				x
Advanced issues in sustainable pomology		O	1	x	x	x			x	x	x	x	x	x				x	x		x	x
Medicinal and aromatic plants		O	1	x	x	x	x			x		x	x	x	x	x	x		x			x
Advanced issues in sustainable production of vegetables		O	1	x	x	x	x			x	x						x	x			x	
Advanced issues in sustainable production of ornamental plants		O	1	x	x	x	x			x	x							x	x			
Arboriculture		O	1	x	x	x	x	x		x	x	x	x	x		x		x	x	x		x
Plant functioning under environmental stresses		O	1	x	x	x	x			x	x		x	x			x	x	x	x		
Impact of environmental degradation and climate changes on sustainable horticulture		O	1	x	x						x					x		x				x
Aspects of plant pathology in sustainable horticulture		O	1	x		x	x		x	x		x	x					x	x			
Pest control in sustainable horticulture		O	1	x	x	x				x	x	x		x				x	x			x
Intellectual properties		O	1					x	x							x				x	x	x
Advanced information technologies		O	1			x						x										x
Breeding and sustainable propagation of fruit plants		O	2	x	x	x	x			x	x	x				x		x	x			

Subject	Specialty	Mandatory	Semester	SH_K2_W01	SH_K2_W02	SH_K2_W03	SH_K2_W04	SH_K2_W05	SH_K2_W06	SH_K2_U01	SH_K2_U02	SH_K2_U03	SH_K2_U04	SH_K2_U05	SH_K2_U06	SH_K2_U07	SH_K2_U08	SH_K2_K01	SH_K2_K02	SH_K2_K03	SH_K2_K04	SH_K2_K05
Nutritional properties of fruits from organic production		F	2	x		x					x							x				
English language II		F	2	x										x	x			x				x
Sustainable methods of seed production and propagation of vegetable and medicinal plants		O	2	x	x	x	x			x	x	x				x						x
Pruning and training of trees and shrubs		F	2	x		x				x	x	x	x	x		x						x
Breeding and sustainable propagation of ornamental plants		O	2	x	x	x	x				x	x		x	x	x		x	x			
German language II		F	2	x										x	x			x				x
Plant physiology aspects in sustainable production of herbs and vegetables		F	2	x		x	x			x	x	x				x				x		x
Environmental monitoring and detection of plants pests		O	2	x	x					x		x										x
Wild-growing medicinal, food and cosmetic plants		F	2	x	x	x			x		x		x	x		x	x	x	x	x		x
Polish language II		F	2	x										x	x			x				x
Role of plants diseases detection in sustainable horticulture production		O	2	x		x				x		x							x			
Spanish language II		F	2	x										x	x			x				x
Indoor flower arrangements		F	2	x	x	x	x			x		x				x	x	x	x		x	
Practicum of phytopathological research		F	2		x	x				x		x						x				
Insect behaviour		F	2	x	x	x	x			x	x	x			x	x	x	x	x			x
Fruit quality		O	3	x	x	x	x			x	x	x		x		x		x	x		x	
Diploma seminar II		F	3	x	x	x	x			x	x	x	x	x				x	x	x	x	x
Ecotoxycology		F	3	x		x				x	x					x	x				x	x

Subject	Specialty	Mandatory	Semester	SH_K2_W01	SH_K2_W02	SH_K2_W03	SH_K2_W04	SH_K2_W05	SH_K2_W06	SH_K2_U01	SH_K2_U02	SH_K2_U03	SH_K2_U04	SH_K2_U05	SH_K2_U06	SH_K2_U07	SH_K2_U08	SH_K2_K01	SH_K2_K02	SH_K2_K03	SH_K2_K04	SH_K2_K05
Decision support systems in fruit production and storage		F	3	x	x					x			x						x			x
Postharvert treatment of vegetable and medicinal plants		O	3	x	x	x	x			x	x	x						x	x			
Evaluation and shaping of ecological structure in landscape		O	3	x	x					x	x					x						x
Quality evaluation of plant products		F	3	x			x			x	x							x				
Phytoremediation		O	3	x	x	x	x			x	x	x	x	x			x	x		x		x
Essential oils application in sustainable horticulture		F	3	x	x	x	x			x	x										x	x
Plants' mysteries under microscope		F	3	x						x	x	x						x	x	x		
Economics, management, marketing in horticulture		O	3		x						x			x		x	x	x	x	x	x	x
Ornamental plants in human environment		F	3	x	x	x	x					x	x						x		x	
Integrated methods pests management		F	3	x	x	x	x	x		x	x	x						x	x	x	x	x
The microworld of fungi		F	3	x							x							x				
Plants in human diet		F	3	x						x	x											x
Diploma seminar III		F	4	x	x	x	x			x	x	x	x	x		x				x		x
Diploma thesis		F	4	x	x	x	x			x	x	x	x	x		x		x	x	x		x
Humanities/social subject: A man in a bussines		F	4					x	x							x	x			x	x	x
Humanities/social subject: Cultural heritage of the gardens		F	4		x			x		x	x	x		x		x		x		x		x
Humanities/social subject: Ethnobotany		F	4	x	x					x	x									x		
Humanities/social subject: Protection of cultural heritage in rural areas		F	4					x									x				x	

Subject	Specialty	Mandatory	Semester	SH_K2_W01	SH_K2_W02	SH_K2_W03	SH_K2_W04	SH_K2_W05	SH_K2_W06	SH_K2_U01	SH_K2_U02	SH_K2_U03	SH_K2_U04	SH_K2_U05	SH_K2_U06	SH_K2_U07	SH_K2_U08	SH_K2_K01	SH_K2_K02	SH_K2_K03	SH_K2_K04	SH_K2_K05
Humanities/social subject: Law and sociological aspects of landscape and ecological infrastructure protection		F	4	x				x									x					x
Sum (elective):				26	14	15	10	5	2	16	18	12	6	15	9	10	7	20	9	10	8	23
Sum (obligatory):				18	17	16	12	2	3	16	15	14	6	9	2	10	5	14	13	5	5	12
Sum:				44	31	31	22	7	5	32	33	26	12	24	11	20	12	34	22	15	13	35

# Programme indicators

2023/24/S\_D/2/OGR/SH/all

Name	Value
Potwierdzenie - na podstawie planu studiów, że student realizuje zajęcia z dziedziny nauk humanistycznych i/lub społecznych, którym przypisano nie mniej niż 5 punktów ECTS	8
Potwierdzenie - na podstawie planu studiów, że student ma możliwość wyboru zajęć, którym łącznie przypisano liczbę punktów ECTS nie niższą niż 30% ECTS określonych dla programu tych studiów	68/120 (56.67%)
Potwierdzenie, że program studiów o profilu ogólnoakademickim obejmuje zajęcia związane z prowadzoną w uczelni działalnością naukową, w wymiarze większym niż 50% liczby punktów ECTS, określonej dla programu tych studiów	116/120 (96.67%)
Potwierdzenie, że liczba punktów ECTS uzyskanych w programie studiów poprzez realizację zajęć z wykorzystaniem metod i technik kształcenia na odległość jest nie wyższa niż 75% ogólnej liczby punktów ECTS w programie studiów o profilu ogólnoakademickim	0/120 (0%)
Liczba godzin w programie	1294



