Responsive project plan

Project basics

Project title:		Planning plant treatment based on meteorological data
Branch:		Agriculture, Horticulture
EQF/EQF level		5
Education/profession to which the project relates:		Horticultural technician, agricultural engineer, horticultural engineer
Special area:		Agrometeorology
Estimated duration (weeks):		6
Estimated teacher input (hours)		30 hours
Estimated student expenditure (hours)		10 hours theory, 5 hours practice
Estimated expenditure by the company (hours)		10 hours
Planned start:		February 2024
Institution:		Magyar Gyula Horticultural Technical and Vocational School
Labour market partner:		Szuvandzsiev Ornamental Gardening, AgriDron Ltd.
The plan was developed	For the company:	Peter Szuvandzsiev PhD; Vince Lang PhD
	For the school:	Sara Ekert

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About the project

The problem the project aims to solve (the "why")

Within the framework of the project, students organize their knowledge (they already have) into a system, acquired in the field of plant physiology and meteorology. Refresh their knowledge of the various meteorological data collection tools; get to know specific measuring tools that are used in practice. They learn to interpret, process and analyze the data they receive and collect. Based on this, conclusions are drawn on how all this can be used in ornamental plant growing and in the production of more marketable goods.

Specific objective of the project (the "what")

The specific objective of the project: systematization of students' acquired knowledge (meteorological tools and plant physiology); strengthening systemic thinking; their use in annual ornamental plant growing in greenhouse.

The main tasks to be carried out in the project: refreshing the students' knowledge acquired so far (meteorological instruments); getting to know the operation of the modern measuring instrument used on the practical site; accurate reading of data; detecting and correcting possible incorrect readings; interpreting and processing the collected data; drawing conclusions from crop management programmes.

Goal from the point of view of the development of students: development of their digital competence; familiarization with new tools and methods; improvement of cooperation and communication skills (student-student; student-company employee); independently plan and organize the work processes of ornamental plant growing; professionally use and operate the meteorological instruments and equipment necessary for the performance of the activity.

The main activities of the students: collecting meteorological data, professional analysis of the collected and previous data series and drawing conclusions for a more efficient crop management program.

Necessary tools, equipment (the "Whereas")

The partner company uses:

- modern meteorological measuring instrument (Smart home system; devices for measuring temperature and humidity)
- two layered greenhouse with large air space,
- digital environment (for learning materials and processing data).

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Implementation environment (the "where")

On the one hand, in a school environment, and on the other hand, at the sites of partner companies (Szuvandzsiev Ornamental Gardening; Kővári Chrysanthemum Ltd).

Occupational safety regulations (if any)

At the site of the partner company, it takes into account the fire, accident and environmental regulations prescribed there.

Project plan

Introducing the project team

KMASZC Márton Varga Horticulture and Surveying Technical and College 11.B grade, horticultural technician students: Anna Bognár, Katalin Gerő, Máté Ficsor, Rebeka Kelner, Juniper Kocsis, Virág Mátyus

Working method, communication, evaluation

Communication between project members takes place in personal and digital formats (email, phone, messenger).

Documentation related to planned and carried out activities is shared with each other through the VetProfit interface. The learning materials are created using digital applications. The practical implementation of the project is documented with photos. The final project report is prepared on the basis of a pre-published template with the help of mentors.

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Results, products, performance indicators

Planned results and products of the project

	Appellation	Description	Responsible	Availability, format	Indicator (pcs, sides, sec)	Assess(es)
1.	Series of meteorological instruments	Thematic, time-series data read from various meteorological measuring instruments. (Typically temperature, humidity, relative humidity data.)	Participating students	Excel table		Members of MAKESIS 1 Group
2.	Graphs, charts	Prepared on the basis of current and previous data series read from measuring instruments; informative, spectacular graphs and diagrams that provide a basis for drawing conclusions from the data series.	Participating students	Excel table		Members of MAKESIS 1 Group
3.	Presentation of the prepared graphs, diagrams and conclusions drawn from them	Presentation of cultivation proposals based on analytical analysis of the data in the form of a small presentation.	Participating students	Powerpoint presentation		The partner company

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Required knowledge, skills, ability, responsibility and autonomy

Activity/ milestone	Knowledge	Ability	Attitudes	Responsibility and autonomy
T1. Introduction. Description of the project. Discussion and distribution of tasks	Know the basic concepts of meteorology and agrometeorology; meteorological factors. Know the working steps of a general measurement process. Know how to manage individual and group work.	Able to divide the professional task into work parts and interpret it as a process, thereby planning it. Ability to formulate their own role in the workflow.	Open to new forms of work organization and tasks. Open to getting involved, taking into account their own strengths and weaknesses.	Actively participates in the formulation of questions related to the topic; in defining the objectives of the project. Take responsibility for the performance of certain parts of work.
T2. Preparing students for field work in advance: Conducting microcourses	Get to know the connections between the thematically acquired knowledge (plant physiology-meteorology-growing equipment).	Able to systematize the acquired knowledge and manage it with a holistic approach. Able to independently obtain information and process it.	Open and committed to the continuous reception of new knowledge. Look for credible sources with a critical approach to certain topics.	There is no longer a need for continuous management when performing tasks. Independently undertake the development of certain topics and take responsibility for them. Reflect on the work of group members.

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Activity/ milestone	Knowledge	Ability	Attitudes	Responsibility and autonomy
T3. Field work: Getting to know the growing equipment and meteorological measuring instrument under real conditions. Data collection.	Know meteorological factors affecting the physiology of plants. Familiar with the meteorological measuring instruments used for measurement. Know the rules of safe device use.	Able to observe meteorological features and collect data on them.	Open to handle new meteorological information platforms. Strive for accurate readings of meteorological data.	Take measurements under professional guidance, partly independently. Interpret meteorological data adequately.
T4. Data processing (analysis, presentation). Drawing conclusions (presentation).	Know the types and characteristics of the collected data. Familiar with manual and digital solutions for processing data (spreadsheet editor, graph and chart editor).	Able to process data and present it visually. Able to draw professional conclusions based on processing.	Strive to prepare documentation that is demanding in appearance and high quality in its professionalism.	Perform documentation tasks independently and responsibly.

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Activity/ milestone	Knowledge	Ability	Attitudes	Responsibility and autonomy
T5. Project closure: presentation of results, summary evaluation (students, teachers, company).	Know the digital tools of presentation; methods of effective communication. In communication, apply the elements of the acquired professional vocabulary. Know the possibilities of evaluating project work.	Able to present individual conclusions based on the results to the group and accept the opinions of peers and teachers. Able to incorporate the results of the summary assessment into self-reflection and self-development.	Open to professional cooperation with fellow students and professionals.	High-quality cooperation between individuals and group members is enhanced. The organization of the group is growing. Able to manage conflicts in order to achieve results.

Missing skills (which we plan to master in the microcourse)

Activity	Knowledge	Ability	Attitudes	Responsibility and autonomy
T2_M1: Plant physiology effects of climatic factors: "The life of a plant"	Know climatic factors and plant physiological processes. Learn about the connections between them, emphasizing cause and effect.	Able to recognize logical connections between the topics of plant physiology and meteorology and to use the related intuitive and creative thinking.	Open to acquiring a systematic level of knowledge and skills. Sensitive and interested in the factors influencing the life of plants as living beings, the creation of better living conditions.	Able to process and present his previously acquired knowledge independently. Respond to the presentation of his classmates in a developmental way.

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Activity	Knowledge	Ability	Attitudes	Responsibility and autonomy
T2_M2: Possibilities of shaping climatic factors: "Life in the greenhouse"	Familiar with climatic factors and the technical equipment of the growing equipment. Learn about the connections between them, emphasizing cause and effect. Learn about the technological workflows determined by relationships.	Able to recognize logical connections between growing equipment (as technical facilities) and meteorology, and to use related intuitive and creative thinking.	Open to the application of material and energy-saving solutions and technologies that can be used in modern growing equipment.	Able to process and present his previously acquired knowledge independently. Respond to the presentation of his classmates in a developmental way.
T2_M3: Refreshing knowledge of measuring instruments. Preliminary presentation of a specific measuring instrument.	Know the tools for measuring meteorological parameters, their principle of operation. Get acquainted with the modern meteorological measuring device used in the project.	Able to recognize measuring instruments used for meteorological measurements, their structural units. Able to collect data using the previously known and current instrument. Able to correct errors (e.g. measurement errors).	Open to learning how new digital measuring devices work. Committed to quality work. If making a mistake, will see and correct it.	Able to process and present his previously acquired knowledge independently. Respond to the presentation of classmates in a developmental way.

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Activity	Knowledge	Ability	Attitudes	Responsibility and autonomy
T2_M4: Types of meteorological data, methods of data processing.	Know the types of data that can be obtained from meteorological measuring instruments. In mathematics, know the topic of data assigned to each other (functions, their representation in a coordinate system). Understand the statistical characteristics of data; graphic ways of representing them.	Capable of interpreting numerical meteorological data series. Able to create graphs and charts from numerical data that can be better interpreted visually. Based on the collected and received data series, observe typical processes.	Open to new data processing methods. Accurate and demanding in work. If making a mistake, will see and correct it.	Perform data processing under professional guidance, partly independently.
T2_M5: Using data in greenhouse cultivation	At a skill level, know how to use concrete, modern meteorological measuring instruments. Know the steps of the management programme of ornamental annuals and the possibilities of interventions. Get to know the specific meteorological needs of the crops grown by the two partner companies.	Able to recognize the correlations between meteorological data and plant development and formulate concrete crop management programme recommendations.	Open to cooperation with partner companies. Able to correct any errors made in the conclusions of the crop management programme. Use the learned strategies to solve problems.	Autonomy and responsibility in addition to one's own work Cover the activities of a collaborating or managed group.

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Pedagogical plan broken down by activity

Activity:	***T1.* INTRODUCTION. DESCRIPTION OF THE PROJECT. DISCUSSION AND DISTRIBUTION OF TASKS**			
Activity Description:	Getting to know and introduce the actors of the project. Formulation of the project task; definition of its purpose. Recording work stages. Distribution of tasks of the working group (students) (roles, division of labor); recording communication channels Record the roles of each actor (students, teachers, company).			
Learning outcomes	**Knowledge**	**Skill**	**Attitudes**	**Responsibility and autonomy**
Professional:	Discuss the experiences related to meteorological measurements so far and the common existing knowledge. Formulate possible questions, point out shortcomings in specific knowledge.	Able to take on tasks assessing their own strengths and weaknesses. Able to present the professional ideas that have arisen for the implementation of the project to the others at the joint meeting.	Open to new professional knowledge, plan what learning strategy they will apply in the project. Open to looking for sources (literature, authentic digital content) on their own.	Actively participate in the formulation of professional tasks and questions related to the topic; in defining the objectives of the project.
Project management knowledge, transversal skills:	Justify why the project needs careful planning (division of labor, time management). Explain the meaning of the concepts "stage of labor", "division of labor", "documentation". Looking for digital tools to work together.	Choose the tasks closest to their capabilities during the formation of the division of labor.. Able to plan their own work, document it following a common agreement.	Proactive in developing common working methods and identifying credible sources. As a team member, being active and helpful.	Makes joint, consensus-based decisions on the organizational issues that arise, cooperation with the others. Perform the tasks undertaken in the division of labor independently on time.
Digital skills:	During the workflow, they join the online meeting; they get involved in the design of the common platform. They create their own work plan digitally and share it with others on an online workspace.			
Forms of work, methods, tools	Team session (personal presence): project kick-off meeting. Elaboration and documentation of individual and joint work plans and agreements on a platform suitable for group work.			
Check, evaluate, feedback				

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Activity:	***T1.* INTRODUCTION. DESCRIPTION OF THE PROJECT. DISCUSSION AND DISTRIBUTION OF TASKS**
During project work	Team members provide each other continuous feedback on defining the goals and stages of work raised (formative assessment). *Feedback:* For the next session, the chosen team leader compiles a work plan (work processes, responsible persons), with the help of which the progress can be continuously monitored and evaluated later.
Assessment of transversal (soft) skills acquired in project work at the end of the activity	Anonymous peer evaluation of how appropriate the commitments of individual team members are considered to be; 1-5 scale. *Feedback:* next time the teacher presents the results of the assessment, if necessary, they correct the division.

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Activity:	***T2.* PREPARING STUDENTS FOR FIELD WORK IN ADVANCE: CONDUCTING MICROCOURSES**			
Activity Description:	In order to successfully carry out the project, it is necessary to systematically summarize the knowledge previously acquired in the lessons. In connection with the individual subjects, the students acquired knowledge about plants, meteorology and cultivation equipment in a linear fashion, however, their comprehensive systematic and systematic knowledge of individual topics is incomplete. The aim of the microcourses is mainly to point out and reinforce the context of each topic.			
Learning outcomes	**Knowledge**	**Skill**	**Attitudes**	**Responsibility and autonomy**
Professional:	Get to know the connections between the thematically acquired knowledge (plant physiology-meteorology-growing equipment).	Able to systematize the acquired knowledge and manage it with a holistic approach. Able to independently obtain information and process it.	Open and committed to the continuous reception of new knowledge. Look for credible sources with a critical approach to certain topics.	There is no longer a need for continuous management when performing tasks. They independently undertake the development of certain topics and take responsibility for them. Reflect on the work of group members.
Project management knowledge, transversal skills:	Can formulate which professional knowledge is lacking for the implementation of the project through joint discussion (critical thinking).	Able to formulate which knowledge they have the most possession. Ability to plan their own theme presentation activity.	Proactive in developing common working methods and identifying credible sources. As a team member, they are active and helpful.	Take a joint, consensual decision on the organisational issues raised in cooperation with the others Perform the tasks undertaken in the division of labor independently on time.
Digital skills:	The workflow involves searching for and presenting digital resources online and sharing them on a common digital platform. (More on individual microcourses.)			
Forms of work, methods, tools	They prepare individually (independent work) from the topic of the given microcourse: pre-discussed, previously acquired knowledge from a brief description of a specific topic close to you.			

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Activity:	***T2.* PREPARING STUDENTS FOR FIELD WORK IN ADVANCE: CONDUCTING MICROCOURSES**
	They actively participate in group sessions where they present the collected materials (collaborative learning organization). The teacher imparts additional, new, systematizing knowledge based on the students' curriculum, preferably within the framework of experience-based learning.
Check, evaluate, feedback	
During project work	Each individual presentation is evaluated by team members; Developer suggestions are given (Method 3-2-1). Based on the assessment, students correct and supplement their presentation and upload it to the common interface accordingly.
Peer review at the beginning and end of the activity	*At the beginning of the activity (at the end of the previous activity):* a short digital test (Redmint) to assess the knowledge already acquired in principle *At the end of* the activity: digital test containing both old and new knowledge (Redmint) Based on the results, it can be seen whether there are areas left that have not reached the desired level of refreshment and mastery. In the latter case, the group decides on the basis of a joint discussion whether a sufficient level of knowledge can be achieved; They shall make an oral agreement in this regard.
Assessment of transversal (soft) skills acquired in the current activity of project work	At the end of the activity, students are anonymously self-assessed on how satisfied they were with their own performance (e.g. work organization, time management, efficiency, activity, conflict resolution). For the teacher, this is a concrete signal; if necessary, gives individual or group feedback based on this, or changes the group dynamics if necessary.

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Activity:	***T2_M1:*** Plant physiology of climatic factors: "The life of a plant"			
Activity Description:	During the microcourse, we review the basic concepts of plant physiology. Through the life cycle of a plant, we review the most important physiological processes. We review meteorological factors (focusing on the factors for which students will take measurements and for which we receive measurement data series). We then connect the two areas, pointing out which physiological processes are affected by meteorological factors and how.			
Learning outcomes	**Knowledge**	**Skill**	**Attitudes**	**Responsibility and autonomy**
Professional:	Know climatic factors and plant physiological processes. Learn about the connections between them, emphasizing cause and effect.	Able to recognize logical connections between the topics of plant physiology and meteorology and to use the related intuitive and creative thinking.	Open to acquiring a systematic level of knowledge and skills. Sensitive and interested in the factors influencing the life of plants as living beings, the creation of better living conditions.	Able to process and present previously acquired knowledge independently. Respond to the presentation of classmates in a developmental way.
Project management knowledge, transversal skills:	Explain why concepts related to basic plant physiological processes (e.g. sowing, hatching, vegetative development, generative development) and meteorological factors (temperature, precipitation, humidity, air pressure, air movement) are necessary. Present them on an individual, pre-selected basis. Express what knowledge of the specific context is lacking; learn about them from the teacher.	Able to formulate which knowledge materials they possess the most, and proactive in developing them. Ability to plan their own theme presentation activity.	Proactive in developing common working methods and identifying credible sources. As a team member, being active and helpful.	Perform the tasks undertaken in the division of labor independently on time.
Digital skills:	Search the Internet for authentic digital resources on plant physiology and meteorological factors. Compile and present a presentation in digital form about the committed topic, and upload it to the common digital platform. The teacher prepares the supplementary material in the form of a PowerPoint presentation with pop-up questions.			

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Activity:	***T2_M1:*** Plant physiology of climatic factors: "The life of a plant"
Forms of work, methods, tools	They prepare individually (independent work) on a related topic of plant physiology or meteorology: a brief description of the previously acquired repeater, confirmatory. They actively participate in group sessions where they present the collected materials (collaborative learning organization). According to the proposals formulated on the basis of a joint, developmental assessment, they correct and supplement their own knowledge base and upload it to the common platform. One of the group members stitches together the received digital materials. The teacher imparts complementary, new, systematizing knowledge based on the students' material, preferably within the framework of experiential learning.
Check, evaluate, feedback	
During project work	Each individual presentation is evaluated by team members; Developer suggestions are given (Method 3-2-1). Based on the assessment, students correct and supplement their presentation and upload it to the common interface accordingly.
Peer review at the beginning and end of the activity	*At the beginning of the activity (at the end of the previous activity):* a short digital test (Redmint) to assess the knowledge already acquired in principle. *At the end of the activity*: a digital test containing both old and new knowledge (Quizlet) Based on the results, it can be seen whether there are areas left that have not reached the desired level of refreshment and mastery. In the latter case, the group decides on the basis of a joint discussion whether a sufficient level of knowledge can be achieved; They shall make an oral agreement in this regard.
Assessment of transversal (soft) skills acquired in the current activity of project work	At the end of the activity, students are anonymously self-assessed on how satisfied they were with their own performance (e.g. work organization, time management, efficiency, activity, conflict resolution). For the teacher, this is a specific indication; If necessary, gives individual or group feedback based on this, or if necessary. changes group dynamics.

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Activity:	***T2_M2:*** Possibilities of shaping climatic factors: "Life in the greenhouse"			
Activity Description:	During the microcourse, we will review the concepts related to the operation of growing equipment (mostly large air-space, greenhouse); the means of operating growing equipment. We recall meteorological factors. Next, we connect the two areas, pointing out how and in what way meteorological factors can be controlled in an artificial environment with the help of growing equipment tools.			
Learning outcomes	**Knowledge**	**Skill**	**Attitudes**	**Responsibility and autonomy**
Professional:	Familiar with climatic factors and the technical equipment of the growing equipment. Learn about the connections between them, emphasizing cause and effect. Learn about the technological workflows determined by relationships.	Able to recognize logical connections between growing equipment (as technical facilities) and meteorology, and to use related intuitive and creative thinking.	Open to the application of material and energy-saving solutions and technologies that can be used in modern growing equipment.	Able to process and present previously acquired knowledge independently. Respond to the presentation of classmates in a developmental way.
Project management knowledge, transversal skills:	Justifie why concepts related to growing equipment and their tools (e.g. types of growing equipment, cooling-heating, irrigation, humidifying, shading) and meteorological factors (temperature, precipitation, humidity, air pressure, air movement) are necessary. Present them on an individual, pre-selected basis Can express what knowledge of the specific context is lacking; will learn them from the teacher.	Able to formulate which knowledge materials they possess the most, and they are proactive in developing them. Ability to plan their own theme presentation activity.	Proactive in developing common working methods and identifying credible sources. As a team member, they are active and helpful.	Perform the tasks undertaken in the division of labor independently on time.
Digital skills:	They search the Internet for authentic digital resources on plant physiology and meteorological factors. They compile and present a presentation in digital form about the committed topic, and upload it to the common digital platform.			

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Activity:	***T2_M2:*** Possibilities of shaping climatic factors: "Life in the greenhouse"
	The teacher prepares the additional material in the form of an explanatory video presentation.
Forms of work, methods, tools	They prepare individually (independent work) on a topic related to a growing equipment or meteorological topic close to them: a brief description of the previously acquired repeater, confirmatory. They actively participate in group sessions where they present the collected materials (collaborative learning organization). According to the proposals formulated on the basis of a joint, developmental assessment, they correct and supplement their own knowledge base and upload it to the common platform. One of the group members stitches together the received digital materials. The teacher imparts complementary, new, systematizing knowledge based on the students' material, preferably within the framework of experiential learning.
Check, evaluate, feedback	
During project work	Each individual presentation is evaluated by team members; Developer suggestions are given (Method 3-2-1). Based on the assessment, students correct and supplement their presentation and upload it to the common interface accordingly.
Peer review at the beginning and end of the activity	*At the beginning of the activity (at the end of the previous activity):* a short digital test (Redmint) to assess the knowledge already acquired in principle *At the end of the activity*: a digital test containing both old and new knowledge (Quizlet) Based on the results, it can be seen whether there are areas left that have not reached the desired level of refreshment and mastery. In the latter case, the group decides on the basis of a joint discussion whether a sufficient level of knowledge can be achieved; They shall make an oral agreement in this regard.
Assessment of transversal (soft) skills acquired in the current activity of project work	At the end of the activity, students are anonymously self-assessed on how satisfied they were with their own performance (e.g. work organization, time management, efficiency, activity, conflict resolution). For the teacher, this is a specific indication; If necessary, will provide individual or group feedback based on this, or if necessary. changes group dynamics.

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Activity:	***T2_M3:*** Refreshing knowledge of measuring instruments. Preliminary presentation of a specific measuring instrument.			
Activity Description:	In the framework of the microcourse, with the help of specific measuring instruments, we revive the meteorological measuring instruments we have already learned, their operation and the nature of the data that can be obtained from them (continuous or individual measurement). In order to work efficiently in the field, we get to know in detail the equipment used on the pilot plots and their operation.			
Learning outcomes	**Knowledge**	**Skill**	**Attitudes**	**Responsibility and autonomy**
Professional:	Know the tools for measuring meteorological parameters, their principle of operation. Get acquainted with the modern meteorological measuring device used in the project.	Able to recognize measuring instruments used for meteorological measurements, their structural units. Able to collect data using the previously known and current instrument. Able to correct errors (e.g. measurement errors).	Open to learning how new digital measuring devices work. Committed to quality work. If making a mistake, will see and correct it.	Able to process and present previously acquired knowledge independently. Respond to the presentation of classmates in a developmental way.
Project management knowledge, transversal skills:	Justifie why concepts related to growing equipment and their tools (e.g. types of growing equipment, cooling-heating, irrigation, humidifying, shading) and meteorological factors (temperature, precipitation, humidity, air pressure, air movement) are necessary. Present them on an individual, pre-selected basis Can express what knowledge of the specific context is lacking; will learn them from the teacher.	Able to formulate which knowledge materials they possess the most, and proactive in developing them. Ability to plan your own theme presentation activity.	Proactive in developing common working methods and identifying credible sources. As a team member, being active and helpful.	Perform the tasks undertaken in the division of labor independently on time.
Digital skills:	Search the Internet for authentic digital resources on plant physiology and meteorological factors. Compile and present a presentation in digital form about the committed topic, and upload it to the common digital platform.			

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Activity:	***T2_M3:*** Refreshing knowledge of measuring instruments. Preliminary presentation of a specific measuring instrument.
	The teacher prepares the supplementary material, on the one hand, by presenting specific measuring devices (experience-based learning), and on the other hand, in the form of a video presentation made at the practical site.
Forms of work, methods, tools	Individually prepare (independent work) about a meteorological measuring instrument close to them (what it is, what and how he measures, what data can be obtained): a brief description of the previously acquired repeater, confirmatory. Actively participate in group sessions where they present the collected materials (collaborative learning organisation). According to the proposals formulated on the basis of a joint, developmental assessment, they correct and supplement their own knowledge base and upload it to the common platform. One of the group members stitches together the received digital materials. The teacher imparts complementary, new, systematizing knowledge based on the students' material within the framework of experiential learning.
Check, evaluate, feedback	
During project work	Each individual presentation is evaluated by team members; Developer suggestions are given (Method 3-2-1). Based on the assessment, students correct and supplement their presentation and upload it to the common interface accordingly.
Peer review at the beginning and end of the activity	*At the beginning of the activity (at the end of the previous activity):* a short digital test (Redmint) to assess the knowledge already acquired in principle *At the end of the activity*: a digital test containing both old and new knowledge (Quizlet) Based on the results, it can be seen whether there are areas left that have not reached the desired level of refreshment and mastery. In the latter case, the group decides on the basis of a joint discussion whether a sufficient level of knowledge can be achieved; They shall make an oral agreement in this regard.
Assessment of transversal (soft) skills acquired in the current activity of project work	At the end of the activity, students are anonymously self-assessed on how satisfied they were with their own performance (e.g. work organization, time management, efficiency, activity, conflict resolution). For the teacher, this is a specific indication; If necessary, will provide individual or group feedback based on this, or if necessary. changes group dynamics.

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Activity:	***T2_M4:*** Types of meteorological data, methods of data processing.			
Activity Description:	In the framework of the micro-course, we deepen the students' mathematical and statistical knowledge necessary for conducting meteorological measurements and analyzing the data. They get acquainted with the types of data, methods of data collection. They learn about and apply digital solutions that can make numerical data more representative (e.g. graphs, charts).			
Learning outcomes	**Knowledge**	**Skill**	**Attitudes**	**Responsibility and autonomy**
Professional:	Know the types of data that can be obtained from meteorological measuring instruments. In mathematics, know the topic of data assigned to each other (functions, their representation in a coordinate system). Understand the statistical characteristics of data; graphic ways of representing them.	Capable of interpreting numerical meteorological data series. Able to create graphs and charts from numerical data that can be better interpreted visually. Observe typical processes, based on the collected and received data series.	Open to new data processing methods. Accurate and demanding in their work. If making a mistake, will see and correct it.	Perform data processing under professional guidance, partly independently.
Project management knowledge, transversal skills:	Justify why meteorological data are needed and their interpretation. Present statistical concepts already acquired in mathematics (e.g. assigned data, function, extreme values, monotony). Express what knowledge of the specific context is lacking; learn them from the teacher. (These are mostly methods of digital data processing.)	Able to formulate which knowledge materials they possess the most, and proactive in developing them. Ability to plan their own theme presentation activity.	Proactive in developing common working methods and identifying credible sources. As a team member, they are active and helpful.	Perform the tasks undertaken in the division of labor independently on time.
Digital skills:	Search the Internet for authoritative digital resources on mathematical statistics. Compile and present a presentation in digital form about the committed topic, and upload it to the common digital platform. The teacher gives the additional material to students in the framework of practical instruction. They process and plot data series in a computer room, using specific software (Excel).			

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Activity:	***T2_M4:*** Types of meteorological data, methods of data processing.
Forms of work, methods, tools	Individually prepare (independent work) from the presentation of an undertaking, closely related mathematical statistical concept: a brief description of the previously acquired repeater, confirmatory. Actively participate in group sessions where they present the collected materials (collaborative learning organisation). According to the proposals formulated on the basis of a joint, developmental assessment, they correct and supplement their own knowledge base and upload it to the common platform. One of the group members stitch together the digital materials received. The teacher impart complementary, new knowledge based on the students' material within the framework of experiential learning.
Check, evaluate, feedback	
During project work	Each individual presentation is evaluated by team members; Developer suggestions are given (Method 3-2-1). Based on the assessment, students correct and supplement their presentation and upload it to the common interface accordingly. The teacher, while transferring new knowledge, constantly monitors the progress of students, immediately gives confirmation and corrective feedback.
Peer review at the beginning and end of the activity	*At the beginning of the activity (at the end of the previous activity):* a short digital test (Redmint) to assess the knowledge already acquired in principle *At the end* of the activity: evaluation of the completed data processing with direct feedback from students and the teacher (voting on who likes which one best) Based on the results, it can be seen whether there are areas left that have not reached the desired level of refreshment and mastery. In the latter case, the group decides on the basis of a joint discussion whether a sufficient level of knowledge can be achieved; They shall make an oral agreement in this regard.
Assessment of transversal (soft) skills acquired in the current activity of project work	At the end of the activity, students are anonymously self-assessed on how satisfied they were with their own performance (e.g. work organization, time management, efficiency, activity, conflict resolution). For the teacher, this is a specific indication; If necessary, will provide individual or group feedback based on this, or if necessary. changes group dynamics.

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Activity:	***T2_M5:*** Using data in greenhouse cultivation			
Activity Description:	In the framework of the microcourse, they get to know in detail the cultivated crop (its general and special needs), in connection with which conclusions of the crop management programme based on meteorological data have to be drawn. Special emphasis is placed on the growing cycle and time factor.			
Learning outcomes	**Knowledge**	**Skill**	**Attitudes**	**Responsibility and autonomy**
Professional:	At a skill level, they know how to use concrete, modern meteorological measuring instruments. Know the steps of the management programme of ornamental annuals and the possibilities of interventions. Get to know the specific meteorological needs of the crops grown by the two partner companies.	Able to recognize the correlations between meteorological data and plant development and formulate concrete crop management programme recommendations.	Openness to cooperation with partner companies. Able to correct any errors made in the conclusions of the crop management programme. Use the learned strategies to solve problems.	Autonomy and responsibility in addition to one's own work Cover the activities of a collaborating or managed group.
Project management knowledge, transversal skills:	Justify why knowledge of crop management concepts, processes (e.g. sowing, growing seedlings, production of market goods) and meteorological data measured in the growing equipment is necessary, and present them on the basis of an individual, preliminary selection. Express what knowledge of the specific context is lacking; Will learn them from the teacher.	Able to formulate which knowledge materials they possess the most, and they are proactive in developing them. Ability to plan your own theme presentation activity.	Proactive in developing common working methods and identifying credible sources. As a team member, being active and helpful.	Perform the tasks undertaken in the division of labor independently on time.
Digital skills:	Each individual presentation is evaluated by team members; Developer suggestions are given (Method 3-2-1). Based on the assessment, students correct and supplement their presentation and upload it to the common interface accordingly. The teacher gives the additional material to the students with a video with explanatory captions and verification questions.			

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Activity:	***T2_M5:*** Using data in greenhouse cultivation
Forms of work, methods, tools	Prepare individually (independent work) from a concept or part of the process of crop management programme undertaken close to them (time factor is emphasized): a brief description of the previously acquired repeater, confirmatory. Actively participate in group sessions where they present the collected materials (collaborative learning organization). According to the proposals formulated on the basis of a joint, developmental assessment, they correct and supplement their own knowledge base and upload it to the common platform. One of the group members stitch together the digital materials received. The teacher imparts complementary, new, systematizing knowledge based on the students' material within the framework of experiential learning.
Check, evaluate, feedback	
During project work	Each individual presentation is evaluated by team members; Developer suggestions are given (Method 3-2-1). Based on the assessment, students correct and supplement their presentation and upload it to the common interface accordingly.
Peer review at the beginning and end of the activity	*At the beginning of the activity (at the end of the previous activity):* a short digital test (Redmint) to assess the knowledge already acquired in principle *At the end of the activity*: a digital test containing both old and new knowledge (Quizlet) Based on the results, it can be seen whether there are areas left that have not reached the desired level of refreshment and mastery. In the latter case, the group decides on the basis of a joint discussion whether a sufficient level of knowledge can be achieved; They shall make an oral agreement in this regard.
Assessment of transversal (soft) skills acquired in the current activity of project work	At the end of the activity, students are anonymously self-assessed on how satisfied they were with their own performance (e.g. work organization, time management, efficiency, activity, conflict resolution). For the teacher, this is a specific indication; If necessary, will provide individual or group feedback based on this, or if necessary. changes group dynamics.

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Activity:	***T3.*** Field work: Getting to know the growing equipment and meteorological measuring instrument under real conditions. Data collection.			
Activity Description:	A practical stage of work built on theoretical knowledge. Field visit, where students acquire practical knowledge in addition to the knowledge revived and strengthened by microcourses. They come into direct contact with the partner company. They get to know the specific cultivation equipment, plant culture, and cultivation technology steps. At the practical site, meteorological measurements are carried out and data are collected. Any errors made during measurement are corrected immediately.			
Learning outcomes	**Knowledge**	**Skill**	**Attitudes**	**Responsibility and autonomy**
Professional:	Know meteorological factors affecting the physiology of plants. Familiar with the meteorological measuring instruments used for measurement. Know the rules of safe device use.	Able to observe meteorological features and collect data on them.	Open to handle new meteorological information platforms. Strive for accurate readings of meteorological data.	Take measurements under professional guidance, partly independently. Interpret meteorological data adequately.
Project management knowledge, transversal skills:	Understand why field work is necessary in order to draw the expected conclusions. Can identify and apply the acquired knowledge during field work. Know the work organization in which the necessary measurements should be carried out (work processes, their schedule, determination of the necessary personal and material conditions).	Able to carry out the necessary measurements. Ability to think critically and solve problems in relation to measurement results: correct if necessary.	Proactive in developing common working methods and carrying out work processes. As a team member, they are active and helpful.	Perform the tasks undertaken in the division of labor independently on time. Each team member independently performs the tasks assigned to them. Milestones and results are evaluated jointly.
Digital skills:	Students also individually document the information recorded on the spot (take photos, video recordings), which are recorded on the common platform. The measured meteorological data shall be recorded according to the group schedule, but the data shall be made public on the common platform.			

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Activity:	***T3.*** Field work: Getting to know the growing equipment and meteorological measuring instrument under real conditions. Data collection.
Forms of work, methods, tools	They document the experiences of the field visit in group work; They closely follow the presentation of the partner company's growing equipment, cultivated ornamental plants and meteorological measuring instruments. (Within the group, they distribute who documents in what form (takes notes, takes photos, makes videos.) The teacher monitors the documentation process; Draws attention to the points that are emphasized. Meteorological measurements are carried out in groups. At the end of the field visit, individual experiences are discussed; If they find that they have a lack of knowledge on a topic, they correct it.
Check, evaluate, feedback	
During project work	Students do their own documentation process individually, but they help each other with direct questions (e.g. did you take a photo of this?! did you write this down?!) during the process. Students upload their documentation to the common platform.
Peer review at the beginning and end of the activity	*At the beginning of* the activity: a short, introductory discussion about the knowledge acquired in the microcourses, which helps to keep the focus of the documentation during the field visit. *At the end of the activity*: scale for field visit / location.
Assessment of transversal (soft) skills acquired in the current activity of project work	At the end of the activity, students are anonymously self-assessed on how satisfied they were with their own performance (e.g. work organization, time management, efficiency, activity, conflict resolution).

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Activity:	***T4.*** Data processing (analysis, presentation). Drawing conclusions (presentation).			
Activity Description:	The stage of processing field data collection (measured and received data series). Typically, the group interprets and processes the data independently (possibly with facilitator help) based on the division of labor within the group; draws conclusions from them in crop management programmes. A presentation will be prepared in digital format for the project participants (students, teachers, company).			
Learning outcomes	**Knowledge**	**Skill**	**Attitudes**	**Responsibility and autonomy**
Professional:	Know the types and characteristics of the collected data. Familiar with manual and digital solutions for processing data (spreadsheet editor, graph and chart editor).	Able to process data and present it visually. Able to draw professional conclusions based on processing.	Strive to prepare documentation that is demanding in appearance and high quality in its professionalism.	Perform documentation tasks independently and responsibly.
Project management knowledge, transversal skills:	Know the documentation possibilities and the importance of illustrative documentation. Can compile a demanding presentation material, based on the knowledge gained. Know in what organization of work the documentation should be compiled (work processes, their schedule, determination of the necessary personnel and equipment conditions).	Able to choose from different presentation forms and prepare the task assigned to them. Able to choose creative, illustrative solutions in the documentation.	Proactive in developing common working methods and carrying out work processes. As a team member, being active and helpful.	Perform the tasks undertaken in the division of labor independently on time. Each team member independently performs the assigned task. Milestones and results are evaluated jointly.
Digital skills:	The final presentation is made digitally – a format agreed upon by the group members at the first meeting. On the common digital interface, the completed work parts are shared with each other; An online discussion will be held on these. Before the final presentation, they "rehearse" the presentation in a personal meeting.			
Forms of work, methods, tools	In group work, they decide on a common presentation form, distribute tasks. They individually prepare the subtasks assigned to them.			

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Activity:	***T4.*** Data processing (analysis, presentation). Drawing conclusions (presentation).
Check, evaluate, feedback	
During project work	The presentation is prepared by the students in their own group organization – direct feedback is given by the student group leader on the prepared materials. (Students upload their own documentation sections to the common interface).
Peer review at the beginning and end of the activity	*At the end of* the activity: When the presentation is assembled, a mock demonstration is held. Both students and the teacher conduct peer assessments based on guided questions. Based on the evaluation, if necessary, they correct and supplement the presentation.
Assessment of transversal (soft) skills acquired in the current activity of project work	At the end of the activity, students are anonymously self-assessed on how satisfied they were with their own performance (e.g. work organization, time management, efficiency, activity, conflict resolution).

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Activity:	***T5.*** Project closure: presentation of results, summary evaluation (students, teachers, company)			
Activity Description:	The results achieved will be presented to the students present, their teachers and representatives of the two partner companies at the prepared presentations. For this, photos and videos taken in the field are used; the data processing produced, the conclusions formulated. A presentation of appropriate format and high quality content will be presented, where results of scientific demand will be illustrated in detail and spectacularly. They share mistakes made during the project, possible problems and solutions to them. They draw conclusions about how it could have been better, more accurately, more efficiently to implement the project.			
Learning outcomes	**Knowledge**	**Skill**	**Attitudes**	**Responsibility and autonomy**
Professional:	Know the digital tools of presentation; methods of effective communication. In communication, apply the elements of the acquired professional vocabulary. Know the possibilities of evaluating project work.	Able to present individual conclusions based on the results to the group and accept the opinions of peers and teachers. Able to incorporate the results of the summary assessment into their self-reflection and self-development.	Open to professional cooperation with fellow students and professionals.	High-quality cooperation between individuals and group members is enhanced. The organization of the group is growing. Able to manage conflicts in order to achieve results.
Project management knowledge, transversal skills:	Know and familiar with communication techniques and their importance. Can present the results of the project effectively. Can formulate new knowledge and experience in connection with the completed project.	During the presentation, being creative, original and proactive to the extent appropriate to the topic. Able to evaluate tasks performed at individual and group level. Able to formulate conclusions regarding the organization and implementation of the project.	Open and interested in the presentation process; Particularly interested in the external partner and are waiting for their feedback. As a team member, being active and helpful.	Perform the tasks undertaken in the division of labor independently on time. The presentation is compiled in teamwork, but it represents its individual abilities with its independent production.
Digital skills:	During the presentation, they will apply and use digital presentation techniques at a skill level. A short summary of the project and the finished presentation will be made public on a digital platform after the end of the project.			

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Activity:	***T5.*** Project closure: presentation of results, summary evaluation (students, teachers, company)
Forms of work, methods, tools	By prior agreement, the presentation will be shared among themselves and presented in parts, within the framework of an attendance event. After the presentation, both the project as a whole and the task performed, its result; The experience of the whole workflow is evaluated. All project partners (students, teachers, partner companies) are involved.
Check, evaluate, feedback	
Technical evaluation at the end of the project (project closure)	After presenting the presentation, the partner company will provide direct, verbal feedback. All participants (students, teachers, partner company) evaluate their experience with the project through a digital, immediately evaluable platform (scale assessment and word cloud) – separately in relation to the implementation of the project, the use of digital platforms, the organization of teamwork, the results achieved. They hold a joint brainstorming session about the emerging proposals (what would have made the project even better and more effective). They agree on the possibilities of possible continuation of professional work.
Assessment of transversal (soft) skills acquired in the current activity of project work	At the end of the activity, students are anonymously self-assessed on how satisfied they were with their own performance (e.g. time management, efficiency, activity, conflict resolution, problem solving, collaborative work).

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Timeline - Gantt chart

Gantt Chart I. – project management approach

Planned activities, schedule						
Duration: 6 weeks (25.03.2024 – 30.04.2024)	1	2	3	4	5	6
Management tasks						
T1. Introduction. Description of the project. Discussion and distribution of tasks						
T2. Preparing students for field work in advance: Conducting microcourses						
Milestone 1: planning and conducting microcourses						
T2_M1: Plant physiology of climatic factors: "The life of a plant"						
T2_M2: Possibilities of shaping climatic factors: "Life in the greenhouse"						
T2_M3: Refreshing knowledge of measuring instruments. Preliminary presentation of a specific measuring instrument.						
T2_M4: Types of meteorological data, methods of data processing.						
T2_M5: Using data in greenhouse cultivation						
Milestone 2: activities						
T3. Field work: Getting to know the growing equipment and meteorological measuring instrument under real conditions. Data collection.						
T4. Data processing (analysis, presentation). Drawing conclusions (presentation).						
Management tasks						
T5. Project closure: presentation of results, summary evaluation (students, teachers, company).						

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