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Trainings of trainers for teachers

5.2.2025. 11:06

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Module 1

Agriculture core training

Basics of vocational theoretical teaching for the qualification Agricultural Technician of Traditional and Organic Cultivation

5.2.2025. 11:06

Igor Nikolov
External expert

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Module 1

Agriculture core training

Session 1 General aspects of the teaching/learning process for

Agricultural technician of traditional and organic cultivation

Session 2 Process of teaching and learning at Agricultural

technician of traditional and organic cultivation

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Module 1

Agriculture core training

Session 1

General aspects of the teaching/learning process for Agricultural technician of traditional and organic cultivation

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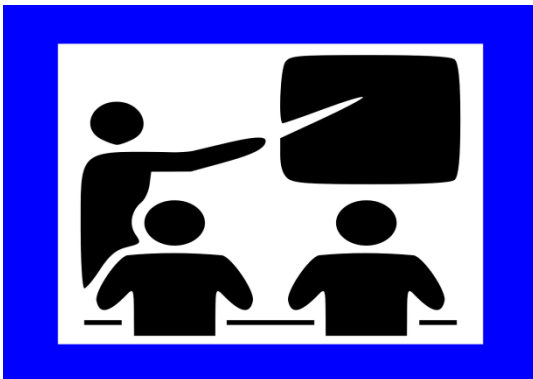
Igor Nikolov
External expert

Introduction of a trainer



- Igor Nikolov
- External expert
- Professor at Secondary School Koco Racin Sveti Nikole, Macedonia
- External associate of the Center for VET
- Author of more than 15 books for secondary education in the field of agriculture
- Licensed professional trainer
- Teacher of vocational subjects in the field of agriculture for more than 20 years
-

Presentation of the training goals and methods



- Goals
- Goals will be given at the beginning of each session

Goals of Session 1:

Comprehending the possibilities for applying innovative approaches to theoretical classes and exercises.

Identifying the principles and methods in the preparation and implementation of innovative learning and teaching processes.

Understanding the holistic approach in teaching.

Understanding digital resources that can be used during teaching, learning and assessment.

Identifying ways to record exercises, preparation, work process, results and conclusions.

Developing a positive attitude towards environmental protection and ecological standards.

- Methods
 - Interactive, Ex-cathedra , Roundabout, Group discussion, Individual work, Group work

Introduction of participants



Introduction of participants

Find a person you don't know and introduce yourself to that person.

Dating and Expectations



Dating and Expectations

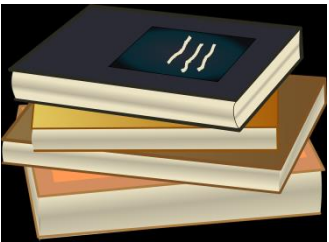
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- Tick statements that match your expectations



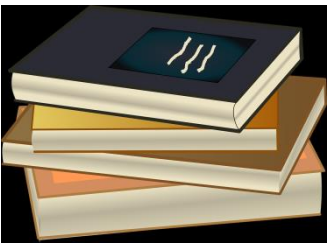
Or use QR code

Working materials (manuals) for the qualification Agricultural Technician of Traditional and Organic Cultivation - short presentation



- **Exercise**
 - **A question**
 - Where can the manuals be used in daily work?
-
- **Explanation**
 - Participants retain existing groups.
 - You have 4' for discussion in the group.
 - 1 participant in the group to present the group's work.

Working materials (manuals) for the qualification Agricultural Technician of Traditional and Organic Cultivation - short presentation



- Three manuals have been developed
 - Learning Material for Agricultural Technician of Traditional and Organic Cultivation
 - Teaching Material for Agricultural Technician of Traditional and Organic Cultivation
 - Work-based Learning Guidelines for Agricultural Technician of Traditional and Organic Cultivation

Working materials (manuals) for the qualification Agricultural Technician of Traditional and Organic Cultivation - short presentation

Questions during the preparation of the manuals:

- ▲ How to cover the whole qualification?
- ▲ What must be part of the manuals?
- ▲ How should the manuals be linked?
- ▲ How to make manuals applicable in all economies?
- ▲



Working materials (manuals) for the qualification Agricultural Technician of Traditional and Organic Cultivation - short presentation

The basis for the preparation of the manuals are the ***learning outcomes on which the qualification*** Agricultural technician for traditional and organic production is based.

All learning outcomes were analyzed and their grouping was done.

4 groups were obtained and they determined the areas/technologies on which the materials/manuals are based:

- General aspects of performing the work of an Agricultural technician for traditional and organic production
- Specific aspects of performing the work of an Agricultural technician for traditional and organic production for growing annual plants
- Specific aspects of performing the work of an Agricultural technician for traditional and organic production for the cultivation of perennial plants
- Specific aspects of performing the work of an Agricultural technician for traditional and organic production for livestock production



Learning Material for Agricultural Technician of Traditional and Organic Cultivation

- The purpose of the Manual is to provide learning materials for students and teachers for the qualification of Agricultural Technician for Traditional and Organic Production.
- In addition to students and teachers, the Manual will also be used by parents, employers, mentors and other stakeholders.



Teaching Material for Agricultural Technician of Traditional and Organic Cultivation

The purpose of this manual is to provide guidance for teachers regarding the realization of professional theoretical classes, exercises and practical teaching.

The manual provides an innovative and comprehensive process in the realization of professional theoretical classes and practical training of students.

Through the Handbook, teachers can combine the learning material and enable the acquisition of knowledge through theoretical teaching, exercises and practical teaching.



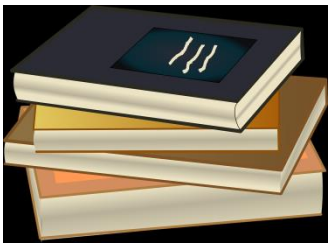
Work-based Learning Guidelines for Agricultural Technician of Traditional and Organic Cultivation

The WBL guidelines aim to provide guidelines for the organization of the students' practical training.

The WBL guidelines are intended for the teachers who carry out practical training and the mentors in companies responsible for implementing practical training, to connect the acquired professional-theoretical knowledge of the students and enable the students to acquire the necessary skills.



Working materials (manuals) for the qualification Agricultural Technician of Traditional and Organic Cultivation - short presentation



- Purpose and users of manuals

Question:

What is the purpose of the manuals and who are the users?



Working materials (manuals) for the qualification Agricultural Technician of Traditional and Organic Cultivation - short presentation

Purpose and users of the manuals

Learning Material

Purpose: to provide learning materials for students and teachers for the Agricultural Technician of Traditional and Organic Cultivation.

Users: students and teachers, but also parents, employers, mentors and other stakeholders.

Teaching Material

Purpose: to provide guidance for teachers regarding the implementation of professional theoretical classes.

Users: teachers engaged in professional-theoretical teaching.

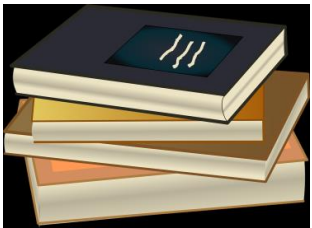
Work-based Learning Guidelines

Purpose: to provide guidelines for the organization of students' practical training.

Users: teachers who implement practical training and mentors in companies through practical training.



Working materials (manuals) for the qualification Agrotechnician for Agricultural Technician of Traditional and Organic Cultivation - short presentation



- **Role of manuals as working material**
- The basis for the development of training for trainers of trainers are the three manuals.
- For teachers of vocational subjects, the manuals provide an innovative, holistic approach to the implementation of vocational-theoretical teaching and practical training of students.

Innovative approach to classes and theoretical exercises

Innovative approach

- Discussion question:
- Which teaching approach do you use?



▲ Innovative approach to classes and theoretical exercises

Factors influencing teaching approach

- 1. Student characteristics: Factors such as students' age, learning style, proficiency level, and cultural background.
- 2. Curriculum requirements and goals: Teachers need to assess the learning outcomes.
- 3. Teacher preferences and expertise: Teachers tend to gravitate towards approaches that they are knowledgeable and comfortable with.

It is important for teachers to consider all these factors and strike a balance between student needs, curriculum requirements, and their own expertise when selecting teaching methods.



▲ Innovative approach to classes and theoretical exercises

Some innovative aspects and approaches that teachers can use to facilitate and enrich teaching are:

- ✓ **Technology in the Classroom**
- ✓ **Project-Based Learning**
- ✓ **Discussions and Case Studies**
- ✓ **Help from Experts**
- ✓ **Interactive Exercises and Games**
- ✓ **Use of Social Media and Online Platforms**



▲ Innovative approach to classes and theoretical exercises

Technology in the Classroom

- Agriculture applications and software can be integrated into the learning process.
- The use of Virtual Reality (RV) can provide hands-on experience in a virtual environment for students without having to step outside the classroom.
- Development of tools and techniques for innovative solutions to agricultural production issues.



▲ Innovative approach to classes and theoretical exercises

Project-Based Learning

- Students can engage in real farming projects, such as creating an organic garden.
- Getting new practical ideas and techniques for classroom application.
- This teaching method helps linking theory with practice.



▲ Innovative approach to classes and theoretical exercises

Discussions and Case Studies

- Using case studies to show the changes and challenges of traditional and organic agriculture.
- Open classroom discussions about students' personal experiences and achievements in agriculture.
- Encouraging students to ask questions and discuss traditional and organic agriculture.



▲ Innovative approach to classes and theoretical exercises

Help from Experts

- Experts in the field of (traditional and organic) agriculture are invited to give lectures.
- This helps provide a new and different perspective to students.



▲ Innovative approach to classes and theoretical exercises

Interactive Exercises and Games:

- Using interactive games and exercises related to agriculture.
- Encouraging students to be creative and independent



▲ Innovative approach to classes and theoretical exercises

Use of Social Media and Online Platforms

Enhancing and supporting the development of digital skills and increasing students' capacity.

Establishing online groups for discussion and resource sharing.

This enables continuous learning by students even outside the school hours.



▲ Innovative approach to classes and theoretical exercises

Technology in the Classroom

<https://newyork.agclassroom.org/resources/apps/>

<https://agclassroom.org/matrix/lesson/715/>

Agricultural Applications and Meteorology Software

<https://agrimetsoft.com/>

Use of virtual reality (RV) in agriculture

<https://www.ixrlabs.com/blog/virtual-reality-for-agricultural-engineering-education/>



Principles/guidelines for the preparation and implementation of an innovative learning and teaching process



Principles/guidelines for the preparation and implementation of an innovative learning and teaching process

- The preparation and implementation of innovative teaching and learning processes includes a combination of principles and guidelines to ensure effectiveness and positive results.
- These principles can help teachers create engaging and impactful learning experiences that better engage students and prepare them for success in a rapidly evolving world.

Principles/guidelines for the preparation and implementation of an innovative learning and teaching process



Principles/guidelines for the preparation and implementation of an innovative learning and teaching process

- Discussion question

What principles/guidelines do you use when implementing the teaching process?

▲ Principles/guidelines for the preparation and implementation of an innovative learning and teaching process

Here are some general principles and instructions:

1. **Approach – students in the centre:**

Put the students in the centre of the learning process.

Adapt the instructions to individual needs and learning styles.

Encourage active participation and self-directed learning.

2. **Clear learning objectives:**

Define clear and measurable learning outcomes.

Communicate these objectives to students so they understand what is expected.

3. **Use of technology and resources:**

Embrace technology to improve your learning experience.

Use different resources, including online platforms, multimedia and interactive tools.

4. **Collaborative learning:**

Encourage collaboration among students through group projects and discussions.

Encourage teaching and learning from peers.



▲ Principles/guidelines for the preparation and implementation of an innovative learning and teaching process

Here are some general principles and instructions:

5. **Critical thinking and problem solving:**

Promote critical thinking skills, posing challenging questions and problems.
Encourage students to analyse, evaluate and synthesize information.

6. **Artistic learning:**

Provide opportunities for practical experience and application of knowledge in the real world.

Use case studies, simulations and practical exercises.

7. **Active engagement:**

Create an active and participatory learning environment.

Use active strategies for learning how to debate, role-play and interactive quizzes.

8. **Return information and assessment:**

Provide timely and constructive feedback to help students improve.

Use different assessment methods, including formative and summative assessments.



▲ Principles/guidelines for the preparation and implementation of an innovative learning and teaching process

Here are some general principles and instructions:

9. **Inclusivity and diversity:**

Ensure that teaching methods are inclusive and responsive to different learning styles and backgrounds.

Promote a culturally responsible and correct learning environment.

10. **Flexibility and adaptability:**

Be open to adapting teaching methods based on student feedback and changing needs.

Accept the way of thinking about the situation and be prepared to experiment with new approaches.

11. **Lifelong learning:**

Instil motivation and the desire for independent and continuous learning outside the classroom.

Offer continuous learning and skills development.



▲ Principles/guidelines for the preparation and implementation of an innovative learning and teaching process

Here are some general principles and instructions:

12. **Reflection and evaluation:**

Regularly reflect on teaching practices and take opportunities for improvement.
Collect and analyse data on student success and feedback.

13. **Professional development:**

Keep up with the latest educational research and trends.
Attend workshops, conferences and engage in on-going professional development.

14. **Sustainability and ethical considerations:**

Consider the ecological and ethical implications of teaching methods and materials.
Promote responsible and sustainable practice.

15. **Communication and cooperation:**

Maintain open communication with students, parents and colleagues.
Collaborate with other educators to share best practices and resources.



▲ Principles/guidelines for the preparation and implementation of an innovative learning and teaching process

Here are some general principles and instructions:

16. **Integration of adaptive technology:**

Include adaptive technologies that take care of individual learning needs.

Use data-based insights to personalize learning experiences.

17. **Assessment for learning:**

Use assessments not only for assessment sake, but as a tool for improving instruction and learning.

Encourage self-evaluation and thinking.

18. **Continuous improvement:**

Be prepared to repeat and refine instructional methods based on constant feedback and evaluation



▲ Principles/guidelines for the preparation and implementation of an innovative learning and teaching process

- focus on students:

Giving an assignment before approaching the topic

Our approach in making the materials:

The student is given the task of visiting a farm and collecting information on a specific topic.

Encouraging students for active participation and self-directed learning.

Then follows processing by the student himself and his presentation of the collected information, ***and the teacher receives information about the students' needs and learning styles.***



Holistic approach to teaching



Holistic approach

Question:

What does the saying refer to?

“If a child can’t learn the way we teach, maybe we should teach the way they learn”

(Ignacio Estrada)

▲ Holistic approach to teaching

Holistic approach

Holistic education refers to a comprehensive, much more diverse approach of teachers to teaching, which goes beyond school teaching where teachers seek to address **the educational, emotional, social, and ethical needs of students in an integrated learning format.**



▲ Holistic approach to teaching

Holistic approach

Creating experiences

Activating the student's intellect, emotions, imagination and body

Addressing the educational and non-educational needs of students

Inspiring students, raising their awareness, balancing relationships

Using different methods and techniques

Structuring appropriate learning experiences



▲ Holistic approach to teaching

Step 1: Field visit to an agricultural holding and data collection

Objective: Gathering information about the upcoming topic/module

Step 2: Processing and presentation of the collected data

Objective: Developing students' interest in acquiring knowledge about the subject

Step 3: Vocational-theoretical teaching

Objective: Acquisition of professional theoretical knowledge among students about the subject

Step 4: Organizing exercises

Objective: Linking the professional-theoretical knowledge of the students on the topic

Step 5: Development of a plan and organization

Objective: Application of the acquired professional-theoretical knowledge of the students on the topic

Step 6: Practical training

Objective: Acquisition of practical skills among students for the subject



Innovative teaching techniques and methods of theoretical teaching and exercises

Innovative teaching techniques and methods

Question:

State which techniques and methods you use in teaching?



Innovative methods for theoretical classes and exercises

Project-based teaching

- ability of the students to apply the acquired knowledge in a real work environment

The innovation of this method consists of hiring experts

- focuses on both the process and the product
- taking responsibility for one's own learning
- teaching in its entirety is directly aimed at achieving a higher level of knowledge

Disadvantage:

- It requires more time, extensive planning and organizational considerations, which makes it impractical for everyday application



Innovative teaching techniques and methods of theoretical teaching and exercises

Specific examples of innovative and applicable teaching techniques

Flipped Classroom

- Video lessons

- Classroom discussions and debates

- Problem solving and projects

- Interactive exercises and tests

- Self-study

Cooperative learning and team performance

Virtual reality (VR) and augmented reality (AR)

Gamification

Personalized learning

Video and multimedia learning

Learning beyond the classroom



Project-based teaching

Step 5: Development of a plan and organization

The teacher will give clear instructions to the students for making a specific plan for organization and carrying out activities for sowing of a specific agricultural holding.

Task: The agricultural holding AgroMix has 10 hectares of arable land. According to the crop rotation, the area consisting of 5 fields should be with the following agricultural crops: wheat on 5 ha, tomatoes (with direct sowing) on 0.1 ha, potatoes on 0.5 ha, corn on 3 ha and sunflower on 4 ha.

You need to create a Plan for the sowing that should be carried out on the AgroMix farm.

Table: Sowing plan in relation to the agricultural holding AgroMix



Project-based teaching

Assignment/Final Exam/Case Study

Analyze the previous tasks given in this thematic unit. Fully develop the production technology for the most common annual crop on the farms you have visited.

Prepare a project entitled "Production technology of -----(specify the culture)" and a presentation.

Present the production technology to teachers, students and other interested parties!

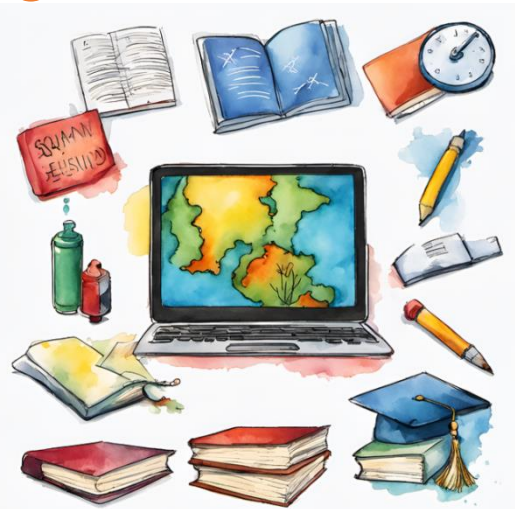


Digital resources that can be used during teaching, learning and evaluation во земјоделството

Digital resources

Question:

Name some digital resources that you use in teaching?



Digital resources that can be used during teaching, learning and evaluation in agriculture

Digital innovation resources

- *Use of Virtual Reality (VR) and Augmented Reality (AR)*
- *Use of digital platforms and applications*
- *Machine learning and artificial intelligence*
- *Distance learning using video conferencing tools*
- *Data analysis and weather forecasting*
- *Geographic Information Systems (GIS)*
- *Using social media and online communities*



Digital resources that can be used during teaching, learning and evaluation in agriculture

Sources and links

Software tools and applications in agriculture

[FarmLogs](#)

[Agrivi](#)

[CropX](#)

Courses and trainings in the field of agriculture and agronomy

Use of online educational platforms such as Coursera, edX and others in relevant agriculture-related courses.

Professional organizations and scientific/academic journals

[American Society of Agronomy](#)

[International Society for Horticultural Science](#)

[Journal of Agricultural Science and Technology](#)



▲ Digital resources that can be used during teaching, learning and evaluation in agriculture

Research projects and scientific/academic articles and papers

Looking up scientific articles and research projects in the field of agriculture using databases such as [Google Scholar](#).

Social media and online communities

Using social media and websites dedicated to agriculture where experiences and knowledge are shared.

Technical research centres and universities

[International Maize and Wheat Improvement Center \(CIMMYT\)](#)

[University of California, Davis - College of Agricultural and Environmental Sciences](#)



▲ Digital resources that can be used during teaching, learning and evaluation in agriculture

Tools and resources used in the agriculture-related teaching process

AgroKnow: Agro-platform that provides access to an abundant repository of educational resources in the field of agriculture. [AgroKnow](#)

e-Agriculture: International initiative for exchange of information and resources in the field of e-agriculture. [e-Agriculture](#)

• **Food and Agriculture Organization (FAO) e-Learning Center:** FAO provides various online courses and trainings in the area of agriculture and sustainable development.

[FAO e-Learning Center](#)

AgLearn: Online educational platform of the United States Department of Agriculture (USDA) offering different courses and trainings pertaining to agriculture. [AgLearn](#)

AgriCultures Network: A network of resources and materials that may be used in education and training in the fields of agriculture and sustainable development.

[AgriCultures Network](#)



▲ Digital resources that can be used during teaching, learning and evaluation in agriculture

AgEcon Search: Research and educational resources in the areas of agroecology and agriculture. [AgEcon Search](#)

FarmSmart: Online resources and tools for agricultural professionals and educators. [FarmSmart](#)

Agriculture in the Classroom: Educational resources and activities aimed at both teachers and students with emphasis on agriculture. [Agriculture in the Classroom](#)

<https://www.scientix.eu/>

<https://www.golabz.eu/>

<https://school-education.ec.europa.eu/en>

<https://academy.europa.eu/>

<https://www.schooleducationgateway.eu/en>

<https://euroguidance.eu/>

<https://epale.ec.europa.eu/en/user/login>

<https://eurodesk.eu/>



Summative assessment of theoretical knowledge and exercises



Summative assessment

Question:

How do we evaluate students' achievements during theoretical teaching and exercises?

▲ Summative assessment of theoretical knowledge and exercises

Formative and summative assessment

Formative assessment

- **assessment for learning (AfL)** and
- **assessment as learning.**

Assessment for learning is an on-going process that happens during the learning journey. quizzes, classroom discussions, observation and feedback from teachers or classmates, asking questions....

Assessment for learning involves students actively participating in their own assessment process

self-assessment and peer-assessment, portfolio etc.

Summative assessment, occurs at the end of a learning period.
focuses on **assessment of learning.**



▲ Summative assessment of theoretical knowledge and exercises

Bloom's taxonomy as basis for standardised assessment

Bloom's taxonomy, a framework for classifying educational objectives encompasses three distinct learning domains: cognitive, affective, and psychomotor.

The affective domain relates to emotions, attitudes, and values - **receiving, responding, valuing, organization, and characterization.**

The psychomotor domain, deals with motor skills and behavioural abilities, connecting cognitive processes to physical actions in education.

The cognitive domain is primarily concerned with knowledge recall, intellectual development, and thinking skills.





Summative assessment of theoretical knowledge and exercises

Revised Bloom's taxonomy verbs for critical thinking

Knowledge	Understand	Apply	Analyse	Evaluate	Create
Define	Summarise	Solve	Contrast	Criticise	Design
Identify	Interpret	Change	Connect	Rename	Modify
Describe	Classify	Relate	Relate	Judge	Role-Play
Recognise	Compare	Complete	Devise	Defend	Develop
Tell	Contrast	Use	Correlate	Appraise	Rewrite
Explain	Infer	Sketch	Illustrate	Value	Pivot
Recite	Relate	Teach	Distil	Prioritise	Modify
Memorise	Extract	Articulate	Conclude	Plan	Collaborate
Illustrate	Paraphrase	Discover	Categorise	Grade	Invent
Quote	Cite	Transfer	Take Apart	Reframe	Write



Templates of documentation required for recording exercises, preparation, work process, results and conclusions

Templates of documentation

Question:

How and where do you record exercises, work process, results and conclusions?



▲ Templates of documentation required for recording exercises, preparation, work process, results and conclusions

Documenting exercises, work processes, results and conclusions in a structured way is pivotal for effective learning and assessment.

Documentation templates can be adapted to digital or hardcopy record keeping systems.

As for digital recordkeeping system, these templates can be generated using software such as Microsoft Word or Excel, Google Docs or Sheets, or any other database or project management tools that allow generation of customized templates.



▲ Templates of documentation required for recording exercises, preparation, work process, results and conclusions

There are various types of templates that have a specific purpose in the documentation process:

- Exercise preparation template - provides a record of all materials and steps prior to the exercise.
- Workflow log template - provides a real-time record of the exercise as it develops.
- Template for recording results - serves to document the immediate quantitative and qualitative results of the exercise.
- Conclusion and reflection template - allows analysis of results, inferring conclusions and reflection on the learning experience.



Templates of documentation required for recording exercises, preparation, work process, results and conclusions

Participants:

Name and surname	Role	Contribution

Work task description:

Take an article sample from a 1 ha surface area for analysis

List of tools and materials used in the work process

Pointed spade
Bucket
Tape measure
PVC bag

Occupational health and safety measures

Use PPE equipment when working
Gloves
Goggles
Boots
Overalls

Steps in the course of work

Determine the sampling method, e.g. zigzag method, 15 samples
Mix all samples and weigh 1-2 kg
Pack the weighed soil in a PVC bag
Write down information about the relevant plot and foreseen planting

Observations

Insert observations:

Measurement results (if any)

Insert results

Analysis of conducted procedure/measurement results

Conclusions

Insert conclusions

Photos and other documents

Add photos and other documents

Environmental protection rules and ecological standards

Environmental protection rules and ecological standards

Question:

Which environmental protection rules and environmental standards are important for agriculture?



▲ Environmental protection rules and ecological standards

Impact of agriculture on the environment

The intensive development of agriculture had a **significant negative impact** on the quality of the environment.

This impact is due to the **high level of utilization of natural resources for agricultural purposes**, such as land, water, etc., but also to the high level of use of synthetic chemical agents, such as chemical fertilizers and pesticides, which cause a large number of negative impacts on the environment in the ecosystem and worsen the quality of the agricultural environment.



▲ Environmental protection rules and ecological standards

1. Traditional production

A system that implements intensive cultural practices This farming practice causes an increase in the release of greenhouse gases, soil and water pollution, soil erosion.

2. Organic production

A system that relies on natural processes, biodiversity, composting and nutrient cycles adapted to local conditions. It protects soil, preserves water and air quality, and protects ecosystems from degradation. It applies environmental standards.



▲ Environmental protection rules and ecological standards

The practices implemented in agricultural production should enable:

- Soil protection
- Water quality protection
- Air quality protection
- Using renewable energy sources on the farm



▲ Environmental protection rules and ecological standards

Environmental standards in agriculture

An environmental standard is a legally binding requirement that places limits on the level of specific inputs applied on farms, the level of pollution in water and air streams, or the type of practice used on the farm.

Example

Environmental standards in organic farming determine the number of head of animals that the farm must keep, by category, in order that the nitrogen (N) intake does not exceed 150-170 kg of active matter N/ha per year. (Regulation (EU) 2018/848).



Manual

ENVIRONMENTAL ASPECTS OF AGRICULTURAL TECHNICIAN

-A useful tool that can help in lesson planning

Contains

- Measures and recommendations
- Practical tips for planning practical teaching
- Recommendations for ecological and sustainable agriculture
- Useful practices
- Examples of best practices - material for discussion



Summarizing the knowledge gained from the session



Summarizing the knowledge

Mentimeter

- Open menti.com
- Enter the code
- Enter a name
- Mark the correct answer to the question



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Module 1

Agriculture core training

Session 2

Process of teaching and learning at Agricultural technician of traditional and organic cultivation

5.2.2025. 11:06

Igor Nikolov
External expert

Session 2

Process of teaching and learning at Agricultural technician of traditional and organic cultivation



Goals of Session 2:

- Specifying modern approaches and opportunities for active participation of students in the acquisition of the necessary professional-theoretical knowledge.
- Differentiating the steps in planning the teaching process.
- Perceiving the process of realization of the teaching.
- Realizing the need for proper preparation of students to acquire practical skills through a process of practical training in school economies or in companies with employers.

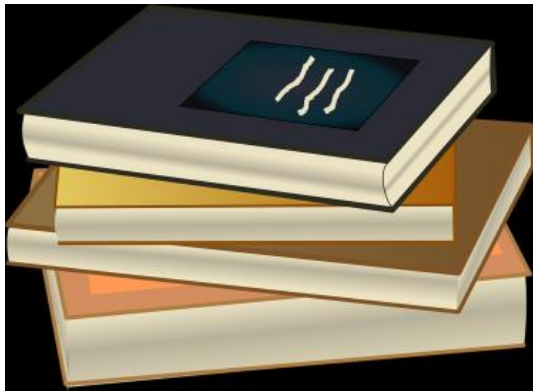
Approaches to the teaching

The implementation of the teaching is based on the application of methods and exercises that will achieve the learning results.

In order to achieve the learning results, expert-theoretical teaching and practical training will be organized.

Approaches to the teaching во земјоделството

o



The realization of the teaching will take place in several steps:

Step 1: Field visit to an agricultural holding and data collection

Objective: Gathering information about the upcoming topic/module

The teacher gives a task (outlined in the Teaching Materials Manual) to collect data and information about the relevant topic. Students make a field visit to a specific agricultural holding and collect the necessary information.



Step 2: Processing and presentation of the collected data

Objective: Developing students' interest in acquiring knowledge about the subject

The collected data is analyzed by the students and presented.



Step 3: Vocational-theoretical teaching

Objective: Acquisition of professional theoretical knowledge among students about the subject

The teacher builds on previous knowledge and provides the necessary professional-theoretical foundations for the specific topic.



Step 4: Organizing exercises

Objective: Linking the professional-theoretical knowledge of the students on the topic

After acquiring the necessary professional-theoretical foundations for the specific topic, exercises are organized to round off the students' knowledge.



Step 5: Development of a plan and organization

Objective: Application of the acquired professional-theoretical knowledge of the students on the topic

In this step, the students work out a specific plan for the organization and performance of the activities that are intended for a specific agricultural economy.



Step 6: Practical training

Objective: Acquisition of practical skills among students for the subject

After the creation of the Organization Plan and the implementation of the activities for a specific agricultural economy, the student, led by the practical training teacher/mentor, proceeds to the realization of the planned activities in the plan of the school economy or in the given company/agricultural economy.



Table: Planning of a unit

Planning classes

Unit	Seeding and planting				
Learning outcomes	4.2.Produces crops' seeds and seedling plant material for own use. 4.3.Applies different preparatory actions and cultivation methods for planting seeds and seedlings in fields and protected/controlled environment by using appropriate tools for work in conformity with relevant standards and regulations.				
Teaching units	Type of teaching	Teaching methods and techniques	Place for implementation	Materials and resources	Assessment
Seeds and seedling plants	Theoretical teaching Exercises	Dialogue Illustration Demonstration Brainstorming Questions-answers Discussion and debate network	Practical training Classroom	Collection of seeds Television LCD Schemes Sketches School supplies	Students' outcome assessment instrument by means of observation and self-assessment
Quality properties of seeds to be used for seeding	Theoretical teaching Exercises	Dialogue Illustration Demonstration Brainstorming Questions-answers Discussion and debate network	Practical training Classroom	Collection of seeds Television LCD Schemes Sketches School supplies	Students' outcome assessment instrument by means of observation and self-assessment
Preparation of seeds to be used for seeding and the seedling plant material	Theoretical teaching Exercises	Dialogue Illustration Demonstration Brainstorming Questions-answers Discussion and debate network	Practical training Classroom	Collection of seeds Television LCD Schemes Sketches School supplies	Students' outcome assessment instrument by means of observation and self-assessment
Seeding, planting, propagating	Theoretical teaching Exercises	Dialogue Illustration Demonstration Brainstorming Questions-answers Discussion and debate network	Practical training Classroom	Collection of seeds Television LCD Schemes Sketches School supplies Seed company	Students' outcome assessment instrument by means of observation and self-assessment
Seeding and Planting Plan	Exercises Field training	Dialogue Demonstration Analysis- Synthesis Research Discussion and debate network	Practical training Classroom Agricultural economy Seed company	Television LCD Schemes Sketches School supplies Camera Measuring tape, etc.	Students' outcome assessment instrument

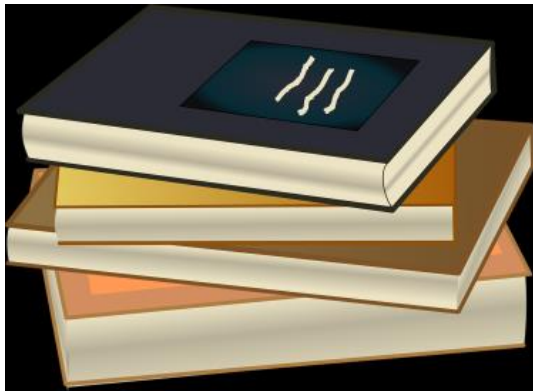


Table: Planning of a unit

Planning classes

Themes	Agrotechnical measures for perennial fruit and grape plant cultivation				
Learning outcome	5.5. Applies agrotechnical measures for the cultivation of perennial plants during the period of fruit/grape bearing.				
Learning units	Type of teaching	Teaching methods and techniques	Place of application	Materials and resources	Assessment
Soil maintenance practices	Theoretical teaching (soil preparation and maintenance to support the healthy growth of perennial plants, the role of biodiversity and companion plants in protecting soil health) Practical teaching Teaching in the field Exercises (Analysis of soil samples, pH testing)	New content Repetition, Lecture Demonstration (Practical sessions and demonstrations during soil maintenance) Discussion Role-Play Project-based learning in inquiry Field expeditions Guest lecturers Digital learning	Class, Laboratory Practical teaching class Outdoor space/terrain Agricultural Farm	Agriculture books, practical instructions Video of soil maintenance practices. Online platform to share experiences and challenges of growers. TV School equipment	An instrument for assessing student achievement through observation and self-assessment
Productive pruning methods	Theoretical teaching (Methods and techniques of productive pruning in trees and vineyards) Practical teaching (Managing the formation of a tree crown during a season) Teaching in the field (Use of productive pruning techniques in trees and vineyards)	New content Repetition, Lecture Demonstration Discussion Role-Play Project-based learning in inquiry Field expeditions Guest lecturers Digital learning	Class, Outdoor space/terrain (Practical workshop in fields of cultivation of perennial plants, during productive pruning) Agricultural farm	Agriculture books, practical instructions (techniques and importance of winter and summer pruning) Video on pruning methods) Video tutorials showing how to perform productive pruning in an orchard or vineyard. Online platform to share experiences and challenges of growers. School equipment	An instrument for assessing student achievement through observation and self-assessment
Fertilization of trees and vineyards	Theoretical teaching (Fertilizers and the importance of fertilizing fruit trees) Practical teaching Teaching in the field (Research on the effects of fertilization on increasing plant production) Exercises	New content Repetition, Lecture Demonstration (Practical sessions and demonstrations during the use of fertilizers) Discussion Role-Play Project-based learning in inquiry Guest lecturers Digital learning	Laboratory Practical teaching class (Seminar on the application of fertilization techniques to concrete plants) Outer Space/Terrain Agricultural farm	Agriculture books (Scientific materials describing the nutrients needed by trees and vineyards during the production period) practical instructions (Practical guide to fertilizing with organic and mineral fertilizers) Video tutorial (use of organic and mineral fertilizers in orchards) Online platform to share experiences and challenges of growers.	An instrument for assessing student achievement through observation and self-assessment
Irrigation of trees and vineyards	Theoretical teaching (The importance of monitoring the level of moisture and reacting to the lack of water) Practical teaching (Designing a drip irrigation system for a vineyard) Teaching in the field (Using the right amount of water in the period of crop production)	New content Repetition, Lecture Demonstration (Practical sessions and demonstrations during the use of fertilizers) Discussion Role-Play Project-based learning in inquiry Guest lecturers Digital learning	Laboratory Practical teaching class Outdoor Space/Terrain (Visits to farms using advanced irrigation systems) Agricultural farm	Agriculture Books, Practical Guides (Soil Moisture Monitoring Guide) Irrigation rainfall charts Advanced Video Systems) Online platform to share experiences and challenges of growers. TV School equipment	An instrument for assessing student achievement through observation and self-assessment
Disease and pest control	Theoretical teaching (The most important diseases and pests that damage trees and fruit trees and vines) Practical teaching (Case studies on disease and pest control measures) Practical workshop Teaching in the field (Case studies of the application of control methods in real farms) Exercises (exercises for recognizing the first signs of diseases and pests)	New content Repetition, Lecture Demonstration (Practical sessions and demonstrations during the use of fertilizers) Discussion Role-Play Project-based learning in inquiry Guest lecturers Digital learning	Laboratory Practical teaching class Outdoor Space/Terrain (Visits to farms using advanced irrigation systems) Agricultural farm	Agriculture books, (illustrated materials on common diseases and pests of trees practical instructions (Practical guide to the treatment and prevention of diseases and pests in trees and vines) Videos and animations showing the effects of diseases and pests on plants. Online platform to share experiences and challenges of growers. School equipment	An instrument for assessing student achievement through observation and self-assessment

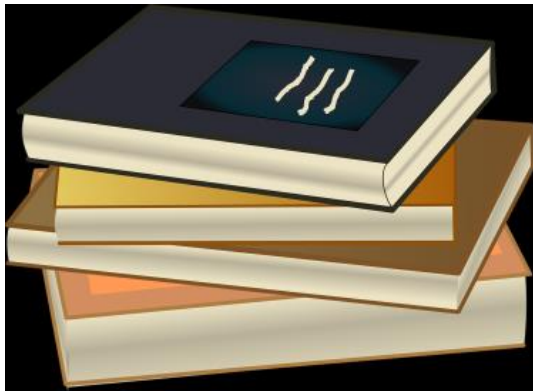


Table: Planning of a unit

Unit	Cow nutrition during the production period				
Learning outcome	OUTCOME 2 Providing livestock nutrition according to the species, breed and class (cattle)				
Teaching units	Type of teaching	Teaching methods and techniques	Place for implementation	Materials and resources	Assessment
Cattle nutrient requirements	Theoretical teaching Exercises	Discussion Illustration	Classroom Laboratory Practical teaching classroom	AV equipment Sketches Diagrams	Evaluation of student's achievements through observation and self-assessment
Feed distribution	Theoretical teaching Exercises	Discussion Illustration Demonstration	Classroom Laboratory Practical teaching classroom Farm Agricultural farm	Feed samples AV equipment Sketches Diagrams	Evaluation of student's achievements through observation and self-assessment
Cattle nutrition	Theoretical teaching Exercises Field teaching	Discussion Illustration Demonstration	Practical teaching classroom Farm Agricultural farm	Feed samples AV equipment Farm Agricultural farm	Evaluation of student's achievements through observation and self-assessment
Cow nutrition during the production period	Theoretical teaching Practical teaching Field teaching	Discussion Illustration Demonstration	Farm Agricultural farm	Feed samples AV equipment Farm Agricultural farm	Evaluation of student's achievements through observation and self-assessment

Planning classes

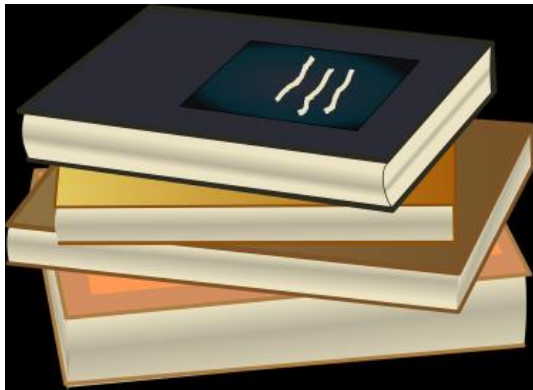


Table: Students' outcome assessment instrument

Assessment of achievements

Topic	Assesment				
	5	4	3	2	1
Seeding and Planting Plan	In-depth and comprehensive Seeding and Planting Plan with stipulated optimum deadlines. Precisely prescribed ways of cropseeding and planting. Fully established norms pertaining to cropseeding and planting.	In-depth and comprehensive Seeding and Planting Plan. Prescribed ways of crop seeding and planting. Established norms pertaining to cropseeding and planting.	Devised Seeding and Planting Plan. Selected ways of crop seeding and planting. Established norms pertaining to crop seeding and planting.	Indicated crops in the Seeding and Planting Plan. Indicated possible ways of seeding and planting. Indicated possible norms pertaining to crop seeding and planting.	Fails to meet the criteria

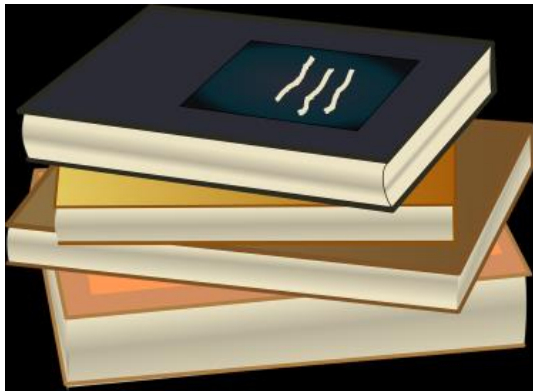
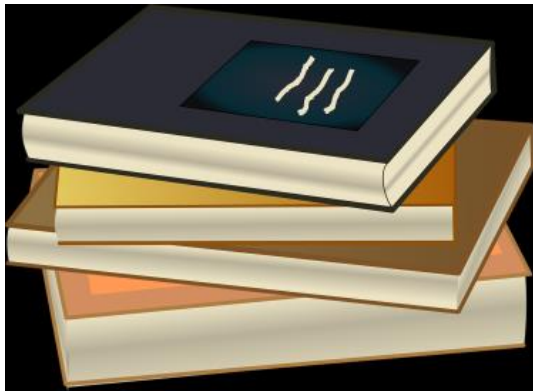


Table: Students' outcome assessment instrument

Assessment of achievements

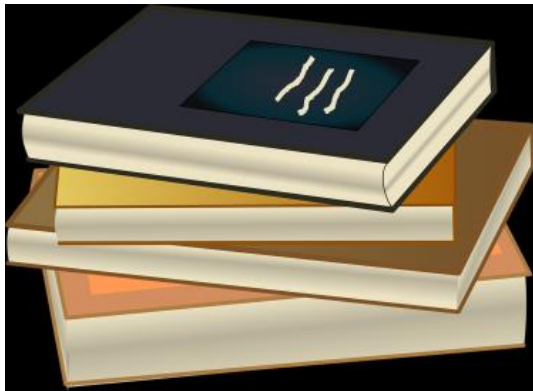


	5	4	3	2	1
1. Agrotechnical measures for the cultivation of perennial plants during the period of fruit and grape production.	<p>The student thoroughly describes productive pruning methods and has the ability to apply productive pruning techniques in orchards and vineyards. The student has complete knowledge about fertilizers and their use.</p> <p>The student has knowledge of the importance of proper irrigation during the production period.</p> <p>The student has knowledge and skills to identify diseases and pests of fruit trees and vines</p>	<p>The student describes the procedures for the implementation of agrotechnical measures for the cultivation of perennial plants during the period of fruit and grape production.</p>	<p>Students identify the procedures for the implementation of agrotechnical measures for the cultivation of perennial plants during the period of fruit and grape production.</p>	<p>Students explain some simple agrotechnical measures for the cultivation of perennial plants during the period of fruit and grape production.</p>	Does not meet the criteria

Table: Students' outcome assessment instrument

Assessment of achievements

	5	4	3	2	1
1. Cow feeding plan in the production cycle	Prepares rations for certain cattle classes Selects the best feedstuffs for dairy cows based on the lactation period	Explains method of obtaining livestock feed Analyses the effect of certain feedstuffs on the productivity of dairy cows	Explains the importance of proper nutrition of dairy cows	Specifies livestock classification according to the feeding methods Specifies types of livestock feeds	Does not meet the criteria



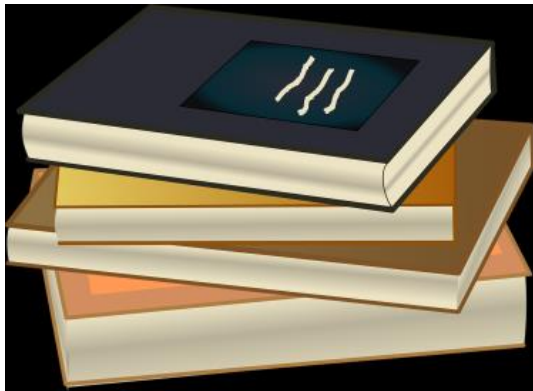
Presentation of a developed example

Presentation of a developed example

Topic/Module: Seeding, planting and plant propagation

Learning outcomes

- Produces crops' seeds and seedling plant material for own use.
- Applies different preparatory actions and cultivation methods for planting seeds and seedlings in fields and protected/controlled environment by using appropriate tools for work in conformity with relevant standards and regulations.





Step 1: Field visit to an agricultural farm and data collection

The teacher assigns the task at least one week prior to the implementation of the topic/module.

Assignment

The student is to visit an agricultural farm and do some research with respect to performing the seeding or planting of the crops to be cultivated. In the course of classes, you are to work in groups and establish ways of seeding, planting and plant propagation. You are to present the conclusions to other participants!

Data to be collected from the agricultural farm:

- Size of the agricultural farm
- Number of fields
- Present crops
- Seeding/propagating material (quality properties and preparation) for all cultivated crops as per the declaration
- Time of seeding/planting/propagation
- Seeding norm
- Way of seeding



Presentation of a developed example

Step 2: Processing and presentation of the collected data

Upon a field visit, the collected data are to be analysed by students and presented.

Agricultural farm: AgroMix				
Date of visit: 10.05.2023				
Type of agricultural farm: Small with mixed production				
Size of the agricultural farm: 3.8 ha				
Number of fields: 4				
Present crops	Maize	Tomatoes	Potatoes	Corn
Area	3 ha	0,1 ha	0,2 ha	0,5 ha
Seeding/planting material Variety	Pobeda	Novi Sad jabuchar	.0 Bintje	ZP704
Category	I Varietal reproduction	Original	Original	Hybrid
Sprouting ability	93 %	88%	/	/
Time when the seeding/ planting/ propagating was performed	15.10.2022	Propagation production 15.03.2023	15.04.2023	10.04.2023
Seeding/ planting norm	240 kg/ha	100 gr/acre	2000 kg/ha	60.000 plants/ha
Way of seeding / planting	Narrow row using a seeding machine Inter-row spacing of 12,5 cm	Propagation production in hotbeds	Performed manually in rows Inter-row spacing of 60 cm, and 30 cm within the row	Wide row using a seeding machine Inter-row spacing of 70 cm



Step 3: Vocational-theoretical teaching

Upon the presentation on the part of students, the teacher sets objectives to build on the previous knowledge and provide necessary vocational-theoretical foundations for the specific subject matter.

In the course of the vocational-theoretical instruction the below-stated are elaborated on:

Seeding material

Planting material

Quality properties of seeds to be used for seeding

Preparatory activities referring to seeds to be used for seeding and planting material

Seeding

Ways of seeding

Time of seeding

Depth at which the seeding is to be performed

Seeding norm

Planting

Propagation



Step 4: Organizing exercises

Exercises are to be organized to round up students' knowledge. The foreseen exercises for this topic/module are as follows:

Exercise 1: Identifying seed quality parameters

Objective: Understanding various parameters that define seed quality.

Instructions:

Provide students with a list of seed quality parameters such as purity, germination rate, moisture content, and presence of weed seeds or inert matter.

Show samples of seed lots that represent different levels of these quality parameters.

Have students examine seed samples and identify quality parameters present.

Outcome: Students will learn to visually and physically assess primary quality characteristics of seeds.

Exercise 2: Seed sowing techniques

Exercise 3: Direct sowing in the field

Exercise 4: Creating a seeding calendar

Exercise 5: Space allocation planning

Exercise 6: Resources and labour allocation

Exercise 7: Record keeping and documentation



Step 5: Plan development and organization

The teacher is to give clear instructions to students so as to devise a specific plan for the organization and performance of seeding activities aimed at a specific agricultural economy.

Assignment

The agricultural farm AgroMix has 10 ha of arable land at its disposal. According to the crop rotation, the area consisting of 5 fields shall have the following crops: maize at 5 ha, tomatoes (by direct seeding) at 0.1 ha, potatoes at 0.5 ha, corn at 3 ha and sunflowers at 1.4 ha.

You are to make a plan regarding the seeding to take place at the agricultural farm AgroMix.



Presentation of a developed example

Table: Seeding plan with reference to the agricultural farm AgroMix

Agricultural farm: AgroMix					
Type of agricultural farm: Small with mixed production					
Size of the agricultural farm: 10 ha					
Number of fields: 5					
Present crops	Maize	Tomatoes	Potatoes	Corn	Sunflower
Area	5 ha	0,1 ha	0,2 ha	3 ha	1,4 ha
Seeding/planting material					
Variety					
Category	Pobeda	Novi Sad jabuchar Original	Désirée Original	ZP704	NS FELIX
Sprouting ability	I Varietal reproduction			Hybrid	Hybrid
...	93 %	88%	/	/	
Optimal seeding/planting/propagating time	15.10.2023	15.03.2024	15.04.2024	10.04.2024	10.04.2024
Seeding/planting norm	240 kg/ha	100 gr/acre	2.000 kg/ha	60.000 plants/ha	50.000 plants/ha 8-10 kg/ha
Quantity of seeding/ planting/ propagating material needed	1.200 kg	100 gr	400 kg	180.000 seeds	70.000 seeds 14 kg
Way of seeding/planting	Narrow row using a seeding machine Narrow rows of 12,5 cm	Wide rows using a seeding machine Wide rows of 60, and 30 cm in the row	Manual in rows The spacing between the rows is to be 50 cm, and 30 cm within the rows	Wide row using a seeding machine Inter-row spacing of 70 cm	Wide row using a seeding machine Inter-row spacing of 70 cm



Work in groups

An assignment

To work out an example of professional theoretical teaching for the specific task.

The approach should be applied: activation of previous knowledge, addition of knowledge (theoretical teaching, exercises, practical teaching), application of knowledge.

Group 1 Macedonia, Bosnia and Herzegovina

Topic/Module: Agrotechnical measures and machines

Group 2 Serbia and Montenegro

Topic/Module: Livestock conditions

Group 3 Albania and Kosovo

Topic/Module: Plantation of fruit trees and vines

Each group will receive work material for the specific topic/module.

40 minutes are planned for group work, and 10 minutes for each group's presentation.

Work in groups



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Module 2 Work-based learning

5.2.2025. 11:06

Igor Nikolov
External expert

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Module 2

Work-based learning

Session 1 General aspects of mentoring/work-based learning

Session 2 Process of Work-based learning at Agricultural technician
of traditional and organic cultivation

5.2.2025. 11:06

Igor Nikolov
External expert

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Module 2

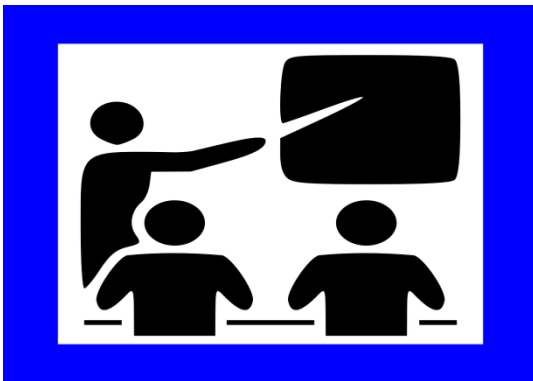
Work-based learning

Session 1 General aspects of mentoring/work-based learning

5.2.2025. 11:06

Igor Nikolov
External expert

Presentation of the training goals



Goals of Session 1:

- Understanding the process of learning through work and the role of the teacher for practical training and the mentor,
- Identification of innovative approaches, principles and methods in the realization of the practical training of students,
- Identifying the assessment and documentation of the learning-by-doing process,
- Understanding the need for a pedagogical approach in practical training.

Work-based Learning (WBL)

Work-based learning (WBL) is a practical training that offers students to gain work experience in real workplace conditions in a company, in a craft workshop and in other facilities.

Work-based learning (WBL) is a learning process that occurs when students do real work in a real work environment.




Work-based learning (WBL) is part of formal education in vocational schools.

Work-based learning (WBL) differs from conventional training in that it involves the acquisition of professional competencies and experience in real working conditions at the workplace.

Work-based learning (WBL) enables the acquisition of professional competences, but also the ability of the student to understand how to develop key competences and learn how to learn.





Collaborative approach of all stakeholders: the business sector, local government, educational institutions, teachers, students and parents.

Good coordination and a clear division of responsibilities between stakeholders (employer, mentor, vocational education school/institution, teacher coordinator for practical training, responsible teacher for WBL, student, parent, municipality, chambers, educational institutions, employers' organization and local economic advice) in the process of realizing learning through work, as well as from established mechanisms for feedback.



A broader interpretation of work-based learning implies work-related learning that is guided by the needs of the individual and society.

The narrower interpretation refers to learning through work that is guided by the needs of the employer and is connected to the realization of learning through work according to the dual model of professional education.

Dual model of education - the student performs work and tasks for an employer in accordance with the curricula for UPR, prepared in accordance with the needs of an employer.



Role, rights and obligations of the responsible teacher for practical education and mentor in the company in the process of Work-based Learning (WBL)

The rights and forms of the responsible teacher for practical education and the mentor in the company, which are the key to the successful realization of work-based learning (WBL).



Role, rights and obligations of the responsible teacher for practical education and mentor in the company in the process of Work-based Learning (WBL)

Role, rights and obligations of the mentor in a company

Attends training for mentors and obtains mentor certificate

Participates in developing a program for the implementation of WBL with the employer, in collaboration with a vocational school teacher

Prepares and determines jobs and tasks for students, including students with disabilities, in accordance with the curriculum and the program

Presents the organizational structure and activity of a company to students

Introduces occupational health and safety regulations and measures to students

Assigns students to workplaces and informs the supervisor about the student's presence at that workplace

Notifies employees about the presence of students

Monitors the compliance with occupational health and safety regulations and measures

Mentors, monitors, evaluates and records student progress

Communicates with the teacher about students' work and progress

Participates in meetings with the teacher, the teacher coordinator and the parent

Controls and maintains documentation related to the implementation of the student's WBL

Participates in performing the final exam,

Informs the school and competent bodies of a company about all important issues related to the WBL of the student



Role, rights and obligations of the responsible teacher for practical education and mentor in the company in the process of Work-based Learning (WBL)

Role, rights and obligations of the practical education teacher

Provides pedagogical and methodical support to a mentor in a company

Monitors the implementation of the WBL program

Expresses the need for professional upgrade and development in the company

Prepares students prior to their engagement by an employer

Checks readiness to learn about occupational health and safety

Performs the student control within a company during the program implementation.

Prepares a list of possible job positions for students during the implementation of the practical training, in cooperation with competent persons from companies

Develops an annual plan and program for implementation and monitoring of practical training of students

Develops an annual operational plan and program for the implementation of work-based learning with the mentor from a company, based on the curriculum

Participates in the implementation of the final exam

Develops and uses instruments to monitor, evaluate and record practical training/work-based learning

Monitors students' progress in the process of practical training/ WBL.

Determines a joint assessment with the mentor from a company

Maintains pedagogical documentation regularly



Innovative approach to work-based learning and practice



The aim of innovative approaches is to create opportunities for students from vocational education and training institutions to apply their knowledge in real working environments through cooperation with enterprises from the public and private sectors, and at the same time to achieve benefits for enterprises in the relevant sectors through training, evaluation and recruitment of potential employees without major costs.



Project-based learning

Create projects that require students to develop and apply knowledge and skills related to traditional and organic production.

Example: Planning, designing and planting a traditional or organic garden.

Learning in real world working environments

Organize visits to organic and traditional farms to learn about techniques used.

Collaborate with local farmers to provide hands-on experience for students.





Digital technology and applications

Use applications and digital tools to help manage farms, track crops, analyse data and identify plant diseases or perform various simulations.

Use simulators and virtual reality for training actions on different agricultural techniques.

Problem-based learning

Set a problem or challenge that students must solve through research and practice.

Example: How to fight a certain plant disease in an organic way?





Engagement of experts in the field as resources

Invite experts in the field of organic and traditional agriculture to help train students and give lectures.

Interconnected learning

Combine knowledge in different subjects, such as biology, chemistry and economics to develop a deeper understanding of agriculture.

Continuous and performance-based assessment

Assess students' practical skills and knowledge through projects, presentations and demonstrations, not just through tests.



Principles/guidelines for the preparation and implementation of an innovative work-based learning

Practical teaching teachers and mentors should adapt innovative teaching and learning processes to the specific context and needs of students. When preparing and implementing an innovative process of work-based learning, in addition to the already mentioned principles in module 1, others can be applied.



Principles/guidelines for the preparation and implementation of an innovative work-based learning



Active learning:

Encourage students to actively engage with the material through discussions, problem solving, group work, and hands-on activities.

Use of technology:

Integrate appropriate technology tools and resources to enhance learning experiences.
Ensure accessibility and usability for all learners.

Interdisciplinary approach:

Promote connections between different topics and real-world applications.
Cultivate creativity and critical thinking.

Collaboration and peer learning:

Encourage collaboration among students through group projects and peer teaching.
Encourage students to learn from each other.

Continuous improvement:

Regularly evaluate and adapt teaching methods and materials based on feedback and outcomes.
Stay up to date with current educational research and trends.



Principles/guidelines for the preparation and implementation of an innovative work-based learning

Real world appliance:

- Relate classroom learning to real-world problems and scenarios.
- Show the practical relevance of the content.

Critical Thinking and Problem Solving:

- Design activities that challenge students to think critically, analyse information, and solve complex problems.

Multimodal Instruction:

- Include a variety of teaching methods, such as lectures, discussions, multimedia and experiential learning.

Innovation assessment:

- Evaluate the success of innovative approaches and be willing to adapt or abandon them if they are not effective.

Learning Communities:

Foster a sense of community among students and create opportunities for them to learn from each other.



Innovative methods for work-based learning



Innovative work-based learning methods encompass a variety of approaches where the focus is on equipping students with relevant, practical skills in an efficient and engaging way.

These methods are based on the practical use of machinery, devices and equipment, as well as emphasizing interdisciplinary learning and a combination of individual and team work.

Innovative methods for work-based learning

Integration of technology and mechanization	Using advanced tools and machinery in training programs allows students to gain hands-on experience with the equipment they will encounter in their respective fields. This method includes virtual reality simulations for training, industrial robotics for manufacturing or artificial intelligence-based systems for IT and data analysis.
Interdisciplinary approaches to learning	This method entails involving students in projects that require knowledge from multiple disciplines, which encourages a holistic understanding of real problems. For example, a project may combine elements of agriculture, the environment and business to address sustainability challenges.
Collaborative projects and teamwork	Team projects refer to real work environments where collaboration is the key. Students can work together on projects, sharing their different skills and perspectives, which improves problem-solving and communication skills.
Individualized learning paths	In this method, adaptive learning technologies are used, learning can be adapted to the capabilities and style of the individual. This method ensures that students are not overwhelmed and are sufficiently motivated, and can focus on areas where they need the most improvement.
Practical research projects	Involvement of students in practical research projects, in collaboration with industrial partners ensures the acquisition of practical experience in their field of study. This can range from conducting scientific research in a laboratory to developing a new business strategy in a corporate environment.
Gamification and interactive learning	Using game elements in education can make learning more engaging and memorable. This may include competitive challenges, reward systems, or interactive simulations that mimic real-life scenarios.
Tools for distance and virtual learning	Leveraging online platforms and virtual distance learning environments provide flexibility and access to a wider range of resources and expertise. This is particularly useful for students located in remote areas and students with special needs.
Solving problems in the real world	Projects that address real-world problems help students apply their knowledge in a practical context. This method may involve working with local businesses or community organizations, and aims to find solutions to the real challenges they face.
Apprenticeship and internship	Combining classroom learning with on-the-job training through apprenticeship or internship allows students to gain practical experience, build professional networks and understand workplace dynamics.
Feedback and reflective practices	Encouraging regular feedback and reflection helps students understand their progress, identify areas for improvement and develop critical thinking skills. This can be facilitated through peer reviews, mentoring programs and self-assessment tools.



Summative school and external evaluation of learning through work



Summative school and external assessment of work-based learning are essential to confirm that students have achieved the required level of competence and are ready for professional practice in their respective fields.

Summative assessments should be aligned with the learning objectives of the work-based learning program, ensuring that they accurately measure the intended outcomes.

The resulting scores must be

valid (measuring what they are supposed to measure) and reliable (consistent in their measurement).

Summative assessments should provide feedback that allows students to understand their strengths and areas for improvement.

Integrated assessment

Summative assessments should integrate school and outside elements. This is especially significant when work-based learning is carried out with an employer under the mentor's guidance.

Summative assessment of work-based learning at school

Final projects or portfolios	Students may be required to complete a comprehensive project or compile a portfolio showcasing the skills and knowledge they have acquired. This may include research projects, practical assignments, case studies or a compilation of various smaller projects.
Written exams and tests	They can assess theoretical knowledge and understanding of principles and concepts learned during education.
Practical exams	Students demonstrate their skills in a controlled real-world environment.
Oral presentations	Students present their projects or research findings, demonstrating not only subject knowledge but also communication skills.
Peer assessments	Involving peers in the assessment process for group projects or presentations.
Teacher ratings	Comprehensive evaluations by teachers based on a range of criteria, including class participation, performance in practical tasks and overall progress.



External summative assessment of work-based learning

Estimates based on industry	Involvement of industry professionals in the evaluation of the learner's performance, during the internship or apprenticeship, focusing on their practical skills and behaviours in the workplace.
Standardized testing	Assessment through standardized tests administered by external bodies and aimed at confirming competence.
External Portfolio Review	External review of the student's portfolio by professionals to ensure an unbiased assessment of his/her skills and readiness for the labour market.
Skill competitions	Organized at a regional, national or international level, they can serve as a form of assessment where students demonstrate their skills under competitive conditions.
Licensing Examinations	For professions that require a license to practice, passing the licensing exam is a key summative assessment.
Teacher ratings	Comprehensive evaluations by teachers based on a range of criteria, including class participation, performance in practical tasks and overall progress.



Templates of documentation required for recording work-based learning



During the implementation of work-based learning, it is necessary to keep training documentation.

These documents help ensure that students are provided with necessary prerequisites during their practical training, so that they can achieve the necessary qualifications, but also that the educational institutions and entities, where the practical training is carried out, have a clear record of the progress and performance of students.

Templates of documentation required for recording work-based learning

Documents required for monitoring the learning process and work-based practice are:
Work-based learning contract. A document signed between a student, an educational institution, and the place where the student performs the apprenticeship, which specifies duties, responsibilities, and goals of the work-based learning.

Work Based Learning Plan (WBL). It defines learning objectives, skills that a student must develop and tasks that he/she will perform during the apprenticeship period.

Student's log of experience. A diary that a student fills in with notes on daily activities, challenges, achievements and reflections on their experience.

Performance evaluation. Forms used by supervisors to evaluate student performance based on predetermined criteria.



Templates of documentation required for recording work-based learning

Daily feedback. Forms completed by the supervisor to provide feedback on the student's work each day or week.

Apprenticeship Final Report. A document that a student prepares at the end of the practice period, reflecting on the experiences gained, tasks performed and the connection between practice and theoretical knowledge.

Certificate of completed training. A certificate confirming that the student has successfully completed the apprenticeship period.

Time registers. Documents in which hours worked, completed tasks and all special remarks about the student's work are being recorded.

Portfolio of experience. A collection of work, projects and assignments that a student has completed during the apprenticeship period.

Peer evaluation. In some cases, the assessment may also be done by a student's peers to have a more complete perspective of his/her performance.



Pedagogical approaches/challenges in the teaching process

Pedagogical approaches/challenges in the teaching process

Question:

What challenges do we face when implementing work-based learning?



Motivation of students

Student motivation is an individual characteristic that a student comes with or possesses.

Motivation is built and developed by the teacher with his behavior during the teaching process and through it he gives a goal and direction to the ambitions, needs and behavior of the student.

The teacher must implement quality teaching, realistically evaluate and continuously stimulate the students to work, in conditions of a creative environment and motivate the student to learn because it fulfills and pleases him/her, not because someone asks for it and expects it from him/her.



Elements of motivation

Elements of motivation are:

- ***the student's attention,***
- ***his trust in the teacher,***
- ***the relevance of the contents and***
- ***satisfaction from achieved goals.***



Factors affecting motivation

The most common factors on which motivation depends are:

- **the level of satisfaction of students' needs,**
- **learning objectives and**
- **the student's personal beliefs about failure.**
 - **Failure as a lack of ability**
 - **Failure as a lack of effort**
 - **Failure as a lack of motivation**



Strategies for motivating students

- **Wake up the students**
- **Apply different organizational forms of teaching, different teaching aids, tools, different places for teaching.**
- **Encourage students to think about the problem**
- **Provide students with: choice, a sense of control, opportunities for success and quality feedback**
- **Encourage students to self-assess**



Communication

Desired communication during the class implies when the communication will be **multidirectional**, which means that the communication should take place on a teacher-student, student-teacher, student-student relationship. The teacher's expression should be **clear and correct**. The teacher should ensure the questions and instructions are **correctly understood by all students**.

During the lesson, in addition to verbal communication, the teacher should also use **visual contact with the students**, use of voice, gestures, facial expression, sense of humor. Teaching material should be **presented clearly, comprehensibly and easily for students to remember**. The teacher should encourage students to express their **opinions and suggestions freely**.



Communication

After asking a certain question to the student, he should give him enough time to think, and when giving the answer, he should be patient enough and allow him to fully express himself, and of course, by asking questions, he should maximally extract all the knowledge from him. in relation to the request made.

When communicating with students, the teacher should address them with a certain respect without using insulting and obscene words. The teacher should pay attention to the communication of the student-student relationship. At the beginning of the school year, he should establish certain rules of communication in the classroom and make sure that they are respected.



Summarizing the knowledge gained from the session



Dating and Expectations

Mentimeter

- Open [menti.com](https://www.menti.com)
- Enter the code
- Enter a name
- Mark the correct answer to the question

▲ Enhancements in the quality of education and training in SEE - EQET SEE



With funding from



Module 2

Work-based learning

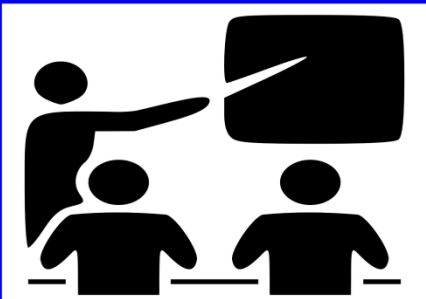
Session 2 Process of Work-based learning at Agricultural technician of traditional and organic cultivation

5.2.2025. 11:06

Igor Nikolov
External expert

Session 2

Process of Work-based learning at Agricultural technician of traditional and organic cultivation



Goals of Session 2:

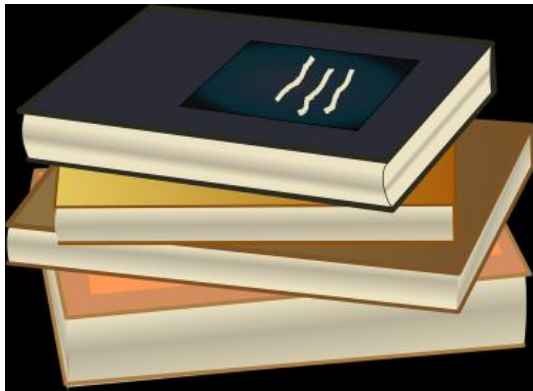
- Understanding the processes of planning and realization of the practical training of students for the technologies of traditional and organic production,
- Identifying the principles on which the process and the resources required are based,
- Understanding the methods, the way of working, monitoring and evaluating the progress of the students in acquiring the necessary skills.

Teacher planning for practical training

The practical training of the students should connect the professional-theoretical knowledge with the practical skills and complete the process of obtaining the necessary competencies of the students.

The realization of the practical training will follow the technological process

Teacher planning for practical training



Work-based learning approaches

Principles on which the Work-based learning for raising annual crops will be based.

Active learning	Encouraging students to actively engage in activities through discussions, problem solving, group work and practical activities.
Use of technology	Integrating appropriate technology tools and resources to enhance learning experiences. Ensuring accessibility and usability for all students.
Collaboration and peer learning	Encouraging cooperation among students through group projects and learning from each other.
Real world appliance	Connecting classroom learning to real-world problems and scenarios.
Critical thinking and problem solving	Designing activities that challenge students to think critically, analyse information, and solve complex problems.



Work-based learning skills

Learning skills you will develop through work-based learning are as follows:

- developing solutions to workplace problems based on theory and practice.
- managing yourself and others.
- transfer of existing knowledge, skills and competences in new contexts.

Work related skills

Work skills you will develop through work-based learning:

- action planning,
- goal setting,
- project management,
- self-evaluation,
- team work.



Specific aspects of mentoring/work-based learning facilitation with respect to annual plant cultivation

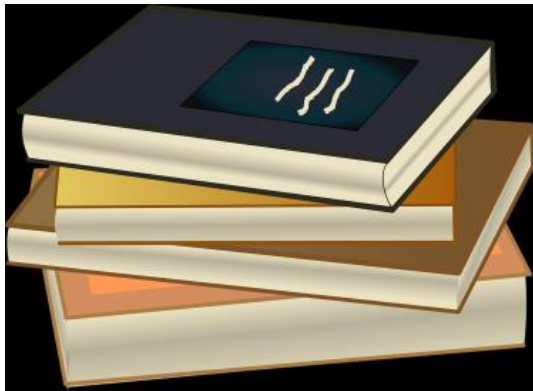
The practical training of students for the cultivation of annual crops should connect vocational-theoretical knowledge with practical skills and round up the process of obtaining necessary competencies of students. The implementation of the practical training will follow the technological process of cultivation of annual crops, by implementing the agrotechnical measures, work operations, activities in production technologies, which are given in the previously prepared production plan.

The practical training will include:

- ❖ preparation of the areas for growing annual crops,
- ❖ sowing, planting and seedling of crops,
- ❖ taking crop care measures,
- ❖ harvest, transportation, storage of agricultural products,
- ❖ processing and obtaining simple products.



Required resources and students' needs



Required resources and students' needs

To implement practical training of students in annual crop cultivation, it is necessary to identify and provide required resources to meet the educational and practical requirements of students.

Resources required for the implementation of the students' practical training for annual crop cultivation:

- Farmland or greenhouse: for hands-on growing experience.
- Farming machinery, tools and equipment.
- Seeds, seedlings and planting material.
- Agricultural laboratory: for analysis and practical demonstrations.
- Means for crop care.
- Equipment for transportation and storage of agricultural products.
- Equipment for processing agricultural products.
- Farm Management Software: Helps in planning and monitoring activities.



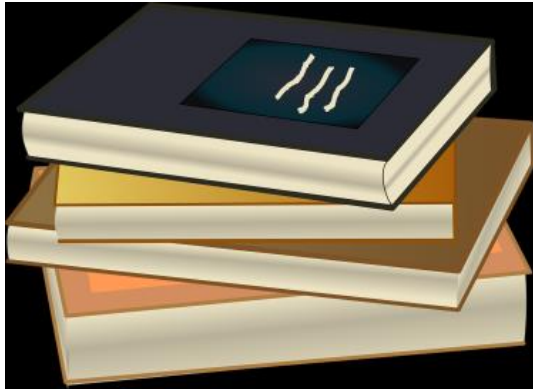
Students' needs in terms of the implementation of practical training for annual crop cultivation:

- Specific training in the use of tools and equipment.
- Clear and structured instructions.
- Ongoing mentoring and support from experts in the field.
- Educational materials (tutorials, videos, case studies, etc.)
- Self-study materials and resources.
- Safety training.
- Education about sustainable and eco-friendly gardening practices.
- Developing critical thinking skills in agricultural contexts.
- Opportunities to work in teams, improve communications and collaboration skills.
- Constructive feedback from mentors and instructors.
- Adaptability and resilience.



Планирање на наставник по практична обука

Presentation of a developed example



Topic/module

Sowing, planting and seedling

Teaching content

Sowing wheat

Presentation of a developed example

Number of classes: 4		Date 20.10.2023
Place of performance: Agricultural farm - AgroMix		
Name of activity: Sowing wheat		
Content and description of activities: Sowing wheat on an area of 5 ha, variety Pobeda(Victory)		
Students' knowledge	<ul style="list-style-type: none"> • Seed material • Quality properties of the seed material • Preparation of seed material for sowing • Sowing • Ways of sowing • Time of sowing • Depth of sowing • Seeding rate 	
Required material	1,200 kg of wheat seed material of the Pobeda variety, I Varietal reproduction	
Necessary equipment and accessories	Scale Mechanization (tractor and seeder) Planter Hand tool Measuring meter	
Protection and equipment	Equipment, hygienic technical protective suit, gloves	
Student	<p>Role</p> <p>Practical implementation of the given task according to the sowing plan developed during the vocational-theoretical teaching and exercises</p>	<p>Contributions</p> <p>Linking theoretical knowledge with practical skills for sowing agricultural crops</p> <p>Organizing resources and workers for machine seeding</p>



Presentation of a developed example

Teacher	Role Monitoring students' activities in the process of work and giving instructions as needed	Contributions Connecting the vocational-theoretical knowledge of the students about sowing agricultural crops in the practical performance.
Mentor/Employee in the company	Role Actively participates in the performance of the assigned task and gives instructions as needed	Contributions Correctly performing the process of sowing agricultural crops and acquiring the necessary practical skills
Required student knowledge	Wheat sowing technology	
Description of the ways of performing work operations	<ul style="list-style-type: none"> ✓ Acceptance of the work assignment ✓ Reading the sowing plan ✓ Preparation for work (PPEquipment, protective measures) ✓ Selection and measurement of seed material ✓ Checking the regulation of the seeder ✓ Beginning of sowing ✓ Checking the work during sowing ✓ Locating and removing blockages during seeding ✓ Checking the quality of sowing ✓ Cleaning and storage of machinery and equipment after sowing ✓ Recorded completed activity 	
Time needed to implement activities	4 hours	
Giving instructions	Students are given instructions for individual steps in the work process	
Conclusions	It is entered after implementation	
Assessment/evaluation	It is entered after implementation	
Feedback	It is entered after implementation	



Presentation of a developed example

Checklist for evaluation of practical training "Wheat sowing"

Explanation

A checklist that will be used to evaluate the student's activity in carrying out the wheat sowing assignment is provided below. The evaluation is performed by simply indicating whether the student has completed all the steps in the activity. If a student failed to take any of the steps, "no" should be marked and the teacher gives an explanation in a note.

Activity/indicator	Yes	No	Note
A detailed wheat sowing plan was developed			
Protective clothing used and protective measures taken			
Adequate variety selected			
Accurate amount of seed material measured			
Seeder regulation checked			
Wheat sowing has commenced properly			
Inspection of the operation during the sowing was carried out			
Adequate reaction to certain setbacks during sowing			
Inspection of sowing quality was done			
Cleaning and storage of machinery and equipment after sowing			
Recorded completed activities			



Presentation of a developed example

Opinion of the teacher/mentor about the quality of performance

The teacher/mentor gives an opinion on how the student has implemented the activity according to the steps.

Teacher's/mentor's notes

Teacher's/mentor's notes are entered.

Evaluation of the student's achievements:

An assessment is given of the entire performance of the activity.

Наставник/ментор



Work in groups

An assignment

To develop an example of practical training for a specific topic. An approach should be applied that will connect professional-theoretical knowledge with practical skills and round off the process of obtaining the necessary competencies.

Group 1 Macedonia, Bosnia and Herzegovina

Topic/Module: Application of agrotechnical measures and machines during basic and additional processing for the production of organic potatoes

Group 2 Serbia and Montenegro

Topic/Module: Cleaning and maintenance of a cow farm

Group 3 Albania and Kosovo

Topic/Module: Raising vines

30 minutes are planned for working in groups, and 5' minutes for each group for the presentation.

Work in groups



The floor is yours dear colleagues for comments questions and notes!

