

Improving the Efficiency and Attractiveness of Vocational Education/Training of Electricians

Erasmus+ Project Nr. 2021-1-DE02-KA220-VET-000029591

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Manual for Trainers

Web-based VET modules in the energy efficiency of intelligent buildings for electricians: EE-VET

Milestone	MS3 e-learning environment
Activity	R4 Development of VET Trainers Manual on implementation of online-based modules
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Date:	26 - 27. of September 2023



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1. Introduction

Moodle is a software package for developing Internet-based education courses and websites. Moodle is freely distributed as open-source software. This means that the product has copyright, but it also gives users additional freedom. It is suitable for all types of online courses and also to complement the training in a real work environment. Most fields for text input, resources, forum messages, journal entries, formulas, and more can use different embedded editors.

Administering user registrations minimizes administrator intervention while maintaining a high level of security. Moodle offers different levels of identification that are supported by additional modules and thus facilitates integration into the system. Each user only needs one registration; each account can have different access levels. The administrator account creates courses and assigns a teacher status to certain users. Teachers can create courses and teach in them and determine the access of students. Students can create their online account with their data. Each student can set a preferred language as well as a time zone. All dates are set according to local time.

Moodle capabilities for online education

Course Management: Educators can create and organize courses, add resources like documents and multimedia, and create various types of activities such as quizzes, assignments, forums, and more.

Collaborative Tools: Moodle provides communication tools like discussion forums, messaging, and chat features to encourage interaction and collaboration among students and instructors.

Assessment and Grading: Instructors can create quizzes and assignments with different question types, set grading scales, and provide feedback to students. Moodle's grading system allows for flexibility in assessing student performance.

Customizability: Moodle is highly customizable, allowing educators to tailor their courses to their specific needs. Themes, plugins, and modules can be added to enhance the functionality and appearance of the platform.

User Management: Moodle enables administrators to manage user accounts, assign roles (teacher, student, or administrator), and control access to courses and resources.

Open Source and Community: Moodle is open-source software, which means its source code is freely available to the public. This has led to a vibrant community of developers, educators, and users contributing to its improvement and development.

Mobile Support: Moodle offers mobile apps for both Android and iOS platforms, making it accessible to learners on the go.

Security and Privacy: Moodle places a strong emphasis on security and offers features like role-based access control and secure login mechanisms to protect user data and privacy.



Platform

EE-VET Virtual Learning Environment (VLE) is a multilingual web application for running online courses. It is based on the Moodle (Modular Object-Oriented Dynamic Learning Environment) open-source web application. Moodle¹ is widely used in Europe and all over the world – by schools, colleges, and universities, it supports collaborative teaching-learning methods and the integration of external digital resources like videos, animations, and embedding external applications, like virtual conference systems. The main parts of Moodle systems are:

- **Learning Management System (LMS)** for supporting the learning-teaching activities enrolment of students, providing them well-structured learning materials in different multimedia formats, e.g. e-books, and tools of collaboration and communication through public forums and/or private communication channels like personal messages. The course participants can submit their assignments, solve quizzes, and fill out feedback questionnaires inside the system, the trainers/mentors can use the tools for online evaluation, and the results will be analysed, and the statistics will be delivered by the system automatically.
- **Learning Content Management System (LCMS):** for supporting the trainers/mentors to create new courses, to create, upload, and share digital learning content, assignments, quizzes, discussion forums, etc. with an easy-to-learn user interface.

There 4 basic roles in Moodle regarding the level of rights inside the system, but the rights can be refined by the developers who implement the VLE:

Students: can visit the course, access the learning materials, and forums, submit assignments,

Non-editing teachers: they work as e-learning mentors, they drive the learning process, communicate with the participants, and evaluate assignments, but they can't add new learning content, or edit the existing ones.

Editing teachers: they can add, edit, delete, or modify learning contents, quizzes, assignments, etc. inside the course.

Course creator teachers: editing teachers are enabled to create a new course as well.

Manager: has the highest level of rights inside the VLE, can do everything that the non-editing teachers can, and has the right to modify any kind of parameters or settings of the platform.



¹ The innovator of the system is Martin Dougiamas, an Australian educator and computer scientist. He aimed to develop an open-source application to support a social constructionist model of teaching and learning within Internet-based communities. Link to the Moodle community: <https://moodle.org>



 **46,366,608+**
Courses

 **166,359+**
Sites

 **239+**
Countries

Minimal requirements for working in the platform.

The E-learning system and all its components have been created and tested on all popular browsers like Mozilla Firefox and Google Chrome. However, it also works with other browsers, however some graphical errors may occur when viewing certain objects or their display on the screen. The optimal screen resolution is 1920x1080 pixels.

2. IMPLEMENTATION

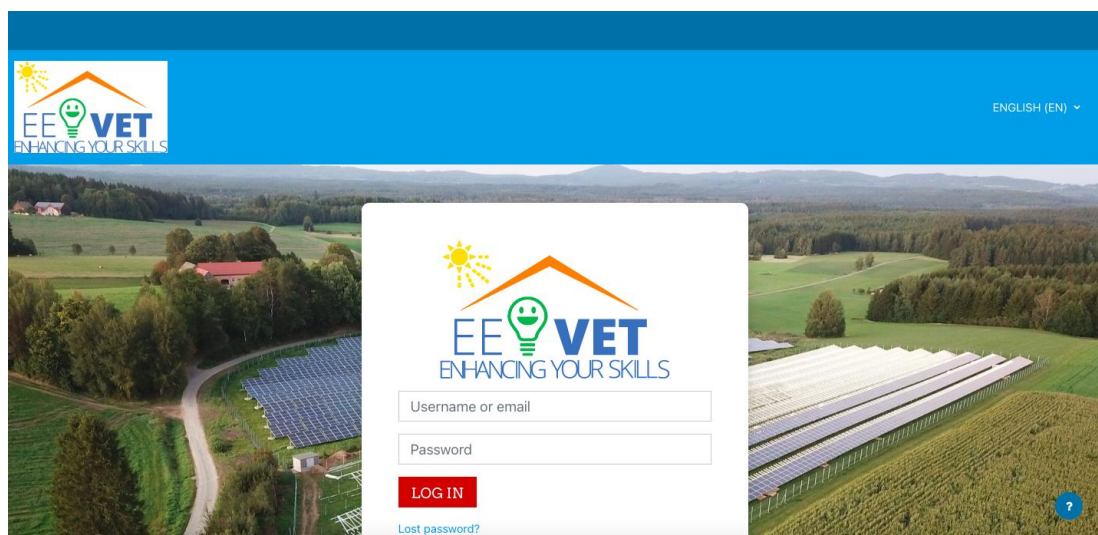
Design

The e-learning platform is available on the URL: <https://ee-vet.rta.lv/>

Login is restricted at present; new users must contact Rezekne Academy of Technologies (Latvia) to activate a new account.

When a user has successfully logged in to a Moodle site, he or she is shown a list of courses – the courses that the user is preparing and teaching (has a teacher role). Clicking on the name of a course opens its homepage. All Moodle courses have the same homepage structure – page header, blocks on both sides and the central part with the course sections.

The design of the interface has been adapted to the project's identity and logo, it makes a pleasant impression on the visitor, and its structure is clear and transparent.



From the front page, the “READ MORE” button navigates to the project website where the visitor find detailed information about the EE-VET project



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Project Learning Management System

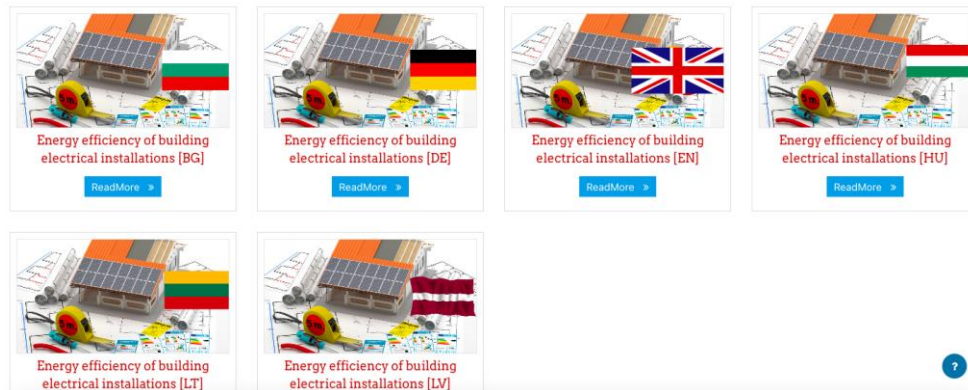
KA2 – Cooperation for Innovation and the Exchange of Good Practice
KA220-VET Cooperation partnerships in vocational education and training
Project Nr. 000029591

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After scrolling down, we receive the lists of the six language versions of the EE-VET course, and the user, having the right to access the course can enter the courses by clicking the blue button.

Available courses



Energy efficiency of building electrical installations [BG]

Energy efficiency of building electrical installations [DE]

Energy efficiency of building electrical installations [EN]

Energy efficiency of building electrical installations [HU]

Energy efficiency of building electrical installations [LT]

Energy efficiency of building electrical installations [LV]

Responsive Web Design

The solution is a responsive website. This approach has become essential as the diversity of devices and screen sizes used to access the web continues to grow. It adjusts its layout, content, and functionality to

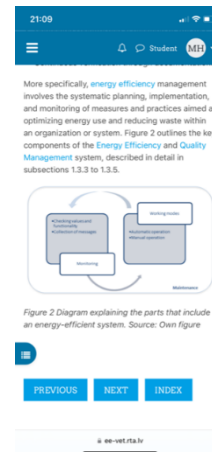
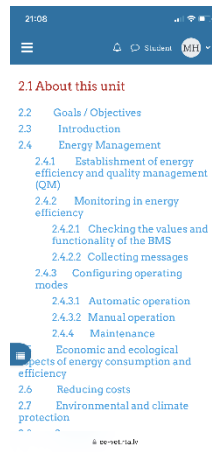


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suit the screen size and capabilities of different devices, such as desktop computers, laptops, tablets, and smartphones.

3. COURSE COMPONENTS AND ACTIVITIES



Learning content: lessons

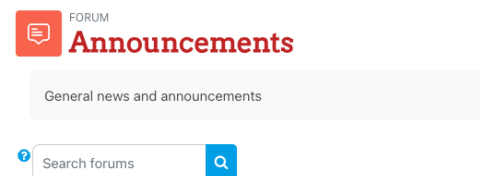
A "lesson" is basically an activity where students can progress step by step through the curriculum. The teacher creates a series of pages or steps that may include text, pictures, videos, or other multimedia elements. These pages or steps must be followed by the students in a sequence determined by the teacher. They can increase engagement and ensure understanding by including a variety of questions, such as multiple choice, matching and short answer. Depending on the student's choice of answer and how the teacher develops the lesson, students may progress to the next page, be taken back to a previous page or be redirected down a different path entirely. The settings for each Moodle installation and course may vary, so details on how to use the 'lesson' will depend on the specific Moodle system and course settings. Lessons are useful for creating self-paced learning experiences, scenario-based learning, and content that adapts based on learner responses.

Communication, collaboration

Forum

The forum offers an opportunity for the course participants to start a discussion on different topics related to the course content. There is an option to click on/off for the participants: they can decide whether to get an e-mail message about the comments or not.

Energy efficiency of building electrical installations [EN] / Announcements



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Messages

The other option to communicate on the platform is sending a direct message to one or more users. Optionally the message will be sent via e-mail as well.



Learning content: glossary

Glossaries can be used in many ways. The entries can be searched or browsed in different formats. A glossary can be a collaborative activity or be restricted to entries made by the teacher. Entries can be put into categories. The auto-linking feature will highlight any word in the course which is in the glossary.

Browse the glossary using this index

Special | [A](#) | [B](#) | [C](#) | [D](#) | [E](#) | [F](#) | [G](#) | [H](#) | [I](#) | [J](#) | [K](#) | [L](#) | [M](#) | [N](#) | [O](#) | [P](#) | [Q](#) | [R](#) | [S](#) | [T](#) | [U](#) | [V](#) | [W](#) | [X](#) | [Y](#) | [Z](#) | [ALL](#)

Page: [1](#) [2](#) [3](#) [4](#) [5](#) [6](#) [7](#) [8](#) [9](#) [10](#) [11](#) (Next)

[ALL](#)

A

Actuators

Equipment or devices that receive signals from the control system and perform actions, such as valves, switches, motors, cooling systems, and heating systems.

Keyword(s):



Adjustment Monitoring

Monitoring after system adjustments.

Keyword(s):



The great option of the Moodle glossary is that the explanation of terms included in the glossary can be hinted at.

Energy efficiency of building electrical installations [EN] / 2. Energy Management and Building Management Systems



LESSON

2. Energy Management and Building Management Systems

MARK AS DONE

Energy Efficiency

2.4.2 Monitoring in

The ability to achieve desired outcomes with the least energy consumption.

This is a key part of energy efficiency to ensure that the energy efficiency areas for improvement, and helps perfect energy efficiency further.

OK



assessment of energy consumption, energy savings, and related factors outcomes. It supplies valuable insights into energy usage patterns, finds






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Adding a glossary

 LESSON
2. Why to manage energy efficiency? 

 LESSON
3. Where are the potentials for an energy efficient operation of buildings? 

 ADD AN ACTIVITY OR RESOURCE

All **Activities** Resources

 Assignment ☆ ⓘ	 Chat ☆ ⓘ	 Choice ☆ ⓘ	 Database ☆ ⓘ	 External tool ☆ ⓘ	 Feedback ☆ ⓘ
 Forum ☆ ⓘ	 Glossary ☆ ⓘ	 H5P ☆ ⓘ	 Lesson ☆ ⓘ	 Quiz ☆ ⓘ	 SCORM package ☆ ⓘ
 Survey ☆ ⓘ	 Wiki ☆ ⓘ	 Workshop ☆ ⓘ			



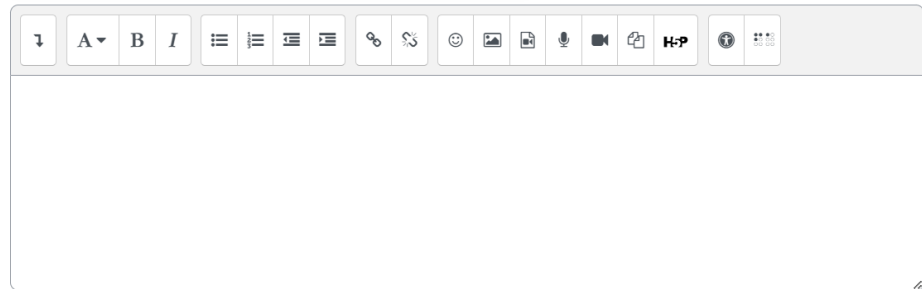
Filling a Glossary Name

General

Name

Name of glossary

Description



Display description on course page

This entry should be automatically linked.

If the Glossary auto-linking filter is enabled, and 'This entry should be automatically linked' is set to "yes", the entry will be automatically linked wherever the concept or keyword(s) appear within the same Moodle course.

Entries

Approved by default

Yes

Always allow editing

No

Duplicate entries allowed

No

Allow comments on entries

No

Automatically link glossary entries

Yes

Adding a Glossary entry

1. To add a glossary entry, click the "Add a new entry" button in the center of the screen.
2. Fill in the term, definition, and any additional information required. You might also be able to add synonyms, related terms, or examples.
3. Click "Save changes" or a similar button to add the new term to the glossary.



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  Search full text

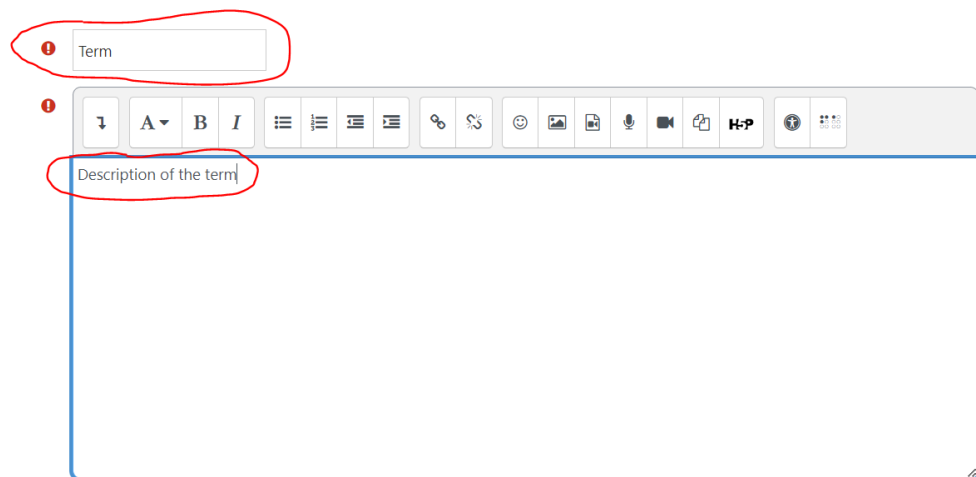
Browse the glossary using this index

[Special](#) | [A](#) | [B](#) | [C](#) | [D](#) | [E](#) | [F](#) | [G](#) | [H](#) | [I](#) | [J](#) | [K](#) | [L](#) | [M](#) | [N](#) | [O](#) | [P](#) | [Q](#) | [R](#) | [S](#) | [T](#) | [U](#) | [V](#) | [W](#) | [X](#) | [Y](#) | [Z](#) | [ALL](#)

▼ General

Concept

Definition



Editing an Existing Term

1. If you're allowed to edit terms, locate the term you want to edit within the glossary.
2. Look for an "Edit entry" or link next to the term.
3. Make your changes to the term or its definition and click "Save changes."

Calendar

The calendar in Moodle is a feature that helps students and instructors keep track of important dates, deadlines, and events related to their courses. It provides a visual representation of course activities and allows users to manage their schedules effectively.

Quizzes, questionnaires

The Moodle Quiz module is one of the most complex parts of the system. It presents a wide variety of possibilities, such as:

- Creating quizzes with various types of questions.
- Generating random quizzes from selected questions.
- Allowing students to take a quiz multiple times.



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- Automatically checking and grading answers.

The following terms relate to Moodle quizzes:

- **Question bank** – Each Moodle course has its question bank. Questions can be created in the Moodle editor or imported from a file. Questions can also be exported to a file to transfer them to a different Moodle course or edited in offline mode.
- **Question categories** – Each question falls under a specific question category. Categories can be arranged in a tree structure. For example, the category Continents may have subcategories Europe and Australia.
- **Question type** – Moodle supports the traditional question types: radio buttons, true/false, essay, answer matching, description, calculation, etc. When evaluating the answers, it is also possible to specify partially correct answers. If a question is answered incorrectly on the first quiz attempt, a penalty can be applied.

We will consider in more detail each question type:

Multiple Choice question

There are two types of multiple-choice questions – single answer and multiple answers.

Single-answer questions

These questions allow one and only one answer to be chosen by providing radio buttons next to the answers. You can specify negative or non-negative marks for each answer.

Multiple-answer questions

The teacher can select "multiple answers are allowed" in a Multiple-choice question type. "Multiple answers" question type in a quiz allows one or more answers to be chosen by providing check boxes next to the answers. Each answer may carry a positive or negative grade.

True/False question type

A student is given only two choices for an answer to this kind of question: True or False. The question content can include an image or html code.

Short Answer

In response to the question, the student enters a word or phrase, which is compared in the system with the correct answers specified by the teacher. Answers may or may not be case-sensitive. It is possible to use the asterisk character (*) as a wildcard to match any series of characters.

Calculated

Calculated questions offer a way to create individual numerical questions using wildcards that are substituted with individual values when the quiz is taken. For example, the question is "What is the sum of A+B?" During the quiz, A and B are replaced with random numbers. The correct answer is calculated using the formula provided by the teacher. It is possible to set the permissible margin of error (tolerance) for answers.



QUIZ

Questionary Lesson 2 - Energy Management and Building Management Systems

BACK

Question 1
Not yet answered
Marked out of 1.00
[Flag question](#)

What is energy management?

- a. It is a combination of measures to minimize energy consumption without significantly affecting system performance.
- b. The manage of resources to improve a building's look and economic incomes.
- c. It is a combination of measures to minimize energy consumption without caring about the system performance.

Quiz navigation

1 2 3 4 5 6 7
8 9 10

Finish attempt ...

After completing the test, the student will receive a detailed assessment of their current knowledge and can decide to go back to improve the results.

Started on Tuesday, 26 September 2023, 8:41 PM
State Finished
Completed on Wednesday, 27 September 2023, 9:52 PM
Time taken 1 day 1 hour
Grade 7.00 out of 10.00 (70%)

Question 1
Correct
Mark 1.00 out of 1.00
[Flag question](#)
[Edit question](#)

What is energy management?

- a. It is a combination of measures to minimize energy consumption without significantly affecting system performance. ✓
- b. The manage of resources to improve a building's look and economic incomes.
- c. It is a combination of measures to minimize energy consumption without caring about the system performance.

Your answer is correct.
The correct answer is:
It is a combination of measures to minimize energy consumption without significantly affecting system performance.

Quiz navigation

1 2 3 4 5 6 7
8 9 10

Finish review

4. COURSE STRUCTURE

The study materials “Energy efficiency of building electrical installations” are divided into three modules and one general information section:

1. General
2. Checking, maintaining, and adjusting the energy-efficient modes of operation of modern automated BMS – Building Management Systems
3. Energy-efficient lighting technologies in buildings
4. Photovoltaic System

Number of	1. Building Management Systems	2. Energy efficient lighting technologies in buildings.	3. Photovoltaic System	Total
topics	70	44	51	165
entries in the glossary	131	15	215	361



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questions in quizzes	49	45	50	144
Duration (weeks)	3	3	3	12

Indicators of EE-VET course with 3 modules

5. SUMMARY

Introduction

Moodle is open-source software for online education, emphasising its versatility, freedom, and suitability for various online courses. It boasts features like collaborative tools, assessment capabilities, customizability, and strong user management, promoting security and privacy.

Platform:

The EE-VET Virtual Learning Environment, built on Moodle, supports multilingual online courses globally. It consists of a Learning Management System (LMS) for learning activities and a Learning Content Management System (LCMS) for course creation. Roles include students, non-editing teachers, editing teachers, course creator teachers, and managers.

Implementation:

The e-learning platform is accessible at <https://ee-vet.rta.lv/>. New users must contact Rezeknes Tehnologiju Akadēmija for account activation. The design is project-adapted, providing a clear and transparent structure. Responsive web design ensures compatibility with various devices.

Course Components Activities:

This section covers lessons, communication tools (forums, messages), and glossary use. The Moodle Quiz module is detailed, explaining question banks, categories, and various question types such as multiple-choice, true/false, short answer, and calculated questions.

Course Structure:

The course on "Energy efficiency of building electrical installations" is divided into four modules: General, Checking BMS, Lighting Technologies, and Photovoltaic System. Detailed statistics reveal the number of lessons, glossary entries, and quiz questions for each module.

