Education/Training of Electricians

Manual for Trainees

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

Milestone	MS3 E-learning environment
Activity	Development of VET Trainees's Manual on implementation of online based modules
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Reviewer	Cristina Barahona, SCRC
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 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

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.

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

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

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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.

2. USER ROLES IN MOODLE

The administrator of the Moodle system assigns roles to users to control what actions they are authorized to perform. A user can be assigned a different role in each course. For example, a user can work as a teacher on one course and participate as a student in another.

The main standard roles in Moodle are:

Guest – If guest access is enabled for a course, a guest can view the entire content of the course but cannot modify anything. For example, a guest cannot take quizzes, participate in discussions, or submit assignments.

Student – Can view course materials, take quizzes, submit assignments, and post in forums; cannot add study materials or change the content of the course.

Teacher – Adds study materials to the e-course, creates quizzes, makes assignments, organizes, and leads the process of learning.

Administrator – Changes the global settings of the system, registers users for courses, and posts announcements intended for all users of the system.

3. MINIMAL REQUIREMENTS FOR WORKING IN THE PLATFORM.

The E-learning system and all its components have been created and tested for Windows 7 minimum; thus we recommend using this platform. Regarding software equipment, primarily, a web browser is needed. The system is optimized for Firefox and Google Chrome. However, it also works with other browsers such as Internet Explorer, where, however, some graphical errors may occur when viewing certain objects or their display on the screen. The optimal screen resolution is 1920x1080 pixels.

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4. LOG IN TO THE PLATFORM AS A STUDENT

1. Open your web browser and navigate to your institution's Moodle website.

The platform is located at the following address: https://ee-vet.rta.lv/

2. Look for the login area. Usually, there's a "Login" or "Sign In" button on the homepage.
3. Enter your username and password provided by your institution. If you're a new user, follow the instructions to create an account.

If you already have an account (with username and password), you can log onto the system. It is important to log in to use all the study materials fully. After logging in you can continue to use the website.

Enter your username and password.

5. USE OF STUDY MATERIALS

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) or in which the user is enrolled (has a student 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.
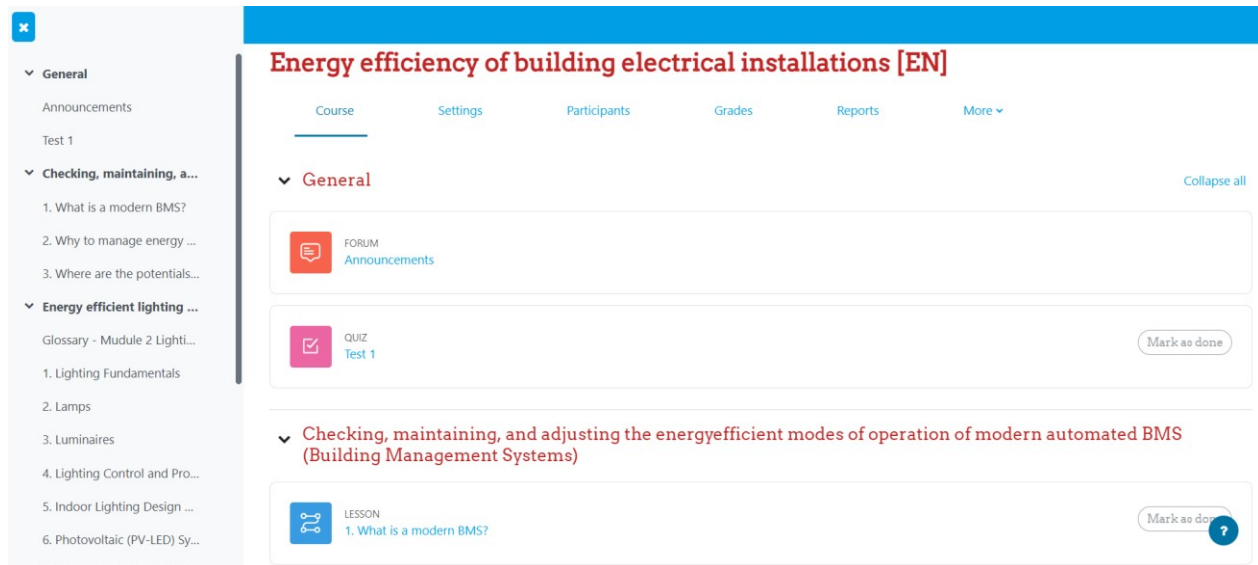
The following figure shows the available courses on "Energy efficiency of building electrical installations" in different languages. We will focus on the English language course.

The study materials "Energy efficiency of building electrical installations" are divided into four modules:

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

6. START E-LEARNING ON THE PLATFORM

The material in each module is structured in the form of lessons. In Moodle, a Lesson is an activity module that allows instructors to create interactive and branching content for their courses. Lessons are useful for creating self-paced learning experiences, scenario-based learning, and content that adapts based on learner responses.

How to use a lesson in Moodle from a student?

As a student using Moodle, you can access and interact with Lessons created by your instructors. Here's how you can use a Lesson in Moodle from a student's perspective:

Accessing the Lesson

1. Log in to your Moodle account and navigate to the course where the Lesson is located.
2. Look for the Lesson activity link on the course page. It might be in a specific section or listed with other activities.

Interacting with the Lesson

1. Click on the Lesson activity link to enter the Lesson.

2. Read the introductory content provided by your instructor. This might include instructions, learning objectives, or any context you need.
3. Select the module and lesson you want. For example: 2. Basic components in the structure of a photovoltaic system

Navigating Through Pages
1. The Lesson will present you with a series of pages containing content and questions.
2. Depending on the Lesson settings, you might be able to navigate forward, backwards, or jump to specific pages.

LESSON

2. Basic components in the structure of a photovoltaic system

MARK AS DONE

Content

2.1. Components of photovoltaic systems - structure, types, and characteristics.

2.2. Junction box purpose and main elements.

2.3. Connecting elements and technology in the installation of a photovoltaic system.

2.4. The inverter's role, functional capabilities, and the different types.

2.5. The role of the DC load switch (DC main switch).

2.6. The role of the AC-side miniature circuit breakers and residual current circuit breakers.

2.7. PV system monitoring point: Integration into the power grid and Counting device.

NEXT   BACK

2.1.Components of photovoltaic systems - structure, types, and characteristics

The "Photovoltaic System Components" section covers all the main electrical components of a photovoltaic system. The individual components are considered in terms of their functions, structure and purpose.
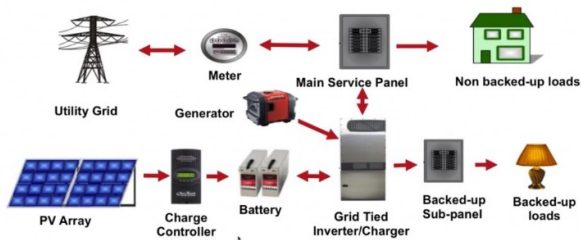
Figure: Principle one grid/hybrid -connected PV system, source:https://www.solarpowerworldonline.com/

A complete photovoltaic system includes different components. These components should be selected taking into consideration your individual needs, site location, climate and expectations. In this section we review the component functions and several different system types.

The functional and operational requirements will determine which components the system will include.

They may include major components, such as a DC-AC power inverter, battery storage, and system and a battery controller with specified electrical loads (appliances).

NEXT   BACK

2.1. Components of photovoltaic systems - structure, types, and characteristics

Structure of a photovoltaic modul

Series connection in crystal cells in the module

In standard modules will mostly 36 to 72 cells one strand in a row switched. The interconnection done in the module lengthwise so that mostly 9 to 12 cells in 4 to 6 geometric rows of cells (often also as cell string denoted) serial commonality tied together are. Sometimes 18 to 20 cells become electric in two to three strands interconnected. Beginning and end of the strand or the parallel strands as well as the taps for the bypass diodes will usually brought out at one point through the rear foil for the electrical connection.
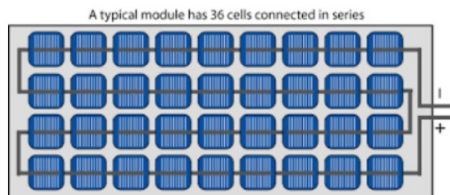

Figure: Serial cell connection in the standard module source: https://www.pveducation.org/pvcdrom/modules-and-arrays

[NEXT]   [BACK]

After finishing the full content of the lesson, click on "Return to the Energy Efficiency of Building Electrical Installations"

Energy efficiency of building electrical installations [EN] / 2. Basic components in the structure of a photovoltaic system

LESSON
2. Basic components in the structure of a photovoltaic system

[MARK AS DONE]

Congratulations - end of lesson reached

Well done!

Return to Energy efficiency of building electrical installations [EN] | View grades

After completing all the lessons, you can take a quiz on the entire module.

Quiz in Moodle

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

- Allowing students to take a quiz multiple times.
- Automatically checking and grading answers.

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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 allow 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.
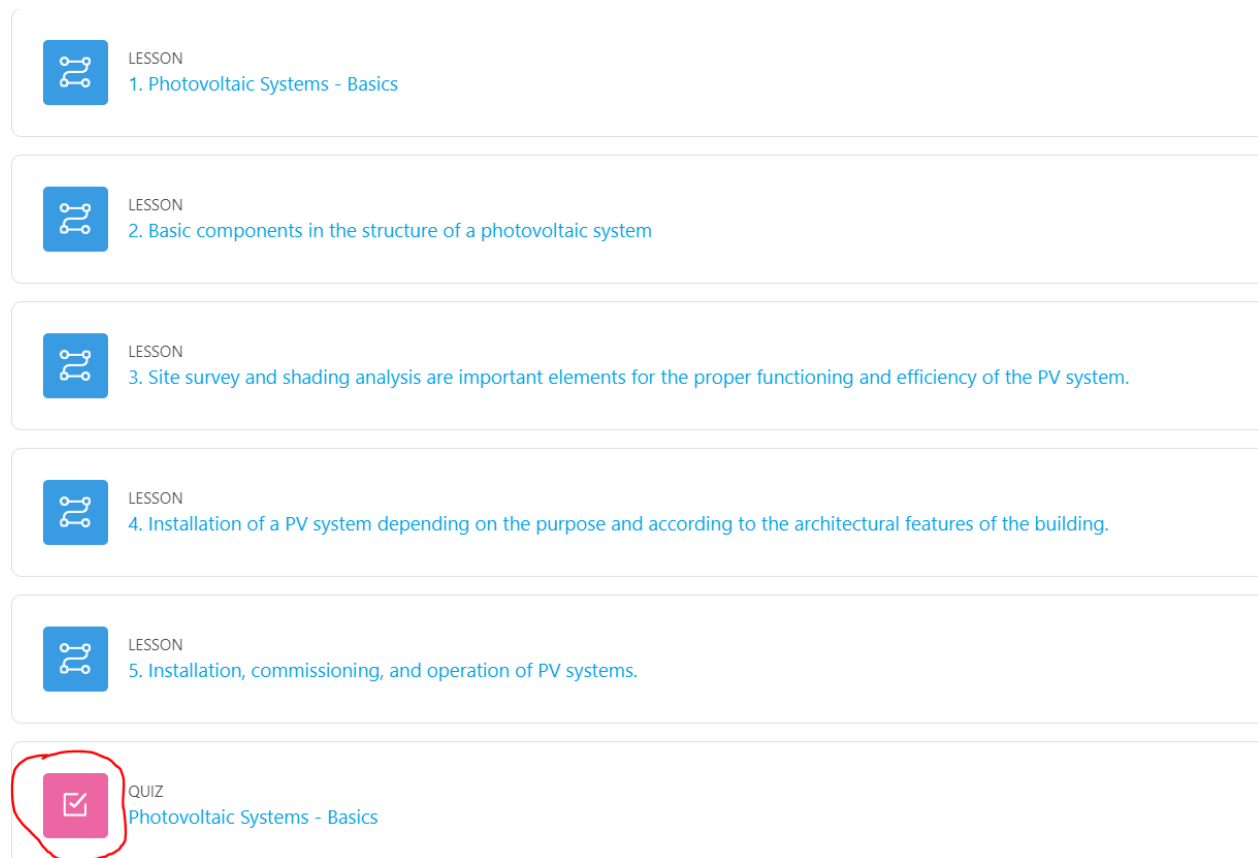
Calculated

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.

Using a quiz in Moodle as a student involves navigating through the quiz questions, selecting answers, and submitting your responses for grading. Here's a step-by-step guide on how to use a quiz in Moodle from a student's perspective:

Starting the Quiz

1. Click on the quiz activity link to enter the quiz.
2. Read any instructions or information provided by your instructor at the beginning of the quiz.

LESSON
1. Photovoltaic Systems - Basics

LESSON
2. Basic components in the structure of a photovoltaic system

LESSON
3. Site survey and shading analysis are important elements for the proper functioning and efficiency of the PV system.

LESSON
4. Installation of a PV system depending on the purpose and according to the architectural features of the building.

LESSON
5. Installation, commissioning, and operation of PV systems.

QUIZ
Photovoltaic Systems - Basics

Answering Questions

1. The quiz will present you with a series of questions, one by one.
2. Read the question and select your answer choice(s). Questions might have different formats, such as multiple-choice, true/false, or short answer.

Navigating Between Questions

1. Depending on the quiz settings, you might be able to navigate back and forth between questions.
2. Use the "Next" and "Previous" buttons to move between questions. Some quizzes might also allow you to jump to specific questions.

Energy efficiency of building electrical installations [EN] / Photovoltaic Systems - Basics

QUIZ
Photovoltaic Systems - Basics

BACK

Question 2

Not yet answered

Marked out of 1.00

⚑ Flag question

Слънцето доставя енергия под формата на:

- ☐ a. поток от елементарни частици
- ☐ b. механични вълни
- ☐ c. поток от фотони
- ☐ d. електромагнитни вълни
- ☐ e. радиация

PREVIOUS PAGE   **NEXT PAGE**

Saving Answers

1. As you answer questions, Moodle might automatically save your responses.
2. However, if there's a "Save" or "Submit" button at the bottom of each question, use it to ensure your answers are recorded.

Energy efficiency of building electrical installations [EN] / Photovoltaic Systems - Basics / Summary of attempt

QUIZ
Photovoltaic Systems - Basics

BACK

Photovoltaic Systems - Basics
Summary of attempt

Question	Status
1	Answer saved
2	Answer saved
3	Answer saved

RETURN TO ATTEMPT

SUBMIT ALL AND FINISH

?

Submitting the Quiz

1. Once you've answered all the questions and reviewed your answers, navigate to the last question or the end of the quiz.
2. Click the "Submit all and finish" button to officially submit your quiz for grading.
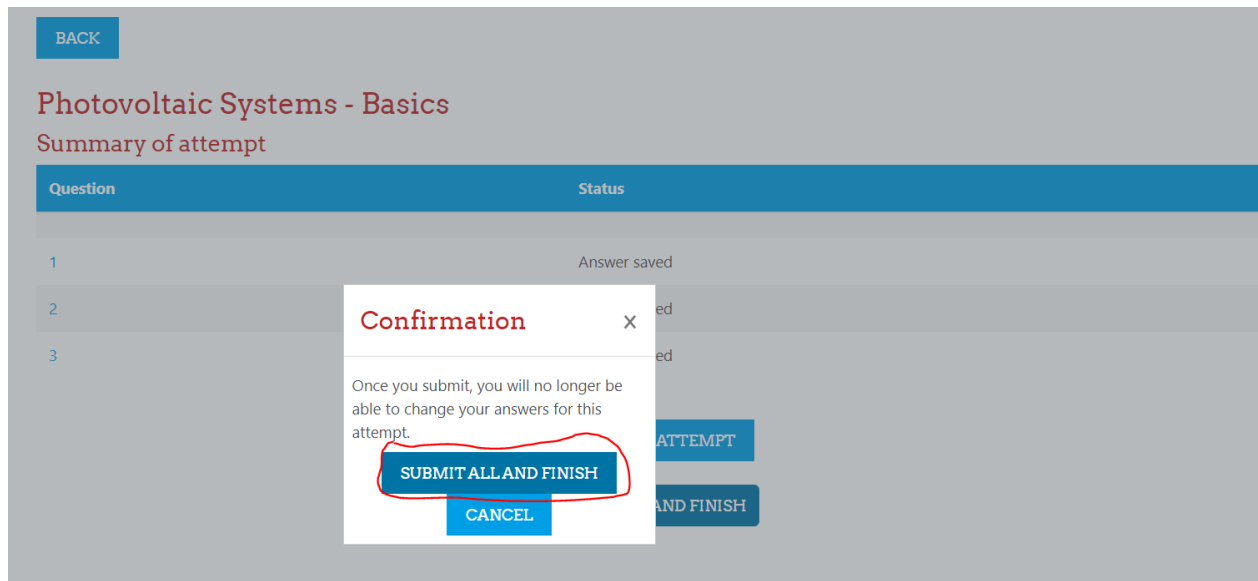
QUIZ

Photovoltaic Systems - Basics

BACK

Photovoltaic Systems - Basics
Summary of attempt

Question	Status
1	Answer saved
2	Answer saved
3	Answer saved

RETURN TO ATTEMPT

SUBMIT ALL AND FINISH

BACK

Photovoltaic Systems - Basics
Summary of attempt

Question	Status
1	Answer saved
2	ed
3	ed

Confirmation ✕

Once you submit, you will no longer be able to change your answers for this attempt.

SUBMIT ALL AND FINISH

CANCEL

ATTEMPT

AND FINISH

Viewing Grades and Feedback

After submitting the quiz, you can often find your grades and feedback in the courses.

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Started on	Saturday, 1 July 2023, 4:12 PM
State	Finished
Completed on	Monday, 14 August 2023, 1:06 PM
Time taken	43 days 20 hours
Marks	2.50/3.00
Grade	**8.33** out of 10.00 (**83.33**%)

Question 1

Correct

Mark 1.00 out of 1.00

⚑ Flag question

Каква е максималната положителна стойност на ъгълът на деклинация на 22 юни (лятното слънцестоене в северното полукълбо)?

○ a. + 24,35 градуса

◉ b. +23,45 градуса ✔

○ c. +32,45 градуса

7. GLOSSARY

Using a glossary in Moodle as a student involves accessing, browsing, and contributing to a collection of terms and their definitions. A glossary can be a valuable resource for sharing knowledge and learning key concepts.

Glossary 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.

Adding a glossary

LESSON
2. Why to manage energy effiency? ✏   Mark as done ⋮

LESSON
3. Where are the potentials for an energy efficient operation of buildings? ✏   Mark as done ⋮

➕ ADD AN ACTIVITY OR RESOURCE

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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.

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.
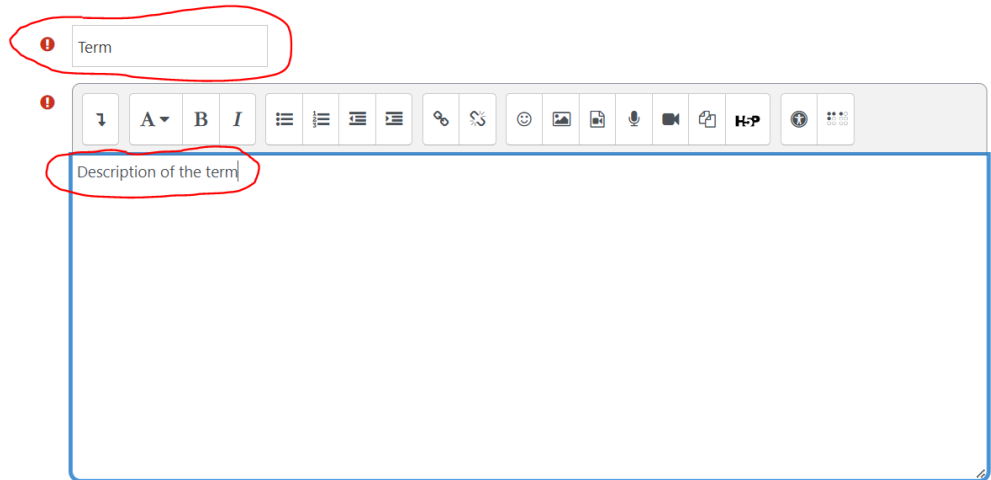3. Click "Save changes" or a similar button to add the new term to the glossary.

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."

Viewing Glossary Entries

1. As you navigate through the glossary, you can browse the different terms and their definitions.
2. Take your time to read through the definitions and understand the concepts.

8. CALENDAR IN MOODLE

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.
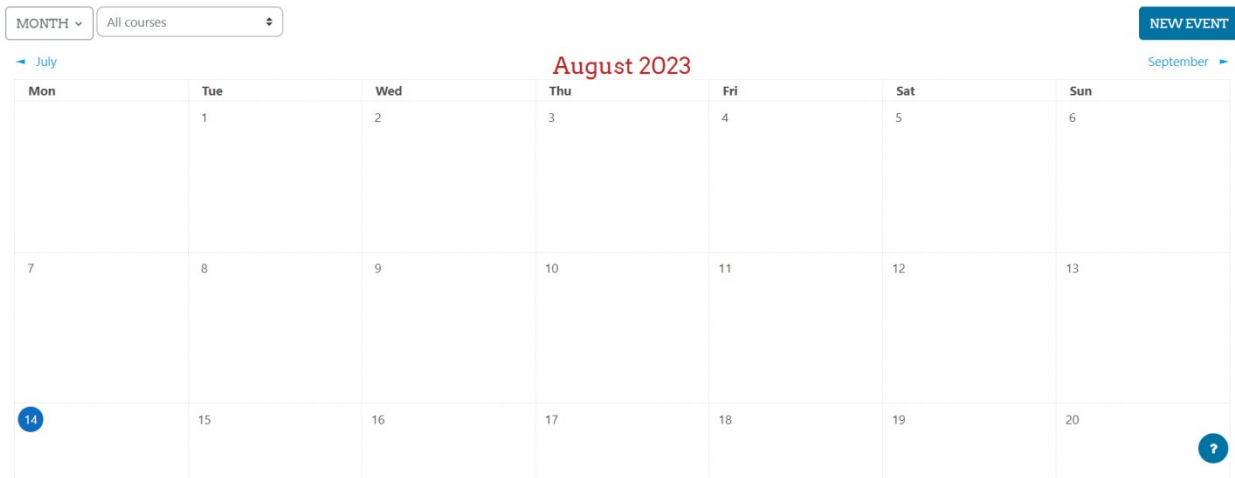
Accessing the Calendar

1. On the course page, look for a "Calendar" link or icon. This might be in the course navigation menu or within a dedicated "Calendar" section.
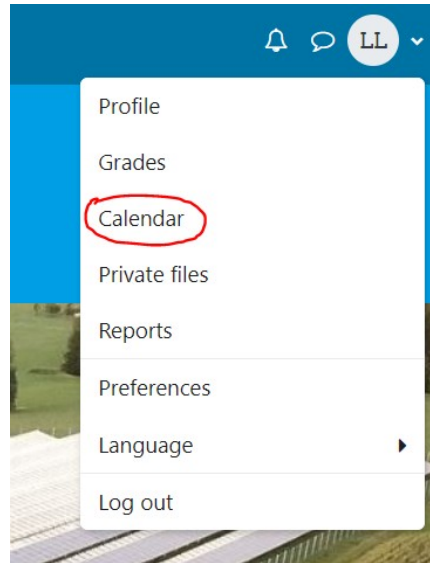
Viewing Calendar Entries

1. Click on the "Calendar" link to access the calendar view.
2. The calendar will display various activities, events, assignments, quizzes, and other course-related dates.

Navigating the Calendar

1. You can usually view the calendar in different formats, such as day, week, month, or agenda view. Choose the format that suits your needs.
2. Use the navigation controls to move between different periods, such as days, weeks, or months.

9. SUMMARY

Introduction to Moodle:

Moodle is an open-source software for developing Internet-based education courses and websites. It supports various features, such as collaborative tools, assessment and grading, user management, mobile support, and emphasizes security and privacy.

User Roles in Moodle:

Different user roles, including Guest, Student, Teacher, and Administrator, are assigned by the system administrator. Each role has specific permissions within a course, allowing users to fulfill different functions.

Minimal Requirements:

Moodle is optimized for Windows 7 and recommends the use of Firefox or Google Chrome browsers. A web browser is the primary requirement, and the system works with other browsers but may experience graphical errors. The optimal screen resolution is 1920x1080 pixels.

Logging in as a student:

Students log in to Moodle using their provided username and password on the institution's Moodle website. Once logged in, they gain access to study materials and courses.

Using Study Materials:

Study materials in Moodle are organized into modules, each containing lessons. Students navigate through these lessons, which are structured to provide interactive and branching content.

Starting E-Learning:

E-learning on the platform involves accessing lessons, interacting with content, and completing modules. After completing lessons, students can take quizzes to assess their understanding.

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Quiz Module:
Moodle's Quiz module supports various question types, including multiple-choice, true/false, short answer, and calculated questions. Students navigate through quizzes, select answers, and submit responses for grading.

Viewing Grades and Feedback:
After submitting quizzes, students can view their grades and feedback in the courses.

Using the Glossary:
Moodle's Glossary feature allows students to access, browse, and contribute to a collection of terms and their definitions. Glossaries can be collaborative or restricted to teacher entries.

Calendar in Moodle:
The calendar feature helps students and instructors track important dates, deadlines, and events related to their courses. It provides a visual representation of course activities and allows effective schedule management.