
How to use LTI Tools in Blackboard

The logo for MATLAB Grader, featuring a 3D surface plot with a color gradient from blue to yellow to red, and the text "MATLAB Grader" in a bold, blue, serif font.

MATLAB Grader



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What is LTI tool in blackboard

Learning Tools Interoperability are third-party tools managed by Blackboard administration in a specific organization. These tools allow the instructor to add more information which are not provided by Blackboard.

What is Matlab Grader?



This LTI tool is a browser-based authoring environment provided by Mathworks for creating and sharing MATLAB coding problems and assessments which is not provided by the learning management system LMS. It can be used within learning management systems to give instructors the ability to create dynamic, code-based problems.

This guide contains the steps of how to use Matlab grader tool within your LMS account in order to create coding problems for your students as follow:



Link Matlab Grader with LMS account



Create dynamic computational assignments



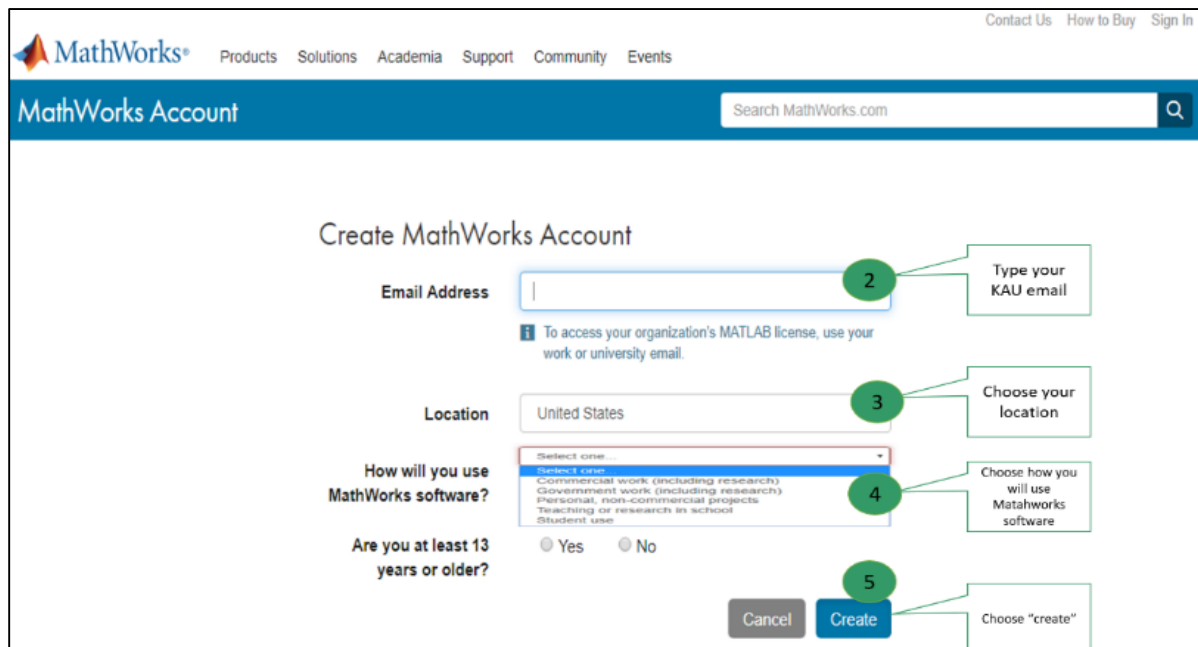
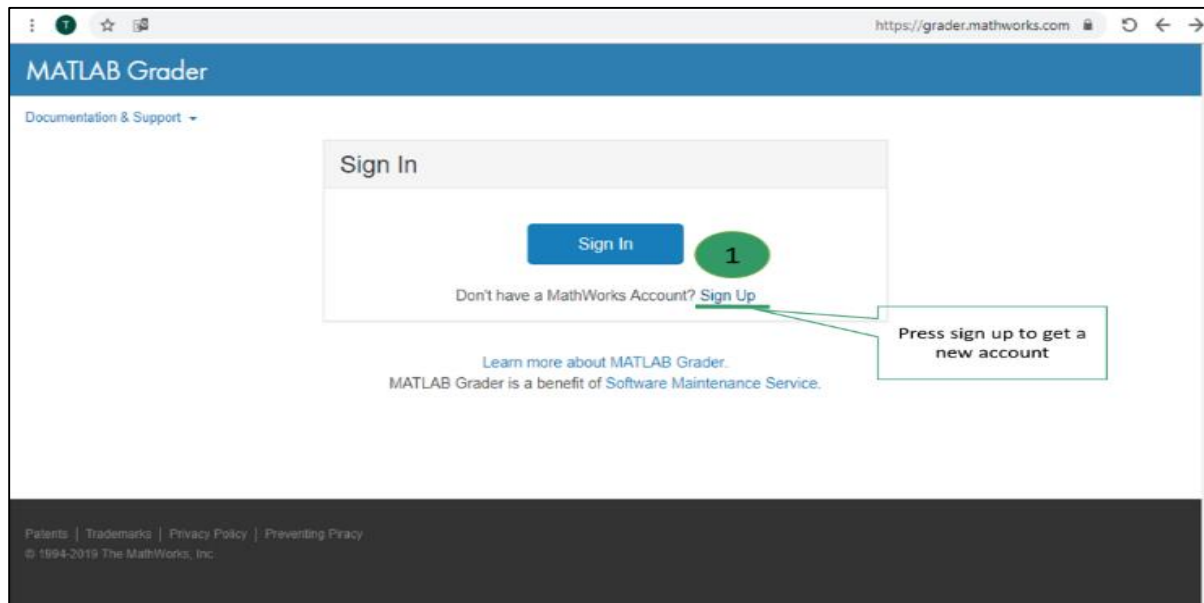
Grading assignments automatically





First: Link Matlab Grader with Blackboard LMS

- 1- KAU email has the privilege to use a Mathwork with academic license within the Blackboard BB Learning Management System LMS.
- 2- In order to get this privilege, sign up with your KAU email for a new account using the following link <https://grader.mathworks.com/>
- 3- You will be asked to fill in information as follow:





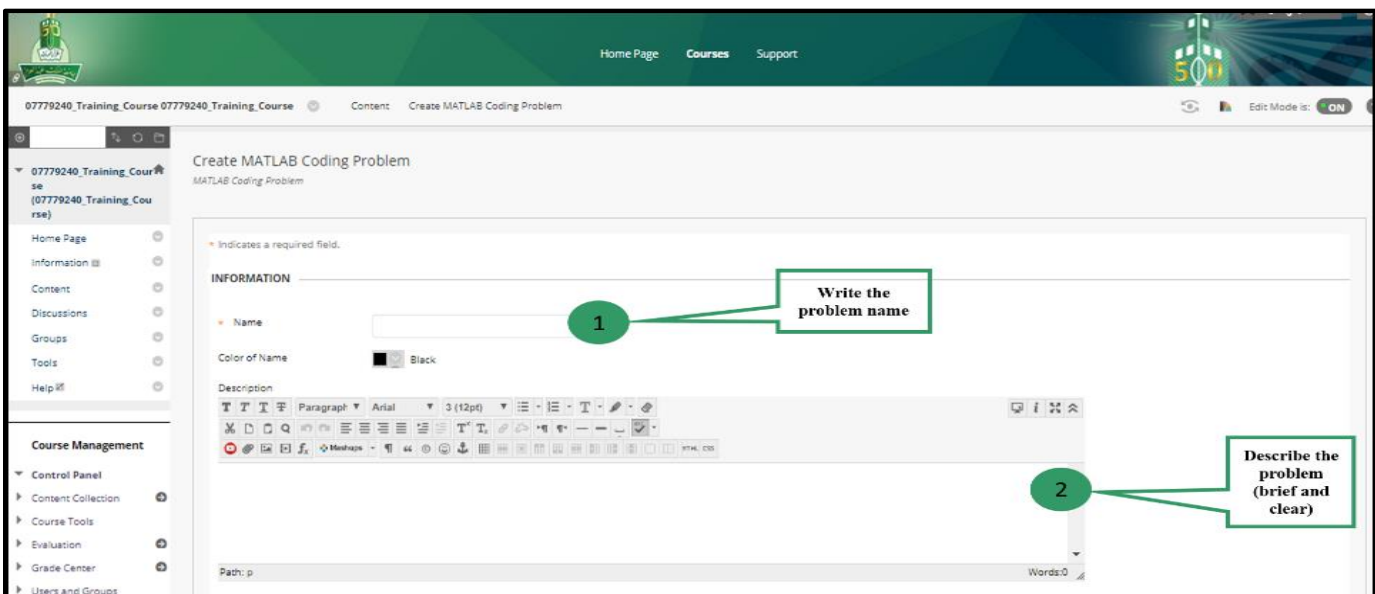
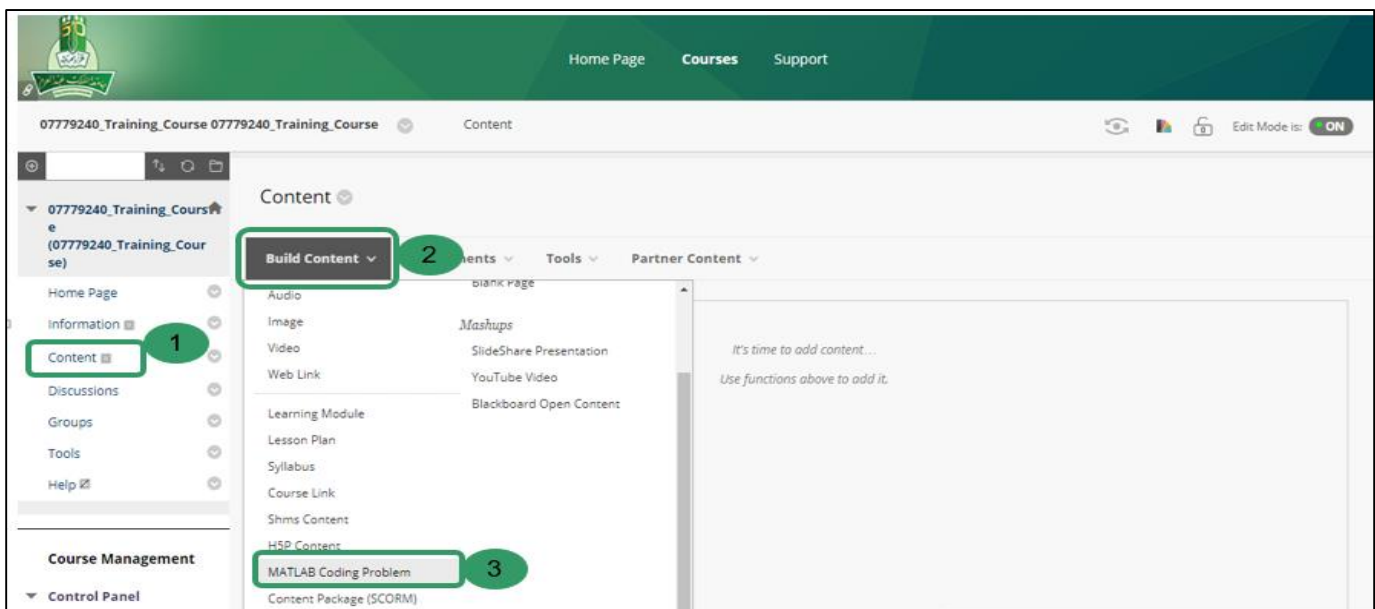
Second: Create Dynamic Assignments

In Matlab grader, the instructor will have the ability to create dynamic, coding problems where the student will solve the assignment with Matlab code.

A. Create the assignment under BB Content:

Sign in to your BB LMS account then follow the steps below:

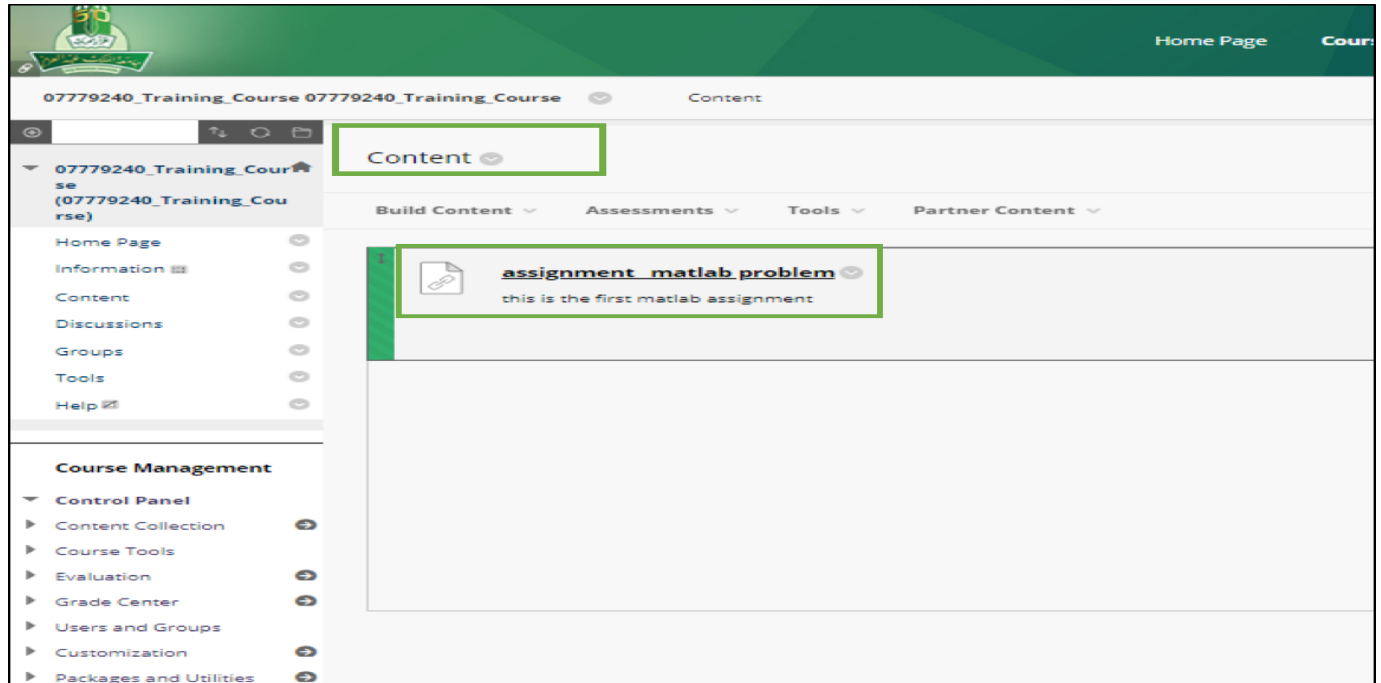
- 1- Open the course that you want to add this assignment in, create a Content from the menu left.
- 2- Under “Build content”, choose “Matlab Coding Problem”.





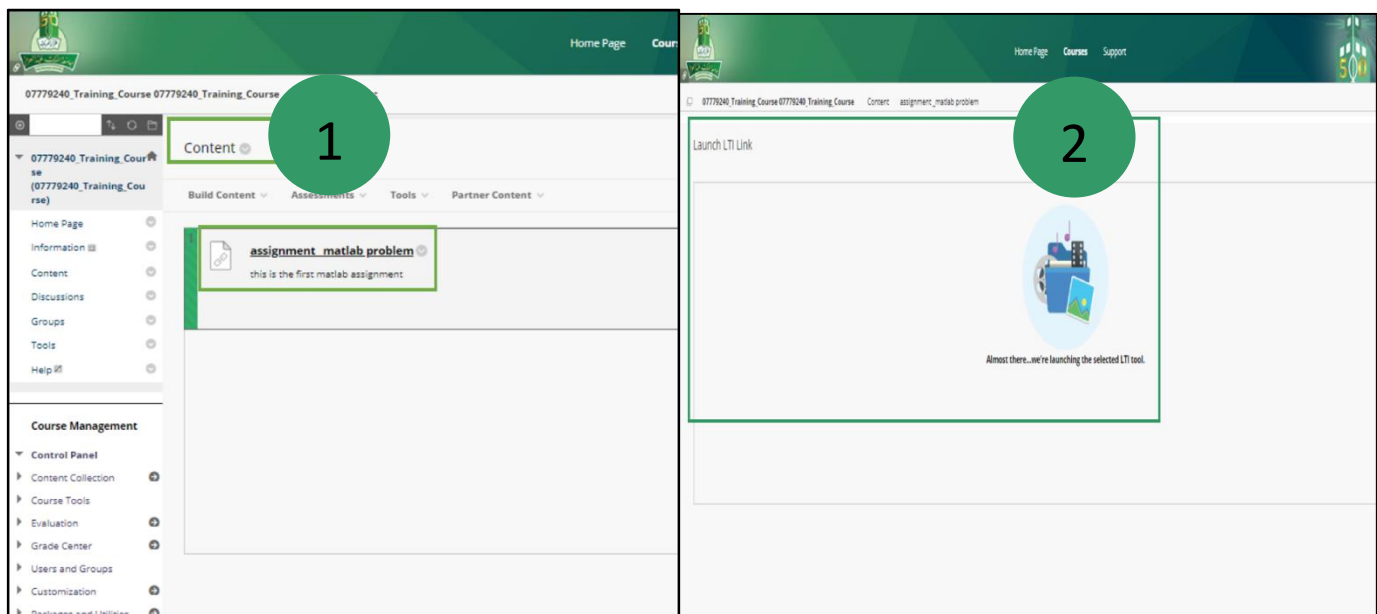
Note: At this type of assignments and problems, you will not need to add any attachments since the grader center will provide you with the editor to formulate the problem.

4- Click “Submit” and the content will be created and listed under “Content” as shown below.



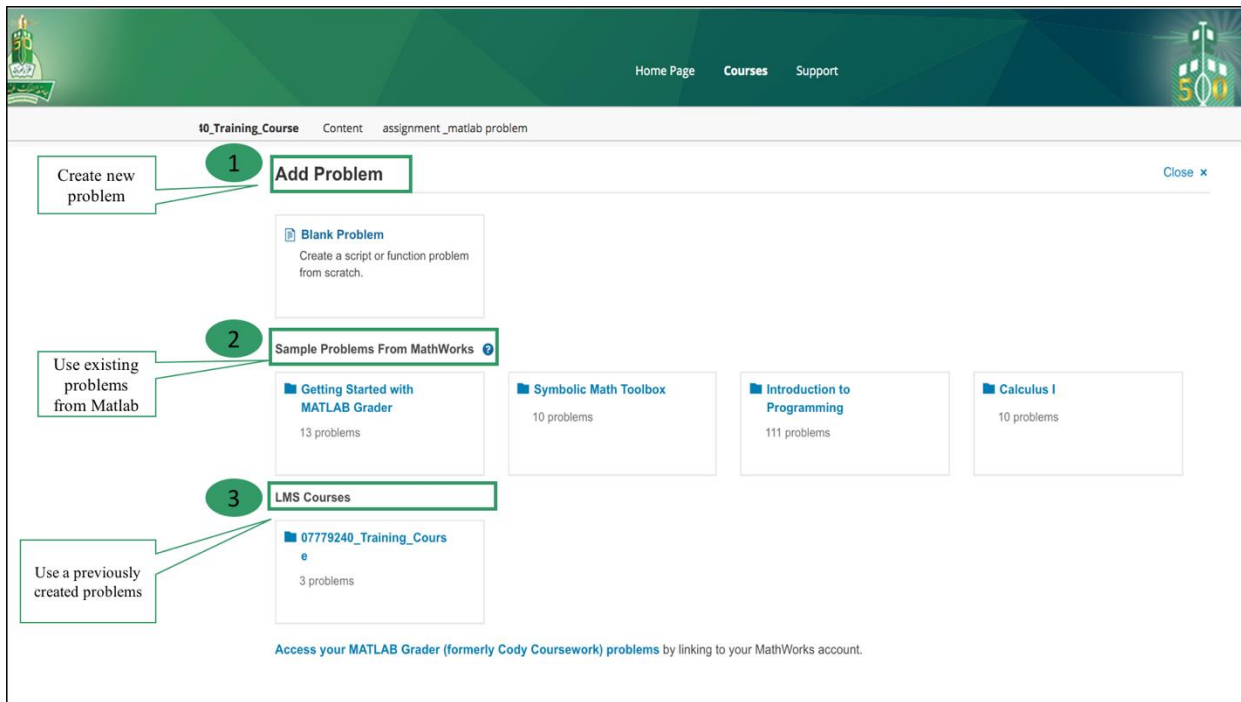
B. Edit Matlab problem

❖ Double click on the content you have created as Matlab problem to launch the Matlab editor.





❖ As an instructor, you have 3 ways to create your Matlab problem as follow:



First way: Blank Problem

At this option, you will create your own Matlab problem which include setting the following:

Requirement	Explain
Setting a file reference	Data and code files that the reference solution, learner solution, and assessment tests can use.
Set the problem	Set up the problem for the students to solve them.
Reference Solution	By writing a reference solution, you can refer to the variables in this solution in your assessment tests, and compare them to the variables in the learner solution.





In order to create your own Matlab problem content follow the following steps:

The screenshot shows the 'MATLAB Problem' creation page. The status is 'DRAFT'. The interface includes a 'Title' field, a 'Problem Description and Instructions' text area with a rich text editor, and a 'Files Referenced' section with an 'Add file' button. Numbered callouts 1 through 4 point to the title, description, and file upload areas respectively.

Write a title to the problem

Describe the problem for your students

Upload the File referenced

1 MATLAB Problem DRAFT 2 Problem status

3 Title

4 Problem Description and Instructions

Files Referenced

+ Add file

The screenshot shows the continuation of the MATLAB Problem creation page. It includes a 'Problem Type' section with 'Script' and 'Function' options, a 'Code' section with a 'Reference Solution' and 'Learner Template' button, and an 'Assessment' section with an 'Assessment Method' dropdown. At the bottom, there are buttons for 'Learner Preview', 'Validate Reference Solution', 'Save as Draft', and 'Save as Final'. Numbered callouts 5 through 10 point to these various sections and buttons.

Choose the problem type

Write the code solution "students cannot see this"

Choose the assessment method

Preview the problem as a student

Check the accuracy of the referenced solution

Choose to save as a Draft for later edit

Choose save as a final to be published for the students

5 Problem Type

6 Code

7 Assessment

8 Learner Preview

9 Validate Reference Solution

10 Save as Draft

Save as Final





Second way: Use existing problem samples provided by Mathworks

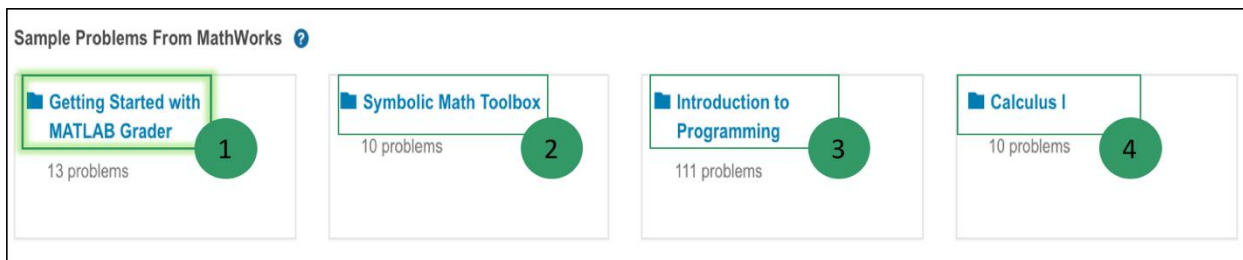
Mathwork provide sample problems for instructors to adopt them within the course. The problems are authorized by Mathworks team and are ready to use within the Blackboard.



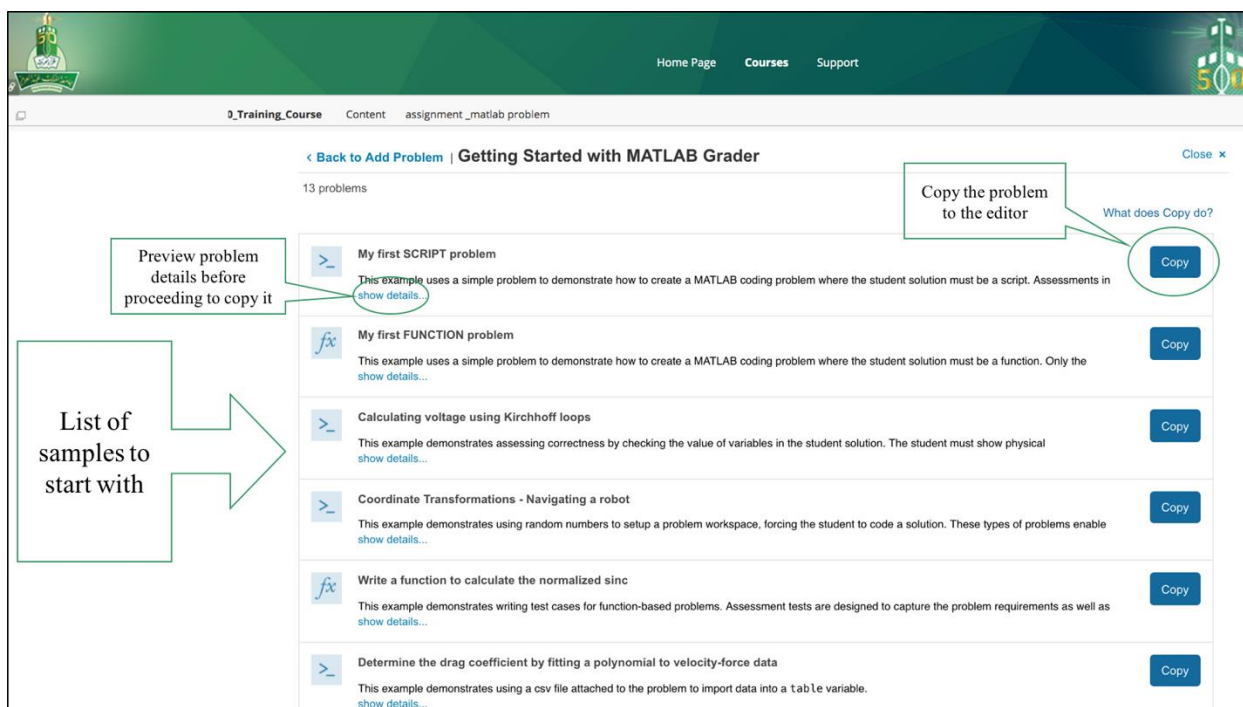
Note: If this is the first time for you to use Matlab grader, then it is suggested to start with the samples in order to practice creating problems by reviewing the requirements and how to set the problem correctly.

To use Mathworks sample problems choose “sample problem from Mathworks” once you clicked on the Matlab problem content from the content list you have created before. Then follow:

1. Choose a sample category (4 categories).
2. In this guide, we will start with one of the samples under “Getting started with Matlab Grader” category.



3. Choose the sample from a list of samples provided under this category





- Once you press on the problem you have selected it will be copied to your problem editor.
- Click “save as final “to publish the problem to your students.

Home Page Courses Support

Training Course Content assignment_matlab problem

MATLAB Problem DRAFT

Reports Choose Different Problem

Title

My first SCRIPT problem

Problem Description and Instructions

This example uses a simple problem to demonstrate how to create a MATLAB coding problem where the student solution must be a script. Assessments in script problem types have access to all variables in the student workspace, making it possible to check intermediate steps as well as the final solution.

Step 1: Use this area to set up the problem and describe the task(s) the student solution will be assessed on.

For example:

Recall from class that the equation for computing the volume of a cone is

$$V = \pi r^2 \frac{h}{3}$$

Write a script that:

- Computes the volume of a cone with radius $r = 5$ mm and height $h = 12$ mm.
- Assigns the resulting value (in mm^3) to a variable named `vol`.

Step 2: Select "Script" for the Problem Type below

Files Referenced

None

+ Add file

Home Page Courses Support

Training Course Content assignment_matlab problem

Problem Type

Script Function

Code

Reference Solution Learner Template

```
1 % Step 3: Provide an instructor solution for the problem. Students cannot see this solution.
2 % Correctness of their solution can be determined by comparing the value of variables in the
3 % Learner Solution to the corresponding variables in the Reference Solution.
4 % Next: switch to Learner Template
5
6 % Cone parameters
7 r = 5;
8 h = 12;
9
10 vol = pi*r^2*h/3;
```

Assessment

Assessment Method: Correct/Incorrect

Only show feedback for initial error

Test 1 Is the calculated volume correct?

vol = Reference Solution?

+ Add Assessment

Learner Preview Validate Reference Solution

Save as Draft Save as Final

Third way: LMS Courses

Blackboard provide you with the ability to use Matlab problems across all the courses by saving the Matlab problem under content collection.





Third: Grading Assignment Automatically

Matlab grader is designed to correct and grade the students' solution based on the requirements you specify at the beginning.

At the edit step, you have the option "assessment" where you can define how you want the test to be evaluated.

Training_Course Content assignment _matlab problem

Problem Type [?]

Script Function

Code

Reference Solution [?] Learner Template [?]

```
1 % Step 3: Provide an instructor solution for the problem. Students cannot see this solution.
2 % Correctness of their solution can be determined by comparing the value of variables in the
3 % Learner Solution to the corresponding variables in the Reference Solution.
4 % Next: switch to Learner Template
5
6 % Cone parameters
7 r = 5;
8 h = 12;
9
10 vol = pi*r^2*h/3;
```

Assessment [?]

Assessment Method: Correct/Incorrect [?]

☒ Only show feedback for initial error [?]

> Test 1 Is the calculated volume correct?
vol = Reference Solution?

+ Add Assessment

Learner Preview Validate Reference Solution Save as Draft Save as Final

❖ Assessment method:

Two types of assessment methods

The assessment returns 1 if all tests pass and 0 if any tests fail.

you assign to each test a relative point value, which is then converted into a percentage of the total



