

Mechanical Material Characterization II

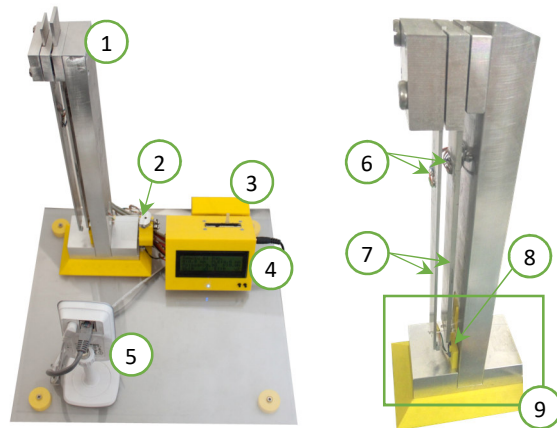
Warnings:

This remote experiment interface works with the most common browsers. Live videos can have some problems with Internet Explorer or Edge browsers. For any other problem please contact tfa@fe.up.pt.

Remote Experiment

Side figures represents the experimental setup comprising the following components:

1. Cantilever support for two beams;
2. Actuator system for loading beams and load cell;
3. Webserver;
4. System for signal conditioning, monitoring, processing and control;
5. IP cam for live video;
6. Strain gauges sensors;
7. Cantilever beams with free end;
8. Deflexion sensors;
9. Live video window.



Access instructions

To access the application the next steps might be followed:

- I. Go to the application link (<http://limserver.fe.up.pt/course/view.php?id=2>);
- II. Log in using the credentials sent by email:


Log in

Username


Password

Remember username

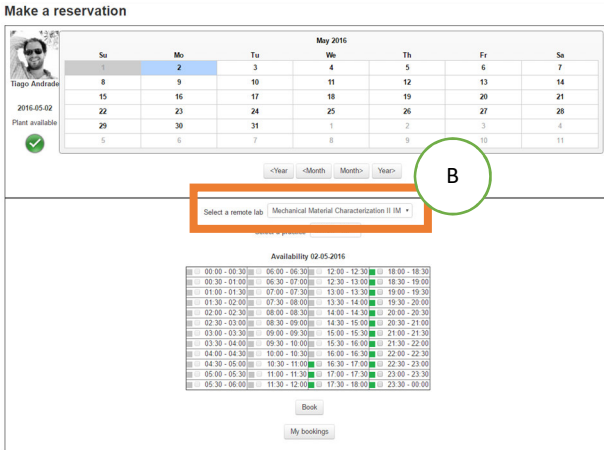
III. Book the experiment on (A) and select the correct experiment on (B);




Booking system




Measurement of mechanical parameters



IV. In the booked time slot, go to the [moodle course](#) and select the [application](#) (C);



Booking system



Measurement of mechanical parameters

C

V. The application should load the interface shown below;

Measurement of Mechanical Parameters

Actuation: Manual

Manual Automatic

Bar: 2

Beam1 Beam2

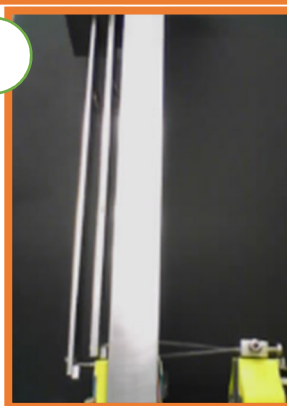
Select the deflection value [mm]

Value:

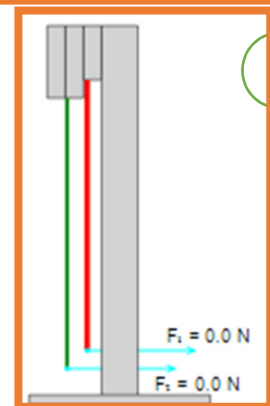
2

V_{outL} [mV]	V_{outT} [mV]	F [N]
0.002	0.000	0.0

3



4



5

Save Data

Reset System

Informations

Interface features

The interface comprises four sections with the following actions:

1. Beam and operating mode (manual or automatic) selection, room temperature info;
2. Test results table;
3. Live video window;
4. Animation;
5. Actions available on the interface.

Operation modes

It is convenient to select the beam to be tested before the operating mode selection.

Manual Mode

In the manual mode, the user can define the beam deflection reference (in mm) in the applied force region, by using the slider.

Actuation: Manual
 Manual Automatic

Bar: 2
 Beam1 Beam2

Select the deflection value [mm]
Value: 0.0

Automatic mode

In the Automatic mode, after pressed the *Start* button, the software will automatically perform the pre-established procedure.

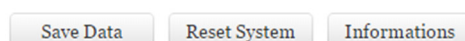
Actuation: Auto
 Manual Automatic

Bar: 2
 Beam1 Beam2

Start the automatic procedure
Start

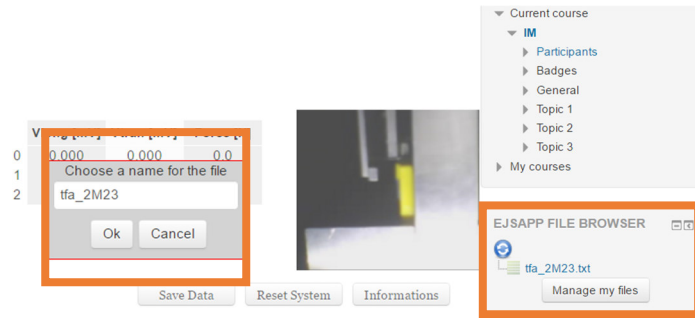
The user interface provides the applied force magnitude and output voltage values for the longitudinal and transversal strain gauges.

Bottom buttons



The *Save Data* button allows the user to save test data from the automatic operating mode. It is only possible to save the last test results of each beam.

After performed the automatic mode test for each beam, the measured values can be saved in the Moodle file system with the desired file name.



The *Reset System* button is used to restart the system.

The *Information* button opens a new window with some relevant information about the setup. If the browser blocks any pop-up windows it is necessary to allow them.

Suggested exercises

1. The beams material is aluminium. Which is expected for the Poisson's Ratio and Young's Modulus?
2. With the data from automatic procedures for each beam fill the tables:

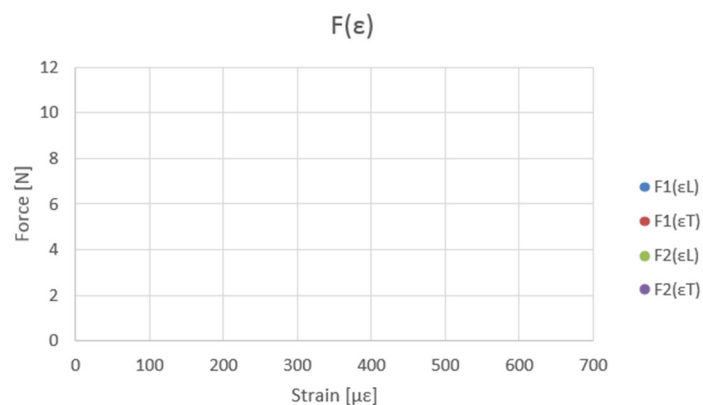
Beam 1

V_{outL} [mV]	V_{outT} [mV]	Force [N]	ϵ_L [$\mu\epsilon$]	ϵ_T [$\mu\epsilon$]	ν	σ [N/mm ²]	E [Gpa]

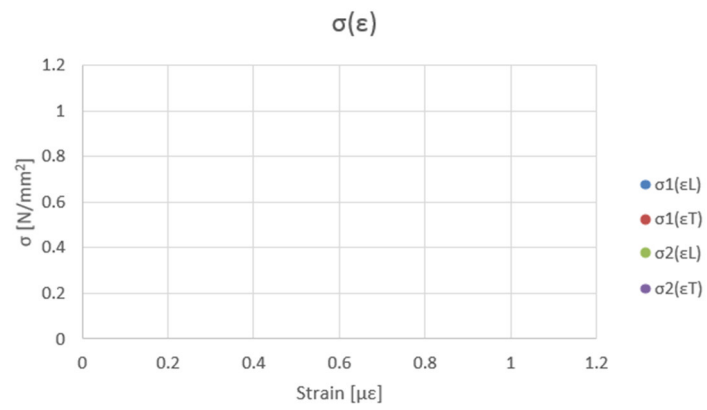
Beam 2

V_{outL} [mV]	V_{outT} [mV]	Force [N]	ϵ_L [$\mu\epsilon$]	ϵ_T [$\mu\epsilon$]	ν	σ [N/mm ²]	E [Gpa]

3. Represent F vs. ϵ_L and F vs. ϵ_T for both beams.



4. Represent σ vs. ϵ_L and σ vs. ϵ_T for both beams.



5. Please comment the results obtained in 3 and 4?