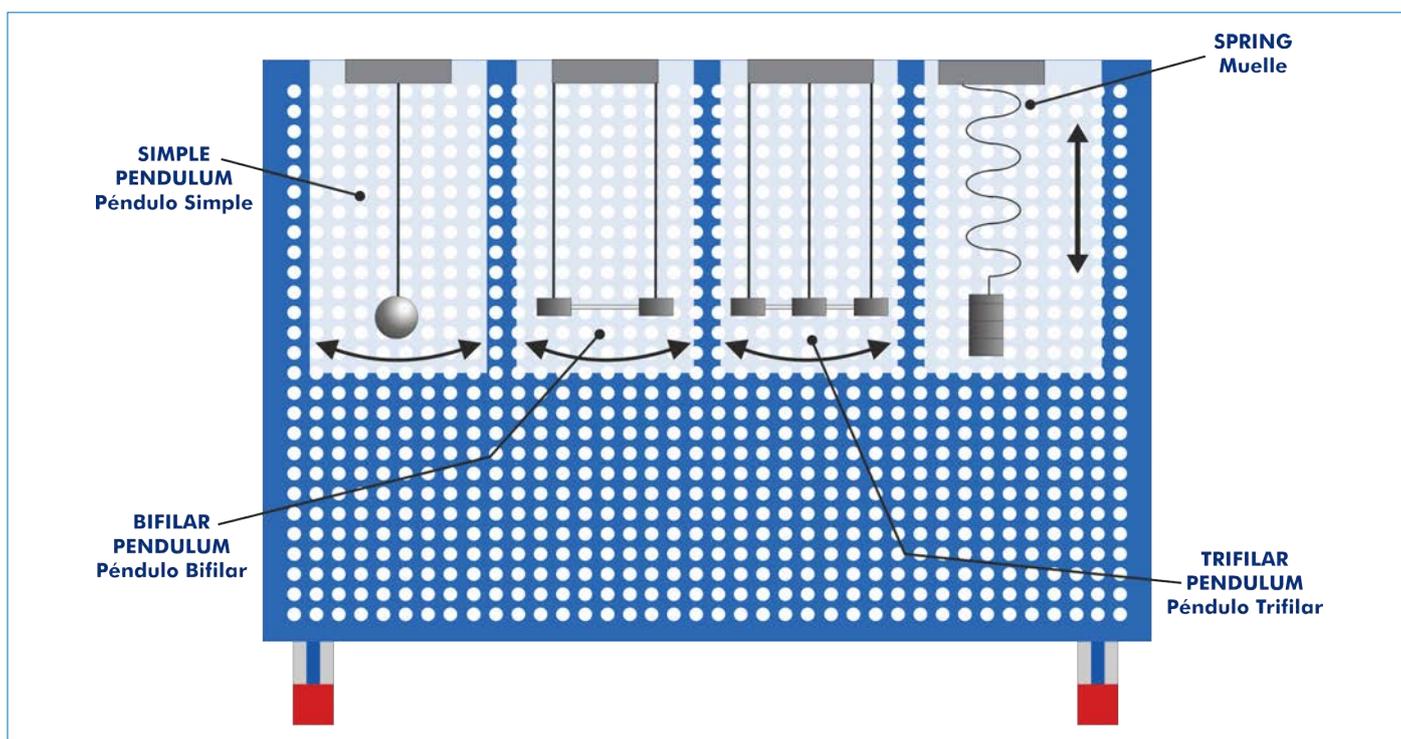


### PROCESS DIAGRAM AND UNIT ELEMENTS ALLOCATION



ISO 9001: Quality Management (for Design, Manufacturing, Commercialization and After-sales service)



European Union Certificate (total safety)



Certificates ISO 14001 and ECO-Management and Audit Scheme (environmental management)



"Worlddidac Quality Charter" and Platinum Member of Worlddidac

## INTRODUCTION

In cases in which a particle is displaced from its equilibrium position by the action of a force proportional to the displacement with respect to that equilibrium point, it is said to describe a simple harmonic motion.

Simple harmonic motion describes a repetitive back and forth trajectory towards the equilibrium point, which is known as oscillatory or periodic motion.

## GENERAL DESCRIPTION

This Simple Harmonic Motion Unit "MSHU" allows many experiments using several pendulums and devices, such as different types of pendulums (simple, bifilar, trifilar and Kater's pendulum) and springs.

Consists of a panel with a support that allows to hang different elements of study.

The study consists of letting freely swing different types of pendulums or a spring to check how different variables affect on their oscillation period. These variables to be studied are the mass hung from the pendulum or spring, and the oscillation length which can be easily modified with the tensors.

The Kater's pendulum shows the relationship between simple harmonic motion and gravity, for prediction of gravity accurately.

The theory shows how to foretell the period of oscillation for a given pendulum or spring for comparison with actual results.

## SPECIFICATIONS

Bench-top unit with adjustable legs.

Anodized aluminum frame and panel in painted steel.

The MSHU unit mainly consists of:

- Top plate (supports the pendulums).

- Bottom plate with goniometer.

- Storage suitcase that includes:

  - Two simple pendulums (aluminum and brass).

  - Rod pendulum as bifilar pendulum.

  - Rod pendulum with equiangular separation as trifilar pendulum.

  - Spring.

  - Set of weights:

    - Six weights of 50 g.

    - Four weights of 150 g.

    - Weights hanger.

  - Stopwatch to measure the oscillation time.

  - Ropes with carabiners to facilitate the suspension of pendulums.

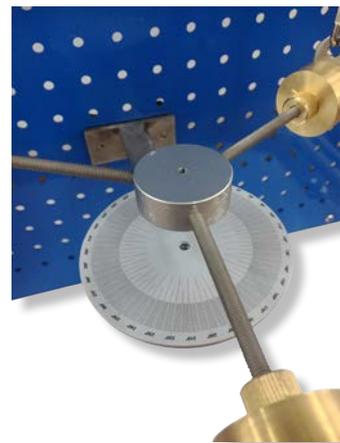
  - Tensors for greater accurate of the length to be fixed.

  - Limiting plates to facilitate a correct adjustment of the supporting ropes.

- Kater's pendulum.

- Graduated scale.  $L = 500$  mm.

Manuals: This unit is supplied with the following manuals: Required services, Assembly and Installation, Starting-up, Security, Maintenance and Practices manual.



MSHU detail

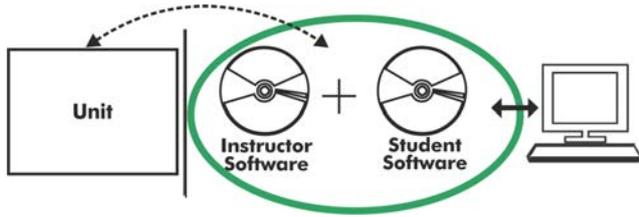
## EXERCISES AND PRACTICAL POSSIBILITIES

- 1.- Simple harmonic motion of simple pendulum of different lengths and masses.
  - 2.- Simple harmonic motion of bifilar pendulum of different lengths and masses.
  - 3.- Simple harmonic motion of trifilar pendulum of different lengths and masses.
  - 4.- Simple harmonic motion of a spring with different masses, and a simple spring rate test.
  - 5.- Simple harmonic motion of the Kater's pendulum.
  - 6.- Calculation of gravity using the Kater's pendulum.
  - 7.- Theoretical determination of the period of a simple pendulum.
  - 8.- Theoretical determination of the period of a bifilar pendulum.
  - 9.- Theoretical determination of the period of a trifilar pendulum.
  - 10.-Determination of the center of mass in pendulums with unbalanced masses.
  - 11.-Determination of the mass center of a Kater's pendulum with unbalanced masses.
  - 12.-Theoretical determination of the period of the Kater's pendulum, using the parallel axes theorem (Steiner's Theorem).
- Additional practical possibilities:

## DIMENSIONS AND WEIGHTS

- Dimensions: 670 x 500 x 1000 mm approx. (26.37 x 19.68 x 39.36 inches approx.).
- Weight: 15 Kg approx. (33 pounds approx.).

**MSHU/ICAI. Interactive Computer Aided Instruction Software System:**



With no physical connection between unit and computer, this complete software package consists of an Instructor Software (EDIBON Classroom Manager -ECM-SOF) totally integrated with the Student Software (EDIBON Student Labsoft -ESL-SOF). Both are interconnected so that the teacher knows at any moment what is the theoretical and practical knowledge of the students.

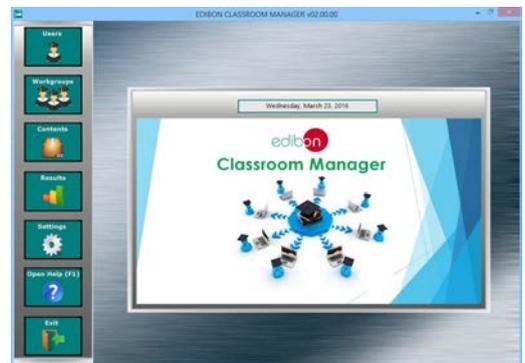
Instructor Software

**- ECM-SOF. EDIBON Classroom Manager (Instructor Software).**

ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual students, workgroups, units, etc... so the teacher can know in real time the level of understanding of any student in the classroom.

Innovative features:

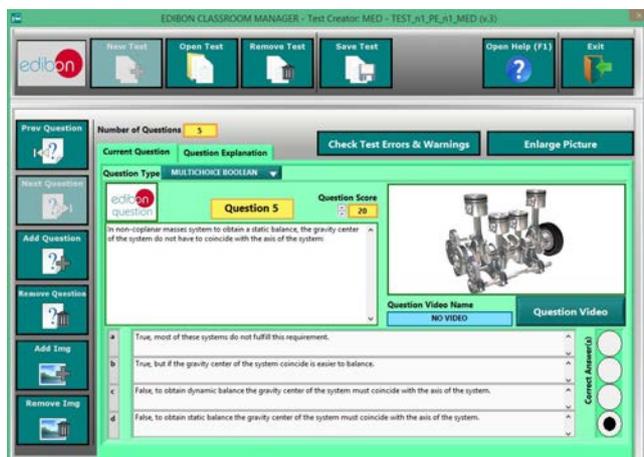
- User Data Base Management.
- Administration and assignment of Workgroup, Task and Training sessions.
- Creation and Integration of Practical Exercises and Multimedia Resources.
- Custom Design of Evaluation Methods.
- Creation and assignment of Formulas & Equations.
- Equation System Solver Engine.
- Updatable Contents.
- Report generation, User Progression Monitoring and Statistics.



ECM-SOF. EDIBON Classroom Manager (Instructor Software) Application Main Screen



ECAL. EDIBON Calculations Program Package - Formula Editor Screen



ETTE. EDIBON Training Test & Exam Program Package - Main Screen with Numeric Result Question



ERS. EDIBON Results & Statistics Program Package - Student Scores Histogram

Optional  
Student Software

- **ESL-SOF. EDIBON Student Labsoft (Student Software).**

ESL-SOF is the application addressed to the Students that helps them to understand theoretical concepts by means of practical exercises and to prove their knowledge and progression by performing tests and calculations in addition to Multimedia Resources. Default planned tasks and an Open workgroup are provided by EDIBON to allow the students start working from the first session. Reports and statistics are available to know their progression at any time, as well as explanations for every exercise to reinforce the theoretically acquired technical knowledge.

Innovative features:

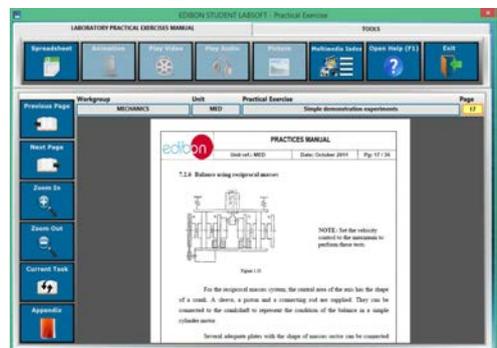
- Student Log-In & Self-Registration.
- Existing Tasks checking & Monitoring.
- Default contents & scheduled tasks available to be used from the first session.
- Practical Exercises accomplishment by following the Manual provided by EDIBON.
- Evaluation Methods to prove your knowledge and progression.
- Test self-correction.
- Calculations computing and plotting.
- Equation System Solver Engine.
- User Monitoring Learning & Printable Reports.
- Multimedia-Supported auxiliary resources.

For more information see ICAI catalogue. Click on the following link:

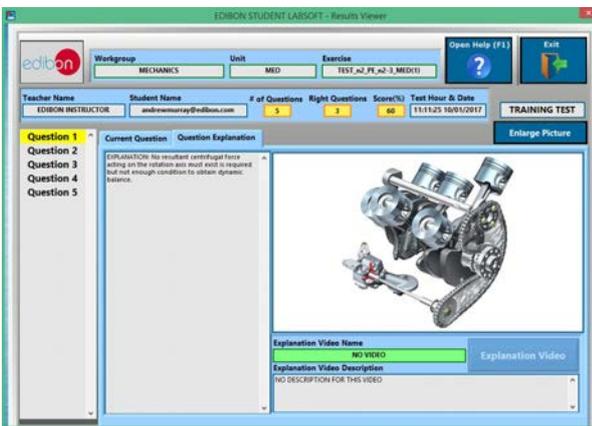
[www.edibon.com/en/files/expansion/ICAI/catalog](http://www.edibon.com/en/files/expansion/ICAI/catalog)



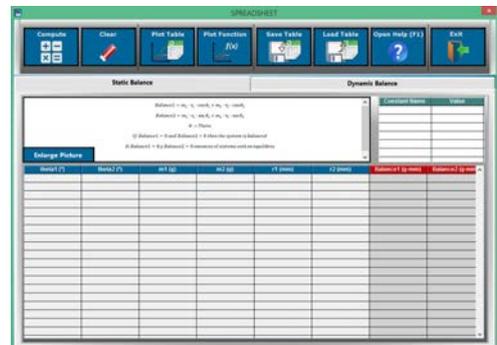
ESL-SOF. EDIBON Student LabSoft (Student Software)  
Application Main Screen



EPE. EDIBON Practical Exercise Program Package Main Screen



ERS. EDIBON Results & Statistics Program Package - Question Explanation



ECAL. EDIBON Calculations Program Package Main Screen

\* Specifications subject to change without previous notice, due to the convenience of improvement of the product.



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REPRESENTATIVE:

