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User Guide for
the iLearn2Main
E-Training platform



iLearn2Main Project 2010

ATHENA Authoring Team

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1. INTRODUCTION

ACCESSING THE iLearn2Main PORTAL/PLATFORM

The iLearn2Main Project portal can be accessed at: <http://www.ilearn2main.eu/>

iLearn2Main:
Industrial Training System for the Modern Enterprise Maintenance

Modern enterprises seeking to improve engineering asset lifecycle management need adequately trained staff.

The iLearn2Main project aims to bring the right innovative training and e-training tools to the right people, in order to **improve Maintenance Management practice**.

iLearn2Main is funded by the Education & Training Directorate of the European Commission, through the **UK National Authority of the Leonardo da Vinci Lifelong Learning Programme**.

[Download the project brochure!](#)

The iLearn2Main Project organised the "E-learning in Maintenance" interactive e-Training workshop during the 3rd FETEC - Industrial Equipment International Exhibition on Saturday 7th November in Athens. Click [here](#) to find more about the workshop.

[Click here for the workshop program](#)

The iLearn2Main Project organised an interactive e-Training workshop during the 4th World Congress on Engineering Asset Management (WCEAM 2009) that was held in Athens 28-30 September 2009.

Click [here](#) to find more about the workshop or click [here](#) and [here](#) to find out more about the WCEAM Congress.

Συνδιοργάνωση:
Hellenic Maintenance Society (HMS, www.hms-gr.eu) and **HMS**
Hellenic Maintenance Society
Hellenic Maintenance Society

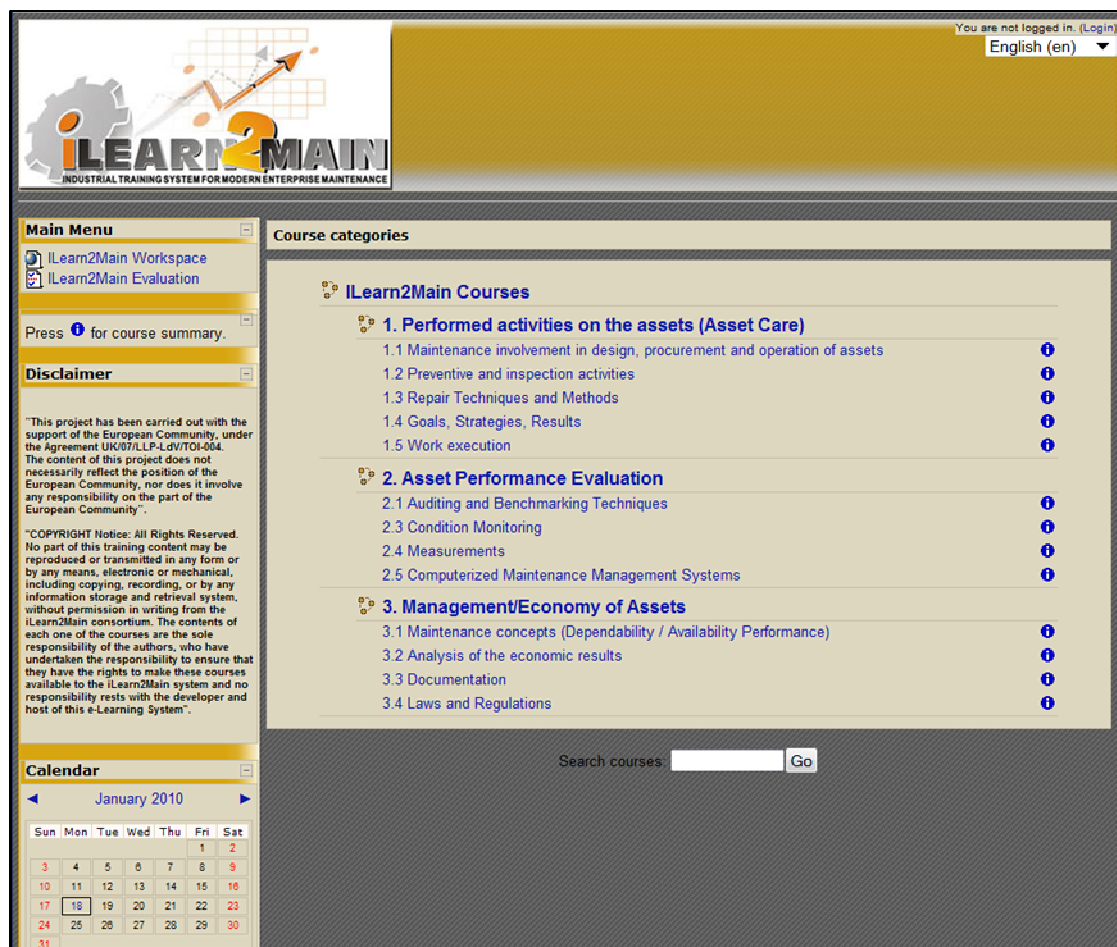
The workshop was jointly organised by the iLearn2Main project, the **Intelligent Manufacturing Systems Technology Platform M4SM - "Maintenance for Sustainable Manufacturing"** and the **Hellenic Maintenance Society**.

The iLearn2Main E-Training Platform can either be accessed:

- ✓ Directly through the following URL: <http://www.ilearn2main.eu/moodle> ,
- ✓ By following the "eTraining" link from the portals main web page.



Both methods will bring you to the iLearn2Main eTraining Platform:



In the top-right corner of the platforms starting page, you can find indications of:

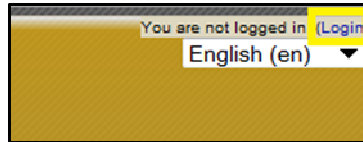
- ✓ your account/session status - that is, if you are logged in the platform with a specific account,

- ✓ and your current language selection (according to this setting, the proper translated e-training modules are presented)

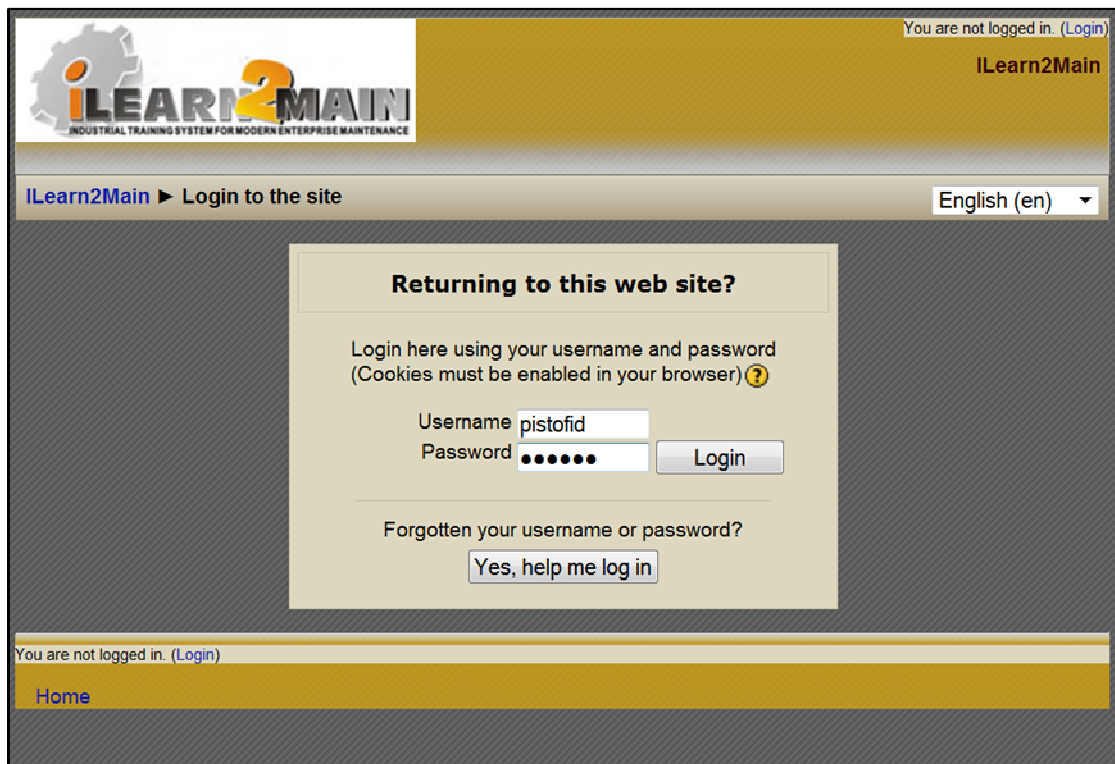


In order to login, you will need a valid account (username, password) provided by the platform's administrator. To acquire such an account, you can contact our portal administrators at: info@ilearn2main.eu

If you already have a valid account for our platform, then you can access the login web page by following the proper link in the upper-right corner, as previously displayed.



In the login page you are requested to fill in your username and password. Cookies should be enabled in your browser, in order to allow session tracking for your account throughout the platform.



The screenshot shows the iLearn2Main login interface. At the top, there is a navigation bar with the iLearn2Main logo on the left and a language dropdown menu on the right. Below the navigation bar, there is a central login form titled "Returning to this web site?". The form contains a message: "Login here using your username and password (Cookies must be enabled in your browser) ?". Below this message, there are two input fields: "Username" with the value "pistofid" and "Password" with masked characters. To the right of the password field is a "Login" button. Below the input fields, there is a link: "Forgotten your username or password?" with a "Yes, help me log in" button. The footer of the page includes a "Home" link.

If your account details are correct, the platform will log you in and redirect you to the starting page. Your status at the top-right corner will be updated with your username, while a "logout" option will be presented to allow you exit the platform.

The screenshot displays the iLearn2Main user interface. At the top left is the logo for iLearn2Main, described as an 'INDUSTRIAL TRAINING SYSTEM FOR MODERN ENTERPRISE MAINTENANCE'. The top right shows a user login status: 'You are logged in as Petros Pistofidis (Logout)' and a language dropdown menu set to 'English (en)'. The main content area is titled 'Course categories' and lists 'iLearn2Main Courses' with three main categories: 1. Performed activities on the assets (Asset Care), 2. Asset Performance Evaluation, and 3. Management/Economy of Assets. Each category has several sub-items with information icons. On the left side, there is a 'Main Menu' with links to 'iLearn2Main Workspace' and 'iLearn2Main Evaluation', a search box for course summaries, and a 'Disclaimer' section. At the bottom left, a 'Calendar' widget shows the month of January 2010. At the bottom right, there is a search box for courses with a 'Go' button.

2. iLean2Main PLATFORM STARTING PAGE

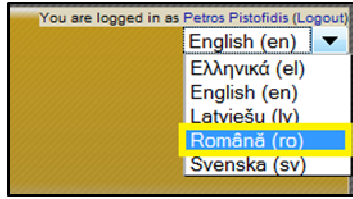
Once you successfully log in the platform, you will be forwarded to the platform starting web page. You will then be able to access all the options and activities, supported by your role/account.

The starting web page contains the following:

- A course syllabus / full-list of available e-training courses.
- A left panel: the student has the option to complete an on-line evaluation questionnaire for the courses he/she has attended. Additional options are available to non-student accounts but they are not really needed when taking the course.

The screenshot shows the iLearn2Main platform interface. At the top right, it indicates the user is logged in as Petros Pistoifidis (Logout) and the language is set to English (en). The left sidebar contains a 'Main Menu' with 'ILearn2Main Workspace' and 'ILearn2Main Evaluation' options. Below this is a 'Disclaimer' section and a 'Calendar' for January 2010. The main content area is titled 'Course categories' and lists 'ILearn2Main Courses' under three main headings: '1. Performed activities on the assets (Asset Care)', '2. Asset Performance Evaluation', and '3. Management/Economy of Assets'. Each heading has a list of sub-topics with an information icon (i) next to them. At the bottom, there is a search bar for courses and a 'Go' button.

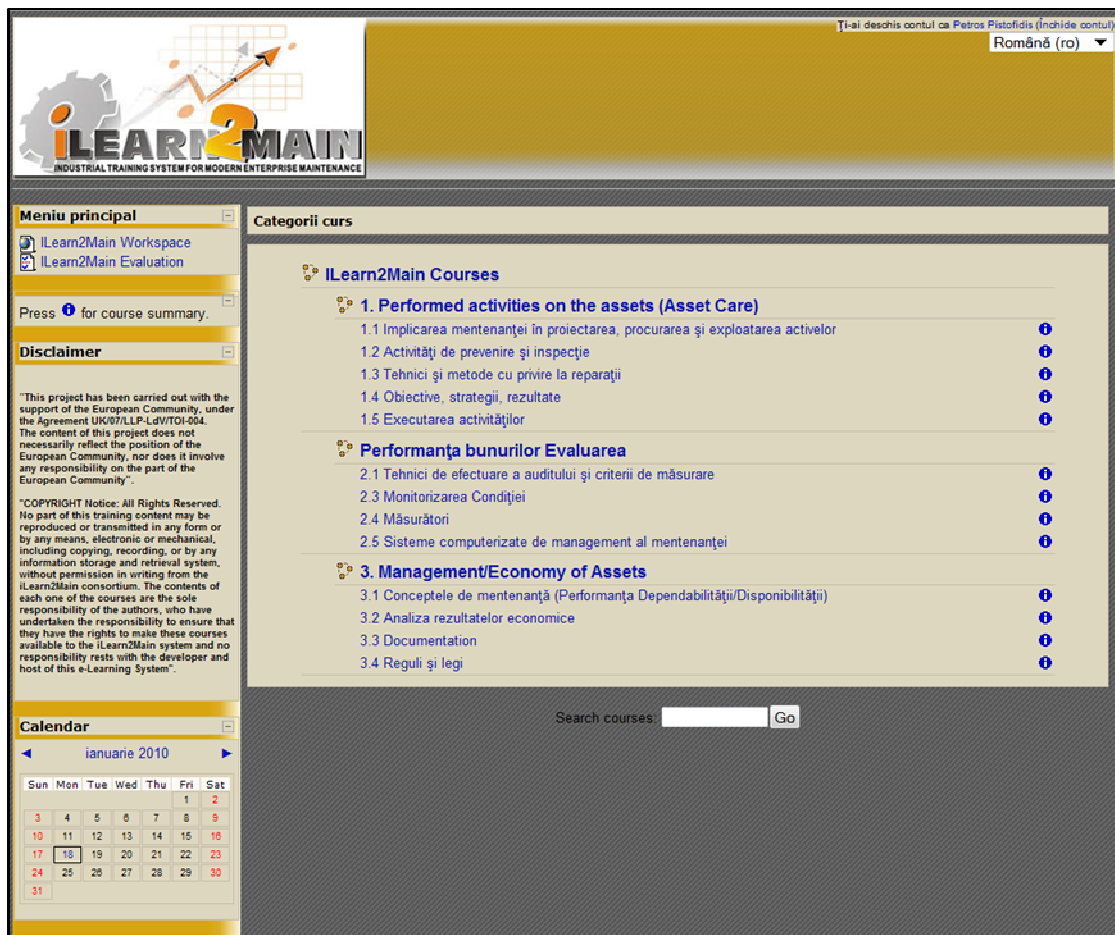
Language Selection: The iLearn2Main platform is a multi-lingual one. In order to view the platform and courses in a different language, you can use the drop down menu at the top-right corner:



Currently the supported languages are English, Swedish, Greek, Romanian and Latvian. More languages may be added in the future.

Your language selection will affect:

- The platform’s user interface and content. You will be presented with a translated version of the platforms’ web pages.
- The content of e-Training courses. You will have access to the translated versions of all available courses in the selected language.



Course Summary: Each e-Training course offers a link, marked with **i** to a short course summary.

1. Performed activities on the assets (Asset Care)	
1.1 Maintenance involvement in design, procurement and operation of assets	i
1.2 Preventive and inspection activities	i
1.3 Repair Techniques and Methods	i
1.4 Goals, Strategies, Results	i
1.5 Work execution	i
2. Asset Performance Evaluation	
2.1 Auditing and Benchmarking Techniques	i
2.3 Condition Monitoring	i
2.4 Measurements	i
2.5 Computerized Maintenance Management Systems	i
3. Management/Economy of Assets	
3.1 Maintenance concepts (Dependability / Availability Performance)	i
3.2 Analysis of the economic results	i
3.3 Documentation	i
3.4 Laws and Regulations	i

The summary contains key introductory material about the course:

- ✓ Course Objectives
- ✓ Learning Outcome
- ✓ Prerequisites or Related Modules

2.3 Condition Monitoring (I2M2.3)

Objectives

In a modern organisation or enterprise, engineering assets condition needs to be assessed throughout their life cycle, in order to meet quality, health & safety and performance targets and constraints. Condition monitoring systems offer the key to the implementation of a condition-based maintenance strategy, wherein maintenance decisions are taken and scheduled on the basis of the real condition of engineering assets. The objective of this module is to provide and outline of cover basic condition monitoring concepts techniques, while offering also practical implementation guidelines.

Learning Outcome

After successfully completing this module you will be able to:

- Understand the principles of condition monitoring systems.
- Appreciate the need for implementing condition monitoring.
- Have a basic understanding of the available condition monitoring techniques.
- Make an initial selection of condition monitoring techniques for different engineering assets.

Prerequisites or Related Modules

Define which other modules need to be completed before taking this module or define which other modules are related to this.

- 1.2. Preventive and inspection activities (related)
- 1.3. Repair techniques and methods (related)
- 1.4. Goals, strategies, results (related)
- 2.2. Remote Control (SCADA Systems) (related)

[Close this window](#)

You are logged in as Petros Pistofidis (Logout)

[Home](#)

Following the link of a course category title will display a web page containing all the summaries of courses included in this category.

	1. Performed activities on the assets (Asset Care)	
	1.1 Maintenance involvement in design, procurement and operation of assets	
	1.2 Preventive and inspection activities	
	1.3 Repair Techniques and Methods	
	1.4 Goals, Strategies, Results	
	1.5 Work execution	
	2. Asset Performance Evaluation	
	2.1 Auditing and Benchmarking Techniques	
	2.3 Condition Monitoring	
	2.4 Measurements	
	2.5 Computerized Maintenance Management Systems	
	3. Management/Economy of Assets	
	3.1 Maintenance concepts (Dependability / Availability Performance)	
	3.2 Analysis of the economic results	
	3.3 Documentation	
	3.4 Laws and Regulations	

3. ATTENDING COURSES – COURSE STRUCTURE

In order to attend an e-Training course the user simply has to follow the corresponding link at the starting page’s course list.

1. Performed activities on the assets (Asset Care)	
1.1 Maintenance involvement in design, procurement and operation of assets	↓
1.2 Preventive and inspection activities	↓
1.3 Repair Techniques and Methods	↓
1.4 Goals, Strategies, Results	↓
1.5 Work execution	↓
2. Asset Performance Evaluation	
2.1 Auditing and Benchmarking Techniques	↓
2.3 Condition Monitoring	↓
2.4 Measurements	↓
2.5 Computerized Maintenance Management Systems	↓
3. Management/Economy of Assets	
3.1 Maintenance concepts (Dependability / Availability Performance)	↓
3.2 Analysis of the economic results	↓
3.3 Documentation	↓
3.4 Laws and Regulations	↓

These links take the user to the main interface of the corresponding training course.

The screenshot shows the course interface for '2.3 Condition Monitoring'. At the top, it says 'You are logged in as Petros Pistofidis: Student' and '2.3 Condition Monitoring'. The main content area is titled 'Topic outline' and lists 10 sections:

- 1 Introduction
- 2 Theoretical Background - Condition Monitoring, Theoretical Background - Vibration Monitoring, Theoretical Background - Other Condition Monitoring Techniques
- 3 Implementation
- 4 Case Studies
- 5 Condition Monitoring Glossary
- 6 List of References
- 7
- 8
- 9
- 10

On the left, there is a navigation menu with sections: Author (R.C. ATHENA, Christos Emmanouilidis and Petros Pistofidis), People (Participants), Activities (Glossaries, Lessons, Resources), Administration (Grades, Profile), and My courses (listing all course topics). On the right, there are three boxes: Latest News (No news has been posted yet), Upcoming Events (There are no upcoming events), and Recent Activity (Activity since Sunday, 17 January 2010, 10:12 PM).

This interface provides the following panels:

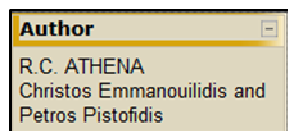
- The **topic outline**. All available courses follow a specific outline to organize their content.

Topic outline		
2.3 Condition Monitoring		
1	Introduction	<input type="checkbox"/>
2	<ul style="list-style-type: none"> ↳ Theoretical Background - Condition Monitoring ↳ Theoretical Background - Vibration Monitoring ↳ Theoretical Background - Other Condition Monitoring Techniques 	<input type="checkbox"/>
3	Implementation	<input type="checkbox"/>
4	Case Studies	<input type="checkbox"/>
5	Condition Monitoring Glossary	<input type="checkbox"/>
6	List of References	<input type="checkbox"/>
7		<input type="checkbox"/>
8		<input type="checkbox"/>
9		<input type="checkbox"/>
10		<input type="checkbox"/>

This outline includes:

- Introduction – Provides introductory material about the courses goals and topics.
 - Theoretical Background – Provides suitable theory and concepts to support trainee’s comprehension of the course’s topics.
 - Implementation – Description of methods and techniques that connect the covered theory with common and specialized practice.
 - Case Study (ies) – Hands on examples from various application fields that provide insight into practical application examples related to the course.
 - Glossary – Glossary of key terms used throughout the course lessons
 - References – A list of resources consulted to formulate the training content or suggested for further probing into course-related material.
- The **information/quick access panel** on the left. This panel provides the following:

- Information about the course’s authors.



- The list of participant’s (platform users) that attend this course.



- Quick access links to the course’s lesson list, glossary and references.



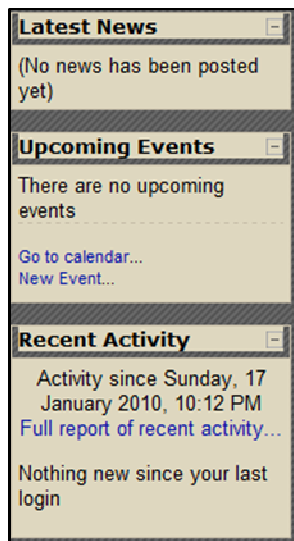
- Quick access links to your account’s Grade history and Profile information.



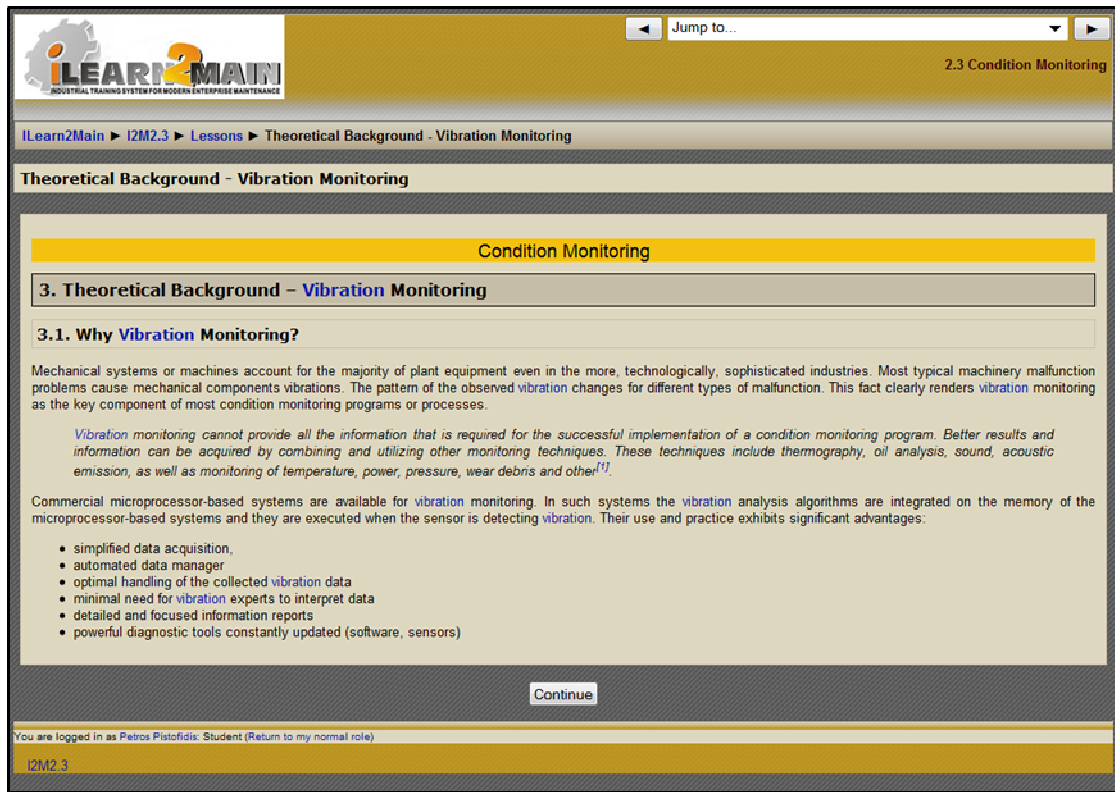
- Quick access links to other courses you attended in the past.



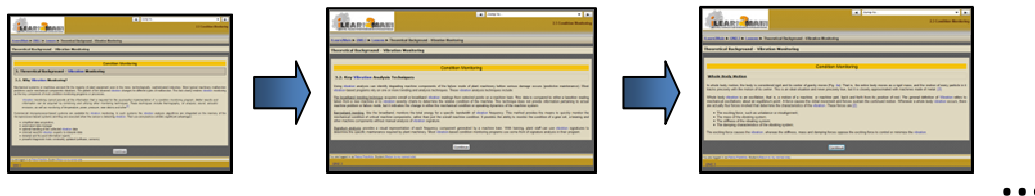
- The **notification panel** on the right. This panel provides notifications on Latest News, Upcoming Events and Recent Activity of the platforms’ community.



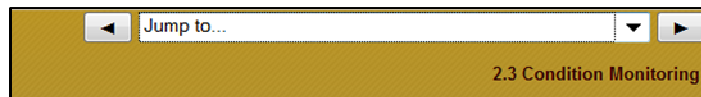
Once a specific lesson within a course is selected, the user is presented with a series of web pages that display the content material of the lesson.



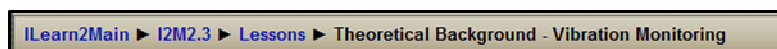
In order to browse from one page to another the user should use the “Continue” button at the bottom of each page.



At the top-right corner there the platforms interface displays the title of the e-Training course the user is currently attending.

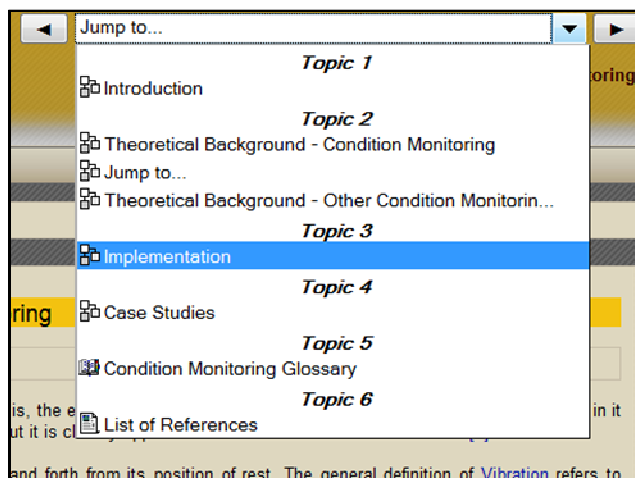


At the top of the page, the platform presents a path that provides links to each level of depth:



- The first part is always “Ilearn2Main” and redirects to the platforms starting page.
- The second part is a code that represents the course the user is currently attending. “I2M2.3” stands for “Ilearn2Main course 2.3”. This link brings the user to the page displaying the topic outline of the course he/she is attending.
- The third part offers a quick link to the main course sections.
- The last part does not constitute a link and displays the name of the lesson or the glossary term the user is currently browsing.

The user can also use the drop down menu to “jump to” any part of the courses structure whether that is a specific lesson, the glossary or the list of references.



Glossary Links: In each page the user may come across terms presented as links. These links will forward the trainee to the corresponding entries inside the course’s glossary.

Whole body vibration is an oscillation, that is, a motion of a machine, or machine part, back and forth from its position of rest. The general definition of Vibration refers to mechanical oscillations about an equilibrium point. A force causes the initial movement and forces sustain the continued motion. Whenever a whole body vibration occurs, there are actually four forces involved that determine the characteristics of the vibration. These forces are [2]:

- The exciting force, such as unbalance or misalignment;
- The mass of the vibrating system;
- The stiffness of the vibrating system;
- The damping characteristics of the vibrating system.

The exciting force causes the vibration, whereas the stiffness, mass and damping forces oppose the exciting force to control or minimize the vibration.



Vibration

Whole body vibration is defined as an oscillation, that is, a motion of a machine, or machine part, back and forth from its position of rest. In case of Pressure Waves vibration, the machine’s center of gravity is more or less stationary. Pressure waves originate at a contact point and radiate outward from there.

[» Condition Monitoring Glossary](#)

Keyword(s):

References: References are also presented as links redirecting the trainee to the course’s references list for further information.

Whole body vibration is an oscillation, that is, a motion of a machine, or machine part, back and forth from its position of rest. The general definition of Vibration refers to mechanical oscillations about an equilibrium point. A force causes the initial movement and forces maintain the continued motion. Whenever a whole body vibration occurs, there are actually four forces involved that determine the characteristics of the vibration. These forces are [2].

Condition Monitoring

8. List of References

Publications & Books:

- [1]. P. Higgs, R.M. Parkin, M.R. Jackson, A. Al-Habaibeh, F. Zornassatine and J. Coy, (2004), A Survey on Condition Monitoring Systems in Industry, the 7th Biennial ASME Engineering Systems Design and Analysis, Manchester.
- [2]. D.W. Gardiner, (1998), Review of fundamental vibration theory, in Handbook Handbook of Condition Monitoring, Edited by A. Davies (KLUWER Academic).
- [3]. V. Wowk, (1991), Machinery Vibration Measurement and Analysis, Victor Wowk, Book-mart Press (McGraw Hill).
- [4]. R.K. Mobley, (2002), Introduction into Predictive Maintenance, (Butterworth-Heinemann).

Web sites:

- [5]. David Stevens: Machinery Vibration Diagnostics, 07/05/2009, <http://www.vibanalysis.co.uk/>
- [6]. Australia's Manufacturing and Industrial Directory, 27/05/2009, <http://www.fernet.com.au/>
- [7]. Maintenance Technology, 27/05/2009, <http://www.mt-online.com/>
- [8]. Center for Advanced Life Cycle Engineering (CALCE), 29/05/2009, <http://www.calce.umd.edu/>
- [9]. Corrosion Doctors, 29/05/2009, <http://corrosion-doctors.org>
- [11]. British Institute of Non-Destructive testing, 29/05/2009, <http://www.bindt.org/>
- [12]. NDT Resource Center, 29/05/2009, <http://www.ndt-ed.org/>

Review Questions: Each lesson may be followed by a set of Review Questions, assessing the trainee’s comprehension and proper understanding of the course’s concepts and topics. These questions may include:

- True/False Questions

Condition Monitoring

Vibration analysis can significantly support predictive maintenance through early identification of progressing faults.

True

False

Please check one answer

- Multiple Questions

Condition Monitoring

What is the origin/reason for the presence of harmonics in the spectrum of loose mechanical parts:

- The clipping of their waveform by the physical objects they meet.
- Their low mass.
- The energy print of the noise-product.
- Their size ratio with the rest of the machinery.

Please check one answer

After each question the platform provides feedback informing the trainee whether his/her answer was right or wrong. In the later case, the system provides additional information so that the trainee can quickly review suitable course content that will help him/her figure out the right answer.

Condition Monitoring

Vibration analysis can significantly support predictive maintenance through early identification of progressing faults.

Your answer

True

Correct Answer!

Continue

Condition Monitoring

What is the origin/reason for the presence of harmonics in the spectrum of loose mechanical parts:

Your answer

Their low mass

Wrong Answer.
Please re-read section 5.2.3

Continue

4. ASSESSMENT QUESTIONS

The iLearn2Main platform offers an electronic tool for Maintenance Management knowledge assessment. It includes questions for each course and a tool to create an overall assessment tests, including questions from all courses. The main goal of this tool is to evaluate whether and at what level the desired learning outcome has been achieved. The E-Assessment tool can be accessed through the iLearn2Main Project portal.

The screenshot shows the iLearn2Main project portal. On the left, there is a navigation menu with the following items: The Project, Partners, eTraining, eAssessment (highlighted), News and Events, Links, Dissemination, and Contact. Below the menu is the logo for the Lifelong Learning Programme, featuring the European Union flag and the text 'Education and Culture Lifelong Learning Programme'. The main content area is titled 'iLearn2Main: Industrial Training System for the Modern Enterprise Maintenance'. It contains the following text:

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[Click here for the workshop program](#)

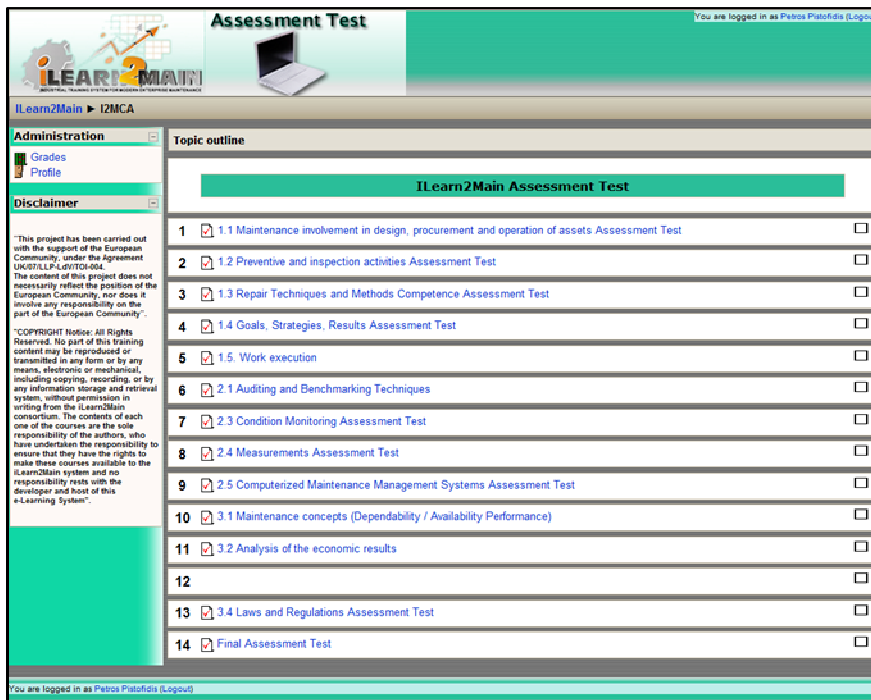
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Click [here](#) to find more about the workshop or [click here and here](#) to find

28-30 Σεπτεμβρίου 2009, Athens Ledra Marriott Hotel

The logo for WCEAM (World Congress on Engineering Asset Management) is also visible.

This link takes the user to the e-Assessment page, where he/she can browse the list of courses that provide assessment tests.



Selecting a course from the list initiates the e-assessment tool for this particular course. It is also possible to select the 'Final Assessment Test'. When you do that the system composes a different test (each time) by randomly selecting a small subset of questions from each course. The user is requested to fill in and submit his/hers answers.

1.4 Goals, Strategies, Results Assessment Test - Attempt 2

1
Marks: 1
Which technique utilises sensors, sampling of lubricant products and visual inspection to permit continued operation of critical machinery and avoid catastrophic damage to vital components?

Choose one answer.

- A. TPM
- B. RCM
- C. CBM

2
Marks: 1
Preventive maintenance is carried out after a detected failure.

Answer:

- True
- False

3
Marks: 1
The prime objective of RCM is:

Choose one answer.

- A. To provide reliable diagnosis of machinery condition
- B. To ensure that production machinery is operating without faults
- C. To preserve system function

4
Marks: 1
Predetermined maintenance is another term for preventive maintenance.

Answer:

- True
- False

5
Marks: 1
RCM process consists of:

...

17
Marks: 1
When the failure frequency is high, CBM is always the recommended action.

Answer:

- True
- False

18
Marks: 1
Vibration analysis is a CBM technique.

Answer:

- True
- False

Save without submitting Submit all and finish

The system processes the user's answers and provides a full report with total grade/statistics.

1.4 Goals, Strategies, Results Assessment Test

Review of attempt 1

[Close this window](#)

Started on	Tuesday, 19 January 2010, 01:19 AM
Completed on	Tuesday, 19 January 2010, 01:26 AM
Time taken	7 mins 16 secs
Marks	9/18
Grade	5 out of a maximum of 10 (50%)
Feedback	Unfortunately you failed the test.

1
Marks: 1 **Vibration analysis is a CBM technique.**

Answer:

True ✓

False ✗

Correct Answer!

Correct
Marks for this submission: 1/1.

2
Marks: 1 **Preventive maintenance is carried out after a detected failure.**

Answer:

True ✗

False ✓

Correct Answer:

Correct
Marks for this submission: 1/1.

3
Marks: 1 **Remote maintenance is carried out at the location where the item is used.**

Answer:

True ✗

False ✓

5. iLearn2Main EVALUATION QUESTIONNAIRE

Finally every user is asked to fill in an evaluation questionnaire. This is valuable contribution to enable the iLearn2Main team to improve the system. The questionnaire is available at the starting page of the e-Training platform (left panel). The questionnaire can be completed:

- **Online** - Complete the e-Questionnaire and submit your comments and feedback.

iLearn2Main Evaluation

Evaluation feedback questionnaire

Please fill in the following questionnaire. Alternatively, you can download the offline version from [here](#) and email it to info@ilearn2main.eu

Page 1 of 4

1 Which of the following better describes your function?

trainer

trainee

Manager

Engineer

Technician

Other

2 Which of the following courses have you tried?

1.1 Maintenance involvement in design, procurement and operation of assets

1.2 Preventive and inspection activities

1.3 Repair Techniques and Methods

1.4 Goals, Strategies, Results

1.5 Work Execution

2.1 Auditing and Benchmarking Techniques

2.3 Condition Monitoring

2.4 Measurements

2.5 Computerized Maintenance Management Systems

3.1 Maintenance concepts (Dependability / Availability Performance)

3.2 Analysis of the economic results

3.4 Laws and Regulations

A. General Questions on e-Learning

- **Offline** - Please download the Questionnaire in the form of a Word Document, edit your answers and comments and then send it to: info@ilearn2main.eu