

Project acronym: **CLEM**

Project title: **CLoud services for E-Learning in Mechatronics technology**



Project Number: **518656-LLP-1-UK-LEONARDO-LMP**

Grant Agreement: **2011-4542/001-001**

Sub-programme or KA: Leonardo da Vinci Multilateral Projects for Development of Innovation

Work Package7: Application, Implementation & Innovation

Deliverable 10: Teacher Training Course

Start date of project: 1 January 2012

Duration: 24 months

Organization name of lead contractor for this task: UNICAS

Project co-funded by the European Commission within the LLP – Leonardo da Vinci program (2007-2013)		
Dissemination level		
PU	Public	
PP	Restricted to other programme participants (including the Commission Services)	✓
RE	Restricted to a group specified by the consortium (including the Commission Services)	

CLEM

Cloud services for E-Learning in Mechatronics Technology

Application, Implementation & Innovation

Document Control

WP7: Application, Innovation & Implementation

Work Package Leader: UNICAS (Prof. Giorgio Figliolini)

File Reference: Teacher_Training_Course_FinalV2.0

Date: 31/03/2014

Version: V2.0

General Comments:

Version Control Record

Vers.	Date	Description	Author
V2.0		Final version document	Eng. Pierluigi Rea Prof. Giorgio Figliolini Prof. Kuo-Ming Chao Prof. Anne James
V1.4		Second document delivered to Partners for comments and additional content.	Eng. Pierluigi Rea Prof. Giorgio Figliolini Prof. Kuo-Ming Chao Prof. Anne James
V1.3		First document delivered to Partners for comments and additional content.	Eng. Pierluigi Rea Prof. Giorgio Figliolini

Deliverable 10: Teaching Training Course

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FOREWORD

Deliverable 10, the Teacher Training course is an event deliverable. In this document we highlight the main aspects of the events including an overview of content and a listing of the events that took place. More detailed analysis of organization, content and evaluation of the events can be found in other deliverables:

Deliverable 4 – Exploitation Report – Evaluation

Deliverable 5 – Quality Report – Organisation and Quality Assurance

Deliverable 7 – Online Learning Modules – Static Content

Deliverable 8 – Collaborative Learning Resources – Dynamic Content

Deliverable 9 – Rapid Course Development Tutorial – Tutorials used in the Training

1. INTRODUCTION TO CLEM PLATFORM

CLEM is a web site directed to educators and students to teach them and let them learn Mechatronics. Courses have been designed by experts in the field and are available to be copied and integrated in each local course. We have realized a cloud service for educators and students to teach and learn Mechatronics. The cloud is composed by; as shown in Fig.1:

- Static Material
 - Courses, which have been designed by experts in the field and are available to copy and integrate into your local courses;
 - Exercises;
 - Examples: videos and case of studies;
- Dynamic Part
 - Suitable remote labs (dynamic material); and test-beds, in which is possible to reproduce the main characteristics of the Mechatronic devices which are used into a real industrial environment.

This innovative learning platform realized thanks to the CLEM-Project, provides teachers and trainers a suitable online learning material to develop Mechatronic courses. We developed courses for every stage of a teacher's career, from an initial pre-service qualification to advanced level and beyond. Unlike a residential face-to-face course, learning online gives you the flexibility to set your own study hours and save money to buy equipment. Thanks to the innovative ideas and outcomes, it is fundamental goal of the project create and provide a suitable teaching training course to explain to training mentors, teachers and trainers, supervisors how the platform works and how to use it. It is important to point out that Mechatronics is not taught/known in European countries at same level, therefore it is important to develop tools, which could be used for all countries especially for those that have not a long tradition of Mechatronics teaching.

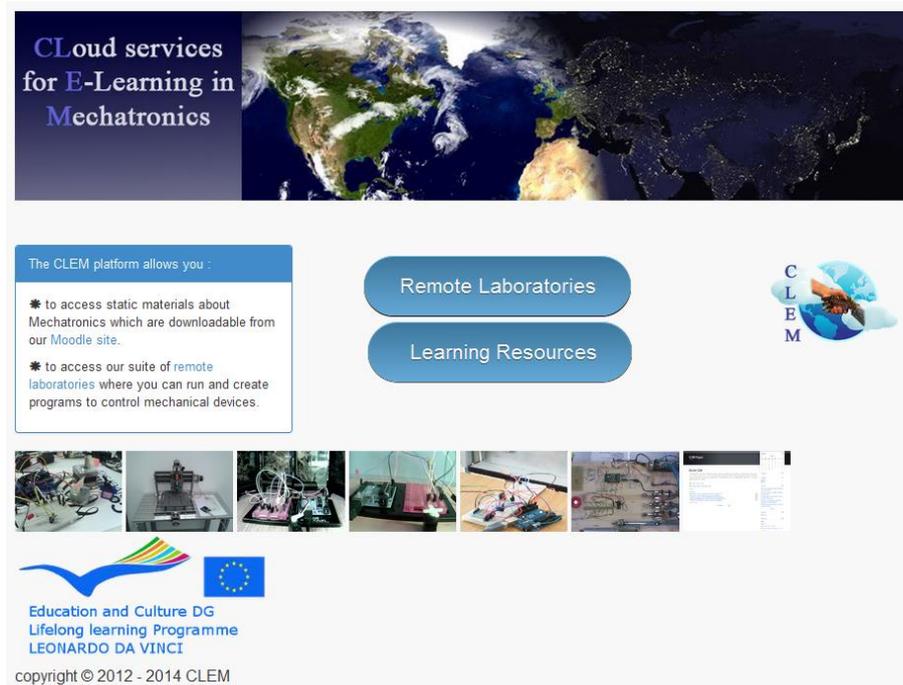


Fig. 1: Screenshot of the entry page of the web site: <http://clem.coventry.ac.uk/>.

2. TEACHING TRAINING COURSE: STATIC AND DYNAMIC MATERIAL

The static material, which has been designed by experts in the field and available to be copied and integrated into local courses is composed of Power Point presentations, exercises and movies, as listed below. Here we just highlight content. Further detail on the contents of the course can be found in Deliverables 7, Online Learning modules and Deliverable 9, Rapid Course Development Tutorial.

Introduction to Mechatronics (provided by University of Ruse "Angel Kanchev")

Content:

In these lectures is given an introduction to mechatronics technology.

Sensors and Transducers (provided by University of Rouse "Angel Kanchev")

Content:

In these lectures is given an introduction to the different typology of sensors.

Actuators and Control (provided by the University of Cassino and Southern Lazio)

Content:

In these lectures is given an explanation to the different typology of actuators (electric, pneumatic, hydraulic) and technique to control the mechanical system.

Assessment

The assessment activity is useful to test a student's understanding of the whole module.

Case Studies

Illustrative examples of research and development are given here as cases of studies carried out at the University of Cassino and Southern Lazio in the area of Robotics and Mechatronics. In particular,

-  Ca.U.M.Ha. Robotic Hand File
Case Study Video
-  WAIROBOT URL
Case Study Video: WAIROBOT: Hybrid Serial-Parallel Robot
-  Unicas remote Lab File
Video tutorial to explain how to use the Cassino remote lab

Robotics and Biomechatronics (provided by the Technical University of ClujNapoca)

Content:

In these lectures is given an explanation of the Robotics and Biomechatronics by using the Arduino board.

Case Studies

Illustrative examples of research and development are given here as cases of studies carried out at the Technical University of Cluj-Napoca in the area of Robotics and Biomechatronics. In particular,

-  CNC with Arduino Film
-  CNC with Arduino Film 2
-  Big Glide Parallel Robot film
-  Big Glide Parallel Robot and Arduino Film
-  Delta Linear Parallel Robot Support Film

Intelligent Control (provided by IFMA, the French Institute of Advanced Mechanics)

Content:

In these lectures is given an explanation of the technique to numeric control for mechanical Systems.

Teaching Training Course, Dynamic Part: The Remote Labs

The Dynamic parts, which have been designed and realized by experts in the field of Mechatronics, are available to be used into local courses. More detailed description on these can be found in Deliverable 8, Collaborative Learning Resources and details on how to use them can be found in Deliverable 9, Rapid Course Development Tutorial. Here we highlight some aspects of their use.

In order to use this Cloud of the remote laboratory type or copy and paste the following address:

<http://clem.coventry.ac.uk/arduino/index.php>

This website will allow users to practice remotely on mechatronics equipment (especially Arduino boards) to gain a better understanding of the mechatronics material and introduction offered by CLEM Project. Furthermore, this website provides access to remote laboratories equipped with mechatronics hardware.

It is worth noting that in order to create the dynamic part two different approaches were developed.

1. Integrated Suite Approach (developed at Coventry University)
 - Coventry University Station
 - CNC Machine
 - Coventry Allesley Station
 - Coventry Solihull Station
 - Technical University of Cluj-Napoca Station
 - IFMA
2. Independent Approach (developed at Cassino University)
 - Unicas Lab

A basic idea behind this project is to allow end users to start testing out a mechatronic system without having to buy electronic boards and components. The only requirement is to register, check out the pin's locations, go to the testing page and write or modify an existing code. Then users will be able to see the result on their screen in real time, thanks to the available webcam at remote labs.

3. TEACHING TRAINING COURSE: HOW TO USE THE REMOTE LABS (OVERVIEW)

In order to give the opportunity to use the CLEM remote laboratories directly, some programs are uploaded in order to drive all physical equipment displayed on the laboratories. More detail on the remote laboratories and how to use them is provided in Deliverable 8, Collaborative Learning Resources and Deliverable 9, Rapid Course Development Tutorial.

In order to access to this Cloud of the remote laboratory there are two possibilities:

- the first one is to log in as a guest and browse through the website. In this case users cannot see the remote laboratory in real time (just click on button “Guest User”);
- the second option is to log-in as a registered user, this allows access to live streaming of the remote lab, giving the ability to use the remote lab.
 - In order to use our services users need to [log in](#);
 - If they do not possess an account to login, they need to get [registered](#) before.
 - If they have log in details and they wish to use a remote lab they need to [schedule](#) a slot.
 - If they have already scheduled a slot they can access the [remote](#) lab straight away.

Integrated Suite Approach (developed at Coventry University)

1. type the following address
 - a. Coventry Web Site: <http://clem.coventry.ac.uk/arduino>
2. click on the button “Welcome Guest” and click on Login/Register, the project will start by creating a new user account or Login with Username and Password.
3. click on the button “Register new Account”, the project will start by creating a new user account; users have to:
 - a. Insert Username;
 - b. Insert Password;
 - c. Repeat Password;
 - d. insert Captcha and click on the button “Register”;
4. Popup menu will appear that confirms the creation of the new user, click Ok;
5. at the web page address <http://clem.coventry.ac.uk/arduino>, insert users’ “username” and “password”, and click on “Submit”;
6. click on the page “Board Configuration” in order to know all physical connections between the control board and the real test bed;

7. click on the web page “schedule”, select the station to use and select the date and time in which users would like test the remote lab, and finally click on “submit” (Important: Users can reserve only 1h for each access, if they need more time, please repeat step 6). Note: insert time referring to UK local time.
8. click on the web page “remote testing”. In this web page users can:
 - a. visualize what happens in the remote lab, thanks to the online streaming on the web cam;
 - b. display the sequence of command lines of the precompiled programs (from Examples);
 - c. test it only by clicking on the button “Compile” and after click on the button “Upload” and visualize what happens in the real-time streaming from the remote Lab;
 - d. modify these command lines to test your version of the program, and test it by clicking on the button “Compile” and after click on the button “Upload”;

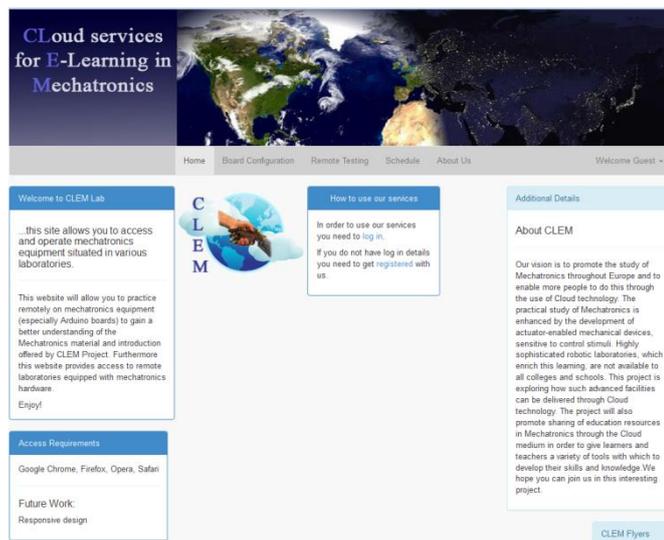


Fig. 2: Screenshot of the entry page of: <http://clem.coventry.ac.uk/arduino/>

Independent Approach (developed at Cassino University)

In order to use the cloud service, you should follow these steps:

1. type the following address
 - a. Cassino Web Site: <http://193.205.61.70/arduino/index.php>

2. click on the button “Create Account” and the project will start by creating a new user account; users have to:
 - a. Insert Username;
 - b. Insert Password;
 - c. Insert First and Last Name and finally, select an image for the account;
 - d. click the button “Submit”;
3. Popup menu will appear that confirms the creation of the new user, click Ok;
4. at the web page address <http://193.205.61.70/arduino/index.php>, insert users’ “username” and “password”, and click on “Submit”;
5. click on the page “Board Configuration” in order to know all physical connections between the control board and the real test bed;
6. click on the web page “schedule” and select the date and time in which users would like test the remote lab, and finally click on “submit”, (Important: Users can reserve only 1h for each access, if they need more time, they have to repeat step 6).
Note: insert time referring to UK local time.
7. click on the web page “remote testing”. In this web page users can:
 - a. visualize what happens in the remote lab, thanks to the online streaming on the web cam;
 - b. display the sequence of command lines of the precompiled programs (from Code1 to Code 7);
 - c. test it only by clicking on the button “Code0..to...Code8” and visualize what happens in the real–time streaming from the remote Lab;
 - d. modify these command lines to test customized version of the program, by copy and paste developed program in the second form at the bottom of the page;
8. In order to test users’ program, they should follow these steps;
 - a. copy the command line in the second form;
 - b. make any changes they want in order to validate their experiments;
 - c. when read click on the button “Upload”;

- d. at this point the web-page will ask users if you want save a “code.txt” file with the modified code. Then they can save, open or ignore this message;
- e. click on the button “load on Arduino board”;
- f. visualize what happens thanks to the webcam.



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CLEM: Cloud services
for E-learning in Mechatronics technology
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Login:

Username:
Login as Guest:

Password:
New Account:

Fig. 3: Screenshot of the entry page of: <http://193.205.61.70/arduino/index.php>

4. LIST OF EVENTS OF TEACHING TRAINING COURSE

Here we list the teacher training events. More detail about how they were organized and evaluation can be found in Deliverables 4 and 5, Exploitation and Quality reports.

Stakeholders (who)	What do to	How to do	When
i.e. list of technical schools	i.e. Seminar	i.e. invitation by email, seminar at department	Date of the event
Local teachers (UK)	Teacher Training Course run as specified in the Teacher training document	Workshop in our department as part of a Computing at Schools Event	12 th September 2014
International and local teachers (UK)	Teacher Training Course run as specified in the Teacher training document	Workshop in our department as part of a Computing at Schools Event	13 th September 2014

Local teachers and trainers (UK)	Informal Teacher Training Sessions	Small 1-1 sessions over an extended period. Availability announced at special events or informally and followed up at convenient time for teacher and trainer	January – March 2014
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Stakeholders (who)	What do to	How to do	When
i.e. list of technical schools	i.e. Seminar	i.e. invitation by email, seminar at department	Date of the event
Local company trainers (IT)	Teacher Training Course run as specified in the Teacher training document	Workshop in Bari in south of Italy	January 31, 2014
Local teachers and trainers (IT)	Teacher Training Course run as specified in the Teacher training document	Workshop at University of Cassino and Southern Lazio, Cassino, Italy	February 12, 2014
Local teachers and trainers (IT)	Informal Teacher Training Sessions	Small 1-1 sessions over an extended period. Availability announced at special events or informally and followed up at convenient time for teacher and trainer	January – March 2014

Stakeholders (who)	What do to	How to do	When
i.e. list of technical schools	i.e. Workshop/Seminar	i.e. invitation by email/phone,	Date of the event
Local technical schools and industry (BG)	Teacher Training Course run as specified in the Teacher training document	Workshop in conference hall of hotel Kristal, Ruse, Bulgaria	24 th March 2014

Stakeholders (who)	What do to	How to do	When
i.e. list of technical schools	i.e. Workshop/Seminar	i.e. invitation by email/phone,	Date of the event
Teachers Trainers VET Education Planners (DE)	Teacher Training Course run as specified in the Teacher training document	Workshop at ESTA, Bad Oeynhausen, Germany	16 th January 2014



Stakeholders (who)	What do to	How to do	When
i.e. list of technical schools	i.e. Seminar	i.e. invitation by email, seminar at department	Date of the event
Local teachers and trainers (RO)	Seminar	Seminar at Department of Mechatronics and Dynamics of Machines	February 2014
Local teachers and trainers (RO)	Workshop	Workshop at Department of Mechatronics and Dynamics of Machines	May 2014

Stakeholders (who)	What do to	How to do	When
i.e. list of technical schools	i.e. Seminar	i.e. invitation by email, seminar at department	Date of the event
Local teachers and trainers (FR)	Seminar	seminar of the MMSI research team	May 15 th 2014