

# Evaluation of e-learning platforms

## mSysTech

Stand: 02.03.2009  
Version 1.00

# eWorks

---

eWorks GmbH  
Hebelstraße 11  
60318 Frankfurt am Main

[www.eWorks.de](http://www.eWorks.de)

**Written by:** Irina Drewitz  
**Contact:** [drewitz@eWorks.de](mailto:drewitz@eWorks.de)

**Table of contents**

|          |   |           |
|----------|---|-----------|
| <b>1</b> | <b><i>Introduction</i></b> .....                                | <b>3</b>  |
| <b>2</b> | <b><i>Requirements</i></b> .....                                | <b>3</b>  |
| 2.1      | Technical requirements  | 3         |
| 2.2      | Financial requirements  | 3         |
| 2.3      | Functional requirements   | 3         |
| 2.4      | Miscellaneous requirements                                      | 4         |
| <b>3</b> | <b><i>Overview and preselecting</i></b> .....                   | <b>5</b>  |
| 3.1      | Review of current e-learning platforms                          | 5         |
| 3.2      | Pre-selection of convenient systems                             | 8         |
| <b>4</b> | <b><i>Comparison of features</i></b> .....                      | <b>9</b>  |
| 4.1      | Detailed overview of selected platforms                         | 9         |
| 4.2      | Recommendation: Analysis of e-learning systems to be considered | 11        |
| <b>5</b> | <b><i>A closer Look at Moodle</i></b> .....                     | <b>12</b> |
| 5.1      | Installation  | 12        |
| 5.2      | Handling  | 12        |
| 5.3      | Important course modules  | 13        |
| 5.3.1    | Web page  | 14        |
| 5.3.2    | Quizy   | 15        |
| 5.3.3    | Book  | 16        |
| 5.4      | Resume  | 16        |

## 1 INTRODUCTION

In consideration of the shortage of engineers in the range of micro–nano–systems and the decrease of students in the electronic field at the universities in Romania and Bulgaria the project “E-Training Microsystems Technologies” (mSysTech) was launched and should improve the competitiveness of these countries’ universities within Europe.

Based on a corporate-used platform, the possibility of communication without further ado should be given to training organisations, professionals from SME<sup>1</sup> in electronics, universities and vocational training schools. Up-to-date courses, elected content, simulations and demonstrations will be used in the most effective way to prepare the technicians to be for their future professions.

This documentation will give you a review of already existing e-learning platforms with all their characteristics, advantages and disadvantages and contains a comparison between the different systems. A slight tendency towards “moodle” prevails and the maintenance of the yet existing platform “NanoTrain” has been taken into account. At the end the most convenient platform for the mSysTech proposal to be chosen is recommended.

## 2 REQUIREMENTS

### 2.1 Technical requirements

Altogether the e-learning platform should exhibit low technical complexity for students, teachers and administrators and ought to be a web-based solution. For an easier technical migration the preferred platform’s requirements are the programming language PHP, the database MySQL and the Apache web server.

### 2.2 Financial requirements

An Open Source Software and a free or at least inexpensive web hosting should be opted ideally. In case of a required software enhancement the access to the source code would be also helpful.

### 2.3 Functional requirements

Considering the fact that several countries with dissimilar mother tongues are involved in the project, the administration and the course handling should to be multi-lingual and support all languages spoken by the mSysTech partners. Those are English (EN), French (FR), German (DE), Bulgarian (BG) and Romanian (RO).

The support of the Cyrillic alphabet and UTF-8 is as necessary a role-based administration system (at least “administrator”, “teacher”/ “tutor” and “student”).

A comfortable dealing with the e-learning system should encourage users to share in. Therefore a user-friendly and clear interface is indispensable. An HTML editor should facilitate the input of the content. The flexible learning contents should include multiple

---

<sup>1</sup> Small and medium enterprises

choice questions, automatically corrected by the system and consequently assure the successful learning progress of the students.

Since the field of study and its teaching content is very technological, the system needs to have the ability of displaying complex mathematical formulas.

In addition, embedding of interactive and multimedia content (e. g. videos, Flash or Java applets etc.) must be possible.

Several project-management-tools like a board for announcements, a secured section to upload documents, data export (e. g. to XML) and data import (MS Word or PDF etc.) are important features and ought to be covered as well.

## **2.4 Miscellaneous requirements**

The purpose of a user-friendly platform fitted to the needs of an academic environment is preferable.

Beyond, an established community would be very administrable for reasons of maintenance, technical support and additional features.

### 3 OVERVIEW AND PRESELECTING

#### 3.1 Review of current e-learning platforms

The current Learning Management System (LMS) market offers various e-learning platforms, with differing advantages and disadvantages. To encircle the large range, 24 e-learning systems were picked and tested in relation to their technical and financial requirements and the languages featured. A free e-learning system with the technical requirements of supporting Apache, MySQL and PHP and the diverse Partner's languages is desired. The following chart will give you a review of the selected e-learning systems and provides a first pre-selection.

| Name (URL)   | System requirements                                   | Price / License   | Multi-lingual                                |
|--|---|---|--|
| .LRN ( <a href="http://dotlrn.org/">http://dotlrn.org/</a> )                                   | UNIX / Linux  | Open Source / GNU GPL   | EN, ES, DE                                   |
| AnaXagora – LCMS<br>( <a href="http://www.anaxagora.lu/">http://www.anaxagora.lu/</a> )        | Apache Tomcat 4, MySQL 4.1,<br>PHP 4, Linux / Windows | Open Source / GNU GPL   | EN, FR                                       |
| AngelLearning<br>( <a href="http://www.angellearning.com/">http://www.angellearning.com/</a> ) | Not disclosed   | Commercial  | Not disclosed                                |
| ATutor<br>( <a href="http://www.atutor.ca/">http://www.atutor.ca/</a> )                        | XAMP-Software   | Open Source / GNU GPL   | All, included EN, FR, DE, BG, RO             |
| Blackboard<br>( <a href="http://www.blackboard.com/">http://www.blackboard.com/</a> )          | Not disclosed   | Depends on licence<br>(5000US\$(and upwards)<br>/server/p.a.) | Not disclosed                                |
| Claroline ( <a href="http://www.claroline.net/">http://www.claroline.net/</a> )                | XAMP-Software   | Open Source/ GPL  | 35 languages, included EN, FR,<br>DE, BG, RO |
| Desire2Learn<br>( <a href="http://www.desire2learn.com/">http://www.desire2learn.com/</a> )    | Not disclosed   | Commercial  | Not disclosed                                |

| Name (URL)  | System requirements    | Price / License       | Multi-lingual   |
|---|------------------------|-----------------------|---|
| Docebo ( <a href="http://www.docebo.org/">http://www.docebo.org/</a> )                  | XAMP-Software          | Open Source / GPL 2.0 | 17 languages, excluded BG, RO                                       |
| Dokeos ( <a href="http://www.dokeos.com/">http://www.dokeos.com/</a> )                  | XAMP-Software          | Open Source / GPL 2.0 | 34 languages, included EN, FR, DE, BG, RO                           |
| eCollege ( <a href="http://www.ecollege.com">http://www.ecollege.com</a> )              | Not disclosed          | Commercial            | Not disclosed   |
| eFront ( <a href="http://www.efrontlearning.net/">http://www.efrontlearning.net/</a> )  | XAMP-Software          | Open Source / CPAL    | 24 languages, included EN, DE, ES; BG, RO, FR (Machine translation) |
| Fle3 ( <a href="http://fle3.uiah.fi">http://fle3.uiah.fi</a> )                          | Zope, Python 2.3.x     | Open Source / GPL     | 20 languages, which is not disclosed                                |
| Ganesha ( <a href="http://ganesha.fr/">http://ganesha.fr/</a> )                         | PHP, MySQL             | Open Source / GPL     | EN, FR  |
| Ilias ( <a href="http://www.ilias.de/">http://www.ilias.de/</a> )                       | XAMP-Software          | Open Source / GNU GPL | 22 languages, included EN, FR, DE, BG, RO                           |
| It's learning ( <a href="http://www.itslearning.com/">http://www.itslearning.com/</a> ) | ASP.NET                | Commercial            | EN, ES, NO, NL, DA, SV  |
| Learn.com ( <a href="http://www.learn.com/">http://www.learn.com/</a> )                 | Not disclosed          | Commercial            | Not disclosed   |
| LON-CAPA ( <a href="http://www.lon-capa.org/">http://www.lon-capa.org/</a> )            | Linux, Apache, MySQL   | Open Source / GNU GPL | Not disclosed   |
| Moodle ( <a href="http://moodle.org/">http://moodle.org/</a> )                          | XAMP-Software,         | Open Source / GNU GPL | 78 languages, included EN, FR, DE, BG, RO                           |
| Nano-Train ( <a href="http://nano-train.com/">http://nano-train.com/</a> )              | XAMP-Software          | -                     | EN, FR, DE, BG, (RO)  |
| OLAT ( <a href="http://www.olat.org/">http://www.olat.org/</a> )                        | Java, Linux, Apache2.0 | Open Source           | 24 languages, excluded BG, RO                                       |

| Name (URL)   | System requirements | Price / License       | Multi-lingual |
|--|---------------------|-----------------------|---------------|
| Prométhée ( <a href="http://promethee.eu.org/">http://promethee.eu.org/</a> )      | XAMP-Software       | Open Source / GNU GPL | EN, FR, ES    |
| Sakai ( <a href="http://sakaiproject.org/">http://sakaiproject.org/</a> )          | Java, Apache Tomcat | Open Source / ECL     | EN            |
| SyberWorks ( <a href="http://www.syberworks.com/">http://www.syberworks.com/</a> ) | Not disclosed       | Commercial            | Not disclosed |
| WebStudy ( <a href="http://www.webstudy.com/">http://www.webstudy.com/</a> )       | Not disclosed       | Commercial            | Not disclosed |

### Legend:

Green: Perfect aspect

Yellow: Not disclosed

Red: Knock-out-aspect

### **3.2 Pre-selection of convenient systems**

Based on the preceding compendium of e-learning systems it is possible to narrow down contemplable platforms. For cost and licensing reasons “AngelLearning”, “Blackboard”, “Desire2Learn”, “eCollege”, “It’s learning”, “Learn.com”, “Syberworks” and “WebStudy” are out of the question.

Furthermore “.LRN”, “AnaXagora – LCMS”, “Docebo”, “Fle3”, “Ganesh”, “OLAT”, “Prométhée” and “Sakai” don’t meet our demands. Not only due to unavailable “language packages” for the languages required, but also due to technical inaccessibility.

“eFront” features mechanical translation into Bulgarian and Romanian language, which creates space for interpretation and most likely will cause a decline of quality. Therefore this platform is excluded from the further breakdown.

“ATutor”, “Claroline”, “Dokeos”, “Ilias”, “Moodle” and “Nano-Train” are up to all specified standards and will be evaluated particularly in the following chapters.

## 4 COMPARISON OF FEATURES

### 4.1 Detailed overview of selected platforms

After the first pre-selection ATutor, Claroline, Dokeos, Ilias, Moodle and Nano-Train remain for further testing. A detailed analysis of the demo versions available on the official websites, detect the factual capability of the several systems. "Ilias" doesn't provide a demo version; for this reason detailed information couldn't be collected. The following chart contains the remaining platforms related to their preferable features and clarifies which systems won't be considered.

| Features  | ATutor 1.6.2   | Claroline 1.8.11            | Dokeos 1.8.5 | Ilias 3.10.4 | Moodle 1.9  | Nano-Train |
|---|--|-----------------------------|--------------|--------------|---|------------|
| Unicode/UTF-8 support                               | ✓  | - <sup>1</sup>              | ✓            | ✓            | ✓   | ✓          |
| Cyrillic alphabet support                           | ✓  | ✓                           | ✓            | ✓            | ✓   | ✓          |
| Role-based user access <sup>2</sup>                 | ✓  | ✓                           | ✓            | ✓            | ✓ <sup>3</sup>  | ✓          |
| Project management tools                            | -  | -                           | -            | 4            | ✓ <sup>5</sup>  | ✓          |
| Mathematical formulas                               | -  | -                           | -            | -            | ✓<br>Tex filter and algebra filter                      | -          |
| Tex / LaTeX support                                 | ✓  | ✓                           | ✓            | ✓            | ✓   | -          |
| Embedding of multimedia                             | ✓<br>mpeg, mov, wmv, swf, mp3,<br>wav, ogg, mid, YouTube | ✓<br>swf, mp4, wmv, mp3,flv | ✓            | ✓            | ✓<br>mp3, swf, mov, wmv, mpg, avi, flv,<br>ram, rpm, rm | ✓          |
| Online tests with immediate evaluation <sup>6</sup> | ✓  | ✓                           | ✓            | ✓            | ✓   | ✓          |
| Standard compliance (e. g. SCORM)                   | ✓  | ✓                           | ✓            | ✓            | ✓   | -          |

| Features  | ATutor 1.6.2            | Claroline 1.8.11    | Dokeos 1.8.5                   | Ilias 3.10.4             | Moodle 1.9                      | Nano-Train  |
|---|-------------------------|---------------------|--------------------------------|--------------------------|---------------------------------|-------------|
| Data import                                     | ✓                       | ✓<br>SCORM          | ✓<br>SCORM, AICC               | ✓                        | ✓<br>IMS/SCORM                  | -           |
| Data export                                     | ✓<br>IMS, SCORM         | ✓<br>SCORM, IMS&QTI | ✓<br>SCORM                     | ✓<br>XML, HTML,<br>SCORM | ✓<br>SCORM                      | -           |
| Ease of use                                     | -                       | ✓                   | ✓                              |                          | ✓                               | -           |
| Comfortable handling of content via HTML-editor | ✓                       | ✓                   | ✓                              |                          | ✓                               | ✓           |
| Courses hierarchically structured               | ✓                       | 7                   | ✓                              |                          | ✓ <sup>8</sup>                  | ✓           |
| Customizing                                     | Source code and modules | Source code         | Source code                    | Source code              | Source code and modules         | Source code |
| Academic purpose                                | ✓                       | ✓                   | ✓                              | ✓                        | ✓                               | ✓           |
| Established community (e. g. forum, wiki, chat) | ✓                       | ✓                   | ✓                              | ✓                        | ✓                               | -           |
| Miscellaneous remarks                           |                         |                     | Detachment of Claroline (2004) | No demo available        | Documentation is very extensive |             |

<sup>1</sup> UTF-8 will be supported in Claroline 2.0

<sup>2</sup> At least student, teacher, admin

<sup>3</sup> Contains also course creator, non-editing teacher, guest, authenticated user, permissions are changeable

<sup>4</sup> Not disclosed

<sup>5</sup> Module to add (Task/Bug Tracker)

<sup>6</sup> Multiple choice, single choice, etc.

<sup>7</sup> Predefined sub items (Course description, Agenda, exercises, etc.), manually not extensible

<sup>8</sup> called meta courses

## 4.2 Recommendation: Analysis of e-learning systems to be considered

All learning management systems except “Claroline” support UTF-8 and the Cyrillic alphabet. The preferable role-based user management (at least admin / teacher and student) is provided by all systems. “Moodle” features even more roles than the minimum targets given. As you can see from the chart Nano-Train is the only system featuring also project-management-tools. “Moodle” provides a module to integrate such tools.

At this point it needs to be accentuated that “Moodle” features various convenient modules to be installed uncomplicatedly.

All platforms provide the opportunity of entering teaching content via HTML-editor as well as importing SCORM1-compatible content. High usability is given by nearly all systems. Only “ATutor” requires a fairly long training period.

Embedding of multimedia-content (e. g. Videos, Flash etc.) and the creation of online tests are possible in all systems.

The wide community of “Moodle” yet existing is a great advantage over every other platform. Both, multilingual web forums and comprehensive documentation are very helpful on problem-solving of most different kinds.

### Conclusion:

Considering the sum of advantages of the “Moodle”-systems and the disadvantages of others, the decision was made in favour of “Moodle”. In the next chapter there will be a closer look at “Moodle” and its features.

---

<sup>1</sup> Sharable Content Object Reference Model

## 5 A CLOSER LOOK AT MOODLE

### 5.1 Installation

The installation of the “Moodle” system turned out to be quite simple. The user is guided by the accompanying instructions and thereby aware of possibly missing system requirements needed for the installation.

### 5.2 Handling

The use of “Moodle” is quite simple and as self-explanatory as possible. Once you have logged in, you have an overview over the available course categories and the associated courses.

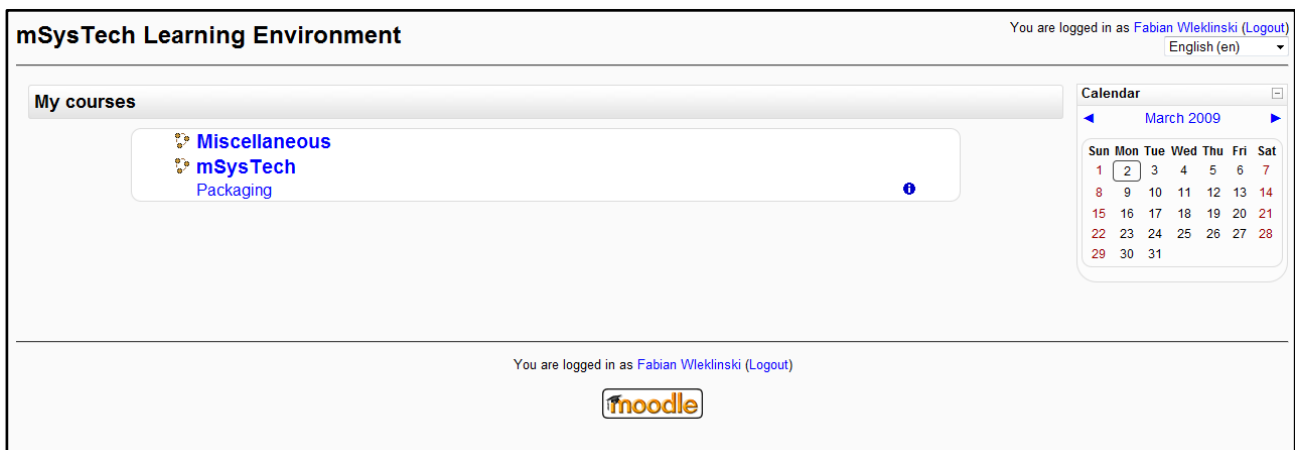


Image 5-1: moodle overview

When you click on a course category, you will see an overview over all the courses available in this category and a short description of each.

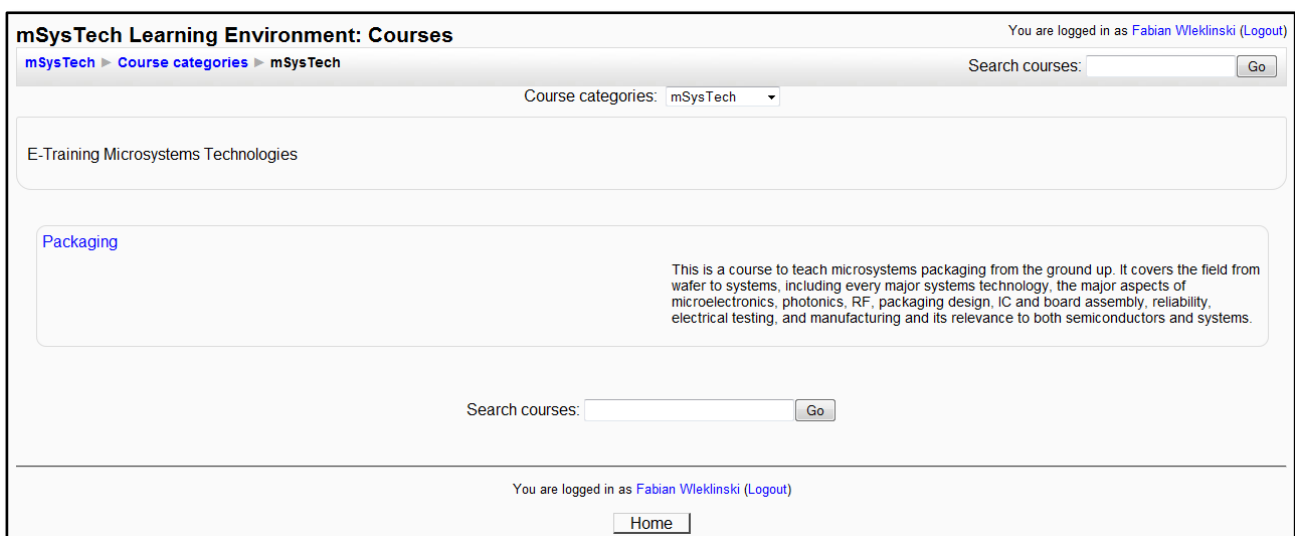


Image 5-2: moodle course category

When you enter a course, you see all the modules (such as chapters, tutorials, tests) available for this course. Depending on your user role (“teacher”, “student”) there are different functions available. As a teacher you can add/edit/delete the course modules, as a student you can read chapters and do tests.

The screenshot shows a Moodle course interface for a course named "Packaging". The user is logged in as Fabian Wlekinski. The interface is divided into several sections:

- Left Sidebar:** Contains navigation menus for "People" (Participants), "Activities" (Books, Forums, Quizzes, Resources), "Search Forums" (with a search box and "Go" button), "Administration" (with various system management options like Turn editing on, Settings, Assign roles, etc.), and "Course categories" (Miscellaneous, mSysTech).
- Topic outline:** A central list of course topics:
  - 1 Introduction (Prerequisite)
  - 2 What is Microsystems Packaging? (Tutorials, Tests)
  - 3 Fundamentals of IC Assembly (Tutorials, Tests)
  - 4 Thermal Management (Tutorials, Tests)
  - 5 Multichip Modules Packaging (Tutorials, Tests)
  - 6 Wafer-Level Packaging (Tutorials, Tests)
  - 7 Nanopackaging (Tutorials)
  - 8
  - 9
  - 10
- Right Sidebar:** Contains "Latest News" (Add a new topic...), "Upcoming Events" (None), and "Recent Activity" (Activity since Saturday, 28 February 2009).
- Footer:** Includes a "Moodle Docs for this page" link, a login status indicator, and a "Home" button.

Image 5-3: moodle course

### 5.3 Important course modules

There are a lot of different types of course modules in “Moodle” and you can even add more by installing extensions. The three most important types of modules will be introduced in this chapter.

### 5.3.1 Web page

A web page is a single page and should be used for introductions or other short texts. Adding of images is possible as well.

**Packaging** Jump to...

[mSysTech](#) > [Packaging](#) > [Resources](#) > [What is Microsystems Packaging?](#) Update this Resource

Microsystems and the technologies they constitute are the building blocks of information technology. These systems require a set of fundamental technologies that include not only microelectronics but also photonics, MEMS, RF and wireless. For these functions to be integrated into systems, they have to be designed, fabricated, tested, cooled and reliability assures. In other words, they have to be system-packaged.

As the name implies, it includes three major technologies:

- Microelectronics, Photonics, MEMS and RF Devices
- Systems Engineering
- Systems Packaging

Microelectronics typically refers to those micro devices, such as integrated circuits, which are fabricated in sub-micron dimensions and which form the basis of all electronic products. "IC" is an abbreviation for "Integrated Circuit" and is defined as a miniature or microelectronic device that integrates such elements as transistors, resistors, dielectrics, and capacitors into an electrical circuit possessing a specific function. "Systems" refers to all electronic products. "Packaging" is defined as the bridge that interconnects the ICs and other components into a system-level board to form electronic products. The overlap of ICs and Packaging is referred to as Packaged Devices or IC Packaging.

Last modified: Monday, 2 March 2009, 04:23 PM

[Moodle Docs for this page](#)  
 You are logged in as [Fabian Wleklinski](#) ([Logout](#))

Image 5-4: moodle web page

### 5.3.2 Quizzy

A quizzy is a test, a student has to take. You can even add a time limit to these tests. You can also use images to reveal the questions.

**Packaging**
You are logged in as [Fabian Wlekinski \(Logout\)](#)

mSysTech > Packaging > Quizzes > Tests > Attempt 1
[Update this Quiz](#)

Info Results Preview Edit

#### Preview Tests

Start again

**1** Marks: -/1

The graphics shows:

Choose at least one answer.

- a. The graph of the automotive industry is wrong
- b. The growth of the industries
- c. The growth of the industries but with exchanged positions
- d. The growth of the demand
- e. The graph of the microsystems is wrong

Submit

**2** In a system packaging:

Marks: -/1

Choose at least one answer.

- a. Materials are most important because they determine the cost of the package.
- b. Mechanical packaging refers only to the heat evacuation.
- c. Electrical problems relate to both signal propagation between the ICs and to power distribution.
- d. System packaging involves a whole set of electrical, mechanical, thermal, chemical and environmental challenges
- e. Electrical packaging is not important because it is done on/in the IC.

Submit

**3** The packaging levels are:

Marks: -/1

Choose at least one answer.

- a. Level 4: mother board, which interconnects the printed wiring boards
- b. Level 3: printed wiring board, which houses the entire system
- c. Level 2: chip-to-chip communication provided by the packaging on the mother board
- d. Level 1: chip package, which houses and protects the chip

Submit

Save without submitting Submit page Submit all and finish

Moodle Docs for this page

You are logged in as [Fabian Wlekinski \(Logout\)](#)

Packaging

Image 5-5: moodle quizzy

### 5.3.3 Book

Books differ from simple web pages in the ability to create structured content in a hierarchy. Books can be used for all kinds of contents that should be taught – just like real life books.

The screenshot shows a Moodle book page with the following content:

- Navigation:** mSysTech > Packaging > Books > Tutorials. Includes 'Update this Book' and 'Turn editing on' buttons.
- Table of Contents:**
  - What is Microsystems Packaging
    1. Electronics Systems Are Similar to Humans
    2. What Is the Relation between Information Technology (IT), Microsystems and Packaging?
    3. What Is IC and System Packaging?
    4. Systems Packaging Involves Electrical, Mechanical and Materials Technologies
    5. Why Is Microsystems Packaging Important?
- Main Content:**

**What is Microsystems Packaging**

An example of "packaged device" technology is today's microprocessors in your PC. The overlap of Packaging and Systems refers to incomplete or unintelligent system-level Boards, since these Boards do not contain the "brains"(the devices).

Finally, the overlap of ICs and Systems can be referred to as Sub-Products. These are considered sub-products because they perform a partial function of a system, limited by the magnitude of integration at the IC level and yet they typically don't involve extensive packaging. These "sub" or complete products depend heavily on the high integration of ICs without a dependency on packaging in order to meet a variety of product functions. In the future evolution of systems technology, this approach is predicted to evolve into a system-onchip (SOC). A single chip radio is perhaps the best example of this.

Most, if not all, products, however, are based on a number of packaged ICs and other components assembled onto a system-level board. This is referred to as system-on-board (SOB). A new paradigm called system-on-package (SOP), or system-in-package (SIP) is analogous to SOC, in that it is a single component, multi-function, multi-chip package providing all the needed system-level functions. These functions include analog, digital, optical, RF and MEMS. Both SOC and SOP are expected to be the wave of the future.
- Diagram:** A cross-sectional diagram of a system-on-package (SOP) assembly. Labels include: Thermal Sensor Port, Heat Sink, Robotic Grip Pedestal, IR Laser Thermal Stress Port, MEMS Removable Carrier Socket, CMOS Die, Contact Spring, Compression Mass, MEMS/ Photonics Device Contact Spring, MEMS Fixed Socket, CMOS Tester-on-Chip Die, SoC Package, SoC I/O Pin, Dry Nitrogen Gas Filled, Gold-to-Gold Thermosonic Bonding, Gold Bonding Wire, and Thermally Conductive Seal.
- Footer:** Moodle Docs for this page, You are logged in as Fabian Wleklinski (Logout), and a 'Packaging' button.

Image 5-6: moodle book

### 5.4 Resume

“Moodle” has a lot of features, is easy to use and can easily be extended by even more functionality. This chapter only showed the base functionality, there are lot more functions that can be useful, but under the impact of limited evaluation time and document size, these basic features have to be adequate for this documentation. All in all, you can say that “Moodle” is the right choice for the realization of our project.