

MOODLE COURSE: PRINCIPLES OF LOW SPEED AERODYNAMICS

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The aim of this study was to assign a comprehensive online learning management course to the basic study literature from the field of aerodynamics. The source literature serves as a theoretical preparation for transport and commercial pilots and for airborne qualification. The result is a complex electronic Moodle course for the Faculty of Aviation, Technical University of Košice. The course is designed not only for students of the Faculty of aviation, but also for the wider community of experts.

K e y w o r d s: learning management system, electronic course (e-course), Moodle, aerodynamics, pilot, airborne qualification.

1 INTRODUCTION

The Faculty of Aeronautics of Technical University of Kosice was granted a certificate of competency by the *Civil Aviation Authority* of the Slovak republic to provide theoretical preparation within the pilot training. One condition of granting such certificate was the operation of an electronic learning management system.

1.1 Reasons for using electronic learning management system

- The use of management system (*LMS – learning management system*) is a condition for opening new courses for aviation specialists.
- It is a modern system of education for teachers that is qualitatively superior to the classical method of teaching.
- Modern support of studies of external, internal and foreign students as well as aviation specialists.
- The whole process of education is digitalized (lectures, tests, submitting the tasks). *Therefore, the study materials of assignment may be reached at any time from any location* (provided the availability of Internet connection).

1.2A short history of the introduction of LMS Moodle in the Faculty of Aeronautics

2005: Establishment of the Faculty of Aeronautics of Technical University in Kosice

2006: Question: development of own learning management system or to apply an existing Open Source solution?

2007: Answer: Open Source, Moodle (Why? – verified system, a large community of users and developers, 75 000 registered users)

2007: Trial operation of the Moodle system at the Department of Aerodynamics and Simulations

2008: Initiation of the Moodle system to service for the entire Faculty of Aeronautics at the Department of Flight Training.

2 OBJECTIVES OF THE STUDY

The objective of this study was to establish the basic electronic course of low speed aerodynamics for theoretical training for aviation specialists and students of the *Faculty of Aeronautics*.

3 STUDY RESOURCES – MOODLE FA AND USED PUBLICATIONS

Since 2008 there is a reliable electronic learning management system *Moodle FA* (Faculty of Aeronautics) in continuous operation in the Faculty of Aeronautics [5]. We have decided to implement the electronic course in this system. As a content source we have chosen the literature that is a basic literature for theoretical training of *transport and business pilots* and the *airborne classification* in the Czech republic, see [1], [2].

4 FEATURES OF THE MOODLE FA

In most cases the subjects teaching in the Faculty of Aeronautics (2012) is performed by a traditional form. Information are presented to students by the informative teaching. Students do not always have the access to the study material. Testing and evaluation of tests in the classic way is a very difficult process for teachers, given the large number of students. In order to facilitate the work of teachers in testing, Moodle FA system may be of help, as it provides test evaluation automatically. Students obtain objectively evaluated result immediately.

Moodle FA system can be also used for a comprehensive management and learning conducting. Among the advantages of the system is availability – time as well as spatial, dynamic and simple, easy user interface.

The *teacher – students communication* in the electronic course is performed via Moodle LF server. The system contains extensive tools for managing, monitoring and evaluation of education activities.

When using the electronic system of education, the *added value for students* is on-line monitoring of the process of obtaining credit, provided the course is adjusted this way.

5 COURSE IMPLEMENTATION

In this work we have created a comprehensive electronic course in the Moodle LF system. Therefore, each thematic unit of the electronic course contains: lecture, exercises, links for teachers, tests and home assignments. In addition, the system includes general chapters such as: applied information technologies, database of tasks with results. To write mathematical symbols in the course was used *TeX system*, see [3], [4]. *Knowledge of TeX* is generally required for writing *e-courses* for technical fields.

It is possible to apply the course for the complex management of the subject "*Basics of aerodynamics of low speed*". The course is flexible and can be supplemented, modify and assign to the students course. It has following structure.

General part of the course:

Conditions of obtaining credit and tests: This source contains conditions for obtaining credit and test from the subject "Principles of flight" or "Principles of Aerodynamics". The conditions created in the course are fictional and can serve as an example for subjects evaluation. These conditions are freely modifiable. When establishing the conditions of subject evaluation, it is necessary to design the process of the entire electronic course management.

Sources: In these sources there is used literature, which we used while creating the course

Glossary: In this source the basic terms, definitions and basic relations from aerodynamics, which are presented in the lectures, are defined.

The system contains eight themes, thematic units. Individual thematic units have the following structure:

Lectures: The lectures are divided according to thematic areas. At the end of each lecture there are questions that can be used as a summary of the theme.

Exercises: Exercises are created to every thematic unit of lectures, which are created specifically for students and teachers. They consist of examples.

Instructions for lecturers: This source offers a teacher the alternative of how to manage exercises and schedule a time interval in order to fulfil the aim of the exercise.

Test: The activity test offers the testing of students with the automatic evaluation of results. Tests consist of 10 questions and have set a time limit.

Home assignments: These are created from each learned problematic area. They consist of examples. Students can improve their final grade after submitting the assignment.

At the end of the course there are general objects such as database of solved tasks or test questions and an example of the final test.

Database of test questions: For each theme there were created test questions. This allows the teachers to create various tests, e.g. for every theme, final testing or for exam test.

Database of solved examples: The database contains all the solving examples from the entire course, which can be gradually added, modified and can be used in another course or another system.

Final exam: The final exam activity is formed mainly from computation examples that students will have to complete at the end of each complex problematic from the subject Principles of flight and Principles of aerodynamics for subsonic speed.

6 CONCLUSION

In this work, we have designed and created a basic electronics course for theoretical training flight specialists in the subject “Principles of low speed aerodynamics”. Created electronic course can be used in the process of education in the Faculty of Aeronautics and there is also a freely available version of the course for the professional community, see. [5]. The course can be freely modified. For more information about the system can be found at work [6].

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