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ACTIVE ENGINEERING EDUCATION**

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## **Title**

Group Project Courses in the Curriculum of ISEP Informatics Engineering

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## **Type of Presentation**

Poster session (60 min)

## **Short Description**

This paper presents a novel approach to improve teaching informatics engineering in a Portuguese polytechnic school. Realizing the need to have project-based group activities in the curriculum, the authors describe the new courses created to include those project activities and how they relate and interact with the traditional courses.

## **Relevance to the Conference and/or CDIO Initiative**

*Please indicate (tick) the strand that the presentation most closely relates to:*

- Curriculum and program design

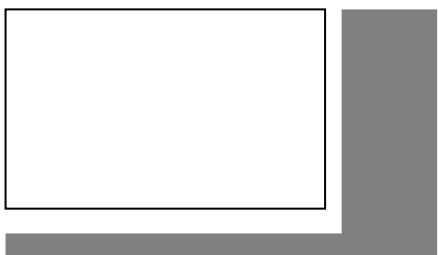
## Abstract

ISEP is a polytechnic engineering school located in Porto, Portugal. The Informatics Degree of ISEP was started in 1985 and changed several times during the period 1990-1999, becoming Informatics Engineering (LEI-ISEP) later in 1998. In 2006-2007 the Bologna revised version of LEI-ISEP started with the first cycle (baccalaureate degree) and one year after the second cycle (master degree). The curricular revision process of LEI-ISEP started in 2003 and finished in 2007, incorporating the CDIO paradigm and many of its techniques and suggestions.

Being a polytechnic institution, in all ISEP curricula there is a special emphasis on the practical aspects of engineering. Even so, in 2005 the professional accreditation review board pointed out the lack of multidisciplinary and integrative curricular activities in LEI-ISEP. As such, one of our main concerns during LEI-ISEP Bologna-oriented revision was to introduce a multidisciplinary and curricular project activity (a kind of design-build experience adapted to informatics engineering). This document aims to describe how the new LEI-ISEP was modified to be more CDIO compliant and to address the aforementioned deficiency.

The revision of LEI-ISEP was oriented by a set of reference curricular documents (ACM Computing Curricula 2001 [1], ACM Computing Curricula 2005 Overview Report [2], ACM Information Technology 2005 [3], etc) and professionally oriented guidelines and best practices (Dublin Descriptors, CareerSpace Consortium, CDIO, etc).

The rationale for changes in LEI-ISEP acknowledged the need to have curricular project-based multidisciplinary group activities in each semester except the last one, which would include a capstone project as before. In each semester there should be a period for acquisition/training, another period for design/building/operation and finally an evaluation period. The acquisition and training period (weeks 1 to 12) includes the traditional courses and the competencies modules. The design, building and operation period (weeks 13-17) includes four weeks for project-based group activities, with milestones and deliveries, and one week for project evaluation. Finally, the evaluation period (weeks 18-20) is dedicated to the written exams of traditional courses.



The following diagram shows graphically how the three different periods are related during one semester.

The left side white box represents the initial traditional courses, the middle gray region represents the Lab./Project course (for design/building/operation) and the right side box is the final examination period. The gray region extending from weeks 1 to 12 represents the competency module of each semester.

This structure is used in the five initial curricular semesters with variations. In terms of traditional courses, the ratio of informatics to non-informatics courses is, for each of the semesters one to five: 2/2, 2/2, 3/1, 4/0, 4/1. In this way, the student never loses focus from the informatics engineering domain. Also, our experimental approach to informatics seems to be in line with emerging experimental computer science trends like those described in [4]. The LEI-ISEP curricular sequence also includes competencies modules within the Lab./Project courses (personal skills, linguistics skills, group skills, ethics and law, professional skills). The new LEI-ISEP study plan has been applied and tested during 2006-2007 and, despite being a transactional scholar year, the results in the Lab./Project courses were very positive. Although there was some resistance from students in the beginning, at the end their global impression was good.

In 2007-2008 LEI-ISEP scholar activities are going well, with more planning and central management, so teachers and students are getting used to this new curricular structure. In the end of the 1<sup>st</sup> semester the Lab./Project courses success rates were amongst the best of LEI-ISEP and student opinions were very positive and encouraging...

### References:

- [1] – Final Report of the Joint ACM/IEEE-CS Task Force on Computing Curricula 2001 for Computer Science ([http://acm.org/education/curric\\_vols/cc2001.pdf](http://acm.org/education/curric_vols/cc2001.pdf))
- [2] – Computing Curricula: 2005 Overview Report ([http://www.acm.org/education/curric\\_vols/CC2005-March06Final.pdf](http://www.acm.org/education/curric_vols/CC2005-March06Final.pdf))
- [3] – Information Technology 2005 – Draft ([http://www.acm.org/education/curric\\_vols/IT\\_October\\_2005.pdf](http://www.acm.org/education/curric_vols/IT_October_2005.pdf))
- [4] – Communications of the ACM, November 2007 (volume 50, number 11, pages 24-59).