Integrated Mechatronic Design with Project Base Learning

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One of the main issues as regards as regards education and especially engineering education is to arbitrate between adding interesting new skills and consolidate existing ones. Indeed, many students have difficulties to transform their academic knowledge into professional know-how. Many different ways have been proposed to make the students succeed in this this task : internships, trainings, projects,….that complement the traditional courses. This is all the more the case for mechatronic engineers because they have to deal with complex systems that need interdisciplinarity, which requires further more than academic expertise in one or more scientific and technical fields. Topics are indeed too much separated in education but are so close in a real system. In addition, within the classical projects activities, students often have to organize and drive for the first time their own project. Last but not least, engineers have more and more to work with foreigners in international teams and have to deal with different cultures and habits. That's why the educational team of Polytech Orleans that is involved in the final year of Mechatronic and Systems Design has proposed another organization for the skill acquisition within a specific course which is called: Integrated Mechatronic Design. The goal of this paper is to present this concept and the results after 5 years of experience and improvement.

The principle is based on a guided industrial mechatronic project activity for which the students are gathered in multinational teams of 6-7 people. Each team is driven by a project leader chosen among the students via a typical recruitment process with a CV and a cover letter. The composition of the teams is made with dedicated human resources software « PAPI »to obtain well balanced skilled teams. The overall aim is explain how their knowledge can be used to solve a real industrial problem and to experience human resources management which is a key point in real life industrial project activities. Back to the introduction, this course tries to answer the issue of transforming their academic knowledge into professional know-how. It promotes actives learning processes based on issue learning process. However, knew concepts are taught to the students but only according to what is needed to solve the problem asked by the project, respecting the project progress. Students are supervised by the pedagogical team who plays the role of experts. Well adapted to "y generation" that are often associated to the following key words: connecting people , Immediate knowledge , Role games, attractiveness of community , teams , actions , pragmatic tasks, real skills with software ; the course gets a high level of satisfaction of the students and industrials who come for their evaluation at the end of the course and employ our students.