

# Chapter 5

## Work–Integrated Learning for Engineers in Coordination with Industries

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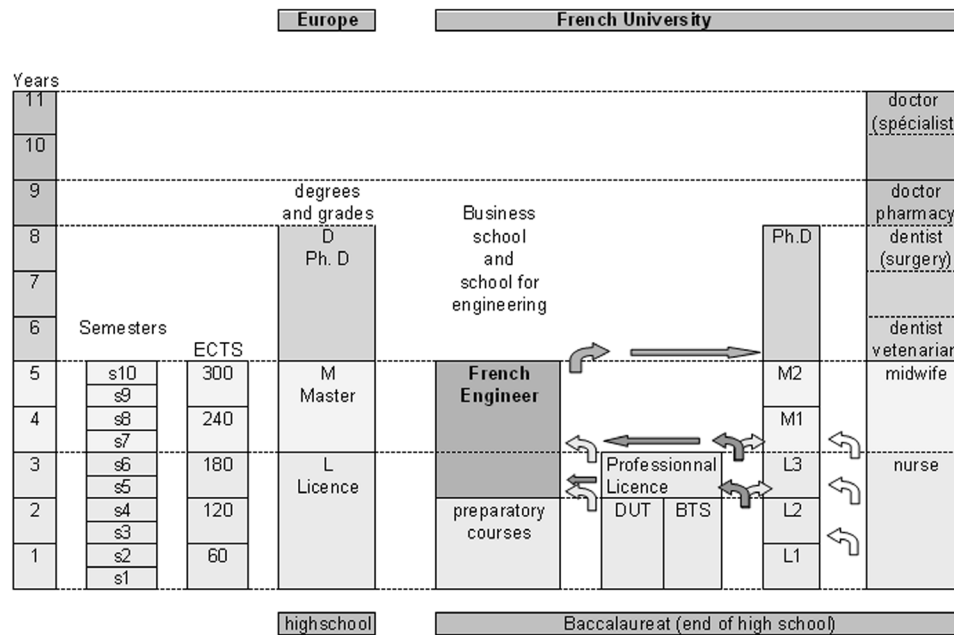
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### ABSTRACT

*This chapter presents the curriculum and training process applied in the IESP department, standing for “Ingénieur d’Exploitation des Systèmes de Production” of the Ecole Polytechnique Universitaire de Lille (Polytech’Lille, F59 Villeneuve d’Ascq, France), with an emphasis upon the WIL training process for Exploitation Engineers of Production Systems. The IESP department is dedicated to lifelong learning and apprenticeship leading to a Master’s degree in Engineering (French Engineer level) in the production field. It is an accredited program. This practice relies upon a background experience of 18 years with close partnerships with industry from many sectors, such as; energy, metallurgy, food industry, automotive, chemical engineering, and aeronautics. The graduates from Continuing Vocational Education and Training (CVT) that are already employed in the company improve their position. Younger graduates from Initial Vocational education and Training (IVT) that also validated their abilities are much more employable. They can work in any industrial sector dealing with engineering production having a strong technical and managerial skill base. In this chapter, the historical setting up and evolution is elaborated in the legal French education framework. The training model based on the IESP professional profile is presented. This model presents an academic curriculum with WBL that integrates a real formative work situation in the industry. The tools and methods developed all along the training process are also focused within a sustainable development policy. Finally, success and difficulties or challenges with mobility due to the globalization of the economy and innovation with respect to the economical crisis are also discussed.*

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Figure 1. scheme of path to French diploma of higher education with European equivalent (LMD)



# INTRODUCTION

To help readers to understand the French Education framework, it is important to explain the French higher education system and the peculiarity of the French engineer diploma (master degree program of 5 years after high school, standing for chartered engineers). Since the Bologna process (1999), the specificity of French education system was adapted to European qualification through the Master degree. The modes of access are summarized in Figure 1 with the equivalent European grades. For someone to be employed in France it is made easier if the Baccalaureat degree is passed (it is not an obligation but this level of qualification validates studies during high school that gives the basics (language, mathematics, history)). Therefore one enters university (higher education) to prepare a technical certificate in two years or a grade L. With such a bachelor degree, graduates can start their professional activities. Note that in France universities are public establishments where training fees are mostly reduced. Private institutions exist with

more expensive fees for students. Several state social aids limit social discrimination. A master's degree can be obtained by further studies at university. In France, it is a requirement to undertake a minimum training period within industry that is work experience mostly dealing with practice in a real environment. The duration depends on the training but forms part of the curriculum. Figure 1, highlights the comparison between the French education system and the European systems, which is License (Bachelor), Master (Engineer), Doctorate (Ph.D) or LMD. Gateways exist between university trainings and engineering trainings. The European Credit Transfer and Accumulation System (ECTS) apply and take into account the academic workload by semester.

At the university, courses and training are conducted by teachers and researchers (“enseignant-chercheurs”) mostly hired with a PhD qualification. They work within a laboratory environment engaged in research. Some of them are first chartered engineers especially when teaching in school of engineering like Polytech’Lille.

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