Due to its high potential and encouraging results, project-based learning emerges as a highly interesting paradigm in the education systems worldwide. Robotics is an interdisciplinary field where students could learn and apply their skills in mechanics, electronics, computer science, mathematics, and control engineering. This paper presents a robotics project-based learning methodology which focuses on collaborating with the industry to design, develop, evaluate, integrate and manage a design that is designated to be used in real-life applications. This learning method emphasizes and enables the students to understand the importance of fulfilling client requirements, interacting with the client, the suppliers, and with the other members of the team. The students, coached by a partner from industry, have the opportunity to apply and improve their project management skills under a large-scale, highly complex project. This method is being applied since 2008 at ISEN Lille, France, with significant impact.