The ever-increasing influence of technology-related industrial sectors makes the acquisition of technological competences such as logical, abstract and algorithmic thinking, analysis and acting a key element for the success of the next generation of students. Although today's fast-paced world and its economies are rapidly changing, public education has maintained almost the same since its inception. Current educational curricula often lack opportunities to acquire required skills and knowledge. Despite worldwide efforts to reform education, much of the current teaching system continues to prepare apprentices for the future, using methods from the past. This paper presents the mechatronic design of a robotic system with ''smart'' drives as a solution to bypass the skill gaps. An application is being developed that accommodates the interdisciplinary field of engineering by integrating application-related knowledge from mechanics, electrical engineering and computer science in a closed system. The ''smart'' drives allow a configurable, modular structure which can be dynamically configured upon request change to be customized to specific tasks. This facilitates the development of robots for engineers, as the system can be modulated quickly and inexpensively while being specialized to particular tasks. In addition, the modules are also aimed at researchers and teachers, as the modular hardware in combination with open source software do not require any specialized industrial facilities or university research laboratories to impart practice-oriented content and research. The results show that a prototype can be manufactured in an intrinsically safe, portable and cost-effective manner to give engineers the unique opportunity of studying parallel kinematic machines in a practical way.