The ever-increasing influence of industrial sectors makes the acquisition of technological competences such as logical, abstract and algorithmic thinking, analysing and acting a key element for the success of the next generation of students. Despite efforts to reform education, much of the current teaching system continues to prepare apprentices for the future, using methods from the past. For students, current educational curricula often lack opportunities to establish interdependencies between individual areas of engineering and to create interdisciplinary connections. This paper presents the mechatronic design of a robotic system with ''smart'' drives as an approach to facilitate educational access to the versatile field of engineering. An application is being developed that accommodates the field of engineering by integrating application-related knowledge from mechanics, electrical engineering and computer science in an integrative system. The ''smart'' drives allow a 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.

The ever-increasing influence of industrial sectors makes the acquisition of technological competences a key element for the success of the next generation of students. Despite efforts to reform education, much of the current teaching system continues to prepare apprentices for the future, using methods from the past. Current educational curricula often lack opportunities to provide students interdependencies between individual areas of engineering and hence they are often unable to establish interdisciplinary connections. This paper presents the mechatronic design of a robotic system with ''smart'' drives as an approach to facilitate educational access to the versatile field of constructing and designing robots. For this purpose a prototype of a DELTA robot is being developed which integrates knowledge from mechanics, electrical engineering and computer science in an integrative system. The application is realized via ''smart'' drives, which allow a modular structure and thus the robot can be dynamically configured upon request change to be customized to specific tasks. The drives facilitate 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 of a robot can be manufactured in an intrinsically safe, portable and cost-effective manner to give prospective engineers the unique opportunity of studying parallel kinematic machines in a practical way.