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An integrated electro-mechanical energy conversion system (IEECS) was developed at West Virginia University Institute of Technology (WVU Tech) for supporting the undergraduate education. As its name indicates, the electro-mechanical energy conversion system can be configured in motor and generator modes. In each mode, the system can be further reconfigured to various motor/generator architectures, such as series, shunt, compound DC motors, AC motors, single-phase and three-phase generators. The system is capable of demonstrating more than 50 realistic motor/generator configurations. The IEECS is comprised a reconfigurable machine, an actuator with built-in sensors, a programmable controller, and a data collector. These four components are coordinated by a personal computer, such that the system performance can be controlled and visualized in real time.

As the underlying technology of many vital industries, electro-mechanical energy conversion is an important topic of the undergraduate engineering programs. The system is expected to significantly enrich the curricula of Electrical and Computer Engineering, Mechanical Engineering, and Computer Science Departments at WVU Tech. This project establishes an excellent platform for collaborative efforts among faculties and students from these three departments.

Versatility and flexibility of the IEECS enables students to have hands-on experience with various types of electro-mechanical system and control/measure their performance. Thus, access to the system is anticipated to enhance the students' learning effectiveness enormously. The IEECS was constructed in September 2016 and it is under various tests to ensure proper course implementation.

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