How Quanser helps
CAPTIVATE, MOTIVATE
and GRADUATE
MSOE Engineering Students

Department of Electrical Engineering and Computer Science pre-lab assignment.
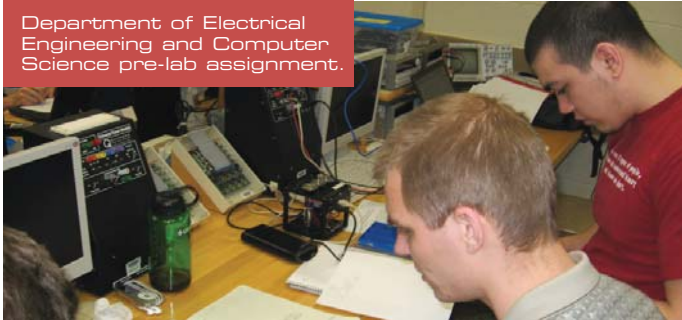
CAPTIVATE

Milwaukee School of Engineering (MSOE) draws ambitious students seeking personal and professional success. Students learn how things work in theory, then use that knowledge to make things work. The department of Electrical Engineering and Computer Science (EECS) is where 'making things work' happens. Supporting 14 laboratories, EECS offers plenty of space and challenges to captivate students and help them apply the classroom theory.

Originally, EECS did not have a laboratory for control systems – the department was using a conventional analog lab, which could not offer students practical real-time knowledge. Real-time solutions and integration with Simulink helped convince Professor Hadi Saadat to equip the newly established controls laboratory with Quanser rotary family experiments back in the 1990s. After Saadat's retirement, Dr. Stephen Williams worked closely with Saadat on the new lab implementation.

"Quanser was the only supplier with a Simulink data acquisition graphical object library and real-time control with data streaming," recollects Williams. "Our faculty worked with Matlab and Simulink quite a lot, so we leveraged our existing expertise."

Hooking up the circuitry.
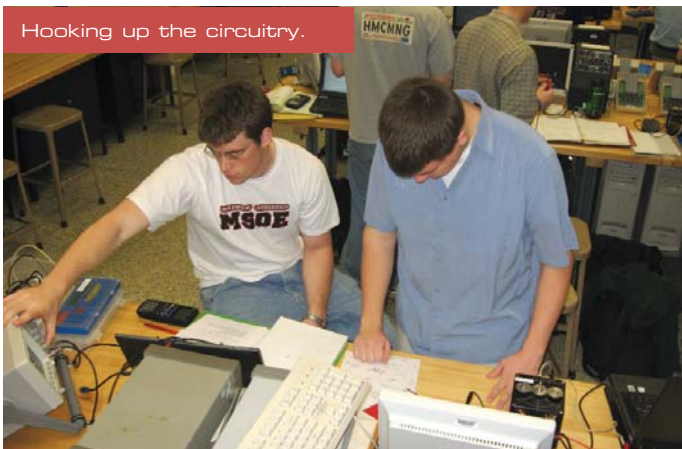
MOTIVATE

Ten rotary family workstations allow undergraduate students to expand on their theoretical knowledge in controls with hands-on experience in electrical, computer, and biomedical engineering. They learn by doing which Williams believes can motivate them to do and learn more. They work with different experiments – Ball and Beam, Rotary Inverted Pendulum, Flexible Link – using the curriculum that accompanies the experiments and with material subsequently developed in-house. "Now we have a number of years of experience working with Quanser rotary workstations," says Williams. "Thanks to the open-architecture of the Quanser equipment we've also customized experiments, and added new ones. Their open architecture is a great plus for us."

Noting the results, Williams also plans to incorporate Quanser products into advanced student projects. "We already had a few senior control systems design projects that used Quanser development tools," he explains, "but will do more in the future because Quanser's platform is ideal for rapid prototyping and design."

Project integration with oscilloscopes, analog circuits and SRVO DC motor control.
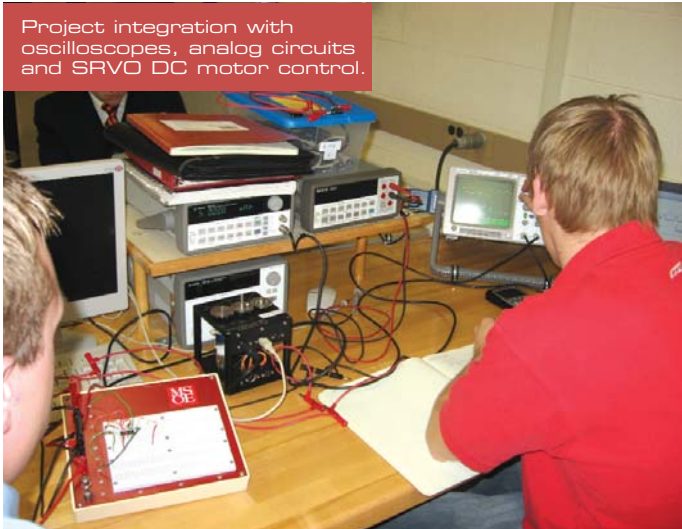
GRADUATE

MSOE has been equipping laboratories with Quanser since 1991. With increased demand to graduate more students, that relationship continues to grow. For instance, EECS is going to open its controls laboratory to even more engineering students in the future. "We will also accommodate students in mechanical engineering," says Williams. "In a year, we will have one or two mechanical engineering courses on using a newly re-furbished servo controls laboratory," which will double utilization of the lab. "Even now, the controls laboratory is the most heavily used lab in our EECS department."

"We see many universities going in the same direction," notes Erlisa Jorganxhi, laboratory solutions advisor at Quanser. "They realize that through Integrated Learning Centers the control laboratories can be better managed, utilized and shared by various departments. Because whether you study electrical, mechanical, aerospace or biomedical engineering, you need to understand basic control principles." Jorganxhi and Quanser are pleased to help MSOE captivate, motivate and graduate engineers.

Dr. Stephen Williams, P.E. is an Associate Professor and Program Director of Electrical Engineering at the Electrical Engineering and Computer Science Department, Milwaukee School of Engineering. He consults on electromechanical controls applications. His professional activities include serving on the board for the Energy Conversion and Conservation Division of the American Society for Engineering Education.

Quanser Rotary Family challenges enlighten students on a range of control issues, including robotics, vibration and dynamics, position control, non-minimum phase control, rate control, adaptive control, flexible structures, and more. The universal challenge is to design, implement and test your control system of choice. Each system is supplied with a state feedback controller, the complete mathematical modeling as well as detailed system parameters to help streamline the control system implementation of your choice. Quanser rotary experiments are fully compatible with National Instrument's LabVIEW™ and N.I.'s E- and M- Series data acquisition boards, The MathWork's Simulink® and Maple™ from Maplesoft.