Stepping Up

Capstone course brings out the best in students and industry partners.

By Phoebe Dey

When senior electrical engineering students present their year's work in their capstone design course, they aren't just going for top marks. Many are trying to land a job at the same time.

A partnership between industry and the Department of Electrical and Computer Engineering means students are being evaluated not only by their instructor, but also by an engineering firm scouting for employees.

For the course, Faculty Service Officer Loren Wyard-Scott solicits projects from clients in industry and research groups. Student groups are then asked to select a project, design it, and build a prototype over the course of two semesters. Edmonton-based Eleven Engineering, a global leader in wireless audio, has been heavily involved as a client. For the last two years they have worked with five student groups. Other companies, such as Schlumberger, Design Shelter Inc., Harding Instruments and Trinity Electronics, also participate in the process.

"My motivation for having industry serve as a client for the projects is that it improves the students' learning experience and, often,
their motivation, says Wyard-Scott. “Students gain relevant experience by tackling real-world design problems with real-world applications. Industry involvement provides students with a wider variety of perspectives than could be offered by the course alone.

“In the end, this often leads to better-designed projects, and students who are better prepared to enter the work force.”

Eleven Engineering, led by president John Sobota (Electrical ’86), initially became active with the course to recruit soon-to-be graduates for his firm.

“That course is very practical—it tells us what we need to know to recruit real people,” says Sobota. “We want to hire practical engineers that can design and build products that we can ship to customers in the hundreds of thousands. This course is a great indicator of who can do that.”

In the last few years the collaboration between Eleven Engineering and the course has evolved to new levels. Students now receive guidance from engineers working in the field, and have access to a support person who can answer their questions.

“We are one of the few chip companies based in Edmonton and the only processor company,” says Sobota. “We thought, why don’t we encourage the students to use our XInC processor instead of the usual suspects? XInC has a more advanced architecture, and if the students like it, we will have projects flowing out of the University of Alberta that are based on Alberta silicon.

“And for us, it’s long-term marketing because maybe, once they graduate, they will remember our technology and want to work for us. Or maybe it will inspire them to stay in Alberta and see that they could start their own company here—perhaps it’s a way to keep some of our brightest engineers at home.”

Eleven Engineering is walking the walk. In the last three years, the firm has hired four U of A grads. It sits in on each of the presentations—this year there will be 27—with a grading system of its own that helps decide who to pursue for a further interview.

Recent grad Nick Schwinghamer (Electrical ’08) is one of the company’s newest employees. He was part of a group that worked on designing an autonomous sumo robot, programmed to detect robots and push them out of the ring. His group, and all the others in the course, spent many hours planning, designing and building a prototype that would be ready for the end-of-year presentation and demonstration event.

Eleven Engineering projects are popular among the students, so Wyard-Scott employed a lottery system to divide them up. Schwinghamer’s group picked one of those projects, which meant they were assigned a personal mentor from Eleven Engineering, and were provided hardware support and training sessions on their equipment.

“That individual contact was a huge advantage,” says Schwinghamer. “It made a big difference to us to have an actual industry contact to see how deadlines work, different management styles—just the exposure was worth so much.

“It also helped that we were working on something that we really enjoyed. In that last week before the presentation, we worked until three or four in the morning. But it was worth it.”

The electrical engineering capstone course is greatly anticipated by students in the years leading up to it.

Recent graduate Ivan Chan says the course added an extra dimension to his education. “One of the great things for us here is that we learn how to learn—it isn’t four years of school and we’re done forever,” he says. “Here, we learn how to be engineers. We go beyond the classroom. We take the theory and put it into practice.”

“My sense is the students are intimidated by the course,” says Wyard-Scott, who has been teaching the class since 2002. “Once they are through it, though, they develop an appreciation for how valuable it has been.”

Schwinghamer agrees. “For sure, it is the high point and the culmination of four years of work,” he says. “It is something people spend a lot of time worrying about because it’s a lot of work. But I probably learned more in that course than in any other classroom work I did in all my other years.”

During the presentation, everything fell into place for Schwinghamer, whose group drew the attention of the Eleven Engineering scouts. A few interviews later, he was offered a job. Now, six months into his position, Schwinghamer has spent much of his time in China, where he develops systems that test Eleven’s wireless audio modules in mass production.

“I was sent quickly after I started and thrown right into the middle of things, which is the best way to learn,” says Schwinghamer. “The day we had our presentation in our course, I knew it was make or break for me and it all worked out well in the end.”

L-R Nick Schwinghamer, Stephen Chow, Michael Hui, Steve Merryfield.