Amir Rubin didn’t know much about the business world.

But when he joined some friends from his fencing team in launching a startup company in his last semester in spring 2003, he did have one qualification under his belt: practical engineering experience. Rubin was on a team that had designed a wireless fire hydrant pressure gauge for an Ocala emergency equipment company. The team did the project as part of the College of Engineering’s Integrated Product and Process Design (IPPD) Program, a program intended to immerse students in real-life engineering while providing solutions to corporate and government sponsors.

The wireless monitor allowed firefighters to check the water pressure on street hydrants quickly and easily. That seemingly had nothing to do with the startup’s main product: A tiny military surveillance drone known as a micro air vehicle, or MAV.

But for Rubin, 26, vice president for core technologies at Prioria - - a Gainesville-based engineering and consulting company with 19 employees that specializes in autonomous “intelligent” systems -- what mattered was that he had gotten his hands dirty.

“Up until the IPPD program, every engineering assignment you do in school, your professor hands you a piece of paper with a great detailed description of the assignment,” Rubin says. “But when it comes to actual product development, you don’t get a nice piece of paper clearly defining your assignment. You have to work with your client and you have to figure out what your client wants -- and what you can do.”

Launched in 1995, the IPPD program is one of a handful of multidisciplinary senior capstone design classes nationwide, says Keith Stanfill, the program’s director and Industrial and Systems Engineering faculty member. Most, if not all the others, however, are at private colleges such as Lehigh University, Brigham Young University and Harvey Mudd College, Stanfill says.

At UF, about 150 undergraduates participate in more than two dozen projects per year sponsored by the military, private companies and government agencies. Projects are wide-ranging, from industrial processes to factory upgrades to commercial and medical products.

Over the years, student teams have designed an environmentally friendly bug trap, a lightning detection system, a blood clot remover, a helicopter simulator from laser-guided mortars to lightning detectors.
and a safety-shield for a mortar designed to prevent injury should the weapon fire prematurely. Student teams have helped a sandwich chain, Firehouse Subs, engineer a better oven for heating sandwiches and an appliance manufacturer, Sunbeam, build a better coffee maker. They’ve also assisted Dow Chemical with a batch processing challenge and Medtronic Xomed with packaging for a medical nasal sponge. The latter projects were among numerous IPPD projects focused not so much on commercial products, but rather on improving industrial and manufacturing processes.

Companies and other sponsors pay $20,000 annually to sponsor a team, funds that reimburse departments for faculty time and pay for student travel, supplies or miscellaneous costs. The companies also agree to designate a liaison engineer to work with the team. The company liaison pairs with a UF faculty advisor also assigned to each team, which means all student teams are supervised by at least two engineers.

For sponsors, many of whom have participated for multiple years, that $20,000 and liaison’s time commitment is a bargain compared to the alternative: Devoting a full-time salaried engineer or team of engineers to solving the problem at hand.

Defense contractor General Dynamics has sponsored nearly 20 projects, more than any other. Dean Bartles, vice president and general manager for the company’s large-caliber weapons and ammunition division, says he has tapped IPPD teams for everything from improving manufacturing systems to designing artillery shells.

“It’s a combination of things,” Bartles says. “We like being a good community steward, partnering with universities, but we also find we get an extremely good value for the investment required.”

He adds that his engineers also get a lot out of the experience.

“The students have a tremendous amount of energy,” he says. “It’s extremely refreshing for our people to work with students who don’t have preconceived ideas that ‘you can’t do this,’ or ‘you can’t do that.’”

Most students begin the program thinking they will gain hands-on technical experience to supplement their classroom work. While that’s certainly true in many cases, the bigger benefit is the “softer” skills related to planning, teamwork, budgeting and other aspects of project management not stressed in engineering classes, alumni say.

Mark Burns, a 1997 electrical engineering graduate, worked with his team to re-design two circuit boards for a company he ended up taking a job with after he graduated. Burns is now the principal engineer for St. Petersburg-based GTS.

“What you learn is the entire design flow, from the start in determining what the design requirements are, all the way through pushing it through production,” Burns says. “So it’s a well-designed starter project for what you will do the rest of your life.”

Chris Birdsall, a 1996 graduate in chemical engineering, says that although he didn’t recognize it at the time, the problems he encountered in the IPPD program were strikingly similar to those at the workplace.

With regard to bringing the team together, for example, “At the time, it was like, ‘We’re on the team. Why can’t we find our way through this?’,” Birdsall says. “And then you find out this is real life, right?”

Birdsall, now a chemical engineer for a major oil company whose duties include recruiting on campus, says students with IPPD on their resumes have an automatic leg up.

“It makes a difference in their hiring,” he says.

from virtual to real startups

That built-in advantage is great for the majority of students seeking to find work at a corporation or government agency after graduating. Some students, however, have a more entrepreneurial bent.

In 2003, IPPD partnered with UF’s Office of Technology Licensing and the Warrington College of Business’ Center for Entrepreneurship and Innovation to provide a home for these students through its entrepreneurial program.

Stanfill says the goal is to bring together engineering, business and law students to nurture a UF-developed technology via a virtual company. The two or three teams each year not only do the engineering work of developing prototypes, but also investigate intellectual property issues and craft marketing plans.

“We look for UF inventions that can be mass produced but may need some help in commercialization,” Stanfill says.

Although only four years old, the program has already spun off one bonafide company: Enviroflux, which makes a device that monitors groundwater contamination.

“With a traditional IPPD project, there’s a potential for a job with a large company at the end of the process, and certainly that’s happened,” Stanfill says. “Here there’s a possibility of getting involved with a start-up, and now we’re seeing that too.”

Prioria, for its part, was formed before the entrepreneurial program was put into place. But even though Rubin might have benefited from the entrepreneurial track, he says he benefited greatly from the introduction to real-world engineering.

“When we first started out, it wasn’t drastically different from an IPPD team,” he says. “It was a lot of work and a lot of insanity...It didn’t give me all the answers, but it did teach me where to look.”