INTERNATIONAL ENGINEERING

Engineering is the application of the theories and principles of science and mathematics to solve problems. *Engineers* design and help build the cars that we drive, the water purification systems that keep our drinking water free of harmful pathogens, the medical equipment that helps detect and treat diseases such as cancer, and the smartphones we use to make our daily lives easier. Other engineers help extract raw materials, such as petroleum and natural gas, that keep our transportation industry moving; design and help build bridges, highways, and skyscrapers; and develop systems that keep our homes and offices safe from fire and other natural hazards.

Employment for engineers in the United States is expected to be good during the next decade, according to the U.S. Department of Labor. It is expected to be even better for engineers who have educational and work experience abroad and who are proficient in one or more foreign languages. Graduates with these skills are qualified to work for U.S. companies that do business abroad, foreign engineering firms, and foreign companies that require the services of engineers. Only a few colleges—such as the **University of Rhode Island** and **Valparaiso University**—offer baccalaureate-level international engineering degrees that prepare engineering students to succeed in the global marketplace.

TYPICAL CLASSES:

- ✔ Engineering specialty classes (electrical, mechanical, industrial engineering, etc.)
- ✔ At least one foreign language (Mandarin, French, Spanish, German, etc.)
- ✔ Foundations of Engineering
- ✔ Advanced Engineering Mathematics
- ✔ Statistics Methods in Research
- ✔ Probability and Statistics for Engineers

TYPICAL EMPLOYERS:

- ✔ U.S. companies that do business abroad
- ✔ Foreign engineering firms
- ✔ Colleges and universities
- ✔ Foreign companies that require the services of engineers

AVAILABLE AT:

The following colleges offer international engineering programs. Contact schools in your area to see if they offer similar programs.

University of Rhode Island (Kingston, RI)
401/874-4700
sberka@uri.edu
iep@etal.uri.edu
www.uri.edu/iep
Degrees available: Bachelor's degree

Valparaiso University (Valparaiso, IN)
219/464-5011
www.valpo.edu/engineering/programs/viep
Degrees available: Bachelor's degree

The following colleges offer a variety of traditional degrees in engineering, but also have comprehensive programs that allow engineering students to complete coursework in foreign countries:

University of Kentucky (Lexington, KY)
859/257-9000
www.engr.uky.edu/programs/international
Degrees available: Certificate, bachelor's degree, master's degree, doctorate

University of Wyoming (Laramie, WY)
307/766-4253
www.uwyo.edu/ceas/current-students/international
Degrees available: Bachelor's degree, master's degree, doctorate

FOR MORE INFORMATION

American Association of Engineering Societies
888/400-2237
www.aaes.org

American Society for Engineering Education
202/331-3500
www.asee.org

INTERVIEW: JOHN GRANDIN

John Grandin, the founding executive director of the International Engineering Program at University of Rhode Island in Kingston, Rhode Island, and professor of German, who is now emeritus

Q. Can you please provide an overview of your program?
A. The University of Rhode Island International Engineering Program is a five-year B.A./B.S. program, comprising simultaneous majors in a language and an engineering discipline, as well as a semester of study abroad and a six-month internship with an engineering-based firm in a country of the target language. Students study German, French, Spanish, Italian, or Chinese along with the engineering major for the first six semesters and then spend the entire fourth year abroad, studying language, culture, and technical subjects in the target language, with the expectation that they return home for year five fully proficient in their second language and with substantial cross-cultural communication skills. A Japanese, Portuguese, and Arabic IEP are in the planning stages.

Q. How will the IEP prepare participants for international work?
A. Graduating with a strong proficiency in a second or third language, with a good engineering background and with study and work experience from a different engineering culture, prepares students for today's truly global workplace.

Did You Know?

✔ More than 400 students are currently enrolled in the International Engineering Program (IEP) at the University of Rhode Island. Thirty percent of students are women.
✔ No previous foreign-language experience is required to participate in the IEP.
✔ The most popular engineering specialties in the United States (in descending order) are civil, mechanical, industrial, electrical, electronics (except computer), hardware, aerospace, and environmental.
✔ The most popular areas of engineering study at the University of Rhode Island (in descending order) are mechanical, chemical, civil, biomedical, electrical, ocean, computer, and industrial.
✔ Much-faster-than-average employment growth is projected for biomedical and petroleum engineers. Faster-than-average growth is expected for civil and environmental engineers.

Sources: University of Rhode Island, U.S. Department of Labor

Q. Can you detail the internship and exchange opportunities that are available in your program?
A. All IEP students spend the fourth year abroad, studying for one semester as exchange students at one of our partner schools in Germany, France, Spain, Italy, Mexico, or China, and then completing a six-month internship with a company in that country.

The IEP has developed valuable working partnerships with excellent engineering universities in Germany, France, Italy, Spain, Mexico, China, and Canada. The relationships are designed on a one-to-one exchange basis, with tuition obligations covered at the home institution and a simple exchange of students, which must balance out over the long run. Students pay tuition at home, but room and board costs at the host institution. Through extensive advising and careful preparation, students are able to take course work at the host institution and transfer full credit back home, thereby studying abroad without loss of time toward the degree. The IEP is sending between 35 and 50 students abroad for semester-long study at a partner university each year. In turn, that same number of students, on average, come to Rhode Island for course work either at the advanced undergraduate or master's level.

IEP students are required to complete a six-month internship with a firm abroad in the fourth year of the program and usually do so immediately after the semester of exchange study. For that reason, approximately 35-50 IEP students are placed in international internship positions each year. The IEP has built relationships with numerous global companies operating in the target countries and is able to arrange placements with approximately six months' advance preparation. The companies are asked to provide a meaningful engineering experience for the students, a housing accommodation, and a subsistence stipend enabling the students to live with very little out of pocket expenses. Placements are often with subsidiaries of American-based global firms such as Sensata, Hasbro, or Hexagon, or with European- or Asian-based global firms having significant operations in the United States, such as Siemens,

There are many employment opportunities for international engineering graduates in the global natural gas and oil exploration industry. (Photo credit: Thinkstock)

BMW, Saint-Gobain, BASF, Conti, or ZF. In many cases students are able to complete summer internships with a branch of a company in the U.S. before completing the full internship abroad with the same company. The latter arrangement provides the student with exposure to the company's operations on two continents and likewise gives the companies the opportunity to know the student in greater depth and thereby assess the desirability of making an offer upon graduation.

Q. What personal qualities should students have to be successful in your program and in their post-college careers?

A. IEP students need to be strong in math and science, but also must be eager to learn another language. They need to be open-minded and flexible, mobile and receptive to change, and good team players, although the latter are often the skills acquired through the program. IEP students are hardworking, motivated, and eager to go the extra mile. They need to be focused on the long-term goals of the IEP.

Q. Can you detail a few of the success stories of IEP graduates?

A. IEP grads have gone on to great careers with global corporations like Siemens, Johnson & Johnson, Boeing, Covidien, Sensata, BMW, Volkswagen, and ZF in fields related to automotive technology, computer and software technology, alternative energy, biomedical engineering, aerospace, etc. They have also gone on to excellent graduate programs at schools such as Princeton, MIT, Yale, Brown Medical School, and Georgia Tech.

Q. What is the employment outlook for engineers with skills that prepare them to work internationally?

A. Students complete the IEP with the expectation of then finding employment with a firm actively engaged in global business and technology. The placement rate for IEP graduates is extremely high, almost 100 percent, with the great majority employed by firms working globally and many students joining the companies with which they interned. Most graduates are based in the U.S., but each year a few launch their careers in positions abroad. ●