

# ***Engineering***

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*Chair: Dr. John Harris*

Saint Francis University has cooperative engineering programs with Clarkson University of New York, the Pennsylvania State University, and the University of Pittsburgh. The programs are designed to prepare a student with a liberal arts background for a professional career in a branch of engineering. After successfully completing three years in the pre-engineering program at Saint Francis University, the qualified student transfers to any of the three schools mentioned or to any school offering an ABET (Accreditation Board for Engineering and Technology)-accredited B.S. program in engineering to complete the final two years of the program. After successful completion of one full year in an engineering program at another school, the student will receive the degree of Bachelor of Arts in Engineering from Saint Francis University. The general degree requirements for the Bachelor of Arts as specified by Saint Francis University must be satisfied. The degree of Bachelor of Science in the appropriate branch of engineering is conferred by the engineering school upon the fulfillment of all the requirements of the program at the end of the normal five-year period. The branches of engineering available for study are aerospace, agricultural, ceramic, chemical, civil, computer, electrical, engineering science, environmental, industrial, mechanical, metallurgical, mining, petroleum and natural gas, and nuclear.

## **BACHELOR OF ARTS IN ENGINEERING**

### **MAJOR REQUIREMENTS**

Physics 121, 122; Engineering 201, 202; Mathematics 121, 122, 221, 222, 306; Computer Science 121, 203; Chemistry 101, 102; and successful completion of one year in engineering at an ABET-accredited engineering school, including at least 24 credits in courses appropriate for an engineering program with a minimum Q.P.A. of 2.0 and a total of 128 credits between the two schools.

Depending upon the branch of engineering chosen for study, one or more additional classes may be required for admission to an engineering school. Consult the program coordinator for details. Pre-engineering students must maintain a 3.0 overall quality point average and obtain a faculty recommendation for transfer to the Pennsylvania State University. Students transferring to the University of Pittsburgh or Clarkson University must have an overall 2.5 quality point average in those classes they intend to transfer. Students may transfer no classes in which their grades were below "C". Transfer requirements for other engineering schools vary and will be addressed on an individual basis.

*Dr. Jean Twenge, keynote speaker, addresses the audience at the 2008 undergraduate commencement exercises.*

## ENGINEERING — COURSE DESCRIPTIONS

### **101-102. Introduction to Engineering Concepts I, II (1 credit each)**

Introduction to engineering with emphasis on problem-solving and numerical procedures. *Prerequisite: 1½ units of high-school algebra. Fall, Spring.*

### **201. Engineering Statics (3 credits)**

Particle statics, rigid bodies, equivalent systems of forces, equilibrium of rigid bodies, centroids and centers of gravity, forces in beams and cables, and moments of inertia. *Prerequisite: Physics 121. Fall, odd-numbered years.*

### **202. Engineering Dynamics (3 credits)**

Particle kinematics, Newton's Second Law, energy and momentum methods, systems of particles, kinematics of rigid bodies, kinetics of rigid bodies in two and three dimensions, and mechanical vibrations. *Prerequisite: Engineering 201. Spring, even-numbered years.*

### **301. Fluid Mechanics (4 Credits)**

Development of the conservation (of mass, energy, and momentum) equations for fluid continua in both integral and differential forms. Application of the conservation equations to engineering hydraulics and geophysical flows. *Three lecture-recitation periods and one four hour laboratory. Prerequisite: MATH 221, ENGR 202. Spring.*

### **398-399. Engineering Internship (3-15 credits)**

The integration of classroom theory with practical work experience under which students have specific periods of attendance at college and specific periods of employment, either full- or part-time, with or without pay. *Credit may vary from three to 15 credits, but no more than four credits may be counted toward major requirements, with additional credits counted as free electives. Available with approval of the department chair and the Provost. Fall, Spring, Summer.*

### **491. Seminar: Special Topics (1-3 credits)**

Topic of current interest covered. *Open to qualified students with special areas of interest. Consult with department chair. As needed.*