

EXPERIENTIAL ENGINEERING EDUCATION



The E3 Engineering Institute is a specialized academic program that began in the fall of 2013. The E3 Institute is designed to meet the needs of students with interest and aptitude for science, technology, mathematics, creative problem solving, and their adaptation to the fields of engineering. The purpose is to intellectually engage and challenge students with a rigorous curriculum that includes coursework focused on engineering as well as to expose them to the field of engineering through activities occurring outside the classroom.

Program components consist of enrichment activities such as seminars, field trips, and topical speakers. In addition, students will broaden their engineering experience by developing a relationship with a professional adult mentor and through a job shadow or field-experience practicum. The Institute operates within a three-year cohort model, open for students to apply for admission prior to their sophomore year.

SEMINARS & ENRICHMENT

Engineering Institute students will attend a number of outings, tours, and guest seminars each year. Events, coordinated by Totino-Grace, may include a lecture or presentation given by a prominent professional in the engineering field, visiting a worksite, lab or manufacturer, or other engineering activities. These enrichment opportunities are geared toward students' interests as well as the areas of expertise of the professionals.

ENGINEERING COURSEWORK

E3 students will take three semesters of engineering specific coursework during their three years in the program. Focus is placed on introducing students to the fundamentals of engineering; what engineering is, the work engineers do, the variety of types of engineering, and the engineering design process. In addition, students will learn technical skills including computer-aided design (CAD), computer programming, and production/manufacturing processes. Higher-level courses will apply these fundamentals and skills to engineering design challenges and projects in a variety of engineering fields.





CURRICULUM

In addition to their engineering coursework, students participating in the institute will take a rigorous college prep curriculum at Totino-Grace. A strong foundation in mathematics and science is emphasized, as well as critical thinking, technical learning, public speaking, and collaborative, project-based learning skills — important tools to master success in any career, particularly engineering. As part of their Totino-Grace college preparatory curriculum and the E3 cohort, four years of mathematics and science are required, as well as a minimum of two years of a world language. E3 students are also encouraged to take CAD, computer science, woods and metals, and visual arts courses.

CAPSTONE PROJECT

During their senior year, students will take an engineering project from conception to completion and present their project to a larger audience. This will entail conceptualizing, designing, fabricating, testing, and presenting a functional product or system.

ENGINEERING MENTORSHIP

Students participating in the Engineering Institute will be assigned a mentor from a specific engineering field. The goal of the mentoring relationship is to give students an authentic view of the engineering profession, to make them aware of the personal and interpersonal skills required to succeed, and to provide connections with professionals and business people in our community. Students will connect with their mentor on several occasions during the year and be expected to communicate with them by phone and email on a regular basis. The engineering program continues to look for professionals to serve as mentors to the growing number of E3 participants. If you, a colleague or associate would be interested in learning more about this rewarding opportunity, visit the Engineering Institute page on our website or contact one of the program directors.

JOB SHADOW/ FIELD-EXPERIENCE

Students are required to take on a job shadow or field-experience practicum following their junior year. The goal is for students to gain significant experience by working with or observing a professional in an engineering field.

PROGRAM ENHANCEMENT

The Engineering Institute hopes to add a global component to the program, providing students with the ability to communicate and collaborate with engineers and engineering students from other countries and cultures. To complement the curriculum, co-curricular opportunities such as robotics and coding clubs enhance classroom work, allowing students to apply engineering processes through challenges and competition and work in partnership with their peers.

E3 Program Directors

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