Program description

The Kansas State University Carl R. Ice College of Engineering program, Engineering Leadership and Innovation, or ELI, was developed in response to alumni feedback, corporate discussions, government initiatives and opinions of professional societies that a need exists for technical leaders with a broad understanding of how engineering is practiced in a rapidly changing business environment. The complexity of problems facing today's industries requires leaders with both technical and team management skills to solve complex problems that require careful assembly of the social, cultural, ethical, political, economic, business and engineering pieces.

The ELI program will prepare engineering students for potential leadership roles in these types of dynamic environments. Participants enter the four-semester program in their junior year, and will receive a scholarship to take leadership and business courses, learn from an industry mentor, meet with industry leaders and practice hands-on leadership within a creative inquiry team.

Engineering Leadership and Innovation Program Scholar Guide

Congratulations on being selected to be a participant in the Engineering Leadership and Innovation program. We hope you find your time in the program to be both fulfilling and enlightening. The purpose of this guide is to provide an overview of the program and requirements for student scholars.
Vision
The Engineering Leadership and Innovation (ELI) program will prepare exceptional engineering students for leadership roles in diverse and inclusive organizations that flourish in a dynamic business environment operating under complex social, cultural, ethical, political, economic, business and engineering factors.

Mission
The ELI program will —

» equip students with the skills and confidence needed to lead real-world engineering projects;
» strengthen students’ classroom learning through a leadership practicum on a creative inquiry team or student professional organization;
» help students build a realistic career plan directed toward engineering management;
» build students’ appreciation of nontechnical factors that affect technical decisions; and
» exemplify an inclusive culture where multiple perspectives are valued as key to engineering solutions.

Approach
Participants learn business and leadership theory through coursework, and define a personal leadership development path through engagement with mentors. Participants will then create and implement innovative solutions on creative inquiry teams or student organizations. They will document their leadership journey using standard measurement tools interpreted in collaboration with the mentors.
Primary program elements are as follows:

» Coursework in leadership and business
» Leadership practice
» Engagement with industry mentor
» Corporate partner interactions
  • On-campus corporate events
  • On-site facility tours
» Leadership portfolio
  • Leadership development plan
  • Leadership essay (senior year)
  • Reflections, photos and plans
» Evaluation of skills development
» Scholarship of $3,000 per year

ELI program timeline

<table>
<thead>
<tr>
<th>Prerequisites</th>
<th>ELI Program</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Freshman</strong></td>
<td></td>
</tr>
<tr>
<td>Creative inquiry team or student organization (two semesters participation)</td>
<td>LEAD 212</td>
</tr>
<tr>
<td>LEAD 212 Application</td>
<td>Leadership development plan, Corporate partner interactions</td>
</tr>
<tr>
<td><strong>Sophomore</strong></td>
<td></td>
</tr>
<tr>
<td>Creative inquiry team or student organization (three semesters participation)</td>
<td>Coursework in business and/or leadership studies (select two of the seven courses offered)</td>
</tr>
<tr>
<td><strong>Junior</strong></td>
<td></td>
</tr>
<tr>
<td>Leadership development plan, Leadership essay, Corporate partner interactions</td>
<td>Leadership development plan, Leadership essay, Corporate partner interactions</td>
</tr>
<tr>
<td>Self-evaluation</td>
<td>Self-evaluation</td>
</tr>
<tr>
<td><strong>Senior</strong></td>
<td></td>
</tr>
<tr>
<td>360° evaluation</td>
<td>Scholarship ($3,000 per year)</td>
</tr>
</tbody>
</table>
Coursework in leadership and business

Prior to entering the program, scholars must have taken LEAD 212 - Introduction to Leadership Concepts (3 credit hours), which is organized to provide students with a broad overview of leadership theories, an introduction to ethical decision making, identification of personal leadership styles and current societal issues for leaders. Approval to take LEAD 212 during the scholar’s first year in the program may be approved on a case by case basis by the ELI Program Administrator.

Scholars can then tailor their coursework by selecting two of the following seven courses:

**Leadership Studies courses**

» **LEAD 350 - Culture and Context in Leadership** (3 credit hours) is organized to provide students with an opportunity to integrate the course and leadership experiences in light of contemporary issues in the study of leadership behavior across cultures and contexts. The course is based on the current research and writing that introduce and discuss the impact of culture and context on the concept of leadership and development of individuals as interculturally competent leaders. (Prerequisite: LEAD 212)

» **LEAD 405 - Leadership in Practice** (3 credit hours) provides an opportunity to practice leadership and followership in an experiential setting followed by an in-depth classroom discussion. (Prerequisites: LEAD 212, LEAD 350 and junior standing)

**Business courses**

» **ACCTG 231 - Accounting for Business Operations** (3 credit hours) is an introduction to the operating activities of businesses, and the roles that accounting information plays in planning, evaluating and recording those activities. An introduction to financial statements is included. (Prerequisites: MATH 100 and GENBA 110 or sophomore standing)

» **ENTRP 340 - Introduction to Entrepreneurship** (3 credit hours) examines the entrepreneurial process. We will focus on business start-up but will also address organizational entrepreneurship or “intrapreneurship.” We will address the process of creativity and innovation and its impact on the success of business start-up. Specific topics covered include new venture planning, marketing, financing, and management. This course will serve as a strong foundation for those aspiring to own and operate their own businesses as well as a real-world heads-up course for students who acknowledge that their future in businesses could very well benefit from examining projects in an entrepreneurial way. (Prerequisite: none)

» **ENTRP 350 - Technology and Innovation Management** (3 credit hours) aims to equip students with an understanding of the main issues in the management of innovation and an appreciation of the relevant skills needed to manage innovation at both strategic and operational levels. The course focuses on four themes: (1) the source, discovery, and evaluation of innovation and opportunities; (2) the provisions of innovation (products and services) that satisfy the needs of customers; (3) the development of mechanisms to appropriate the returns from the exploitation of the innovation; and (4) the organization of efforts to innovate. (Prerequisites: ENTRP 340)

» **MANGT 420 - Management Concepts** (3 credit hours) provides an introduction to the four basic managerial functions of planning, organizing, leading and controlling and their application to today's complex work environment. An emphasis is placed on the roles and responsibilities of managers that help them to successfully meet organizational objectives by effectively leading employees and optimizing processes. (Prerequisite: none)

» **MKTG 400 - Introduction to Marketing** (3 credit hours) is a general study of marketing principles which lead to the development of marketing strategy. A review of environmental influences and key analytical tools used in formulating marketing plans. Product or service design, distribution, pricing, and promotional programs. (Prerequisite: ECON 110 or 120)

**Action Items**

- Complete LEAD 212 with a grade of C or better prior to entering the ELI program.
- Complete two of the following seven courses with a grade of C or better: LEAD 350, LEAD 405, ACCTG 231, ENTRP 340, ENTRP 350, MANGT 420, MKTG 400.
Leadership practice on a creative inquiry team or student organization

A key element of the program is for scholars to execute and then evaluate the effectiveness of leadership techniques. Scholars will practice leadership through a leadership position on a creative inquiry team or student organization. The teams and organizations will be strengthened by having trained leaders, and the ELI program scholars will learn from attempting to apply leadership theory to motivate their fellow students. ELI program scholars are expected to be a member of a creative inquiry team or student organization for at least three semesters while in the program. It is expected the scholar will work with the same creative inquiry team or student organization and ultimately seek a leadership position (e.g., president or treasurer).

**Action Items**
- Participate on a creative inquiry team or student organization for at least three semesters during the program.
- Seek a leadership position within the team or organization.

Mentor group

Scholars will be assigned to a mentor group comprised of an industry mentor from one of the K-State Carl R. Ice College of Engineering’s corporate partners and ELI scholars. The group will serve as the connection point of mentors and mentees. Mentors will interact with their mentees via email, K-State Canvas, phone, video chat or face-to-face meetings. The focus of the mentor group will be on leadership, through the completion of assignments (i.e., leadership development plan and leadership essay) and a series of assessments.

Leadership development plan

Scholars will document their career goals and plan leadership activities throughout the program. During the first semester, scholars will meet with their mentor group to prepare a set of goals and planned activities such as running for office on a creative inquiry team or student organization. At the start of each subsequent semester, scholars will highlight successes and respond to challenges during the previous semester. Scholars’ leadership development plans will then be updated for the coming semester. Mentors will advise scholars in setting goals and evaluate their progress toward these goals.

**Action Items**
- Create leadership development plan (fall semester, junior year).
- Revise leadership development plan, taking into consideration the successes and challenges during the previous semester (spring semester junior year, fall and spring semester senior year).
The Student Leadership Practices Inventory, or Student LPI, is a commercial tool sold by Wiley under the Leadership Challenge brand. “Applying the proven principles of Kouzes and Posner’s acclaimed Practices of Exemplary Leadership® model, the Student LPI enables individuals and organizations to measure their leadership competencies and act on their discoveries. Leaders will gain deep insight into how they see themselves as leaders, how others view them, and what actions they can take to improve their effectiveness” [LPI Overview]. This helps students determine actions that will improve their leadership skills. Measurement is made against the Five Practices leadership model, which says leaders will —

- Model the Way.
- Inspire a Shared Vision.
- Challenge the Process.
- Enable Others to Act.
- Encourage the Heart.

Students will use the Student LPI in two ways —

» Self-assessment in which the ELI scholar answers a set of questions about her or his own interests and attitudes.

» 360° assessment in which the ELI scholar answers a set of questions about his or her own interests and attitudes, and can select team members, mentors, instructors, etc. to answer the same questions. The survey consists of self and observer questionnaires and can be used by unlimited observers, in order to get rich and useful feedback on the frequency of one’s leadership behaviors.

Each ELI scholar will take the self-assessment at the start of the program and at the start of the second year. Mentors will provide feedback and coach the scholars as they respond to the leadership assessment reports. The role of the mentor will be to help mentees face candid evaluation while challenging them to undertake constructive personal reflection.

Scholars will take the full 360° assessment in the last semester of the program. Mentors (and mentor group members) will receive an email with a link to each scholar’s 360° assessment. Mentors will then answer the 30 question assessment for each scholar in their mentor group. Once all of the assessments have been submitted, the Program Administrator will provide a copy of the 360° individual feedback report and a reassessment report that compares the scholar’s most recent 360° scores with the scores from their previous self-assessments.

Action Items

- Complete self-assessment (fall semester, junior and senior year).
- Identify team/group members for 360° assessment (spring semester, senior year).
- Complete 360° assessment (spring semester, senior year).
Leadership essay
The culmination of the program is the leadership essay. Scholars will work with their mentor groups to summarize and interpret their leadership activities throughout the ELI program to develop a five-page leadership essay. As one component, scholars will respond to the Student LPI 360° assessment performed within their creative inquiry teams or student organizations.

Action Item
- Write a five-page leadership essay that summarizes and interprets leadership activities and development throughout the ELI program (spring semester, senior year).

ePortfolio
Scholars will use the ePortfolio module in K-State Canvas to document their leadership journey. Scholars will post their resume, leadership development plan, leadership essay, Student LPI reports, reflections, photos and plans throughout the ELI program into their ePortfolio. Mentors may have access to each scholar’s ePortfolio and will be able to provide comments directly onto the ePortfolio website.

Action Items – Upload the following upon completion of each item:
- Leadership development plan
- Student LPI reports
- Leadership essay
- Resume

Corporate partner interactions
Throughout the program, ELI scholars will meet with representatives from our corporate partners while they are on campus for ELI program events. Scholars will visit and meet with industry executives to take part in tours at corporate partner facilities during a one-day trip. The corporate partner tour will allow scholars to gain knowledge on employer expectations, which will help scholars prepare for an engineering career.

Action Items
- Meet with company representatives during on-campus ELI program events (each semester).
- Attend corporate partner tours.

Scholarship
Each scholar will receive a $1,500 scholarship for each semester of satisfactory participation, for up to four semesters.

Questions or comments
If you have questions or comments concerning the Engineering Leadership and Innovation program, please contact Karah Hildebrand at 785-532-5590 or eliprogram@k-state.edu.
