PURDUE UNIVERSITY | College of Engineering

Engineering Faculty Document
No.: 84-25
December 6, 2024

TO: The Engineering Faculty

FROM: The Faculty of the Experiential Learning Committee

RE: New Engineering Certificate

The Faculty of the Experiential Learning Committee has approved the following new undergraduate Certificate from the College of Engineering. This action is now submitted to the Engineering Faculty with a recommendation for approval.

TITLE:

Business Essentials for Engineering Leadership Certificate

DESCRIPTION:

The proposed Business Essentials for Engineering Leadership undergraduate certificate program will be offered by the College of Engineering, enabled by the generous support from the Charles E. and Louise W. Springer Endowment. The goal of the certificate is to equip Purdue engineers with the business acumen and understanding of fiscal responsibility practices that are necessary to lead global businesses within the engineering, manufacturing, and tech industries. The proposed certificate incorporates the embedded fiscal responsibility learning outcomes for core courses and activities as well as activities for preparing students to "work effectively with others both in professional practice and in relating to those outside of the discipline, in leadership roles, and as members of a team."

RATIONALE:

Despite almost half of the Fortune 10 CEOs having undergraduate degrees in engineering, most undergraduate engineering curriculums in the United States do not contain adequate amounts of business and leadership development. With more of our nation's top organizations relying on engineers to lead them, it is critical for undergraduate engineers to possess a fundamental understanding of how leaders of business and industry maximize shareholder value, foster a culture of innovation, and lead with integrity.

Head/Director of the Experiential Learning Committee

Springer Business Essentials for Engineering Leadership Certificate

Originating/Sponsoring Unit: College of Engineering Experiential Learning Committee

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Rationale

Despite almost half of the Fortune 10 CEOs having undergraduate degrees in engineering2, most undergraduate engineering curriculums in the United States do not contain adequate amounts of business and leadership development3. With more of our nation's top organizations relying on engineers to lead them, it is critical for undergraduate engineers to possess a fundamental understanding of how leaders of business and industry maximize shareholder value, foster a culture of innovation, and lead with integrity.

Competency Goals

The general concept of this certificate is a cross-discipline approach to developing corporate leadership abilities in undergraduate engineers through curricular and co-curricular action. In addition to meeting the general competency goals for undergraduate engineering students (such as communication, ways of thinking, interpersonal skills and intercultural knowledge), students pursuing this certificate will be well prepared for determining project return on investment, making a business case, and leading global and multidisciplinary teams. Furthermore, an engineering executive forum will expose students to industry-specific knowledge. Students pursuing this certificate will be prepared to exhibit the following abilities:

- Financial statement analysis: Knowledge of basic financial statements and how they connect with each other

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[1] https://www.purdue.edu/provost/students/s-initiatives/curriculum/outcomes.html

[2] America's Top CEOs and Their College Degrees, https://www.investopedia.com/articles/professionals/102015/americas-top-ceos-and-their-college-degrees.asp

[3] Capabilities of Effective Engineering Leaders, https://gelp.mit.edu/sites/default/files/images/Capabilities_v4.0.pdf

- Group leadership capabilities: An understanding of leadership theories and styles best suited for leading a group
- Problem solving in the business world: Ability to address situations by collecting and analyzing information to determine the best decision or course of action
- Design thinking and innovation leadership: Ability to conceive, implement, and evaluate successful projects in any engineering discipline
- Ethical decision making: Knowledge of which ethical approaches are best in a business environment and how to apply them as engineers

Requirements for the Certificate

Undergraduate students seeking to earn the Business Essentials for Engineering Leadership certificate shall take a minimum of 16+ credits in this distribution:

I. Required Core Course (2 credits):
   a. ENGR 30301 Springer Executive Forum

II. Experiential Learning in Business Essentials (at least 2 credit hours or equivalent of any combination of the following):
   a. Full-time internship or co-op in areas relevant to business essentials.
   b. Experiential Learning with fiscal responsibility and leadership learning outcomes (2 semesters)
      i. EPICS or VIP with project management and fiscal responsibility roles
   c. Approved learning experience
      i. IBE + ID Innovation Hackathon / STAMINA IT Analytics Competition / Data 4 Good Case Competition / PowerShift Case Competition
      ii. Startup internships

III. Required Business and Management Courses (choose 2 for 6 credits):
   a. MGMT 33200 Business World Problem Solving
   b. OBHR 33000 Introduction to Organizational Behavior
   c. PHIL 20700 Ethics for Technology, Engineering, and Design
   d. MGMT 22000 Making the Business Case

IV. Selective Business and Management Courses (choose 2 for 6 credits):
   a. MGMT 26100 Introduction to Supply Chain Management
   b. MGMT 35200 Strategic Management
   c. MGMT 36100 Operations Management
   d. MGMT 44680 Experiential Learning and Team Consulting Projects
   e. CE 59601 Entrepreneurship and Business Strategy in Engineering
   f. TLI 31400 Leading Innovation in Organizations