ENGINEERING (ENGR)

ENGR 501: Engineering Leadership for Corporate Innovation

3 Credits/Maximum of 999

Traditional and contemporary leadership theory is analyzed to determine effective strategies for leading projects and innovation within an engineering context. This course focuses on concepts and theory related to the study of leadership in an engineering context. Traditional and contemporary leadership theory will be analyzed to determine effective strategies for leading technical projects and innovation. Based on current literature and research into effective engineering leadership, students will focus on understanding concepts related to: technical communication, optimization of engineering teams, and diffusion of innovation. Financial concepts and Lean Sigma practices will be assessed for effective engineering leadership decision-making. Specific topics addressed related to the engineering leadership concepts include leadership in organizations, communications in the workplace, customer focus in organizations, financial knowledge, workforce focus in organizations, and operational excellence. Students who successfully complete this course will be able to: distinguish leadership theory relevant to an engineering context; recognize commonalities of leaders in successful organizations; explain concepts for how innovation is diffused throughout a corporate culture; define communication concepts relevant for leading change in a diverse technical environment; and recognize the ethical and social implications of engineering work in a global environment. The overall objective for this course is to provide theoretical understanding and practice of leadership and innovation in technical contexts within the global business environment.

ENGR 594: Master's Paper Research

1-3 Credits/Maximum of 3

Investigation of a specific engineering problem and development of a scholarly written report in partial fulfillment of requirements for a master's degree in engineering.

ENGR 595A: Engineering Internship

1 Credits/Maximum of 4

ENGR 595A ENGR 595A Engineering Internship (1 per semester/maximum of 4) This course will provide students with an opportunity to apply fundamental skills and academic concepts in a professional laboratory, industry, or government agency setting within the United States. The final grade (Pass/Fail) will be based on the final report submitted by the student, and by mid-point and final evaluations submitted by the employer. This course will be offered fall, spring, and summer, and may be repeated.

Full-Time Equivalent Course

ENGR 595I: International Engineering Internship

0.5-4 Credits/Maximum of 4

ENGR 595 ENGR 595I International Engineering Internship (1 per semester/maximum of 4) This course will provide students with an opportunity to apply fundamental skills and academic concepts in a professional laboratory, industry, or government agency settingoutside of the United States . The final grade (Pass/Fail) will be based on the final report submitted by the student, and by mid-point and final evaluations submitted by the employer. This course will be offered fall, spring, and summer, and may be repeated.

Full-Time Equivalent Course

ENGR 596: Independent Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, that are supervised on an individual basis and which fall outside the scope of formal courses.

ENGR 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester.

ENGR 597C: **SPECIAL TOPICS**

3 Credits

ENGR 600: Thesis Research

1-15 Credits/Maximum of 999

No description.

ENGR 802: Engineering Across Cultures and Nations

3 Credits

Explores cultural differences and impact on business practices and team dynamics working on virtual project teams with global partner universities. Engineering Across Cultures and Nations is a core course in the Engineering Leadership and Innovation Management graduate program and focuses on the primary knowledge areas and essential competencies required for successful engineers to live and work in today's global marketplace. Within the context of engineering, the course will examine individual and cultural differences and how they impact communication and team dynamics. Students who complete the course will be able to understand sources of conflict that can arise from multicultural teams and effectively use the tools and resources discussed in class to manage individual and team motivation and minimize or effectively deal with conflict, while harvesting the benefits of diversity as they work on a real world virtual team project. Within an engineering context, students who complete this course will be able to: demonstrate a proficiency in team-building, leadership, and service; construct creative solutions to engineering issues incorporating cultural differences among team members, suppliers, and customers; critically analyze personal and team-member competencies and biases; formulate and apply strategies to improve team dynamics, compose effective feedback, recognition, motivation, and corrective guidance for international/intercultural team members; evaluate business opportunities within international and cross-cultural markets; and examine moral, ethical, and legal dilemmas in cross-cultural environments. These topics will be explored in an engineering context through engineering projects, guest lecturers, and discussions. The overall objective of this course is to provide students with a conceptual understanding of the impacts of multi-cultural influence on engineering problems and the leadership theory applicable for effective team performance.

ENGR 804: Engineering Product Innovation

3 Credits

Develop competencies for leading new product/process development or participating in corporate spin-outs using entrepreneurial skills within a corporation. This course focuses on the development of the competencies required to become a successful new product leader or corporate innovator within an engineering context. Course topics include: identification and development of the knowledge, skills, and attitudes of entrepreneurial leaders; fundamentals of corporate entrepreneurship; methods to leveraging intellectual property (IP); and development and use of the Business Model Canvas (BMC) for product development and commercialization. These topics are central to leading new product/process development within an existing engineering corporation. Upon successful completion of this course, students will be able to: describe the successful engineering leadership competencies of a corporate innovator, discuss and apply leadership strategies for leading innovation and creativity within engineering teams, analyze corporate innovation successes and failures and identify factors that play a role, outline the innovation management process and determine barriers to implementation inside the organization, define a successful new product launch using the Business Model Canvas (BMC), and describe the value of intellectual property and patent process to new product innovation within a corporation.

ENGR 805: ELIM Capstone Project

3 Credits

This course applies and integrates knowledge and skills gained throughout the ELIM program on a culminating project within existing organizations. The capstone course is designed to provide an opportunity to apply and integrate the knowledge and skills that were gained throughout the Engineering Leadership and Innovation Management (ELIM) program with strategic management concepts. Capstone projects will target opportunities, problems, and challenges of an existing organization. After successfully completing this course, students will be able to: identify and assess the impact of opportunities and threats in a company, including its industry and its set of competitors; identify and assess a company's internal strengths and weaknesses and suggest alternative strategies; define the business-level strategies of the company; define competitors, competitive rivalry, competitive behavior, and competitive dynamics; and describe corporate-level strategy of a company. The overall objective of this course is to demonstrate integration of theories, knowledge, and application of leadership and innovation to the needs of a dynamic global marketing place.

Prerequisite: ENGR 408, ENGR 411

ENGR 888: Seminar for Engineering Teaching Assistants

1 Credits

Study of recently established knowledge and methodologies as applied to practice. Significant interaction among students and with instructor is expected.