



Purdue University's Engineering Leadership Program: Addressing the Shortfall of Engineering Leadership Education

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Purdue University's Engineering Leadership Program Addressing the Shortfall of Engineering Leadership Education

Abstract

Engineering leadership education should lie at the intersection of theoretical conceptualization and practical implementation; an experiential education in other words. Engineering students should be exposed to formal studies in leadership which they aren't^[1]. Satisfying the societal demand of engineering leadership education is, regrettably, commonly limited to introductory-level coursework in technical communication in most engineering curricula^[1]. The purpose of this paper is to revisit the state of engineering leadership education in academia and to introduce Purdue University's College of Engineering's recently endorsed Engineering Leadership Minor. A potential model to address the shortfall of experiential engineering leadership education within traditional engineering curricula, this minor, which is one element of a larger engineering leadership program, will involve the use of coursework, discussions, one-on-one mentoring by distinguished leaders, guest speakers, and job-shadowing to provide engineering students with understanding and experience applying engineering leadership principles, practices, and tools in a multicultural context. This model will reinforce the educational process by encouraging students to mentor younger students after their first year in the program and by allowing students to facilitate their engineering leadership training. Students will supplement the required seven credits in engineering leadership core courses with nine credits which includes an experiential program and elective courses in one or two of the following concentrations: communication, global and societal impact, creativity and innovation, and ethics.

Introduction

The development and coexistence of technical and leadership skills should be forefront in the training of engineering students. The interdependency of technical and socioeconomic problem solving has increased the need for engineers to also prioritize the development of their "soft," or professional skills^[1]. The dilemma is that engineering curricula all over the country are not positioned to strategically address this growing challenge.

Of all the various types of professional skills, leadership is of particular importance in engineering, as noted in the Engineer of 2020 vision by the National Academy of Engineering.^[2] Good leaders can be argued to be born but good leadership can also be taught and encouraged. Good leadership in engineering can be the result of the application of certain skills such as communication, teamwork, planning, example-setting, result-driving, innovation-driving, rapport-building and enablement.

Addressing the concerns of the National Academy of Engineering^[2], which calls for better leadership development initiatives for engineering students, requires many strategies. One approach would be for an engineering curriculum to incorporate leadership development courses into students' requirements before graduation. This would speak to engineering students the need and the value of leadership skills, since it is accommodated in their engineering curriculum. However, such an approach may not be popular and easily implemented by faculty and administrators because of inflexible engineering curricula and additional course requirements. Primarily due to the knowledge explosion in recent years, the need to increase the number of courses in a curriculum while adhering to the same amount of time has been overwhelming and congesting^[5]. Rather than reorganizing the material that students need to learn, the increased quantity of courses in engineering curricula also has made it difficult to add leadership courses or initiatives to the curriculum, thereby removing many non-technical courses from the curriculum. A departmental engineering leadership development focus would demand that students take additional courses or partake in professional experiences that the curriculum cannot accommodate without destabilization and delaying graduation. As such, it is typical that most engineering schools focus on producing technical excellence^[1,2] without strong regards to leadership development.

An alternative, and a more popular option, is the creation and implementation of engineering leadership development programs which are positioned to supplement the engineering education of college students. Some of these programs, particularly the Gordon-MIT Leadership Development Program and the Penn State Engineering Leadership Development Minor, are successful engineering leadership models. These programs cater to the leadership education needs of their respective schools and provides a basis for discussing a new engineering leadership development program at Purdue University, which houses innovative features to address shortfalls of engineering leadership education and to enhance the educational experiences of engineering students.

The leadership development model discussed in this paper was motivated by the understanding that engineering leadership development should supplement engineering pedagogy, should be offered to undergraduate engineering students early into the academic careers, and should provide ample opportunities for students to take ownership of their leadership development.

The Engineering Leadership Development Program

The Purdue University engineering leadership development program, presented in this paper, was launched in January 2013 and is a model building off other successful models^[1,3,4]. This innovative program aims to provide engineering students with multiple paths to engagement in engineering leadership, with avenues for the development of next-generation engineering and technical leadership knowledge, and with tools and skills to navigate the demands of leadership,

particularly in engineering practice. Based upon sound leadership principles, it offers undergraduate students opportunities to engage in experiential leadership experiences, faculty coaching, and technical leadership across a variety of contexts. Success in the program yields an arsenal of leadership tools and experiences and a minor in engineering leadership that is recorded on the students' transcript.

I. Innovative Features of the Minor

The engineering leadership minor targets students early in their engineering careers, unlike some other notable programs that engage engineering students in leadership activities during their junior or senior years^[3,4,6]. This approach will minimize the burden on the engineering curriculum and will ensure thorough leadership training for enrolled students by utilizing the entire duration of students' time in school to distribute the engineering leadership course load and professional requirements. Hence, the minor targets first-year engineering students with potential to engage upper-level students, graduate students, faculty, and staff in engineering leadership courses, workshops, and seminars on a case-by-case basis. Undergraduate students accepted into the program must have a minimum 3.0 GPA and engage in an interview with the engineering leadership program staff. Innovative features of the course include a focus on experiential learning, faculty coaching, and technical leadership.

Within the minor, students must engage in at least one *experiential learning* experience. Selected from a variety of departments across campus, this experience will serve as a basis for reflection about engineering leadership in one or more courses within the leadership minor. An example of a pre-approved experiential course offers a ten-week long, summer internship in Washington, DC in which students learn about governmental decision-making and the contributions of engineers to the political process.

Faculty coaching (described in more detail in a future section) allows students to select a faculty member in their departments who can serve as a coach to them as they complete their technical coursework and engineering leadership minor coursework. If students are unsuccessful finding their own coach, they can receive a coach from the pool of candidates recruited by the engineering leadership minor staff.

One of the aspects of the minor that differentiates it from traditional leadership development programs is its emphasis on *technical leadership*. This means that students learn core leadership principles taught within business schools and learn how to translate these theories and principles into engineering contexts. The importance of technical leadership should not be overlooked. In concurrence with the Gordon- MIT Engineering Leadership Program, engineering leadership is the technical leadership of change: the innovative conception, design, and implementation of

new products/processes/projects/materials/molecules/software/systems, supported by the invention of enabling technologies, to meet the needs of customers and society^[7].

II. Curriculum

The curriculum consists of sixteen credits consisting of core, experiential, and elective courses grouped into four concentration areas and organized to provide students with understanding and experience applying engineering leadership principles, practices, and tools in a multicultural context. Students are required to complete seven credit hours of core courses and nine credit hours consisting of one experiential course and other elective courses of their choosing (See Appendix A).

Core classes (Student Leadership Development, Planning for Leadership Development, Portfolio: Experiential Engineering Leadership and Reflection on Engineering Leadership) within the minor will be offered in-house and allow students to work closely with faculty and staff, in the College of Engineering, in the development of engineering leadership portfolios (discussed in details below) and reflections that will demonstrate their leadership proficiency to future employers and graduate schools.

Elective courses are a compilation of pre-approved courses from various academic disciplines. These courses are categorized into four concentrations (communication; ethics; creativity and innovation; and global and societal impact) with students taking courses in one or two concentration areas. The selection of these concentrations is a result of research about other engineering leadership programs and availability of course options across the university. The *communication* concentration courses focus on the development of students' professional skills and engagement with technical and non-technical audiences. The *ethics* concentration courses align with regulatory, legal, and policy-related aspects of engineering. The *creativity and innovation* concentration courses relate to areas such as entrepreneurship. The *global and societal impact* concentration courses explore the impact of leadership across diverse stakeholders and national and global communities.

III. Supplemental Activities

This engineering leadership minor utilizes a routine of empowerment and engagement about the importance of engineering leadership. Accomplished leaders and students with engineering leadership experiences will be invited to engage in a variety of contexts. The Robe Leadership Institute identified this plan as being a key component of their leadership development experiences^[1].

The speakers will be scheduled strategically such that the topics discussed in each seminar or workshop reinforces leadership concepts and practices that students are learning in core classes, concentration classes, and experiential activities. The selection of speakers is contingent on their leadership innovations in a variety of engineering contexts (i.e., academia, industry, or government), technical proficiency, and their abilities to engage an audience of primarily undergraduate students. Speakers must also be representative of the diverse student population in the program and should expose students to different leadership perspectives and styles.

The students will play an active role during the seminars and workshops. They will be notified beforehand about each upcoming guest speaker and the topic of each seminar and will be required to prepare questions for the speaker. Each guest speaker will be introduced by a student, which is a method used to encourage the students to ask questions and actively engage the speaker during the seminar^[1]. This also serves as an opportunity for students to improve their communication skills and to take ownership of their leadership development. Students are required to submit a reflection paper after each seminar. This reflection will relate to key themes taught within the program along with ways to incorporate seminar ideas into their engineering leadership portfolios.

IV. Leadership Mentors and Mentees

The faculty coaching/mentoring aspect of this minor is a two-part initiative where students will have the opportunity to receive mentoring from an industry-based or academia-based leader of their choosing. This way, students may engage proactively with individuals who may or may not be in their current professional networks. This may then reinforce the knowledge and skills students learn from their mentors and allow students to serve as peer mentors to other engineering students.

The mentoring system is a personal development relationship between students and their chosen mentors and mentees, which involves routine activities and interactions. Students' activities with their mentors and mentees are expected to be in-person, or as direct as possible, and will be facilitated by technological means such as Skype, LinkedIn, or Facebook. Mentors will be expected to connect with their students a minimum of five contact hours per semester (i.e., one interaction per month). These activities include, but are not limited to, job-shadowing, attending mentors' industry events and lectures, career-planning, confidence-building, and networking. Students will document their activities with their mentors and will include this in their engineering leadership portfolios. Particular attention will be made regarding students' implementation of leadership theories and their connections of engineering leadership to their technical areas of interest and future career objectives. Engineering leadership minor staff anticipates that this initiative will engage alums financially and technically and will assist in the creation of a repository of future speakers and mentors for the program.

V. Student E-Portfolios

An integral part of the engineering leadership development offered by the program is the engineering leadership portfolios students are required to create and maintain, working closely with faculty and staff. The nature of the engineering leadership portfolio is a web-based electronic portfolio (e-portfolio). An e-portfolio is a digital collection of experiences, accomplishments, skills and publications that represents an individual's professional identity. Other disciplines, such as business, also use e-portfolios to record students' learning experiences and skill sets^[8].

Students in the program will be provided access to a free, life-long, on-line, e-portfolio service to document and gain more ownership of their leadership development and encourage personal self reflection on their leadership growth. Use of e-portfolios will be beneficial to meeting some of the learning outcomes of this engineering leadership minor, discussed later in this paper. Beyond academic and professional documentation, e-portfolios help students become critical thinkers and aid in the development of their writing, information technology literacy skills, and multimedia communication skills^[8].

The e-portfolios provided to students have additional benefits. They can be of continued use to students after they graduate, as it is an independent service not tied to their undergraduate institution. Secondly, beyond academic evidence and leadership development, e-portfolios enable students to create digital repertoires representing their professional identity that can be presented to prospective employers and other professionals to see.

VI. Engineering Leadership Learning Outcomes

At the completion of the engineering leadership minor, students will have ample exposure and experience solidifying their understanding and capabilities within the following contexts: (1) leadership; (2) change; (3) synthesis; and (4) practical competence. See Table 1 for details regarding specific skills within each category.

These engineering leadership learning outcomes were inspired and modified from the learning outcomes in Cox et al.'s Engineering Professionals' Expectations of Undergraduate Engineering Students^[9], to include aspects of the Gordon-MIT's Capabilities of Effective Engineering Leaders^[7], the UCSD Gordon Center's Engineering Leadership Core Values^[10], and Cox's Leadership, Change, and Synthesis Survey^[11]. These learning outcomes are not comprehensive. More learning outcomes will be added upon further research, particularly on how to effectively assess the new outcomes to be added.

Student Learning Outcomes	Skill Sets
Leadership	<ul style="list-style-type: none"> ○ Ability to motivate and empower others to solve problems. ○ Ability and willingness for initiative-taking, goal-setting, and follow through. ○ Ability to identify characteristics and talents of others. ○ Understanding of the impact of ethics and morals on leadership and professional responsibility. ○ Demonstrate a commitment to life-long learning.
Change	<ul style="list-style-type: none"> ○ Ability to participate in multidisciplinary, multicultural, and multifunctional groups. ○ Ability to understand change processes and overcoming human inertia to change. ○ Ability to adjust objectives and priorities to changing environments.
Synthesis	<ul style="list-style-type: none"> ○ Ability to comprehend, synthesize, interpret and apply knowledge to address technical and non-technical problems. ○ Ability to recognize social and business factors in engineering work. ○ Ability to see the impact of engineering work on the broader society. ○ Ability to drive leadership development with personal experiences.
Practical Competence	<ul style="list-style-type: none"> ○ Demonstrate competence of practical and transferrable skills essential to leadership practice and professional interactions. ○ Ability to communicate using written language, verbal and non-verbal language, and electronic and multimedia tools. ○ Ability to articulate acquired skills and tools on a resume, portfolio and other professional mediums.

Table 1 - Engineering leadership learning outcomes

VII. Leadership Assessment

Assessing the leadership development of students in the minor presents an opportunity to track their development and to inform students of their progress and areas where improvements are recommended. These assessment tools were built into the organization of the minor and include: (1) student reflection; (2) entry and exit surveys; and (3) faculty, staff and mentor/mentee observations of students.

Student reflection is a culmination of written reflections authored by each student of their activities with their mentors and mentees, and their thoughts on seminars featuring guest speakers on engineering leadership topics. During the admission process into the minor, students

complete an entry survey in which they rate their skills on various contexts including leadership. Upon graduation from the minor, students, again, rate their skills for comparison purposes. Students in the minor are required to take engineering leadership, in-house, core courses (see Appendix A for full course listing). The faculty members teaching each course will have the opportunity to submit formal reports on students' development and behaviors. Staff members also have the opportunity to observe and document students' development starting from their admission interview and at specific milestones during their time in the program. Mentors and mentees, during their respective activities with the students, are required to submit interaction reports about the students. It is expected that these combination of in-class and out-of-class assessment strategies will give a reliable account of the leadership development of students.

There are some challenges associated with the prescribed assessment methods; some learning outcomes cannot be effectively assessed as of yet. One of these outcomes include: the ability to identify characteristics and talents of others. Still, it is critical to recognize these learning outcome because, at times, outcomes that are difficult to define and measure can be more important in student learning than others that are clearly stated and easily measured^[10]. To address this shortfall, the minor, since it is in its infancy, will focus on learning outcomes that we can reliably assess but will provide opportunities to students toward meeting all specified learning outcomes of the minor. The assessment piece of the minor is still forefront in development and expansion.

Summary


This paper provides an overview of a newly created engineering leadership minor at Purdue University. Building upon successful engineering leadership programs in the U.S. at institutions such as the Massachusetts Institute of Technology and Pennsylvania State University, this new program utilizes coursework, discussions, one-on-one mentoring by distinguished leaders, experiential learning, e-portfolios, and guest speakers to help students define and to take ownership of engineering leadership principles, practices, and tools learned in a multicultural context. The innovative features of this model includes: engaging engineering students in leadership development as early as their first-year, unlike some other programs^[3,4,6], and focusing on experiential learning, faculty coaching, and technical leadership.

The above model may or may not be suitable for all engineering schools but is expected to engage a new generation of engineering leaders in engineering leadership. Although several students in the program might be natural leaders, this program operates under the basis that every student has the potential to be an engineering leader. One does not set out to become a leader but becomes one through the integrity of intent and quality of actions. In engineering practice, where integrity and action are important, helping students to develop the skills and tools to practice good leadership is imperative.

References:

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Appendix A

Approved Courses for Purdue College of Engineering's Engineering Leadership Minor							
Program Requirements:		Students must complete 16 credit hours. Seven (7) credits include core courses, and nine (9) credits must include one experiential course AND courses representing 1 or 2 concentration areas. A grade of "C" or higher is mandatory for courses counting towards minor. Minor courses must be taken at the Purdue West Lafayette campus. The only exceptions are as follows: - one equivalent transfer course from another university can be used if accepted by the ELP Director. - one equivalent university substitution may be used if equivalent to an approved minor course. No more than one substitution from either of the above two categories is acceptable.			Engineering Leadership Minor Concentrations (Select 1 or 2 concentration areas.) Communication Creativity and Innovation Global and Societal Impact Ethics		
Core Required Courses		Type	Credit Hrs.	Major	Pre-requisites/Comments	Semester	
EDPS 300A	Student Leadership Development	Core	3	Open	Permission of the instructor	F	
ENGR 2xx	Planning for Leadership Development	Core	1	Open			
ENGR 3xx	Portfolio: Experiential Engineering Leadership	Core	2	Open			
ENGR 4xx	Reflection on Engineering Leadership	Core	1	Open	May be replaced with any substitute course approved by the Director of Engineering Leadership Dev.		
Approved Experiential Programs (Please contact ELP Director about other potential experiential courses.)		Type	Credit Hrs.	Major	Pre-requisites/Comments	Semester	
WISE	Washington Internship for Students of Engineering	Capstone		Open	3rd or 4th year students selected by the Director.	Su	
EPCS Courses	EPCS Participation Courses	Option	1 to 2	Open		Varies	
ENGR 406	Engineering Ambassador Leadership Seminar	Option	1	Open	Student must be selected as a College of Engineering Ambassador w/ no less than 3 semesters.	F/Sp	
COM 49100	Communicating in the Global Workplace	Option	3	Open	COM 49100 courses are seminars (note name of course when registering); same name as COM 22400	F	
Certificate in Entrepreneurship and Innovation Program		Type	Credit Hrs.	Major	Pre-requisites/Comments	Semester	
ENTR 20000	Introduction to Entrepreneurship and Innovation	Option	3	Open	Not for Seniors (90+ credit hours)	F/Sp	
ENTR 31000	Marketing and Management for New Ventures	Option	3	Open	ENTR 20000. Minimum Grade of D-	F/Sp	
ENTR 39000	Global Entrepreneurship and Innovation	Option	1 to 3	Open			
ENTR 47000	Women and Leadership	Option	3	Open		F/Sp	
ENTR 48000	Entrepreneurship Capstone	Capstone	3	Open	Capstone for students completing pursuing the Entrepreneurship Certificate	F/Sp	
College of Education		Type	Credit Hrs.	Major	Pre-requisites/Comments	Semester	
EDPS 30000	Student Leadership Development	Option	1 to 3	Open	Permission of instructor	F	
EDPS 31500	Collaborative Leadership: Listening	Option	3	Open		F/Sp/Su	
EDPS 31600	Collaborative Leadership: Cross-Cultural Settings	Option	3	Open	Second with 44+ credit hours	Sp/Su	
EDPS 31700	Collaborative Leadership: Mentoring	Option	3	Open	Second with 44+ credit hours	Su	
College of Engineering		Type	Credit Hrs.	Major	Pre-requisites/Comments	Semester	
CE 29201	Contemporary Issues in Civil Engineering	Option	1	CoE	Sophomore or higher	F/Sp	
CE 35500	Engineering Environmental Sustainability	Option	3	Open	Sophomore or higher	Sp	
CE 52400	Legal Aspects in Engineering Practice	Option	3	Open	Junior 74 credit hours or higher	F/Sp	
ME 55400	Intellectual Property for Engineers	Option	1	Open	Junior or higher, GR-ME 55400 and PHYS 17200.	Sp	
College of Liberal Arts		Type	Credit Hrs.	Major	Pre-requisites	Semester	
AAS 37000	Black Women Rising	Option	3	Open		F/Sp	
COM 21700	Science Writing and Presentation	Option	3	Open	Enrollment in College of Science	F/Sp	
COM 22400	Communicating in the Global Workplace	Option	3	Open		F	
COM 22400	Communicating in the Global Workplace	Option	3	Open			
COM 30300	Intercultural Communication	Option	3	Open	Second semester sophomore or higher	F/Sp	
COM 31400	Advanced Presentational Speaking	Option	3	Open	COM 11400, COMM R1100, COMM C1100, or SPCH S1210. Minimum Grade of D-	F/Sp/Su	
COM 31500	Speech Communication of Technical Information	Option	3	Varies	COM 11400 or COMM R1100. Minimum Grade of D-	F/Sp/Su	
COM 31800	Principles of Persuasion	Option	3	Open	COM 11400, COMM R1100, COMM C1100, or SPCH S1210. Minimum Grade of D-	F/Sp/Su	
COM 32000	Small Group Communication	Option	3	Open	COM 11400 or COMM R1100. Minimum Grade of D-	F/Sp/Su	
COM 32400	Introduction to Organizational Communication	Option	3	Open	Second semester sophomores or higher. COM 11400 or COMM R1100; minimum grade of D-	F/Sp/Su	
COM 32500	Interviewing: Principles and Practice	Option	3	Open	Second semester sophomores or higher (44+ credit hours)	F/Sp/Su	
COM 37500	Conflict and Negotiation	Option	3	Open	Second semester sophomore or higher. COM 21200, COM 21400, or COMM C1800; minimum grade of D-	F/Sp	
COM 42300	Leadership, Communication and Organizations	Option	3	Open	Permission of instructor	F/Sp/Su	
ENGL 42000	Business Writing	Option	3	Open	ENGL 10600, ENGL 10300, ENGL 10800, ENGL 10100 or ENGL 10200. Minimum Grade of D-	F/Sp/Su	
PHIL 11100	Ethics	Option	3	Open		F/Sp/Su	
PHIL 11400	Global Moral Issues	Option	3	Open		F/Sp/Su	
PHIL 27000	Biomedical Ethics	Option	3	Open		F/Sp	
PHIL 28000	Ethics and Animals	Option	3	Open		F/Sp	
PHIL 29000	Environmental Ethics	Option	3	Open		F/Sp	
PHIL 41100	Modern Ethical Theories	Option	3	Open	PHIL 11100 or PHIL P1200. Minimum Grade of D-	F/Sp	

Appendix A

Approved Courses for Purdue College of Engineering's Engineering Leadership Minor (Con't)						
Program Requirements:	Students must complete 16 credit hours. Seven (7) credits include core courses, and nine (9) credits must include one experiential course AND courses representing 1 or 2 concentration areas. A grade of "C" or higher is mandatory for courses counting towards minor.				Engineering Leadership Minor Concentrations (Select 1 or 2 concentration areas.)	
	Minor courses must be taken at the Purdue West Lafayette campus. The only exceptions are as follows:				Communication	
	- one equivalent transfer course from another university can be used if accepted by the ELP Director.				Creativity and Innovation	
	- one equivalent university substitution may be used if equivalent to an approved minor course.				Global and Societal Impact	
No more than one substitution from either of the above two categories is acceptable.				Ethics		
College of Agriculture						
		Type	Credit Hrs.	Major	Pre-requisites	Semester
AGEC 26000	Mentoring Leadership	Option	1	Open	AGEC, AGFN, AGMG, FARM, FIMM, QAEC, and SLMK students. Permission of dept. required.	F
AGEC 32700	Principles of Food and Agribusiness Marketing	Option	3	Open	ENTR 20000 or AGECE 33000. Minimum Grade of D-	F/Sp
AGEC 33000	Management Methods for Agricultural Business	Option	3	Open		F/Sp
AGEC 33100	Principles of Selling in Agricultural Business	Option	3	Open	Second semester freshman or higher	F/Sp
AGEC 34000	International Economic Development	Option	3	Open	AGEC 20300, 20400, 21700, ECON 21700, 25100, E1030, E2010, 25200, E1040, or E2020. D- or better	Sp
AGEC 41000	Agricultural Policy	Option	3	Open	AGEC 22000, 21700, ECON 25200, E1040, and E2020. Min. grade of D-.	Sp
AGEC 41500	Community and Resource Development	Option	3	Open	AGEC 22000. Minimum grade of D-.	Sp
AGEC 42400	Financial Management of Agricultural Business	Option	4	Open	AGEC 31100, MGMT 20000, 20010 or BUS A2010. Minimum Grade of D-.	F/Sp
AGEC 42701	Advanced Agribusiness Marketing	Option	3	Open	AGEC 32700, 42600 or MGMT 32300. Minimum Grade of D-.	F
AGEC 43300	Executive in the Classroom	Option	1	Open		Sp
AGEC 43500	Leadership in a Changing World	Option	3	Open	Second semester freshman or higher	Sp
AGEC 61600	Resource Economics and Policy	Option	3	Open	AGEC 60400 and/or ECON 51100. Graduate students status. Check with department.	F
AGR 20100	Communicating across Culture	Option	3	Open		F/Sp
AGR 20100	Communicating across Culture	Option	3	Open		Sp
AGRY 46000	Contemporary Issues in Agriculture	Option	3	Open	Second semester sophomore or higher	Sp
AGRY 59600	Professional Presentation	Option	1	Open	Second semester sophomore or higher	F
AGRY 59700	Communicating with the Public	Option	1	Open	Second semester sophomore or higher	Sp
College of Health and Human Sciences						
		Type	Credit Hrs.	Major	Pre-requisites	Semester
CSR 30900	Leadership Strategies	Option	3	HHS	Junior or higher	Sp
Krannert School of Management						
		Type	Credit Hrs.	Major	Pre-requisites	Semester
OBHR 23000	Teamwork	Option	2	Open		F/Sp
OBHR 44200	Introduction to Administrative Decision Making	Capstone	3	Open	Seniors in specific majors only. OBHR 33000 or BUS Z3020. Minimum Grade of D-	F
MGMT 35400	Legal Foundations of Business I	Option	3	MGMT		Sp/Su
College of Technology						
		Type	Credit Hrs.	Major	Pre-requisites	Semester
OLS 27400	Applied Leadership	Option	3	Open		f/Sp/Su
OLS 28400	Leadership Principles	Option	3	Open		f/Sp/Su
OLS 34500	Critical Thinking in Organizations	Option	3	Open		f/Sp/Su
OLS 34600	Critical Thinking and Ethics	Option	3	Open	OLS 38600. Minimum Grade of C.	f/Sp/Su
OLS 38400	Leadership Process	Option	3	Open	OLS 25200 and OLS 27400. Minimum Grade of C	f/Sp/Su
OLS 38600	Leadership for Organizational Change and Innovation	Option	3	Open	OLS 25200 and OLS 27400. Minimum Grade of C	f/Sp/Su
OLS 38800	Leadership through Teams	Option	3	Open	OLS 25200. Minimum grade of C	f/Sp/Su

Last updated: March 5, 2013. This document is subject to change given elimination or addition of courses across departments and programs.

