

# ENGINEERING (ENGR)

Courses primarily for undergraduates:

## ENGR 1010: Engineering Orientation

Credits: Required. Contact Hours: Lecture 1.

Introduction to the College of Engineering and the engineering profession. Information concerning university and college policies, procedures, and resources. Undeclared sections: Considerations in choosing an engineering curriculum. Opportunities to interact with departments. Declared sections: Introduction to major-specific topics. Offered on a satisfactory-fail basis only. (Typically Offered: Fall, Spring)

## ENGR 1040: LEAD Program Orientation

Credits: 1. Contact Hours: Lecture 1.

Orientation for LEAD Learning/Living Community participants. Introduction to college and university resources, tools and techniques to promote academic, professional and social/cultural development and success. Focus on building support networks with peers, faculty, and staff. Introduction to core engineering competencies including but not limited to initiative, communication, teamwork, and cultural adaptability. Offered on a satisfactory-fail basis only. (Typically Offered: Fall)

## ENGR 1050: LEAD Program Seminar

Credits: 1. Contact Hours: Lecture 1.

Seminar for LEAD Learning/Living Community participants. Focus on professional development and exposure to various engineering disciplines through hands-on lab experiences, industry visits and networking opportunities with alumni, faculty, and staff. Development of core competencies: engineering/technical knowledge, communication and teamwork. Offered on a satisfactory-fail basis only. (Typically Offered: Spring)

## ENGR 1310: Learning Community Seminar

Credits: Required. Contact Hours: Lecture 1.

Peer-mentored review of course topics in engineering undeclared learning communities. Offered on a satisfactory-fail basis only. (Typically Offered: Fall)

## ENGR 1500: Foundations of Leadership Development and Learning

Credits: 1. Contact Hours: Lecture 1.

Leadership development with focus on global context and awareness of events shaping the context. Exposure to theory of leadership with examples. Necessary characteristics of a leader, and strategies for leadership skills development. Exposure to non-traditional career paths for engineers. Outline of personalized leadership development. Offered on a satisfactory-fail basis only. (Typically Offered: Fall, Spring)

## ENGR 1600: Engineering Problems with Computer Applications Laboratory

Credits: 3.

*Prereq:* MATH 1430 or satisfactory score of 76 on mathematics placement exam

Solving engineering problems and presenting solutions through technical reports. Significant figures. Use of SI units. Graphing and curve-fitting. Flowcharting. Introduction to mechanics, statistics and engineering economics. Use of spreadsheet programs to solve and present engineering problems. Solution of engineering problems using computer programming languages. (The honors section includes application of programming to mobile robotics). Satisfactory placement scores can be found at: <https://math.iastate.edu/academics/undergraduate/aleks/placement/>. Graduation Restriction: Only one of ENGR 1600, ABE 1600, AERE 1600, CE 1600, CHE 1600, CPRE 1850, EE 1850, IE 1480, ME 1600, and SE 1850 may count towards graduation. (Typically Offered: Fall, Spring, Summer)

## ENGR 2030: Engineering Career and Employment Preparation

Credits: 1. Contact Hours: Lecture 1.

Development of practical career knowledge and skills such as understanding employers of engineers, determining career goals, identifying employers of interest, developing effective application materials, applying for positions, networking, interviewing, and evaluating offers. Overview of professional resources and tools available to aid in the employment process. Offered on a satisfactory-fail basis only. (Typically Offered: Fall, Spring, Summer)

## ENGR 2500: Leadership in Engineering Teams

Credits: 1. Contact Hours: Lecture 1.

Building and sustaining decision-making engineering teams. Students will explore the interrelated processes of discerning purpose, thinking systemically, developing reflective judgment, and exercising leadership by mobilizing and setting the direction for adaptive change within a team. Industry based examples and information from engineering and natural resource sciences will be infused into the course. Offered on a satisfactory-fail basis only. (Typically Offered: Fall, Spring)

## ENGR 2650: Survey of the Impacts of Engineering Activity

Credits: 3. Contact Hours: Lecture 3.

Survey of the economic, environmental, societal, and political benefits and problems resulting from engineering activity. Effects of engineering projects on human health, social structures, and the environment. Examination of improvements in economic opportunities and quality of life resulting from engineering activity. Case studies of the effects of engineering activity. (Typically Offered: Fall, Spring)

**ENGR 3200: International Experience Report**

Credits: 3.

Critique of work/study abroad experience as it relates to professional development. Taken the semester after completion of work abroad or study abroad. Written report and presentation. Offered on a satisfactory-fail basis only. Meets International Perspectives Requirement. (Typically Offered: Fall, Spring)

**ENGR 3270: Voices of Public Policy**

Credits: 3. Contact Hours: Lecture 3.

*Prereq: Sophomore classification in engineering*

Role and impact of legislative process, partisan politics, government, lobbyists, the media, expert testimony and grassroots activism on public policy. Critical analysis of context; of claims, assumptions, premises, and evidence of both sides; represented and disenfranchised populations; the ethical issues to develop personal position and courses of action to impact public policy process. (Typically Offered: Fall)

**ENGR 3500: Dean's Leadership Seminar**

Credits: 1. Contact Hours: Lecture 1.

*Prereq: Sophomore classification in engineering*

Understanding the complexities of leadership in building an organization, decision-making styles, communication, managing change, building trust, shared responsibility leadership, creating legacy, prioritizing, effective use of authority, conflict, ethics, integrity, transparency, accountability. Selection based on demonstrated commitment to leadership development. Graduation Restriction: May not apply toward a degree in Engineering. Offered on a satisfactory-fail basis only. (Typically Offered: Fall, Spring)

**ENGR 3960: Summer Internship**

Credits: Required. Repeatable.

*Prereq: Permission of Engineering Career Services*

Professional work period of at least 10 weeks during the summer. Students must register for the course prior to commencing work. Offered on a satisfactory-fail basis only. (Typically Offered: Summer)

**ENGR 3970: Engineering Condensed Internship**

Credits: Required. Repeatable.

*Prereq: Permission of Engineering Career Services*

Professional work period less than 10 weeks. Students must register for the course prior to commencing work. Offered on a satisfactory-fail basis only. (Typically Offered: Summer)

**ENGR 3980: Cooperative Education**

Credits: Required. Repeatable.

*Prereq: Permission of Engineering Career Services*

Professional work period during the fall or spring semester. One semester per academic or calendar year. Students must register for the course prior to commencing work. Offered on a satisfactory-fail basis only. (Typically Offered: Fall, Spring)

**ENGR 4300: Entrepreneurial Product Engineering**

(Cross-listed with IE 4300).

Credits: 3. Contact Hours: Lecture 3.

*Prereq: Junior classification*

Process of innovative product development in both entrepreneurial and intra-preneurial settings. Define, prototype and validate a product concept based on competitive bench-marking, market positioning and customer requirement evaluation in a target market into a product design that is consistent with defined business goals and strategies. Combination of lecture, discussion, problem solving and case study review. (Typically Offered: Fall, Spring)

**ENGR 4340X: Entrepreneurial Product Engineering Design Project**

(Cross-listed with IE 4340X).

Credits: 0-99. Contact Hours: Laboratory 4, Lecture 1.

Repeatable.

*Prereq: IE 4300 or ENGR 4300*

Open-ended design project related to creating, validating and launching a new engineered product into the marketplace. Fundamentals related to launching new engineered products in an Entrepreneurial way. Students submit new product ideas or select from a list of company supplied ideas. Application of engineering design principles including product definition, competitive evaluation, requirements evaluation, product design, manufacturing design, manufacturing costing, prototype creation, field validation, user evaluation. (Typically Offered: Spring)

**ENGR 4900E: Entrepreneurship**

Credits: 1-3. Repeatable, maximum of 3 credits.

*Prereq: Junior or senior classification in Engineering; College approval*  
(Typically Offered: Fall, Spring)

**ENGR 4900L: Independent Study**

Credits: 1-3. Repeatable, maximum of 3 credits.

Leadership. (Typically Offered: Fall, Spring, Summer)

**Courses primarily for graduate students, open to qualified undergraduates:**

**ENGR 5380: Foundations of Engineering Education**

(Cross-listed with AERE 5380/ HGED 5380).

Credits: 3. Contact Hours: Lecture 3.

Introduction to the field of engineering education, with an emphasis on engineering education history, existing challenges, teaching and learning pedagogies and theories, research opportunities, and research methodologies. The course goal is to develop students as scholars and to have students think critically about engineering and education. Students will apply the knowledge gained from this course to propose a research project related to their own discipline. The proposal is intended to help students learn and apply the key elements of engineering education research. This course is intended for students with a variety of interests and career goals, including those interested in learning to conduct engineering education research, exploring research discoveries about teaching and learning, and engaging with the engineering education community. (Typically Offered: Fall)

**Courses for graduate students:****ENGR 6930: Entrepreneurship for Graduate Students in Science and Engineering**

(Cross-listed with AGRON 6930/ BCB 6930/ EE 6930/ GENET 6930/ ME 6930).

Credits: 1. Contact Hours: Lecture 3.

Repeatable, maximum of 2 credits.

Understanding key topics of starting a technology based company, from development of technology-led idea to early-stage entrepreneurial business. Concepts discussed include: entrepreneurship basics, starting a business, funding your business, protecting your technology/ business IP. Subject matter experts and successful, technology-based entrepreneurs will provide real world examples from their experience with entrepreneurship. Learn about the world class entrepreneurship ecosystem at ISU and Central Iowa. Offered on a satisfactory-fail basis only. (Typically Offered: Fall, Spring)