INTERDISCIPLINARY COURSES (ENGINEERING) (INTEREGR)

INTEREGR 130 – INTRODUCTION TO MECHANICS AND APPLICATIONS IN ENGINEERING
1 credit.

Introduction to mechanics and applications in engineering, including introduction to free body diagrams, spatial awareness, and how to use vectors in engineering applications.
Requisites: Consent of instructor
Repeatable for Credit: No
Last Taught: Summer 2025
Learning Outcomes: 1. Correctly use basic mathematics concepts that are applied to introductory mechanics and connect math to conceptual physical understanding
Audience: Undergraduate

2. Practice 3D spatial awareness/reasoning
Audience: Undergraduate

3. Apply problem-solving strategies to physical problems, including evaluating engineering problem solving approaches.
Audience: Undergraduate

4. Demonstrate group problem solving skills through assessment of peers' ideas and work, discussion of alternate approaches, and explanation of solutions
Audience: Undergraduate

5. Effectively communicate problem solving processes and results through writing and diagrams.
Audience: Undergraduate

INTEREGR 140 – SUCCESS IN ENGINEERING ACADEMICS
1 credit.

Learn and practice evidence-based strategies for success as an engineering student. Topics include study skills, time management, career exploration, academic writing, academic reading comprehension, motivation and self-directed learning.
Requisites: None
Repeatable for Credit: No
Last Taught: Spring 2025
Learning Outcomes: 1. Practice evidence based learning strategies (such as elaboration, recall, spaced practice)
Audience: Undergraduate

2. Develop and implement time-management techniques
Audience: Undergraduate

3. Practice problem solving strategies
Audience: Undergraduate

4. Identify the tools for being a successful engineering student
Audience: Undergraduate

INTEREGR 150 – DIRECTED STUDIES IN ENGINEERING FOUNDATION COURSES
0 credits.

Directed study through College of Engineering Supplementary Instruction program. Group discussion and problem-solving coaching to enhance understanding of physics and its applications to engineering.
Requisites: None
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Spring 2025

INTEREGR 170 – DESIGN PRACTICUM
3 credits.

Introduction to design via the invention, fabrication and testing of a device that solves a problem proposed by a real world client. Information retrieval techniques, specification writing, methods for enhancing creativity, analysis techniques, scheduling, selection methodologies, cost estimating, sustainability in design, shop safety, engineering ethics, opportunities for engineering students (ie, study abroad, internships, co-ops), major exploration, fabrication equipment and techniques, and oral and written communication.
Requisites: None
Repeatable for Credit: No
Last Taught: Spring 2025
Learning Outcomes: 1. Learn the fundamentals of the engineering design process and then apply them in a laboratory setting by working on a novel, client-based, hands-on engineering challenge.
Audience: Undergraduate

2. Develop individual learning and cooperative teamwork skills through conduct of independent research and collaborative problem solving in a team setting.
Audience: Undergraduate

3. Promote diversity and inclusiveness through exercises designed to create multicultural awareness of, and respect for, individual differences in experience, learning style, and academic interests.
Audience: Undergraduate

4. Effect professional development through team-building activities, practice in personal and professional communication, leadership, project management, and engineering ethics.
Audience: Undergraduate

5. Utilize academic research, creativity, innovation, fabrication, testing, and design iteration to develop effective decision-making and problem-solving skills.
Audience: Undergraduate

6. Practice effective technical communication skills through maintaining a design notebook, giving oral presentations, and writing a technical report.
Audience: Undergraduate

7. Participate in COE shop training to obtain the basic skills required for prototype fabrication and as a prerequisite for more advanced training in subsequent design courses.
Audience: Undergraduate

8. Develop professional teaching and leadership skills in junior and senior engineering student assistants through peer-mentoring and training activities during the course.
Audience: Undergraduate

9. Define engineering and learn the fundamentals of the engineering design process
Audience: Undergraduate

10. Major exploration and self reflection
Audience: Undergraduate

11. Learn pertinent information to maximize success as an engineering student
Audience: Undergraduate

INTEREGR 275 – TECHNICAL PRESENTATIONS
2 credits.

Principles and theory of effective oral technical presentations. Provides a framework for applying the principles in professional settings common to the engineering profession. Preparation, delivery, and evaluation of oral presentation on technical subjects, analysis of professional "real-world" technical presentations, survey of presentation technology, self-analysis including listening and non-verbal skills, and practice of group discussion and interview skills.
Requisites: Sophomore standing
Repeatable for Credit: No
Last Taught: Summer 2025
Learning Outcomes: 1. Present technical concepts and information to a general audience without oversimplifying or losing technical complexity
Audience: Undergraduate

2. Deliver a compelling technical presentation
Audience: Undergraduate

3. Develop a compelling argument about a unique research question
Audience: Undergraduate

4. Conduct relevant and credible research to enhance presentation value
Audience: Undergraduate

5. Design well-organized, informative, clear, engaging visuals that enhance but do not dominate the presentation
Audience: Undergraduate

6. Anticipate or identify audience expectations and concerns and to address them appropriately in your presentation
Audience: Undergraduate

7. Work in teams to prepare and practice discussing cases in engineering ethics
Audience: Undergraduate

INTEREGR 303 – APPLIED LEADERSHIP COMPETENCIES IN ENGINEERING
3 credits.

Introduction to basic leadership theories and perspectives; application of said theories to real-life experiences (both engineering and otherwise) through reflections, course discussion, readings, and experiential education in their local communities. Social Change Model of Leadership Development and Servant Leadership theory, viewed through an Applied Critical Leadership Theory lens.
Requisites: None
Repeatable for Credit: No
Last Taught: Spring 2025
Learning Outcomes: 1. Identify the leadership role that engineering professionals play in service to a breadth of social, political, environmental, economic, and global issues
Audience: Undergraduate

2. Apply and reflect on the "Seven C's" of the Social Change Model through engaging as servant leaders in a stewardship service project
Audience: Undergraduate

3. Apply teamwork and leadership skills necessary to embrace individual differences and help groups collaborate on shared aims and values
Audience: Undergraduate

4. Identify and describe one's own individual strengths, and be able to identify and honor the strengths in others
Audience: Undergraduate

5. Communicate comfortably and professionally with peers, practicing engineers, and adult professionals
Audience: Undergraduate

6. Reflect upon and understand one's own responsibility to strive for self-awareness, empathy, authenticity, vulnerability, and curiosity when working on leadership skill attainment
Audience: Undergraduate

7. Utilize a critical race perspective to address leadership challenges found in personal and professional experiences to achieve change in response to power, domination, access, and achievement imbalances
Audience: Undergraduate

INTEREGR 397 – ENGINEERING COMMUNICATION
3 credits.

Communication for engineering, science, and technology; theory and practice in planning, preparing, and critiquing reports, proposals, and workplace correspondence; persuasive argumentation, ethical decision-making strategies, multidisciplinary communication skills, research strategies, collaborative work; oral presentations.
Requisites: Satisfied Communications A requirement and junior or senior standing only
Course Designation: Gen Ed - Communication Part B
Repeatable for Credit: No
Last Taught: Summer 2025
Learning Outcomes: 1. Identify a focused technical project, then research, organize, draft, apply feedback, develop, and revise technical writing and presentations for a multidisciplinary, professional audience
Audience: Undergraduate

2. Retrieve, identify, and analyze credible research that can help develop and inform a technical problem
Audience: Undergraduate

3. Identify and describe contexts for engineering projects that address relevant social, ethical, environmental, economic, and political impacts
Audience: Undergraduate

4. Apply moral theories and professional codes to effectively analyze problems in engineering ethics and arrive at defensible actions
Audience: Undergraduate

5. Contribute to a team through creating a collaborative and inclusive environment, establishing goals, planning tasks, and meeting objectives
Audience: Undergraduate

INTEREGR 413 – CURRENT ISSUES IN INTERNATIONAL ENGINEERING
1 credit.

Provides a comparative examination and analysis of global trends and regional variations for engineering concepts, standards and practices. Using organizational case studies, the course will describe and analyze multi-national engineering operations and summarize best practices and caveats.
Requisites: Declared in International Engineering Certificate
Repeatable for Credit: No
Last Taught: Fall 2024

INTEREGR 477 – TOOLS FOR PROTOTYPING AND MANUFACTURING
1-3 credits.

Tools for prototyping and manufacturing physical objects along with some of the underlying theory for how the tools work. Tools include 3D printers, 3D scanners, thermoformers, CNC routers, welders, wood saws, mills, lathes, laser cutters, waterjets, machine tools, general electronics, microcontrollers and Virtual Reality.
Requisites: None
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Fall 2024
Learning Outcomes: 1. Implement prototyping as a design methodology that incorporates making, critical reflection, and iteration.
Audience: Both Grad & Undergrad

2. Use rapid prototyping and machining equipment and techniques safely.
Audience: Both Grad & Undergrad

3. Employ a set of prototyping techniques and approaches for concept development.
Audience: Both Grad & Undergrad

4. Work independently and collaboratively to generate a portfolio of hands-on projects using the various tools.
Audience: Both Grad & Undergrad

5. Apply engineering principles and equipment theory to troubleshoot while operating equipment.
Audience: Both Grad & Undergrad

6. Describe the current roles of the rapid prototyping and machining techniques in industry and research.
Audience: Graduate

INTEREGR 601 – TOPICS IN INTERDISCIPLINARY ENGINEERING
1-3 credits.

Interdisciplinary topics of special interest to undergrad and grad students in engineering.
Requisites: None
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Spring 2025

INTEREGR 941 – COLLABORATIVE CAPSTONE II
3 credits.

Explore chosen opportunity area through prototyping, user testing, and iteration. Creation of final, high resolution design, with communication and launch plan for startup, product or service. Practice behaviors of design thinking - ethics, critique, and storytelling.
Requisites: INTER-HE 940
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Spring 2025
Learning Outcomes: 1. Apply an iterative design thinking process on an interdisciplinary team.
Audience: Graduate

2. Generate creative ideas through structured brainstorming sessions.
Audience: Graduate

3. Develop and fabricate rapid prototypes using a wide range of techniques (physical, digital, etc.) to bring their ideas into reality as quickly as possible and obtain feedback.
Audience: Graduate

4. Deliver a clear, thoughtful design with evidence showing it is desirable, feasible, and viable.
Audience: Graduate

5. Communicate effectively, both visually and orally.
Audience: Graduate

6. Demonstrate constructive collaboration behaviors– creative critique, balancing independent work with group work, and knowing when to get an outside opinion.
Audience: Graduate