

ENGINEERING (ENGI)

ENGI 100 - INTRODUCTION TO SPATIAL VISUALIZATION

Short Title: INTRO SPATIAL VISUALIZATION

Department: Engineering Division

Grade Mode: Satisfactory/Unsatisfactory

Course Type: Laboratory

Credit Hour: 1

Restrictions: Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.

Course Level: Undergraduate Lower-Level

Description: The ability to mentally visualize in three dimensions is an important skill for engineers and scientists. In this course, students will move through ten different modules that will strengthen spatial reasoning and visualization skills. All assigned work will be completed during the scheduled class time. Only students scoring <70% on the PSVT:R will be allowed into the course. Course is limited to new first time matriculants only.

ENGI 101 - INTRODUCTION TO ENGINEERING PROGRAMS AT RICE

Short Title: INTRODUCTION TO ENGINEERING

Department: Engineering Division

Grade Mode: Satisfactory/Unsatisfactory

Course Type: Seminar

Credit Hour: 1

Restrictions: Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.

Course Level: Undergraduate Lower-Level

Description: Students will learn about the different engineering majors and career paths. In presentations by faculty members, the students will gain an understanding of the curricular requirements, professional skills and extracurricular activities that will prepare them to succeed at Rice and beyond.

ENGI 120 - INTRODUCTION TO ENGINEERING DESIGN

Short Title: INTRO TO ENGINEERING DESIGN

Department: Engineering Division

Grade Mode: Standard Letter

Course Type: Lecture

Credit Hours: 3

Restrictions: Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.

Course Level: Undergraduate Lower-Level

Description: Students learn the engineering design process and use it to solve meaningful problems drawn from the community and around the world. Teams of students evaluate design requirements and construct innovative solutions in the Oshman Engineering Design Kitchen. Students develop teaming and communication skills. Only first year students may enroll. Non-first year students wishing to take introductory engineering design may enroll in ENGI 220. ENGI 120 does not fulfill the FWIS requirement or carry D3 credit. Mutually Exclusive: Cannot register for ENGI 120 if student has credit for FWIS 188.

ENGI 128 - INTRODUCTION TO ENGINEERING SYSTEMS

Short Title: INTRO TO ENGINEERING SYSTEMS

Department: Engineering Division

Grade Mode: Standard Letter

Course Type: Lecture/Laboratory

Credit Hours: 3

Restrictions: Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.

Course Level: Undergraduate Lower-Level

Description: This course will be a fun, hands-on introduction to the key concepts of electrical/mechanical/computational systems. Each student will use a small mobile robot to learn about block diagrams, abstraction and modularity, energy storage and conservation, feedback and control, digital communications, and software design. All interested freshman are welcome, no previous experience or prerequisites are required. The course will conclude with a multi-robot final project.

ENGI 140 - ENGINEERING LEADERSHIP DEVELOPMENT

Short Title: ENG'G LEADERSHIP DEVELOPMENT

Department: Engineering Division

Grade Mode: Standard Letter

Course Type: Lecture/Laboratory

Credit Hours: 2

Restrictions: Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.

Course Level: Undergraduate Lower-Level

Description: The purpose of this course is to prepare students to begin developing the skills, knowledge, and motivations needed to become an engineering leader. Learning methods for the class include assessments of current leadership skills, skill-learning via lectures and discussions, skill-practice and feedback via experiential exercises, and skill development via self-directed action planning. Major deliverables for the class include an autobiographical paper, an engineering leadership portfolio, and a leadership development plan. Mutually Exclusive: Cannot register for ENGI 140 if student has credit for RCEL 100/RCEL 200.

Course URL: rcel.rice.edu (<http://rcel.rice.edu>)

ENGI 150 - SURVEY OF ENGINEERING DISCIPLINES

Short Title: SURVEY OF ENGR DISCIPLINES

Department: Engineering Division

Grade Mode: Satisfactory/Unsatisfactory

Course Type: Seminar

Credit Hour: 1

Restrictions: Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.

Course Level: Undergraduate Lower-Level

Description: This seminar provides a survey of practice of engineering, including traditional and non-traditional career paths; graduate and professional options; and introductions to ethics, intellectual property, and written and oral communication. Engineering departments will provide overviews of their specific disciplines. Assignments include team presentations. Instructor Permission Required.

ENGI 200 - ENGINEERING DESIGN STUDIO**Short Title:** ENGINEERING DESIGN STUDIO**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Laboratory**Credit Hours:** 3**Restrictions:** Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.**Course Level:** Undergraduate Lower-Level**Prerequisite(s):** ENGI 120 or FWIS 188 or ENGI 220**Description:** Graduates of ENGI 120 and ENGI 220 will have the opportunity to gain a more in-depth knowledge of the engineering design process by furthering progress on specific engineering design projects. Students may extend their project work by completing advanced prototyping for their designs and conduct testing. Students will be held accountable through technical mentorship, weekly meetings, and prototype evaluations. Students will only work in design teams. Student teams wishing to continue their projects from ENGI 120/220 may apply.**ENGI 202 - INDEPENDENT STUDY IN ENGINEERING DESIGN PROCESS****Short Title:** IS IN EDP**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Independent Study**Credit Hours:** 1-2**Course Level:** Undergraduate Lower-Level**Prerequisite(s):** ENGI 120 or FWIS 188 or ENGI 220**Description:** Graduates of ENGI 120 and ENGI 220 will have the opportunity to gain a more in-depth knowledge of the engineering design process by furthering progress on specific engineering design projects. Students may extend their project work by completing advanced prototyping for their designs and conduct testing. Students will be held accountable through technical mentorship, weekly meetings, and prototype evaluations. Students will only work in design teams. Student teams wishing to continue their projects from ENGI 120/220 may apply.**ENGI 210 - PROTOTYPING AND FABRICATION****Short Title:** PROTOTYPING & FABRICATION**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Lecture/Laboratory**Credit Hours:** 3**Restrictions:** Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.**Course Level:** Undergraduate Lower-Level**Prerequisite(s):** ENGI 120 or FWIS 188 or ENGI 220**Description:** Students in ENGI 210 will learn and practice advanced prototyping and fabrication skills useful in the construction of physical objects for engineering design projects. The course is structured as lecture and demonstration of basic and advanced prototyping techniques and out-of-class work practicing and honing the application of these techniques. Example techniques include low fidelity prototyping, 2D and 3D Computer Aided Design, electronics, foam cutting, laser cutting, plasma cutting, 3D printing, and molding/casting methods. Students will individually apply these techniques to create physical objects. Graduate/Undergraduate Equivalency: ENGI 599.**Course URL:** engi210.blogs.rice.edu (<http://engi210.blogs.rice.edu>)**ENGI 218 - ENGINEERING LEADERSHIP LAB I****Short Title:** ENGINEERING LEADERSHIP LAB I**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Laboratory**Credit Hour:** 1**Restrictions:** Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.**Course Level:** Undergraduate Lower-Level**Description:** Students develop a variety of leadership skills and abilities by solving weekly engineering challenges in small teams. Students practice various roles as team members and leaders, then receive rapid performance assessments and mentoring from fellow students and staff. Mutually Exclusive: Cannot register for ENGI 218 if student has credit for RCEL 100/RCEL 200.**ENGI 219 - ENGINEERING LEADERSHIP LAB II****Short Title:** ENGINEERING LEADERSHIP LAB II**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Laboratory**Credit Hour:** 1**Restrictions:** Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.**Course Level:** Undergraduate Lower-Level**Prerequisite(s):** ENGI 218**Description:** Students develop a variety of leadership skills and abilities by solving weekly engineering challenges in small teams. Students practice various roles as team members and leaders, then receive rapid performance assessments and mentoring from fellow students and staff. Instructor Permission Required. Mutually Exclusive: Cannot register for ENGI 219 if student has credit for RCEL 300/RCEL 400.**Course URL:** rcele.rice.edu/courses (<http://rcele.rice.edu/courses/>)**ENGI 220 - INTRODUCTION TO ENGINEERING DESIGN II****Short Title:** INTRO TO ENGINEERING DESIGN II**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Lecture/Laboratory**Credit Hours:** 3**Restrictions:** Students with a class of Freshman may not enroll. Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.**Course Level:** Undergraduate Lower-Level**Description:** Students learn the engineering design process and use it to solve meaningful problems drawn from the community and around the world. Teams of students evaluate design requirements and construct innovative solutions in the Oshman Engineering Design Kitchen. Students develop teaming and communication skills. Students may not be in their first year of school. First year students wishing to take introductory engineering design may enroll in ENGI 120. ENGI 220 is taught as the same time as ENGI 120.

ENGI 221 - NEW ENTERPRISES: DISCOVERY**Short Title:** NEW ENTERPRISES: DISCOVERY**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Lecture/Laboratory**Credit Hours:** 3**Restrictions:** Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.**Course Level:** Undergraduate Lower-Level**Description:** New Enterprises: Discovery emphasizes exploration, research, and discovery to uncover problems that are worth solving. In this course, you'll explore multiple areas of personal interest to decide whether there are viable options for you to pursue as a startup venture or an innovation you want to bring to the world. Cross-list: BUSI 221.**ENGI 238 - SPECIAL TOPICS****Short Title:** SPECIAL TOPICS**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Internship/Practicum, Laboratory, Lecture, Seminar, Independent Study**Credit Hours:** 1-4**Restrictions:** Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.**Course Level:** Undergraduate Lower-Level**Description:** Topics and credit hours vary each semester. Contact department for current semester's topic(s). Repeatable for Credit.**ENGI 241 - PROFESSIONAL EXCELLENCE FOR ENGINEERS****Short Title:** PROF EXCELLENCE FOR ENGINEERS**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Internship/Practicum**Credit Hour:** 1**Restrictions:** Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.**Course Level:** Undergraduate Lower-Level**Description:** Guided career and professional development course for engineering students, which includes required practicum and workplace experience. Instructor Permission Required. Mutually Exclusive: Cannot register for ENGI 241 if student has credit for RCEL 241.**Course URL:** rce1.rice.edu/courses (<http://rce1.rice.edu/courses/>)**ENGI 300 - ENGINEERING DESIGN WORKSHOP****Short Title:** ENGINEERING DESIGN WORKSHOP**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Independent Study**Credit Hours:** 1-3**Restrictions:** Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.**Course Level:** Undergraduate Upper-Level**Description:** Advanced design students will have the opportunity to further their design projects in an independent study course. Students will work with faculty to develop their own schedule, set their own deadlines, goals, and expectations to be met for grading purposes. Students may complete advanced prototyping for their designs, conduct tests, perform safety evaluations with external committee and/or write up their work for publication. The specific tasks that will be completed are dependent on the project needs. Students will be held accountable through technical mentorship, weekly meetings, and prototype evaluations. To be eligible for ENGI 300 students must have taken ENGI 120 (or equivalent), ENGI 210, and ENGI 200. Instructor Permission Required. Repeatable for Credit.**ENGI 301 - INTRODUCTION TO PRACTICAL ELECTRICAL ENGINEERING****Short Title:** INTRO TO PRACTICAL EE**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Lecture**Credit Hours:** 3**Restrictions:** Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.**Course Level:** Undergraduate Upper-Level**Prerequisite(s):** ENGI 120 or ENGI 220 or FWIS 188**Description:** Students will acquire intermediate-level proficiency in the tools (both physical and software) used to design, build and debug embedded hardware designs. Students will learn the basics of electronic components and how to use those components in a successful embedded hardware design.**ENGI 302 - SUSTAINABLE DESIGN****Short Title:** SUSTAINABLE DESIGN**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Lecture**Distribution Group:** Distribution Group III**Credit Hours:** 3**Restrictions:** Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.**Course Level:** Undergraduate Upper-Level**Description:** The objective of this course is to develop skills in formulating and solving problems of societal development and advancement in light of increasing material, energy and water demands and decreasing resource availability. Sustainable design requires balancing economic, ecological/environmental and social issues to create physical as well as social structures that will work for current and future generations. In addition to learning to apply sustainable design principles to individual engineering and developing projects, students will be challenged to understand the application of sustainable design thinking at the municipal and corporate level. Cross-list: CEVE 302.

ENGI 303 - ENGINEERING ECONOMICS**Short Title:** ENGINEERING ECONOMICS**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Lecture**Credit Hours:** 3**Restrictions:** Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.**Course Level:** Undergraduate Upper-Level**Description:** Introduction to the evaluation of alternative investment opportunities with emphasis on engineering projects and capital infrastructure. Time value of money concepts are developed in the context of detailed project evaluation and presentations. In addition, concepts and applications of risk analysis and investment under uncertainty are introduced. Requires oral and written presentations by students. Cross-list: CEVE 322. Graduate/Undergraduate Equivalency: ENGI 528. Mutually Exclusive: Cannot register for ENGI 303 if student has credit for RCEL 505.**ENGI 311 - LEADING CHANGE - REVOLUTIONARY MOMENTS IN ENGINEERING AND SOCIETY****Short Title:** LEADING CHANGE IN ENGINEERING**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Lecture**Credit Hours:** 3**Restrictions:** Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.**Course Level:** Undergraduate Upper-Level**Description:** The course examines the impact of engineering on human history by exploring the social context, leadership frameworks, and societal impact of advances in technology. Students explore the social and political implications of emergent technology, with an emphasis on how these advances build upon and reify ideological paradigms and socio-economic systems. Graduate/Undergraduate Equivalency: ENGI 511. Mutually Exclusive: Cannot register for ENGI 311 if student has credit for ENGI 511.**ENGI 315 - LEADING TEAMS AND INNOVATION****Short Title:** LEADING TEAMS AND INNOVATION**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Lecture**Credit Hours:** 3**Restrictions:** Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.**Course Level:** Undergraduate Upper-Level**Description:** Students learn the principles of engineering leadership, strategies for launching and leading engineering teams, and methods for utilizing creativity and innovation in engineering environments. Learning methods include case studies, simulations, group projects, and interactions with industry professionals. Graduate/Undergraduate Equivalency: ENGI 515. Mutually Exclusive: Cannot register for ENGI 315 if student has credit for ENGI 515/RCEL 300/RCEL 400.**Course URL:** rcele.rice.edu (<http://rcele.rice.edu>)**ENGI 317 - LEADERSHIP ACTION LEARNING****Short Title:** LEADERSHIP ACTION LEARNING**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Laboratory**Credit Hours:** 2**Restrictions:** Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.**Course Level:** Undergraduate Upper-Level**Description:** This course allows students to practice leadership skills in an applied context as the leader of a team or project with a defined scope, schedule, and goal. Students will identify areas of leadership growth, and receive guided mentorship and feedback as they develop these skills through practice. Mutually Exclusive: Cannot register for ENGI 317 if student has credit for RCEL 450.**ENGI 318 - LEADING ENGINEERING LEADERSHIP LAB I****Short Title:** LEADING ENG LEADERSHIP LAB I**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Laboratory**Credit Hour:** 1**Restrictions:** Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.**Course Level:** Undergraduate Upper-Level**Prerequisite(s):** ENGI 315**Description:** Students organize, execute, and debrief the leadership development activities completed by novice students in ENGI 218 (Engineering Leadership Lab I). ENGI 318 students learn advanced leadership and communication skills; get frequent practice delivering feedback; and receive intensive mentoring from course staff.**ENGI 319 - LEADING ENGINEERING LEADERSHIP LAB II****Short Title:** LEADING ENG LEADERSHIP LAB II**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Laboratory**Credit Hour:** 1**Restrictions:** Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.**Course Level:** Undergraduate Upper-Level**Prerequisite(s):** ENGI 315**Description:** Students organize, execute, and debrief the leadership development activities completed by novice students in ENGI 219 (Engineering Leadership Lab II). ENGI 319 students learn advanced leadership and communication skills; get frequent practice delivering feedback; and receive intensive mentoring from course staff. This course is a continuation of ENGI 318. Instructor Permission Required.

ENGI 320 - ETHICS AND ENGINEERING LEADERSHIP**Short Title:** ETHICS & ENGINEERING LEADERSHIP**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Lecture**Credit Hours:** 3

Restrictions: Enrollment is limited to students with a major in Civil & Environmental Engineer, Civil Engineering or Environment Analysis&Decisions. Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.

Course Level: Undergraduate Upper-Level**Prerequisite(s):** CEVE 101

Description: Seminar introduces students to a framework for discussing and making ethical engineering and professional decisions. Using case studies and exercises, students will look at their own profession and its Engineering Code of Ethics as well as at the issues and risks they may face as managers and executives. Cross-list: CEVE 320. Graduate/Undergraduate Equivalency: ENGI 529. Mutually Exclusive: Cannot register for ENGI 320 if student has credit for ENGI 529.

ENGI 330 - ENGINEERING PRACTICUM**Short Title:** ENGINEERING PRACTICUM**Department:** Engineering Division**Grade Mode:** Satisfactory/Unsatisfactory**Course Type:** Internship/Practicum**Credit Hour:** 1

Restrictions: Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.

Course Level: Undergraduate Upper-Level

Description: This undergraduate course is designed to supplement technical coursework in the school of engineering with practical application and reflection on the challenges and value of applying knowledge to real-world problems in professional settings. Student undertakes a work internship and writes a report under supervision of a faculty member. NOTE: Instructor permission required, and must be obtained prior to the start of the internship. If interested in this course, please work with your Major Advisor and, if you are an international student, OISS to secure an approved internship opportunity. Once an internship is secured, contact Jen Mashburn (mashburn@rice.edu) for a copy of the course Syllabus & Student Agreement. Instructor Permission Required. Graduate/Undergraduate Equivalency: ENGI 530. Repeatable for Credit.

ENGI 350 - NEEDS IDENTIFICATION AND DESIGN IMPLEMENTATION**Short Title:** NEEDS ID & DESIGN IMPLEMENT**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Lecture**Credit Hours:** 3

Restrictions: Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.

Course Level: Undergraduate Upper-Level**Prerequisite(s):** ENGI 120 or ENGI 200 or FWIS 188

Description: Students in this course will identify needs situated in two or more environments, and learn to ask questions that elucidate the problem, needed features and criteria for success. Students also develop implementation plans and conduct testing for refined design solutions that may include standards and safety compliance, patent applications, and manufacturing and user documents.

ENGI 355 - DIGITAL DESIGN AND VISUALIZATION**Short Title:** DIGITAL DESIGN & VISUALIZATION**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Lecture/Laboratory**Credit Hours:** 3

Restrictions: Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.

Course Level: Undergraduate Upper-Level**Prerequisite(s):** ENGI 120 or ENGI 220 or FWIS 188

Description: Students will acquire intermediate-level proficiency in the creation of virtual models and engineering drawings using computer aided design. Emphasis will be placed on best modeling practices including efficient part creation, dimensioning, tolerancing, and formatting of engineering drawings. Students will use a number of programs to format data and create models.

ENGI 390 - ENGINEERING ETHICS SEMINAR**Short Title:** ENGINEERING ETHICS**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Seminar**Credit Hour:** 1

Restrictions: Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.

Course Level: Undergraduate Upper-Level

Description: This discussion based class will focus on situations that can occur during a career in engineering that present ethical dilemmas, with emphasis in helping the students develop a skill set for tackling these challenges through immersive case studies.

ENGI 400 - PRESENTATION SKILLS FOR ENGINEERS**Short Title:** TECHNICAL PRESENTATIONS**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Studio**Credit Hour:** 1

Restrictions: Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.

Course Level: Undergraduate Upper-Level

Description: This course prepares engineering students to communicate complex concepts and data to different audiences. The instruction focuses on strategy, delivery, slide design, and audience interaction. Students will learn to give effective informative presentations, data presentations, demonstrations, progress reports, proposal presentations, and impromptu presentations.

ENGI 425 - PITCHING NEW IDEAS TO WIN**Short Title:** PITCHING NEW IDEAS**Department:** Engineering Division**Grade Mode:** Satisfactory/Unsatisfactory**Course Type:** Seminar**Credit Hour:** 1**Restrictions:** Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.**Course Level:** Undergraduate Upper-Level

Description: To succeed, you must pitch new ideas effectively or those ideas die. In ENGI 525, you will learn how to pitch, whether design, research, or startup ideas, so you win in high-stakes situations. Learning takes place through several rounds of hands-on coaching and practice with faculty and peers. You will acquire strategies to capture the interest of professional audiences and secure prized opportunities. Graduate/Undergraduate Equivalency: ENGI 525. Mutually Exclusive: Cannot register for ENGI 425 if student has credit for ENGI 525. Cross-list: ENGI 525. Mutually Exclusive: Cannot register for ENGI 425 if student has credit for ENGI 525. Graduate/Undergraduate Equivalency: ENGI 525. Mutually Exclusive: Cannot register for ENGI 425 if student has credit for ENGI 525.

ENGI 428 - ENTREPRENEURSHIP INDEPENDENT STUDY**Short Title:** ENTREPRENEURSHIP IND STUDY**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Independent Study**Credit Hour:** 1**Restrictions:** Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.**Course Level:** Undergraduate Upper-Level

Description: Students who have completed entrepreneurship coursework/training may use this course to learn the process of developing startups or launching new ventures. Students will meet weekly with course instructors and complete periodic assignments on advancing ventures. Instructor Permission Required.

ENGI 455 - ENGINEERING PERSUASION: HOW TO DRIVE DECISIONS AND CHANGE**Short Title:** ENGINEERING PERSUASION**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Lecture**Credit Hours:** 2**Restrictions:** Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.**Course Level:** Undergraduate Upper-Level

Description: Engineers require persuasion to fuel technology change. You will learn approaches to convince others of the quality of your work. These simple but powerful approaches account for high-stakes success in design discussions, product adoption, and investor pitching. Graduate/Undergraduate Equivalency: ENGI 555. Mutually Exclusive: Cannot register for ENGI 455 if student has credit for ENGI 555. Graduate/Undergraduate Equivalency: ENGI 555. Mutually Exclusive: Cannot register for ENGI 455 if student has credit for ENGI 555.

ENGI 477 - SPECIAL TOPICS**Short Title:** SPECIAL TOPICS**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Internship/Practicum, Seminar, Lecture, Laboratory**Credit Hours:** 1-4**Restrictions:** Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.**Course Level:** Undergraduate Upper-Level

Description: Topics and credit hours vary each semester. Contact department for current semester's topic(s). Repeatable for Credit.

ENGI 480 - PEDAGOGY FOR ENGINEERING DESIGN AND WRITING MENTORS**Short Title:** PEDAGOGY FOR ENGINEERING DESIG**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Seminar**Credit Hour:** 1**Restrictions:** Enrollment is limited to Undergraduate, Undergraduate Professional or Visiting Undergraduate level students.**Course Level:** Undergraduate Upper-Level**Prerequisite(s):** ENGI 120 or FWIS 188 or ENGI 220

Description: This course is designed to support Engineering Design and Writing Mentors as they instruct their individual teams in ENGI 120/ FWIS 188/ENGI 220. Topics include pedagogy of engineering education, applying the engineering design process, writing in the discipline, engineering concepts, issues of problem-based learning (PBL), theories of learning, and fundamental teaching skills. Required for ENGI 120/ FWIS 188/ENGI 220 DMs and WMs. Repeatable for Credit. Instructor Permission Required. Repeatable for Credit.

ENGI 501 - WORKPLACE COMMUNICATION FOR PROFESSIONAL MASTER'S STUDENTS IN ENGINEERING**Short Title:** WORKPLACE COMMUNICATION**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Seminar**Credit Hours:** 3

Restrictions: Enrollment is limited to Graduate level students. Enrollment limited to students in a Master Materials Sci & NanoEng, Master of Bioengineering, Master of Chemical Eng, Master of Civil & Env Eng, Master of Comp & Appl Math, Master of Comp Sci & Eng, Master of Computer Science, Master of Data Science, Master of Electrical Comp Eng, Master of Electrical Eng, Master of Industrial Eng, Master of Mechanical Eng or Master of Statistics degrees.

Course Level: Graduate

Description: This course will equip students with strategies to communicate more successfully on the job. Students will improve their written, oral, visual and interpersonal communication skills through formal and informal assignments, in-class activities, practice, and feedback.

ENGI 505 - ENGINEERING ECONOMICS AND PROJECT MANAGEMENT**Short Title:** ENG ECONOMICS & PROJECT MGMT**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Lecture**Credit Hours:** 3**Restrictions:** Enrollment is limited to students with a major in Environment Analysis&Decisions. Enrollment is limited to Graduate level students. Students in a Doctor of Philosophy degree may not enroll.**Course Level:** Graduate**Description:** Life cycle economics analysis to project development, project economic analysis, contracting, network scheduling, risk management, organizational structures and cases. 505 requires an additional paper. Cross-list: CEVE 505. Mutually Exclusive: Cannot register for ENGI 505 if student has credit for CEVE 301/CEVE 479.**ENGI 510 - TECHNICAL AND MANAGERIAL COMMUNICATIONS****Short Title:** TECHNICAL AND MANAGERIAL COMM**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Seminar**Credit Hours:** 3**Restrictions:** Enrollment is limited to Graduate level students. Enrollment limited to students in a Master Materials Sci & NanoEng, Master of Bioengineering, Master of Chemical Eng, Master of Civil & Env Eng, Master of Comp & Appl Math, Master of Comp Sci & Eng, Master of Computer Science, Master of Data Science, Master of Electrical Comp Eng, Master of Electrical Eng, Master of Eng Mgmt & Leadership, Master of Industrial Eng, Master of Mechanical Eng or Master of Statistics degrees.**Course Level:** Graduate**Description:** In this communications course designed for Engineering Professional Master's Program (EPMP) students, the approach will be experiential and interactive, with in-class exercises, analyses, and presentations. The focus will be on your practicing and refining the oral, written, and interpersonal skills you will need in your professional career. You should be prepared to participate in class. If you are a non-native speaker, you should be very proficient speaking and writing English. Preference will be given to EPMP students. Mutually Exclusive: Cannot register for ENGI 510 if student has credit for COMP 604.**ENGI 511 - LEADING CHANGE - REVOLUTIONARY MOMENTS IN ENGINEERING AND SOCIETY****Short Title:** LEADING CHANGE IN ENGINEERING**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Lecture**Credit Hours:** 3**Restrictions:** Enrollment is limited to Graduate level students.**Course Level:** Graduate**Description:** The course examines the impact of engineering on human history by exploring the social context, leadership frameworks, and societal impact of advances in technology. Students explore the social and political implications of emergent technology, with an emphasis on how these advances build upon and reify ideological paradigms and socio-economic systems. Graduate/Undergraduate Equivalency: ENGI 311. Mutually Exclusive: Cannot register for ENGI 511 if student has credit for ENGI 311.**ENGI 515 - LEADING TEAMS AND INNOVATION****Short Title:** LEADING TEAMS AND INNOVATION**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Lecture**Credit Hours:** 3**Restrictions:** Enrollment is limited to Graduate level students.**Course Level:** Graduate**Description:** Students learn the principles of engineering leadership, strategies for launching and leading engineering teams, and methods for utilizing creativity and innovation in engineering environments. Learning methods include case studies, simulations, group projects, and interactions with industry professionals. Graduate students are required to complete an additional paper focusing on leadership development. Instructor Permission Required. Graduate/Undergraduate Equivalency: ENGI 315. Mutually Exclusive: Cannot register for ENGI 515 if student has credit for ENGI 315.**Course URL:** rcel.rice.edu (<http://rcel.rice.edu>)**ENGI 525 - PITCHING NEW IDEAS TO WIN****Short Title:** PITCHING NEW IDEAS**Department:** Engineering Division**Grade Mode:** Satisfactory/Unsatisfactory**Course Type:** Seminar**Credit Hour:** 1**Restrictions:** Enrollment is limited to Graduate level students.**Course Level:** Graduate**Description:** To succeed, you must pitch new ideas effectively or those ideas die. In ENGI 525, you will learn how to pitch, whether design, research, or startup ideas, so you win in high-stakes situations. Learning takes place through several rounds of hands-on coaching and practice with faculty and peers. You will acquire strategies to capture the interest of professional audiences and secure prized opportunities. Graduate/Undergraduate Equivalency: ENGI 425. Mutually Exclusive: Cannot register for ENGI 525 if student has credit for ENGI 425.**ENGI 528 - ENGINEERING ECONOMICS****Short Title:** ENGINEERING ECONOMICS**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Lecture**Credit Hours:** 3**Restrictions:** Enrollment is limited to Graduate level students.**Course Level:** Graduate**Description:** Introduction to the evaluation of alternative investment opportunities with emphasis on engineering projects and capital infrastructure. Time value of money concepts are developed in the context of detailed project evaluation and presentations. In addition, concepts and applications of risk analysis and investment under uncertainty are developed. Requires oral and written presentations by students. Grad students will have an extra case study to perform. Cross-list: CEVE 528. Graduate/Undergraduate Equivalency: ENGI 303. Mutually Exclusive: Cannot register for ENGI 528 if student has credit for RCEL 505.

ENGI 529 - ETHICS AND ENGINEERING LEADERSHIP**Short Title:** ETHICS & ENGINEERING LEADERSHIP**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Lecture**Credit Hours:** 3**Restrictions:** Enrollment is limited to students with a major in Civil & Environmental Engineer, Civil Engineering or Environment Analysis&Decisions. Enrollment is limited to Graduate level students.**Course Level:** Graduate**Description:** Seminar introduces students to a framework for discussing and making ethical engineering and professional decisions. Using case studies and exercises, students will look at their own profession and its Engineering Code of Ethics as well as at the issues and risks they may face as managers and executives. Graduate students will do an extra paper. Instructor Permission Required. Cross-list: CEVE 529. Graduate/Undergraduate Equivalency: ENGI 320. Mutually Exclusive: Cannot register for ENGI 529 if student has credit for COMP 604/ENGI 320.**ENGI 530 - ENGINEERING PRACTICUM****Short Title:** ENGINEERING PRACTICUM**Department:** Engineering Division**Grade Mode:** Satisfactory/Unsatisfactory**Course Type:** Internship/Practicum**Credit Hour:** 1**Restrictions:** Enrollment is limited to Graduate level students.**Course Level:** Graduate**Description:** This graduate course is designed to supplement technical coursework in the school of engineering with practical application and reflection on the challenges and value of applying knowledge to real-world problems in professional settings. Students undertake a work internship and write a report under supervision of a faculty member. NOTE: Instructor permission required, and must be obtained prior to the start of the internship. If interested in this course, please work with your Major Advisor and, if you are an international student, OISS to secure an approved internship opportunity. Once an internship is secured, contact Jen Mashburn (mashburn@rice.edu) for a copy of the course Syllabus & Student Agreement. Instructor Permission Required. Graduate/Undergraduate Equivalency: ENGI 330. Repeatable for Credit.**ENGI 555 - ENGINEERING PERSUASION: HOW TO DRIVE DECISIONS AND CHANGE****Short Title:** ENGINEERING PERSUASION**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Lecture**Credit Hours:** 3**Restrictions:** Enrollment is limited to Graduate level students.**Course Level:** Graduate**Description:** Engineers require persuasion to fuel technology change. You will learn approaches to convince others of the quality of your work. These simple but powerful approaches account for high-stakes success in design discussions, product adoption, and investor pitching. ENGI 555 includes more advanced assignments and/or examinations than ENGI 455. Graduate/Undergraduate Equivalency: ENGI 455. Mutually Exclusive: Cannot register for ENGI 555 if student has credit for ENGI 455. Graduate/Undergraduate Equivalency: ENGI 455. Mutually Exclusive: Cannot register for ENGI 555 if student has credit for ENGI 455.**ENGI 599 - PROTOTYPING AND FABRICATION****Short Title:** PROTOTYPING & FABRICATION**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Lecture/Laboratory**Credit Hours:** 3**Restrictions:** Enrollment is limited to Graduate level students.**Course Level:** Graduate**Description:** Students in ENGI 599 will learn and practice advanced prototyping and fabrication skills useful in the construction of physical objects for engineering design projects. The course is structured as lecture and demonstration of basic and advanced prototyping techniques and out-of-class work practicing and honing the application of these techniques. Example techniques include low fidelity prototyping, 2D and 3D Computer Aided Design, electronics, foam cutting, laser cutting, plasma cutting, 3D printing, and molding/casting methods. Students will individually apply these techniques to create physical objects. Instructor Permission Required. Graduate/Undergraduate Equivalency: ENGI 210. **Course URL:** engi210.blogs.rice.edu (<http://engi210.blogs.rice.edu>)**ENGI 600 - WRITTEN AND ORAL COMMUNICATION SEMINAR FOR ENGINEERING GRADUATE STUDENTS****Short Title:** GRADUATE COMMUNICATIONS SEM**Department:** Engineering Division**Grade Mode:** Satisfactory/Unsatisfactory**Course Type:** Seminar**Credit Hour:** 1**Restrictions:** Enrollment is limited to Graduate level students.**Course Level:** Graduate**Description:** To be a successful researcher, you must be able to explain, defend, and promote your work to maximize its impact. This interactive seminar is open to engineers actively writing a paper for publication, an extended PhD proposal, a Master's thesis, or a PhD dissertation. The assignments are designed to help you frame and develop your research story in clear, compelling terms. Topics include textual and visual abstracts, composition, data presentation, plagiarism, structure, flow and emphasis.**ENGI 601 - ENGINEERING COMMUNICATIONS WORKSHOP****Short Title:** ENGINEERING COMM WORKSHOP**Department:** Engineering Division**Grade Mode:** Satisfactory/Unsatisfactory**Course Type:** Lecture/Laboratory**Credit Hours:** 0**Restrictions:** Enrollment is limited to Graduate level students.**Course Level:** Graduate**Description:** Students will learn to communicate effectively about their work using 21st-century skills. They will learn what distinguishes high-quality written, oral, and visual communication in their field, and apply these criteria in crafting and revising their own poster, elevator speech, news release, professional website, conference presentation, research statement, and portion of their thesis or dissertation. Instructor Permission Required.

ENGI 610 - MANAGEMENT FOR SCIENCE AND ENGINEERING**Short Title:** MGT FOR SCIENCE/ENGINEERING**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Lecture**Credit Hours:** 3**Restrictions:** Enrollment is limited to Graduate level students.**Course Level:** Graduate

Description: This course is for graduate and undergraduate students who want to understand the basics of management in new and/or small technology-based businesses and is particularly relevant to students who are interested in careers in technology or entrepreneurial ventures. NSCI 610/ENGI 610 is team taught to provide insight into how technology oriented firms manage people, projects, accounting, marketing, strategy, intellectual property, organizations and entrepreneurship. Student's active participation is essential. Students who take this course are eligible for MGMT 625. Cross-list: NSCI 610.

ENGI 614 - LEARNING HOW TO INNOVATE?**Short Title:** LEARNING HOW TO INNOVATE?**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Lecture**Credit Hours:** 2**Restrictions:** Enrollment is limited to Graduate level students.**Course Level:** Graduate

Description: Innovation has become a buzzword. Many of us aspire to be successful innovators, but how? There is ample attention for entrepreneurship, but less is available to support your innovation ambition. This course aims to give you an unconventional innovation experience. Repeatable for Credit.

ENGI 615 - LEADERSHIP COACHING FOR ENGINEERS**Short Title:** LEADERSHIP COACHING FOR ENGR**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Lecture**Credit Hours:** 3**Restrictions:** Enrollment is limited to Graduate level students.**Course Level:** Graduate

Description: Leadership coaching is a professional skill that leaders use to enhance another person's ability to achieve their goals. Students will learn how to lead others in their own professional development through the use of coaching. This course emphasizes experiential learning and some graduates will be selected to become coaches to Rice engineering undergraduates. Repeatable for Credit.

ENGI 677 - SPECIAL TOPICS**Short Title:** SPECIAL TOPICS**Department:** Engineering Division**Grade Mode:** Standard Letter**Course Type:** Independent Study, Internship/Practicum, Laboratory, Lecture, Seminar, Lecture/Laboratory**Credit Hours:** 1-4**Restrictions:** Enrollment is limited to Graduate or Visiting Graduate level students.**Course Level:** Graduate

Description: Topics and credit hours vary each semester. Contact department for current semester's topic(s). Repeatable for Credit.