

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. Instructor Permission Required.

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: Credit cannot be earned for ENGI 120 and 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: Credit cannot be earned for ENGI 140 and RCEL 100/RCEL 200.

Course URL: 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 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.**Course URL:** 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: Credit cannot be earned for ENGI 218 and 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: Credit cannot be earned for ENGI 219 and RCEL 300/RCEL 400.**Course URL:** rcel.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****Short Title:** NEW ENTERPRISES**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:** In this course, students will learn and experience a process for innovation-based venture development. During the semester, students will form teams and create a plan for a new venture. Cross-list: BUSI 221.**ENGI 238 - 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 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: Credit cannot be earned for ENGI 241 and RCEL 241.**Course URL:** rcel.rice.edu/courses

ENGI 242 - COMMUNICATION FOR ENGINEERS: BUILDING A PRACTICAL TOOLBOX**Short Title:** COMMUNICATION FOR ENGINEERS**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:** Students develop communication skills starting with critical thinking about communication strategy and how to best organize a message for different audiences. They will build skills in oral presentations, writing, data visualization, and interpersonal communication to communicate clearly and confidently in a variety of professional situations. Graduate/Undergraduate Equivalency: ENGI 542. Mutually Exclusive: Credit cannot be earned for ENGI 242 and ENGI 542.**Course URL:** rcelconnect.org (<http://rcelconnect.org>)**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**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:** Laboratory**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 arising from emerging technologies for the energy and water industries, such as green construction or renewable energy technologies, in the context of sustainable design. Students will be challenged to examine the economic, social, and environmental dimensions of emerging challenges and opportunities, by identifying the relevant objectives, constraints, and decision variables as viewed by various stakeholders. Grad students will have extra research assignments involving some aspect of a design solution. 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: Credit cannot be earned for ENGI 303 and ENGI 528.**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: Credit cannot be earned for ENGI 311 and 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: Credit cannot be earned for ENGI 315 and ENGI 515/RCEL 300/RCEL 400.

Course URL: rcel.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: Credit cannot be earned for ENGI 317 and 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 & ENGINRNG 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: Credit cannot be earned for ENGI 320 and 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. Instructor Permission Required. 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 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 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 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.**Course Level:** Graduate**Description:** In this communications course designed for Professional Masters students, the approach will be experiential and interactive, with in-class exercises, analyses and numerous presentations. The focus will be on your practicing and refining the oral and written presentation skills you will need in your professional career. You should be prepared to participate in class and must be very comfortable speaking and writing English. You should not take this course in your first semester at Rice. Preference will be given to PM students.**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: Credit cannot be earned for ENGI 511 and 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: Credit cannot be earned for ENGI 515 and ENGI 315.**Course URL:** rcel.rice.edu

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: Credit cannot be earned for ENGI 528 and ENGI 303.

ENGI 529 - ETHICS AND ENGINEERING LEADERSHIP**Short Title:** ETHICS & ENGINRNG 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: Credit cannot be earned for ENGI 529 and 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. Instructor Permission Required. Repeatable for Credit.

ENGI 542 - COMMUNICATION FOR ENGINEERS: BUILDING A PRACTICAL TOOLBOX**Short Title:** COMMUNICATION FOR ENGINEERS**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 develop communication skills starting with critical thinking about communication strategy and how to best organize a message for different audiences. They will build skills in oral presentations, writing, data visualization, and interpersonal communication to communicate clearly and confidently in a variety of professional situations. Additional assignments apply for grad students. Instructor Permission Required. Graduate/Undergraduate Equivalency: ENGI 242. Mutually Exclusive: Credit cannot be earned for ENGI 542 and ENGI 242.

Course URL: rcelconnect.org (<http://rcelconnect.org>)**ENGI 545 - STRATEGIC THINKING FOR COMPLEX PROBLEM SOLVING****Short Title:** STRATEGIC THINKING**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 shows how to solve complex, ill-defined, non-immediate problems. It explains how to combine innovative and critical thinking to: -1- frame the problem, -2- diagnose the problem, -3- identify potential solutions, and -4- choose a solution and implement it. The approach is based on cases, each student will work on a project of their choosing. The course is equally applicable to academic and non-academic projects (such as consulting) in an industry; as such, it is open to students from all schools and departments. It is a part of a larger professional development initiative at Rice to equip students with skills that employers are specifically asking for. Cross-list: LEAD 545.

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 Hours:** 0**Restrictions:** Enrollment is limited to Graduate level students.**Course Level:** Graduate

Description: You have important research results, but unless you can explain them clearly and persuasively, you won't advance in your field. 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 written and oral assignments will help you present your research findings to a wide range of audiences - whether expert, interdisciplinary, international, or general. Topics include content and organization, plagiarism and paraphrase, crafting a persuasive abstract and literature review, effective visuals, and giving feedback to others. Apply directly to <jhewitt@rice.edu>. Instructor Permission Required.

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:** Internship/Practicum, Lecture, Seminar, 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.

ENGI 779 - BUSINESS AND URBAN ANALYTICS**Short Title:** BUSINESS & URBAN ANALYTICS**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: The project based class offers the unique opportunity for students from distinct fields of business and engineering to solve a real world data driven problem in a collaborative way. The data and the problem statement will come from the Rice University's Administrative Center for Sustainability and Energy Management (ACSEM) at the start of the semester. Instructor Permission Required. Cross-list: MGMT 779.