

# ENGINEERING (ENGR)

## ENGR 1000 Lower Level Special Topics

**Description:** Special Topics sessions taught by CEAT faculty members targeted to underclassmen. Offered for variable credit, 1-3 credit hours, maximum of 6 credit hours.

**Credit hours:** 1-3

**Contact hours:** Lecture: 1-3 Contact: 1-3

**Levels:** Undergraduate

**Schedule types:** Lecture

**Department/School:** Dean of Engineering

## ENGR 1111 Introduction to Engineering

**Description:** An introduction to the study and practice of engineering. Skills for students in CEAT; expected engineering student behavior; tools needed by CEAT students; and the role of engineers in society. An introduction to engineering ethics; safety issues; and the relationship of engineering to social, global and contemporary issues. Student enrichment opportunities in the CEAT. May not be used for degree credit with ENGR 1113. Same course as UNIV 1111.

**Credit hours:** 1

**Contact hours:** Contact: 1 Other: 1

**Levels:** Undergraduate

**Schedule types:** Discussion

**Department/School:** Dean of Engineering

## ENGR 1113 Introduction to Engineering Mathematics

**Prerequisites:** High school algebra or MATH 0123 or equivalent.

**Description:** This course focuses on applications of engineering mathematics to analysis and design problems across disciplines of engineering. Application of algebra, trigonometry, linear systems of equations, and basic calculus are illustrated through hands-on laboratory experiments and design projects. May not be used for degree credit with ENGR 1111.

**Credit hours:** 3

**Contact hours:** Lecture: 2 Lab: 2 Contact: 4

**Levels:** Undergraduate

**Schedule types:** Lab, Lecture, Combined lecture and lab

**Department/School:** Dean of Engineering

## ENGR 1322 Engineering Design with CAD

**Description:** Introduction to engineering design using modern design methodologies and computer-aided tools. Design, construction and testing through participation in a multidisciplinary team-based design project contest.

**Credit hours:** 2

**Contact hours:** Lecture: 1 Lab: 2 Contact: 3

**Levels:** Undergraduate

**Schedule types:** Lab, Lecture, Combined lecture and lab

**Department/School:** Dean of Engineering

## ENGR 1332 Engineering Design with CAD for MAE

**Description:** Introduction to engineering design using modern design methodologies and computer-aided tools appropriate for mechanical and aerospace engineering. Design, construction and testing through participation in a multidisciplinary team based design project contest.

**Credit hours:** 2

**Contact hours:** Lecture: 1 Lab: 2 Contact: 3

**Levels:** Undergraduate

**Schedule types:** Lab, Lecture, Combined lecture and lab

**Department/School:** Dean of Engineering

## ENGR 1412 Introductory Engineering Computer Programming

**Description:** Programming to solve problems typical of practice in engineering. Techniques and methods.

**Credit hours:** 2

**Contact hours:** Lecture: 1 Lab: 2 Contact: 3

**Levels:** Undergraduate

**Schedule types:** Lab, Lecture, Combined lecture and lab

**Department/School:** Dean of Engineering

## ENGR 2030 Co-op Industrial Practice I

**Prerequisites:** Sophomore standing and permission of Co-op coordinator.

**Description:** Pre-engineering industrial practice. Written reports as specified by adviser. Application of credit to meet degree requirements varies with level and department. Offered for variable credit, 1-3 credit hours, maximum of 6 credit hours.

**Credit hours:** 1-3

**Contact hours:** Contact: 1-3 Other: 1-3

**Levels:** Undergraduate

**Schedule types:** Independent Study

**Department/School:** Dean of Engineering

## ENGR 2100 Orientation Projects

**Prerequisites:** Pre-engineering standing.

**Description:** Enrollment in independent study or small groups. Projects to assist students with special needs to adjust to engineering curriculum. Offered for variable credit, 1-3 credit hours, maximum of 3 credit hours.

**Credit hours:** 1-3

**Contact hours:** Contact: 1-3 Other: 1-3

**Levels:** Undergraduate

**Schedule types:** Independent Study

**Department/School:** Dean of Engineering

## ENGR 2400 Engineering Lab Topics

**Prerequisites:** ENGR 1111 or BAE 1112 or ARCH 1112 or CMT 1213 and enrolled as a CEAT student or permission of the instructor.

**Description:** Engineering lab topics developed in relationship to ENSC or ENGR courses to provide hands-on interdisciplinary learning. Offered for variable credit, 1-3 credit hours, maximum of 4 credit hours.

**Credit hours:** 1-3

**Contact hours:** Lab: 2-6 Contact: 2-6

**Levels:** Undergraduate

**Schedule types:** Lab

**Department/School:** Dean of Engineering

## ENGR 2421 Engineering Data Acquisition Controls Lab

**Description:** Laboratory course that provides hands-on learning regarding topics that engineering students will encounter in CEAT and throughout their careers. The course is "signal" based and will cover core data acquisition and controls utilizing LabVIEW software. Students will develop the skills required to interface with sensors to acquire data and actuate to control systems.

**Credit hours:** 1

**Contact hours:** Lab: 2 Contact: 2

**Levels:** Undergraduate

**Schedule types:** Lab

**Department/School:** Dean of Engineering

**ENGR 2890 Introductory Honors Add-On**

**Prerequisites:** Honors College participation and concurrent enrollment in a designated course.

**Description:** A supplemental introductory honors experience to partner concurrently with designated course(s). This course adds different intellectual dimension to the designated course(s).

**Credit hours:** 1-3

**Contact hours:** Lecture: 1-3 Contact: 1-3

**Levels:** Undergraduate

**Schedule types:** Lecture

**Department/School:** Dean of Engineering

**General Education and other Course Attributes:** Honors Credit

**ENGR 3030 Co-op Industrial Practice II**

**Prerequisites:** Junior standing and permission of Co-op coordinator.

**Description:** Pre-engineering industrial practice. Written reports as specified by adviser. Application of credit to meet degree requirements varies with level and department. Offered for variable credit, 1-3 credit hours, maximum of 6 credit hours.

**Credit hours:** 1-3

**Contact hours:** Contact: 1-3 Other: 1-3

**Levels:** Undergraduate

**Schedule types:** Independent Study

**Department/School:** Dean of Engineering

**ENGR 3061 Domestic Scholars Experience**

**Prerequisites:** Consent of the coordinator of CEAT Student Services.

**Description:** Participation in the domestic scholars experience.

**Credit hours:** 1

**Contact hours:** Lecture: 1 Contact: 1

**Levels:** Undergraduate

**Schedule types:** Lecture

**Department/School:** Dean of Engineering

**ENGR 3080 International Experience**

**Prerequisites:** Consent of the associate dean of the college.

**Description:** Participation in a formal or informal educational experience outside of the USA. Offered for variable credit, 1-18 credit hours, maximum of 36 credit hours.

**Credit hours:** 1-18

**Contact hours:** Contact: 1-18 Other: 1-18

**Levels:** Undergraduate

**Schedule types:** Independent Study

**Department/School:** Dean of Engineering

**ENGR 3090 Study Abroad**

**Prerequisites:** Consent of the Study Abroad office and associate dean of the college.

**Description:** Participation in an OSU reciprocal exchange program. Offered for variable credit, 1-18 credit hours, maximum of 36 credit hours.

**Credit hours:** 1-18

**Contact hours:** Contact: 1-18 Other: 1-18

**Levels:** Undergraduate

**Schedule types:** Independent Study

**Department/School:** Dean of Engineering

**Additional Fees:** Study Abroad fee of \$200 applies.

**ENGR 3890 Advanced Honors Add-On**

**Prerequisites:** Honors College participation and concurrent enrollment in a designated course.

**Description:** A supplemental advanced honors experience to partner concurrently with designated course(s). This course adds a different intellectual dimension to the designated course(s). Offered for variable credit, 1-3 credit hours, maximum of 9 credit hours.

**Credit hours:** 1-3

**Contact hours:** Lecture: 1-3 Contact: 1-3

**Levels:** Undergraduate

**Schedule types:** Lecture

**Department/School:** Dean of Engineering

**General Education and other Course Attributes:** Honors Credit

**ENGR 4010 Engineering Problems and Design**

**Prerequisites:** Permission of the instructor.

**Description:** Special projects and independent study. Offered for variable credit, 1-6 credit hours, maximum of 10 credit hours.

**Credit hours:** 1-6

**Contact hours:** Contact: 1-6 Other: 1-6

**Levels:** Undergraduate

**Schedule types:** Independent Study

**Department/School:** Dean of Engineering

**ENGR 4030 Co-op Industrial Practice III**

**Prerequisites:** Senior standing and permission of Co-op coordinator.

**Description:** Pre-engineering industrial practice. Written reports as specified by adviser. Application of credit to meet degree requirements varies with level and department. Offered for variable credit, 1-3 credit hours, maximum of 6 credit hours.

**Credit hours:** 1-3

**Contact hours:** Contact: 1-3 Other: 1-3

**Levels:** Undergraduate

**Schedule types:** Independent Study

**Department/School:** Dean of Engineering

**ENGR 4043 International Engineering Service Learning I (I)**

**Prerequisites:** Approval of instructor.

**Description:** International engineering service learning experience. Project design, construction, implementation and training to provide permanent answer to clients' needs. Emphasis on the development of culturally acceptable engineering designs. Includes classroom lectures, hands-on design, writing assignments and travel to foreign country. For both engineering and non-engineering majors.

**Credit hours:** 3

**Contact hours:** Lecture: 1 Contact: 3 Other: 2

**Levels:** Undergraduate

**Schedule types:** Discussion, Combined lecture & discussion, Lecture

**Department/School:** Dean of Engineering

**General Education and other Course Attributes:** International Dimension

**ENGR 4053 International Engineering Service Learning II (I)****Prerequisites:** ENGR 4043 and approval of instructor.**Description:** A continuation of ENGR 4043. International engineering service learning experience. Project design, construction, implementation and training to provide permanent answer to clients' needs. Emphasis on the development of culturally acceptable engineering designs. Includes classroom lectures, hands-on design, writing assignments and travel to foreign country. For both engineering and non-engineering majors.**Credit hours:** 3**Contact hours:** Lecture: 1 Contact: 3 Other: 2**Levels:** Undergraduate**Schedule types:** Discussion, Combined lecture & discussion, Lecture**Department/School:** Dean of Engineering**General Education and other Course Attributes:** International Dimension**ENGR 4060 Topics in Technology and Society****Description:** Problems of society relating to technology and added problems stemming from their solution. Minimal reliance on mathematics; for engineering and non-engineering students. Offered for variable credit, 1-3 credit hours, maximum of 9 credit hours.**Credit hours:** 1-3**Contact hours:** Contact: 1-3 Other: 1-3**Levels:** Undergraduate**Schedule types:** Independent Study**Department/School:** Dean of Engineering**ENGR 4061 CEAT Scholars Study Abroad (I)****Prerequisites:** Permission of instructor.**Description:** Comparison of technologies, history, culture and economic systems between the U.S. and another country or countries. Includes both classroom and travel for on-site study.**Credit hours:** 1**Contact hours:** Lecture: 1 Contact: 1**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Dean of Engineering**General Education and other Course Attributes:** International Dimension**ENGR 4063 Study Abroad: Issues of Engineering, Architecture, Technology & Culture in an Intl Context (I)****Prerequisites:** Sophomore standing and permission of the Associate Dean of Academics and the Study Abroad Office.**Description:** Study abroad experience led by CEAT faculty with a goal of developing a deeper understanding of cultural values and perspectives outside of the United States related to engineering, architecture, technology.**Credit hours:** 3**Contact hours:** Lecture: 1 Contact: 3 Other: 2**Levels:** Undergraduate**Schedule types:** Independent Study, Lecture, Combined lecture & IS**Department/School:** Dean of Engineering**General Education and other Course Attributes:** International Dimension**ENGR 4073 Technology and Culture of Italy****Prerequisites:** Approval of instructor.**Description:** Examination of the technology, history and culture of Italy, with an emphasis on the development of cultural competency. Analysis of similarities and differences in professional practices. Includes classroom lectures, writing assignments and travel to Italy. Minimal reliance on mathematics. For both engineering and non-engineering majors.**Credit hours:** 3**Contact hours:** Lecture: 1 Contact: 5 Other: 4**Levels:** Undergraduate**Schedule types:** Discussion, Combined lecture & discussion, Lecture**Department/School:** Dean of Engineering**ENGR 4083 Technology and Culture of Brazil****Prerequisites:** Approval of instructor.**Description:** Examination of the technology, history and culture of Brazil, with an emphasis on the development of cultural competency. Analysis of similarities and differences in professional practices. Includes classroom lectures, writing assignments and travel to Brazil. Minimal reliance on mathematics. For both engineering and non-engineering majors.**Credit hours:** 3**Contact hours:** Lecture: 1 Contact: 5 Other: 4**Levels:** Undergraduate**Schedule types:** Discussion, Combined lecture & discussion, Lecture**Department/School:** Dean of Engineering**ENGR 4093 Technology and Culture of France****Prerequisites:** Approval of instructor.**Description:** Examination of the technology, history and culture of France, with an emphasis on the development of cultural competency. Analysis of similarities and differences in professional practices. Includes classroom lectures, writing assignments and travel to France. Minimal reliance on mathematics. For both engineering and non-engineering majors.**Credit hours:** 3**Contact hours:** Lecture: 1 Contact: 5 Other: 4**Levels:** Undergraduate**Schedule types:** Discussion, Combined lecture & discussion, Lecture**Department/School:** Dean of Engineering**ENGR 4103 Impact of Law on Engineering Practice****Prerequisites:** Junior standing or consent of instructor.**Description:** Principles and impact of U.S. and international laws and regulations on technical professionals, including the impact of environmental regulations, intellectual property laws, tort claims, and product liability on the design, research and oversight of technologies.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Dean of Engineering**ENGR 4113 Intellectual Property Law for Technical Professionals (S)****Prerequisites:** Junior standing or consent of instructor.**Description:** Law and regulations of patents and other intellectual property protection methods. Impact of statutory and common law on the practice of technical professionals and how they can exploit intellectual property in their daily work.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Dean of Engineering

**ENGR 4123 Tort and Products Liability Law for Technical Professionals (S)****Prerequisites:** Junior standing or consent of instructor.**Description:** Legal liability of the work product and duties of technical professionals to the public. Relevant statutory, regulatory and common law relating to torts, specifically products liability.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Dean of Engineering**ENGR 4133 Environmental Regulation for Technical Professionals (S)****Prerequisites:** Junior standing or consent of instructor.**Description:** Environmental laws and regulations are omnipresent in the practice of engineering, science and architecture. Survey of the environmental laws and regulations affecting the practice of these professions.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Dean of Engineering**ENGR 4163 Study Abroad: Issues of Engineering, Architecture, Technology, Culture & Aesthetics****Prerequisites:** Sophomore standing and permission of the Associate Dean of Academics and the Study Abroad Office.**Description:** Study abroad experience led by CEAT faculty with a goal of developing a deeper understanding of cultural values and perspectives, and aesthetics, outside of the United States related to engineering, architecture, technology.**Credit hours:** 3**Contact hours:** Lecture: 1 Contact: 3 Other: 2**Levels:** Undergraduate**Schedule types:** Independent Study, Lecture, Combined lecture & IS**Department/School:** Dean of Engineering**ENGR 4201 Principles of Nuclear Engineering****Description:** The nuclear enterprise, radiation, biological effects of ionizing radiation, nuclear reactor power plants, radioactive waste disposal, the fission process, food irradiation activities, applications of nuclear power in space, approaches to radiation detection, thermonuclear fusion, and nuclear weapons and proliferation.**Credit hours:** 1**Contact hours:** Lecture: 1 Contact: 1**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Dean of Engineering**ENGR 4203 Nuclear Technologies in Society: Fulfilling Madame Curie's Dream****Description:** Introduction to applications of nuclear science and technology and the radiation principles governing these applications. Problem-based learning environment. Class assignments are web-based and include reference materials and modules to be completed by students.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Dean of Engineering**ENGR 4211 Introduction to Nuclear and Radiation Engineering Concepts****Description:** Aspects and applications of nuclear and radiation engineering/physics. History of nuclear development, basic concepts of radiation and radioactivity, radioactive waste management, global warming and the impact of nuclear power plants, industrial applications, health physics, nuclear medicine, job opportunities at power plants, graduate school and national labs.**Credit hours:** 1**Contact hours:** Lecture: 1 Contact: 1**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Dean of Engineering**ENGR 4213 Elements of Nuclear Engineering****Prerequisites:** ENGR 4201, ENGR 4211 or ENGR 4203 and MATH 2163, PHYS 2114.**Description:** Nuclear engineering concepts and applications, including nuclear reactions, radioactivity, radiation interaction with matter, reactor physics, risk and dose assessment, applications in medicine, industry, agriculture and research.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Dean of Engineering**ENGR 4223 Nuclear Reactor Engineering****Prerequisites:** ENGR 4213 and MATH 2233.**Description:** Physics governing nuclear reactors and the design principles for commercial nuclear power plants. Reactor designs currently operating in the power industry. Generation III and Generation IV reactor designs are also discussed.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Dean of Engineering**ENGR 4233 Energy Systems and Resources****Prerequisites:** ENGR 4213.**Description:** Energy systems, renewable and non-renewable energy sources, and advances in energy applications.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Dean of Engineering**ENGR 4243 Radiation Protection and Shielding****Prerequisites:** ENGR 4213 and MATH 2233.**Description:** Radiation protection, doses, associated risks, and exposure limits; properties of natural and other radiation sources, and evaluation of internal and external doses; and techniques for shield design including ray, point kernel, and transport theories for both neutrons and gamma rays.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Dean of Engineering

**ENGR 4253 Nuclear Reactor Analysis****Prerequisites:** ENGR 4213 and MATH 2233.**Description:** Fundamental physical principles, concepts and modeling techniques for analysis and design of nuclear reactors. Prepares students to analyze nuclear reactors including aspects of performance, dynamics and safety and to either develop new designs or to assess existing or proposed designs based upon fundamental understanding of reactor physics.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Dean of Engineering**ENGR 4263 Nuclear Reactor Theory****Prerequisites:** ENGR 4243.**Description:** Introduction to neutron diffusion theory, neutron moderation, neutron thermalization, and criticality conditions of nuclear reactors.

Distance education only.

**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Dean of Engineering**ENGR 4273 Probabilistic Risk Assessment****Prerequisites:** ENGR 4213.**Description:** This course is a detailed introduction to neutron diffusion theory, neutron moderation, neutron thermalization, and criticality conditions of nuclear reactors.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Dean of Engineering**ENGR 4283 Science and Technology of Terrorism and Counterterrorism****Description:** A General overview of energy systems, renewable and non-renewable energy sources, and advances in energy applications.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Dean of Engineering**ENGR 4293 Nonproliferation: Issues for Weapons of Mass Destruction****Description:** Weapons of mass destruction (WMDs) are a direct consequence of 20th-century technology. The challenges that we face in coming to grips with the awesome destructive power that WMDs hold will be a dominant theme of the 21st century.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Dean of Engineering**ENGR 4300 Nuclear Engineering Special Topics****Description:** Special topics, variable credit hour course (1-8 credits) for Nuclear Minor.**Credit hours:** 1-8**Contact hours:** Lecture: 1-8 Contact: 1-8**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Dean of Engineering**ENGR 4353 Materials Requirement and Selection for Nuclear Energy Applications****Prerequisites:** CHEM 1314 and MATH 2153 and ENSC 2213 and ENSC 2143 or permission of instructor.**Description:** With the resurgence of the nuclear power industry and the growth of the nuclear Navy, there is a need for engineers trained in the materials needs of the nuclear industry. This course covers corrosion and degradation of materials in the nuclear and non-nuclear portions of nuclear power facilities.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Dean of Engineering**ENGR 4403 Interdisciplinary Senior Design****Prerequisites:** Permission of the instructor and department for all students.**Description:** Open-ended interdisciplinary design project with team format addressing real world challenges through applied engineering, collaborative problem-solving and design solutions, prototyping, economic analysis, project management, and fostering entrepreneurial/intrapreneurial opportunities. Projects may be sponsored by a company, agency, individual or be self-generated. Team members work with sponsors, professionals, and faculty who serve as mentors in fields related to their project focus. Previously offered as ENGR 4400. Same course as ENGR 4404.**Credit hours:** 3**Contact hours:** Lab: 6 Contact: 6**Levels:** Undergraduate**Schedule types:** Lab**Department/School:** Dean of Engineering**ENGR 5010 Engineering Problems and Design****Prerequisites:** Permission of instructor.**Description:** Special projects and independent study. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.**Credit hours:** 1-6**Contact hours:** Lecture: 1-6 Contact: 1-6**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Dean of Engineering**ENGR 5103 Advanced Impact of Law on Engineering Practice****Prerequisites:** Graduate standing.**Description:** Principles and impact of U.S. and international laws and regulations on technical professionals, including the impact of environmental regulations, intellectual property laws, tort claims, and product liability on the design, research and oversight of technologies.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Dean of Engineering

**ENGR 5113 Advanced Intellectual Property Law for Technical Professionals**

**Prerequisites:** Graduate standing.

**Description:** Law and regulations of patents and other IP protection methods. Impact of statutory and common law has made on the practice of technical professionals and how they can exploit IP in their daily work.

**Credit hours:** 3

**Contact hours:** Lecture: 3 Contact: 3

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Dean of Engineering

**ENGR 5123 Advanced Tort and Products Liability Law for Technical Professionals**

**Prerequisites:** Graduate standing.

**Description:** Legal liability of the work product and duties of technical professionals to the public. Relevant statutory, regulatory and common law relating to torts, specifically products liability.

**Credit hours:** 3

**Contact hours:** Lecture: 3 Contact: 3

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Dean of Engineering

**ENGR 5133 Advanced Environmental Law for Technical Professionals**

**Prerequisites:** Graduate standing.

**Description:** Environmental laws and regulations are omnipresent in the practice of engineering, science, and architecture. This course will survey the environmental laws and regulations affecting the practice of these professions.

**Credit hours:** 3

**Contact hours:** Lecture: 3 Contact: 3

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Dean of Engineering

**ENGR 5333 Production Engineering**

**Prerequisites:** Consent of instructor.

**Description:** Fundamental production engineering design, evaluation, and optimization for oil and gas wells, including well deliverability, formation damage and skin analysis, completion performance, and technologies that improve oil and gas well performance. Offered through distance education only. No credit with credit in 4333.

**Credit hours:** 3

**Contact hours:** Lecture: 3 Contact: 3

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Dean of Engineering

**ENGR 5343 Reservoir Engineering**

**Prerequisites:** Consent of instructor.

**Description:** Reservoir description techniques using petrophysical and fluid properties; engineering methods to determine fluids in place, identify production-drive mechanisms, and forecast reservoir performance; implementation of pressure-maintenance schemes and secondary recovery. Offered through distance education only. No credit with credit in 4343.

**Credit hours:** 3

**Contact hours:** Lecture: 3 Contact: 3

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Dean of Engineering