

ENGINEERING, ETHICS & SOCIETY

Since 1989, the Herbst Program for Engineering, Ethics and Society has engaged engineering students in the weighty questions of human existence and in linking these to the ethical practice of engineering. As our students discuss great works, they hone their skills at critical thinking and clear communication—essential skills for future engineers. Courses use foundational works from different eras and cultures to address the complexities where these three fields overlap:

- Engineering, as an educational process and a profession
- Ethics, or personal responsibility
- Society, as the rich socio-cultural world in which we live

All Herbst courses count toward Humanities and Social Sciences requirements in the College of Engineering and Applied Science.

Course code for this program is ENES.

Faculty

While many faculty teach both undergraduate and graduate students, some instruct students at the undergraduate level only. For more information, contact the faculty member's home department.

Ambler, Catherine
Assistant Teaching Professor; PhD, Columbia University

Ambler, Wayne (https://experts.colorado.edu/display/fisid_127519/)
Associate Professor Emeritus; PhD, Boston College

Byrne, James
Teaching Assistant Professor; PhD, Princeton University

de Alwis, Lisa (https://experts.colorado.edu/display/fisid_152569/)
Teaching Assistant Professor; PhD, University of Southern California

Diduch, Paul Jordan (https://experts.colorado.edu/display/fisid_154510/)
Teaching Associate Professor; PhD, University of Dallas

Douglass, Scot Ray (https://experts.colorado.edu/display/fisid_102347/)
Professor; PhD, University of Colorado Boulder

Fredricksmeyer, Hardy (https://experts.colorado.edu/display/fisid_115446/)
Teaching Professor; PhD, University of Texas at Austin

Giovannelli, Leland (https://experts.colorado.edu/display/fisid_100755/)
Teaching Professor Emerita; PhD, University of Chicago

Kowalchuk, Andrea (https://experts.colorado.edu/display/fisid_154509/)
Teaching Associate Professor; PhD, University of Dallas

Lange, Anja K. (https://experts.colorado.edu/display/fisid_104576/)
Teaching Professor, Faculty Director; PhD, University of Colorado Boulder

Sieber, Diane E. (https://experts.colorado.edu/display/fisid_101394/)
Associate Professor; PhD, Princeton University

Stanford-McIntyre, Sarah (https://experts.colorado.edu/display/fisid_163315/)
Assistant Professor; PhD, University of Wyoming

Swanson, Joel E. (https://experts.colorado.edu/display/fisid_134311/)
Associate Professor; MFA, University of California, San Diego

Sylvester, Roshanna (https://experts.colorado.edu/display/fisid_164037/)
Associate Professor; PhD, Yale University

Thieman Dino, Angela Lea (https://experts.colorado.edu/display/fisid_145591/)
Teaching Professor; PhD, University of Colorado Boulder

Turner, A. Kane
Lecturer; PhD, University of Dallas

Courses

ENES 1010 (3) Humanity in a Technological Age

This seminar considers what it means to be human in an increasingly technological age. Designed for engineering students, it also looks at the role of technology designers and creators in shaping the human environment. Students focus on sharpening their written and oral communication skills through a series of iterative assignments and projects. Fulfills College of Engineering writing requirement for first-year students only.

Requisites: Restricted to students with 0-26 (Freshmen) College of Engineering majors only.

ENES 1843 (3) Special Topics

Explores different important themes in engineering, ethics, and society; check with the department for specific semester topics. Formerly HUEN 1843.

Repeatable: Repeatable for up to 6.00 total credit hours.

Requisites: Restricted to students with 0-56 credits (Freshmen or Sophomore) College of Engineering majors only.

ENES 1850 (3) Engineering in History: The Social Impact of Technology

Investigates how technology and engineering have both shaped our modern world and been shaped by it. Inquiry-based projects examine the history of technology through historical sources and provide opportunities for critical reflection on how historical thinking can inform engineering practice. Alongside an overview of modern engineering and technology, we investigate questions such as whether new technologies made household labor easier in the 20th century and how the needs of end-users shaped the development of computing. Formerly HUEN 1850.

Requisites: Restricted to students with 0-56 (Freshmen or Sophomore) College of Engineering majors only.

ENES 2010 (3) Tradition and Identity

Explores the place and possibility of personal identity both within and against the influence of tradition, including family, culture, language, and social, political and economic institutions. Via literature and film, wrestles with the nature of freedom, self-determination, and belonging. Formerly HUEN 2010.

Requisites: Restricted to College of Engineering (ENGRU) undergraduates only.

ENES 2020 (3) The Meaning of Information Technology

A survey of the mutual influence of technology, media, and society. Equips students with an understanding of technological transformations in interpersonal, organizational, and mass communication. Emphasis is on the technological, social and political changes that underlie the movement toward a digital society. As such, the class acts as a survey of various technologies and their relationship to socio-political issues. We not only address how does it work and where does this come from but why is it here and how does it impact us as individuals and as a society.

Requisites: Restricted to College of Engineering (ENGRU) undergraduates only.

ENES 2100 (3) History of Science and Technology to Newton

Spans invention and discovery from the Stone Age to the age of Newton, raising questions about culture, history, and personal expectation; studies Pyramids, odometers, cathedrals, Galileo, etc., on the way. Formerly HUEN 2100.

Requisites: Restricted to College of Engineering (ENGRU) undergraduates only.

ENES 2120 (3) History of Modern Science from Newton to Einstein

Surveys the great discoveries and theoretical disputes from Newtonian celestial mechanics to the theory of relativity. Includes physics, astronomy, chemistry, geology, and biology; closely examines scientific method, evolution, light and quantum theory. Uses original sources by Newton, Faraday, Lavoisier, Darwin, etc., for immediate contact with the great minds in science. Formerly HUEN 2120.

Requisites: Restricted to College of Engineering (ENGRU) undergraduates only.

ENES 2130 (3) History of Modern Technology from 1750 to the Atomic Bomb

Surveys the great innovations from the Steam Age to the Atomic Age: transportation, modern construction, communications, internal combustion, etc. Supplements textbook accounts with drawings, patents, and original selections by Edison, Carnegie, Tesla, Bell, etc. Studies the sociological impact of social change via contemporary sources in literature, philosophy, painting and film. Formerly HUEN 2130.

Requisites: Restricted to College of Engineering (ENGRU) undergraduates only.

ENES 2160 (3) Energy, Society, and the Climate Question

Examines the social, political, and cultural dynamics of energy production and consumption with a focus on the green energy transition. Analyzes historic and contemporary efforts to address climate change in the US and around the globe and contextualizes technical and infrastructural developments; students collectively identify barriers and develop possible solutions.

Equivalent - Duplicate Degree Credit Not Granted: ENES 3160

Requisites: Restricted to students in College of Engineering and Applied Science (ENGR) only.

ENES 2210 (3) Modern Science and Technological Society

Explores challenges that engineering and science pose for society plus the ways that societies shape or impede science and engineering. Case studies range from contemporary issues (global warming, nuclear weapons, and genetic engineering) to classic cases (the execution of Socrates). Core texts in the Western Tradition supplement contemporary articles and films. Formerly HUEN 2210.

Equivalent - Duplicate Degree Credit Not Granted: ENES 3210

Requisites: Restricted to College of Engineering majors only.

ENES 2346 (3) Women and Engineering

Explores the role of women as shaping and shaped by engineering, from the past into the future. Texts from history, women's studies, philosophy, film, and literature shed light on how gender has contributed to the forging of our identities, both personal and professional. Engineering professors guest-lecture, sharing their life stories and their research.

Equivalent - Duplicate Degree Credit Not Granted: ENES 3346

Requisites: Restricted to College of Engineering (ENGRU) undergraduates only.

Grading Basis: Letter Grade

ENES 2360 (3) Gaining a Global State of Mind for Effective Engineering Practice

Ranges across cultures and centuries to reveal many dimensions of globalization; shows how cultural awareness enhances effectiveness in the increasingly global profession of engineering. This highly interactive course uses history, philosophy, geography, religion, economics, the arts, etc., to illustrate the complexity of global engineering's cultural context. Concurrently, it encourages new insights into culture and identity, both at home and abroad. Formerly HUEN 2360.

Equivalent - Duplicate Degree Credit Not Granted: ENES 3360

Recommended: restricted to students in the College of Engineering and Applied Science.

ENES 2840 (1-3) Lower Division: Independent Study

Offers opportunity for lower-division Engineering students to do independent study work in humanities, appropriate to their academic level. Subject determined, with a Herbst instructor, to fit the needs of the student. Department and faculty consent required. Formerly HUEN 2840.

Repeatable: Repeatable for up to 9.00 total credit hours. Allows multiple enrollment in term.

Requisites: Restricted to College of Engineering (ENGRU) undergraduates only.

Grading Basis: Letter Grade

ENES 2843 (3) Special Topics

Explores different important themes in engineering, ethics, and society; check with the department for specific semester topics. Formerly HUEN 2843.

Repeatable: Repeatable for up to 6.00 total credit hours. Allows multiple enrollment in term.

Requisites: Restricted to College of Engineering (ENGRU) undergraduates only.

ENES 3100 (3) Ethical Awareness for Engineers

This seminar introduces engineering students to a variety of essential texts and works drawn from literature, history, philosophy, and the arts. Through class discussions and a variety of writing assignments, students reflect on their personal values, goals, commitments, and responsibilities, and how these align with the ethical challenges of engineering. Fulfills the College of Engineering and Applied Science writing requirement.

Requisites: Restricted to students with 57-180 credits (Junior or Senior) College of Engineering students only.

ENES 3160 (3) Energy, Society, and the Climate Question

Examines the social, political, and cultural dynamics of energy production and consumption with a focus on the green energy transition. Analyzes historic and contemporary efforts to address climate change in the US and around the globe and contextualizes technical and infrastructural developments; students collectively identify barriers and develop possible solutions.

Equivalent - Duplicate Degree Credit Not Granted: ENES 2160

Requisites: Restricted to students in College of Engineering and Applied Science (ENGR) only.

ENES 3210 (3) Modern Science and the Technological Society

Explores challenges that engineering and science pose for society as well as the ways that societies shape or impede science and engineering. Case studies range from contemporary issues (global warming, nuclear weapons, and genetic engineering) to classic cases (the execution of Socrates). Core texts in the Western Tradition supplement contemporary articles and films.

Equivalent - Duplicate Degree Credit Not Granted: ENES 2210

Requisites: Restricted to students with 57-180 credits (Junior or Senior) College of Engineering students only.

ENES 3280 (3) Science and Religion

Explores relationship between science and religion from multiple contrasting stances, including Western and non-Western culture; ancient and modern viewpoints; pro and counter Enlightenment arguments. The course uses history, philosophy, psychology, cognitive science, biology, poetry, theology, sociology, political theory, literature, film, and social media to show the pervasiveness and complexity of the relation between science and religion. The course also promotes sympathetic treatment of perspectives, cutting widely across the political, cultural, and belief spectrums. Previously offered as a special topics course.

Requisites: Restricted to College of Engineering (ENGRU) undergraduates only.

Grading Basis: Letter Grade

ENES 3320 (3) Don Quixote's Spain

Examines the first modern novel in the context of modern society's preoccupation with fake news and the difficulty of separating fictions from truth. As a global intensive, focuses on the origins of modern Spain, the rise of Madrid at its center, and the continuing presence of Don Quixote and Sancho Panza in the popular imagination. Interrogates the virtuality of our own perceptions and the role that imagination plays in our construction of self and other.

Recommended: Spanish language experience; fluency not required.

ENES 3330 (3) Science Fiction and Philosophy

Examines significant philosophical concepts through global science fiction novels, stories and films. Relates these concepts to the life, choices and professional career of the future engineer.

Requisites: Restricted to College of Engineering (ENGRU) undergraduates only.

ENES 3340 (3) Leonardo da Vinci's World

Examines Leonardo da Vinci's notebooks, his art and his socio-historical context while interrogating his various engineering roles, his creativity, and his synthesis of science, technology, and art.

Requisites: Restricted to College of Engineering (ENGRU) undergraduates only.

ENES 3346 (3) Women and Engineering

Explores the role of women as shaping and shaped by engineering, from the past into the future. Texts from history, women's studies, philosophy, film, and literature shed light on how gender has contributed to the forging of our identities, both personal and professional. Engineering professors guest-lecture, sharing their life stories and their research.

Equivalent - Duplicate Degree Credit Not Granted: ENES 2346

Requisites: Restricted to College of Engineering (ENGRU) undergraduates only.

Grading Basis: Letter Grade

ENES 3350 (3) Gods, Heroes and Engineers: The Western Quest for Excellence

Investigates the intensely competitive quest of the ancient Greeks for excellence in everything from art and literature to science and war and also the odyssey of the mind generated by this quest, culminating in our modern world. Formerly HUEN 3350.

Requisites: Restricted to students with 57-180 credits (Junior or Senior) College of Engineering students only.

ENES 3360 (3) Gaining a Global State of Mind for Effective Engineering Practice

Ranges across cultures and centuries to reveal many dimensions of globalization; shows how cultural awareness enhances effectiveness in the increasingly global profession of engineering. This highly interactive course uses history, philosophy, geography, religion, economics, the arts, etc., to illustrate the complexity global engineering's cultural context. Concurrently, it encourages new insights into culture and identity, both at home and abroad. Formerly HUEN 3360.

Equivalent - Duplicate Degree Credit Not Granted: ENES 2360

Requisites: Restricted to students in College of Engineering and Applied Science (ENGR) only.

ENES 3370 (3) Harry Potter and the Conflict of Being

Addressing the idea of conflict from a wide variety of perspectives: personal identity, class, race, morality, education, age, ambition, leadership and friendship, this course will explore how these themes are worked out both within this extended coming of age narrative and against the classical background that J.K. Rowling so freely appropriates. Through a close reading of the texts, themselves, we will map out their philosophical/existential significance and how this is related to their popularity. Formerly offered as a special topics course.

Requisites: Restricted to College of Engineering (ENGRU) undergraduates only.

ENES 3430 (3) Ethics of Genetic Engineering: A Multidisciplinary Approach

Investigates the metaphorical, ideological and scientific constructs that inform debates over the genetic modification of humans, animals and plants. Begins with a close reading of Shelley's *Frankenstein*, proceeds to a consideration of philosophical arguments for and against human modification and concludes with a consideration of the scientific and political contexts that inform the regulation of genetically modified foods. Formerly HUEN 3430.

Requisites: Restricted to College of Engineering (ENGRU) undergraduates only.

ENES 3450 (3) Narrative Medicine

Explores the foundations of a narrative practice of medicine through rigorous engagement with various texts, guided writing, and class conversation. Medicine here is defined broadly as engagement with illness and healing, including the practices of doctors, nurses, social workers, researchers, and caregivers. Special attention is given to the role of artists and craftspeople and how such practices might be integrated with an increasingly specialized and technical medical system.

Recommended: Prerequisite a minimum of 30 credit hours.

ENES 3543 (3) History of Western Medicine

Introduces the intriguing and appalling history of western medicine, from prehistory to the present. Includes grave-robbers, leeches and the Black Death. This course links past to present, in discussion of evidence, innovation, ethics and standards of medical education and practice. Based on original sources, textbook accounts and modern scholarship, and featuring student presentations on the Disease of the Week. Formerly HUEN 3543.

Requisites: Restricted to College of Engineering (ENGRU) undergraduates only.

Grading Basis: Letter Grade

ENES 3700 (3) Culture Wars in Rome

Investigates in Rome, Italy (during Maymester), the cultural contrasts among three different cities: ancient, pagan, aristocratic Rome; medieval, Christian, theocratic Rome; and modern, secular, democratic Rome. Draws on evidence from Roman literature, politics, art and architecture. Must have completed a minimum of 26 credit hours by start of course. Requires some preparatory work in Boulder. Formerly HUEN 3700.

ENES 3720 (3) Voices of Vienna: Freud, Wittgenstien, Mozart

Study and visit Vienna, a city famous for Mozart's music, Freud's psychology and Wittgenstein's philosophy. As the seat of the Habsburg Empire, Vienna was a rich cultural and political center; it was a crossroads for international trade and exciting new ideas. As the lively capital of present-day Austria, it remains in the forefront of social change. Formerly HUEN 3720.

ENES 3750 (3) Xi'an, China: Self-Awareness and Images of the Other

Explores Chinese culture abroad, focusing on ideas of self and other within special historical, social, political, and economical circumstances. Chinese and American concepts of self and society, and of individual, collective, and national identities will be analyzed. Held on the campus of Xi'an Jiaotong University, China. Formerly HUEN 3750.

Recommended: Prerequisite completion of lower-division Humanities course.

Additional Information: Departmental Category: Asia Content

ENES 3840 (1-3) Independent Study

Offers an opportunity for students to do independent work in the humanities. Subject arranged to fit the needs of the student. Department consent required. Formerly HUEN 3840.

Repeatable: Repeatable for up to 9.00 total credit hours. Allows multiple enrollment in term.

Requisites: Restricted to students with 27-180 credits (Sophomores, Juniors or Seniors) College of Engineering students only.

ENES 3843 (3) Special Topics

Explores different important themes in engineering, ethics, and society; check with department for specific semester topics. Formerly HUEN 3843.

Repeatable: Repeatable for up to 6.00 total credit hours. Allows multiple enrollment in term.

Requisites: Restricted to College of Engineering (ENGRU) undergraduates only.

ENES 3844 (3) Special Topics Global Intensive

Explores different important themes in the humanities and includes a Global component; check with department for specific semester topics.

Equivalent - Duplicate Degree Credit Not Granted: COEN 4000 or COEN 5000

Repeatable: Repeatable for up to 6.00 total credit hours.

Requisites: Restricted to students in College of Engineering and Applied Science (ENGR) only.

ENES 4800 (1) Leadership & Ethics in the Real World

Formerly HUEN 4800.

ENES 4830 (3) Special Topics

Explores different important themes in engineering, ethics, and society; check with department for specific semester topics. Formerly HUEN 4830.

Repeatable: Repeatable for up to 6.00 total credit hours.

Requisites: Requires prerequisite course of ENES 1010 or ENES 3100.

Restricted to students with 57-180 credits (Junior or Senior) College of Engineering students only.

Certificate Program

- Engineering, Ethics and Society - Certificate (<https://catalog.colorado.edu/undergraduate/colleges-schools/engineering-applied-science/programs-study/engineering-ethics-society/engineering-ethics-society-certificate/>)