ENGR 2392: Engineering Ethics and Its Impact on Society - Honors

Instructors:

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Catalog Description:

ENGR 2392 Engineering Ethics and Its Impact on Society (3). This course will help improve ethical reasoning and critical thinking skills through an examination of ethical theory, codes of ethics and contemporary ethical issues in engineering, technology and society. The course is available in face to face blended mode and by online distance learning.

Late Work Policy:

Late work will not be accepted. Students will periodically be required to submit their work to Turnitin via a portal in Blackboard. When this is the case, assignments will *only* be accepted via the Turnitin portal provided in Blackboard. Unless specifically given permission, no assignments will be accepted via email. All assignments must be turned in on the Blackboard platform.

Meeting Times:

Face to Face: MWF at 9:00am in Engineering Center, room 204.

Attendance Policy:

Attendance is mandatory. Each student will be given five (5) free absences. *Neither documentation nor explanation is necessary for these first five absences*. At six (6) absences, 3% will be deducted from the student's overall course grade. At seven (7) absences, 4% will be deducted from the student's overall course grade. This grade deduction pattern (1% per absence) will continue for each absence after seven (7).

Required Materials:

All required reading materials are available to students as a course pack. Additional course materials are presented on the Blackboard or via the Texas Tech Library.

Course Description:

Ethics is integral to the practice of engineering. This thesis is the starting point of ENGR 2392. In this class, students will learn about the ethical dimensions of engineering practice. Engineering does not take place in a technical vacuum – rather it is a complex undertaking with broad and important social implications. Students will be given the opportunity to explore fundamental ethical principles, theories and codes of ethics as they relate to engineering ethics. Emphasis will also be placed on analyzing contemporary ethical challenges in engineering.

Students should finish the course with an awareness of the complexity of engineering practice, increased sensitivity to potential ethical issues that can arise, and an enhanced ability to effectively address these issues.

This course satisfies the Texas Tech University core curriculum requirement in Language, Philosophy, and Culture.

The objective of the humanities in a core curriculum is to expand the student's knowledge of the human condition and human cultures, especially in relation to behaviors, ideas, and values expressed in works of human imagination and thought. Through study in disciplines such as literature and philosophy, students will engage in critical analysis and develop an appreciation of the humanities as fundamental to the health and survival of any society.

Students graduating from Texas Tech University should be able to think critically and evaluate possible multiple interpretations, cultural contexts, and values.

Texas Tech Languages, Philosophy, and Culture Learning Outcomes

- Identify methodologies of historical, literary, philosophical, and/or aesthetic research and recognize their applicability to everyday life.
- Develop analytical arguments in written and/or oral forms.
- Evaluate events, ideas, and artistic expressions in terms of multiple cultural contexts and value systems.
- Demonstrate ways in which the humanities are fundamental to the health and survival of any society

Expectations about Readings:

Expect this material to be challenging at times. Readings in ethics can sometimes be more difficult to comprehend than in other disciplines.

Students are expected to thoughtfully engage the material. While not expected to a have a final, perfect solution to each issue (many ethical dilemmas are far too complex for this) students are expected to take the material seriously.

ABET Accreditation and Expected Learning Outcomes for the Course

To maintain ABET accreditation *engineering programs* must demonstrate that their graduates have[1]:
      (A) An ability to apply knowledge of mathematics, science, and engineering
      (B) An ability to design and conduct experiments, as well as to analyze and interpret data
      (C) An ability to design a system, component, or process to meet desired needs
      (D) An ability to function on multi-disciplinary teams
      (E) An ability to identify, formulate and solve engineering problems
      (F) An understanding of professional and ethical responsibility
      (G) An ability to communicate effectively
      (H) The broad education necessary to understand the impact of engineering solutions in a global and societal context
      (I) A recognition of the need for, and an ability to engage in, life-long learning
      (J) A knowledge of contemporary issues
      (K) An ability to use the techniques, skills, and modern engineering tools necessary for engineering

To maintain ABET accreditation *computer science programs* must demonstrate that their graduates have[2]:
      (A) An ability to apply knowledge of computing and mathematics appropriate to the program's student outcomes and to the discipline
      (B) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
      (C) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
      (D) An ability to function effectively on teams to accomplish a common goal
      (E) An understanding of professional, ethical, legal, security and social issues and responsibilities
      (F) An ability to communicate effectively with a range of audiences
      (G) An ability to analyze the local and global impact of computing on individuals, organizations, and society
      (H) Recognition of the need for and an ability to engage in continuing professional development
      (I) An ability to use current techniques, skills, and tools necessary for computing practice.

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[1] ABET Engineering Accreditation Commission "Criteria for Accrediting Engineering Programs"
http://www.abet.org/uploadedFiles/Accreditation/Accreditation_Step_by_Step/Accreditation_Documents/Current/2013_-_2014/eac-criteria-2013-2014.pdf

[2] ABET Computing Accreditation Commission "Criteria for Accrediting Computing Programs" Student Outcomes
http://www.abet.org/uploadedFiles/Accreditation/Accreditation_Step_by_Step/Accreditation_Documents/Current/2015-2016/C001%2015-16%20CAC%20Criteria%2011-7-14.pdf

Expected Learning Outcomes:

This course helps meet several ABET Program Outcomes for both Engineering and Computer Science. At the end of the course, students should:

1. Recognize the complex nature of engineering. Students should be able to both identify the complexity and develop skills to effectively grapple with this complexity.
2. Also recognize the constrained nature of engineering. Students should recognize not only economic constraints on design and implementation but social and ethical (e.g. public health and safety, environmental considerations, etc.) ones as well. Students should develop an enhanced ability to correctly balance these constraints.
3. Complete the course with a greater understanding of several engineering codes of ethics and the principles that justify the codes.
4. Students should complete this course with a greater understanding of the local, national, and global impact engineering and computing has on individuals, organizations, and contemporary society as a whole. Students will grapple with local and global issues throughout the course with special emphasis in the CS/Engineering and International Practice blog and assessment as well in the Social Impact Analysis (major project of the course – see below).
5. Improve their ability to express complex ideas.

Expected Learning Outcome	Engineering ABET Criteria	CS ABET Criteria
1. Recognize complex nature of engineering	C	C
2. Recognize social/ethical constraints on engineering	C,D,E,F,G,H,J,K	C,E,G
3. Greater understanding of Codes of Ethics	F,H,J	E,F,G,H
4. Greater understanding of local, national, and global impact of engineering and computing	F,G,H,J	E,F,G
5. Improve ability to express complex ideas	G	F

Features of the Honors section:

The size and format of this section of ENGR 2392 creates some excellent opportunities for critical analysis and discussion of the material covered throughout the semester. Most weeks of the semester will include a required discussion blog. Students will be asked to respond to a question or otherwise weigh in on the material being covered. Blog posts will be evaluated based on depth and clarity of thought.

Approximately one third of the class (i.e. one class period each week) will be dedicated to critical analysis and discussion. Students will be required to prepare comments for "discussion days." The nature and content of these comments will vary with the content of the week. Students will be expected to present their thoughts to their peers and instructor in a clear, concise manner. Comments will be evaluated based on clarity, organization, and depth of thought.

Each student will also be required to develop a presentation for the major project/paper of the course (social impact analysis). This presentation will include a short description of the topic as well as a discussion of the student's position on the topic. Each student's presentation will be evaluated by both her/his peers and the instructor.

Assessment:

Method of Assessment	Percent of Grade
1. In-class quizzes	10%
2. Discussion Blog	20%
3. Social Impact Analysis (SIA) *proposal*	10%
4. SIA *presentation*	10%
5. SIA *research paper*	20%
6. Mid-term Exam	20%
7. Final Exam	10%

Evaluation:

Evaluation of written portions of online assessments and written portions of exams will _not_ be based on the conclusions a student adopts, but upon the reasoning used to support said conclusions. In other words, success in ENGR 2392 is not based on agreeing with the instructors. Instead, success is based on demonstrating ethical sensitivity and the ability to thoughtfully analyze, develop and justify ethical positions.

Extra Credit Opportunity:

Students will be given an opportunity to earn extra credit in this class. A one-time assignment, worth a maximum of 3% of the overall course grade, will be available after the midterm. Students who sign up for extra credit will be expected to read *Cradle to Cradle: Remaking the Way We Make Things* by Michael Braungart and William McDonough and write a brief essay (1-2 pages) response to a specific prompt. Details will be discussed in class. There are no other extra credit opportunities available.

Classroom Citizenship:

Sleeping, reading newspapers, texting and doing homework for other classes is not allowed during class. Additionally, chronic tardiness or coming in excessively late will not be tolerated. Students are expected to maintain a classroom environment that is conducive to learning. Disruptive students will be directed to leave class and will be marked absent for that day.

Use of Electronic Devices During Class

Unless there is a documented reason for doing so (e.g. from Student Disability Services), students are not allowed to use laptops, tablets, or phones during class.

Letter of Recommendation Policy:

Students interested in a letter of recommendation or other type of written support (after the course is completed) must, at a minimum, meet the following criteria:

1. Student must have met with instructor during office hours at least three times over the semester.
2. Student must have participated in class on a regular basis. This includes questions, comments, and other valuable in-class contributions.
3. Student must have demonstrated a sincere interest in and appreciation of engineering ethics.
4. Student must provide instructor with at least three weeks' notice before the letter is due.

Meeting these conditions is not a guarantee that a letter will be written but these are the minimum requirements.

Absence due to religious observance:

The Texas Tech University Catalog states that a student may be excused from attending classes or other required activities, including examinations, for the observance of a religious holy day, including travel for that purpose. A student whose absence is excused for this purpose may not be penalized for that absence and shall be allowed to take an examination or complete an assignment from which the student is excused. (see appropriate section of TTU Course Catalog)

Absence due to officially approved trips:

The Texas Tech University Catalog states that the person responsible for a student missing class due to a trip should notify the instructor of the departure and return schedule in advance of the trip. The student may not be penalized but is responsible for the material missed. (see appropriate section of TTU Course Catalog)

ADA Compliance Statement:

OP 34.22 Establishing Reasonable Accommodation for Students with Disabilities

Any student who, because of a disability, may require special arrangements to meet the course requirements should contact the instructor as soon as possible to make any necessary arrangements. Students should present appropriate verification from Student Disability Services during the instructor's office hours. Please note instructors are not allowed to provide classroom accommodations to a student until appropriate verification from Student Disability Services has been provided. **It is the student's responsibility to make arrangements with the testing center when accommodation includes additional time for in-class exams**. For additional information, please contact the Student Disability Services office in 335 West Hall or 806-742-2405.

Cheating and Plagiarism:

Engineering is one of the most trusted and respected of professional disciplines. We expect nothing less of our engineering students. We take the position that engineering students can be trusted to be accountable for doing their own work and for working independently when required to do so. At a minimum, academic dishonesty undermines a student's ability to truly learn the material presented, diminishes problem solving capabilities, and hinders personal moral development.

The following can be found in the 2015-2016 Texas Tech University Catalog:

"It is the aim of the faculty of Texas Tech University to foster a spirit of complete honesty and a high standard of integrity. The attempt of students to present as their own any work that they have not honestly performed is regarded by the faculty and administration as a serious offense and renders the offenders liable to serious consequences, possibly suspension.." (pg. 65)

" 'Academic dishonesty' includes, but is not limited to, cheating, plagiarism, collusion, falsifying academic records, misrepresenting facts, and any act designed to give unfair academic advantage to the student …" (pg. 65)

2392-H01: Fall 2018   <u>**SCHEDULE AND TOPIC LIST**</u>[3]

Dates	Week	Content/Topic
8/27–9/2	1	Intro to Course and Engineering Ethics
9/5-9/9	2	Intuition
9/10-9/16	3	Utilitarianism
9/17-9/23	4	Respect for Persons/SIA *Proposal*
9/24-9/30	5	Virtue Ethics
10/1-10/7	6	Code of Ethics & Professional Responsibilities
10/8-10/14	7	Systems Thinking & Ethics/Midterm
10/15-10/21	8	SIA *Presentations*
10/22-10/28	9	SIA *Presentations*
10/29-11/4	10	Environment I: Foundations
11/5-11/11	11	Environment II: Applications/SIA *Paper*
11/12-11/18	12	International I: Foundations
11/21	13	International II: Application
11/26-12/2	14	Cyber Security & Autonomous Vehicles
12/3 – 12/5	15	Last Week of Class: Review and Q&A

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[3] **PLEASE NOTE: This schedule is tentative. I reserve the right to make changes based on class pace and other relevant factors. This schedule is not a substitute for attending class and taking careful notes.**