

# ENGR 4392<sup>1</sup> – Course Syllabus

## Engineering Ethics and Its Relationship to Society

A 3-Credit-Hour Course in Engineering Ethics with Emphasis on Its Impact on Society

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## Distance Learning – On-Line Option

Developed and Presented by the



TEXAS TECH UNIVERSITY

### National Institute *for* Engineering Ethics

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Email: [engineering.ethics@ttu.edu](mailto:engineering.ethics@ttu.edu), On-Line Course URL: <http://aln.coe.ttu.edu/ecw>

### Catalog Description

Development of ethical reasoning skills utilizing fundamentals of ethics and case studies with applications to engineering practice. Prerequisite: Junior or Senior Standing.

### Text

*Engineering Ethics Concepts, Viewpoints, Cases and Codes* ©2008 – 2<sup>nd</sup> Edition, Published by National Institute for Engineering Ethics, College of Engineering, Texas Tech University

### Course Instructors

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<sup>1</sup> Approved as a humanity elective and writing intensive course by Texas Tech University.

## **Course Description and Learning Objectives:**

In this course, students will be given the opportunity to examine ethical principles and concepts fundamental to the practice of engineering as well as contemporary ethical challenges introduced by new technology, diverse working environments, etc. Because critical thinking and clear communication are necessary to successfully navigate the obstacles engineers face, emphasis will be placed on improving these skills. The overall goal of the course is to promote an enhanced understanding of how engineering affects the world with the recognition that ethics is integral part of engineering practice.

### **Objectives Include:**

1. Enhance sensitivity to ethical issues that arise in day to day engineering practice
2. Strengthen the ability to critically reason about ethical issues
3. Familiarize students with their professional obligations as laid out in various engineering codes of ethics.
4. Instilling an appreciation of the impact of technology on society
5. Improve students' ability to effectively communicate their thoughts in writing.
6. Foster an understanding of the social complexity of engineering

### **Processes and Activities for Achieving Course Learning Objectives:**

Students will complete a series of assignments available through the course website. Numerical grades and written feedback are provided for each assignment. The latter is intended to help students:

- 1) develop a higher level of ethical sensitivity
- 2) reason more effectively and
- 3) communicate their thoughts more clearly.

In addition to providing written feedback on assignments, course instructors are available for questions by e-mail and phone.

Assignments include participation in an online discussion forum dedicated to several of the topics and case studies introduced in the course. Both students and practicing engineers participate in these forums leading to exposure to a variety of viewpoints and levels of experience with ethical issues.

**An overview of the assignments and the final exam for the course is provided in the following pages.**

## ENGR 4392 Contains Ten (10) Assignments and a Final Exam

✚ Assignments 1-4:	Principles and Concepts (4 @ 9% each) .....	36%
✚ Assignment 5:	A Theory Applied to a Code of Ethics .....	9%
✚ Assignment 6:	Viewpoints.....	9%
✚ Assignment 7:	Case Studies .....	9%
✚ Assignment 8:	Draft Position Paper <i>on Engineering Ethics' Impact on Society</i> .....	0%
✚ Assignment 9:	Final Position Paper <i>on Engineering Ethics' Impact on Society</i> ....	13%
✚ Assignment 10:	Ethics Movie Analyses.....	9%
✚ Proctored Final Exam	.....	15%

Part 1: based on intuition and ethical theory articles; Part 2: case study analysis

### SUMMARY OF ASSIGNMENTS:

#### Engineering Ethics Assignment 1: Assignment on *Intuition*

##### Instructions Prior to Entering the Discussion Forum:

Read the article on *Intuitions* in the text; develop your general thoughts on this topic; develop your specific thoughts about the reliability of *Intuitions*. Consider: Are they always reliable? Sometimes reliable? Why/why not? What role, if any, should *Intuitions* play in our moral deliberations?

Note: Sometimes discussions of abstract topics can be enhanced through the use of examples. You are welcome to generate examples of your own to help explain or prove a point.

##### Enter the Discussion Forum and consider your own position and that of others:

The forum is intended to stimulate discussion among enrollees in our various courses (i.e. students and practicing engineers). Critical comments are welcome and even encouraged, though these should be stated respectfully and with an eye towards enhancing understanding of the topic.

After at least three days, log on again, view and respond to comments on your position(s).

#### Engineering Ethics Assignment 2: Assignment on *Utilitarianism*

Instructions Prior to Entering the Discussion Forum – Similar to Assignment 1:

Discussion Forum – Same instructions as in Assignment 1:

#### Engineering Ethics Assignment 3: Assignment on *Respect for Persons*

Instructions Prior to Entering the Discussion Forum – Similar to Assignment 1:

Discussion Forum – Same instructions as in Assignment 1:

#### Engineering Ethics Assignment 4: Assignment on *Virtue Ethics*

Instructions Prior to Entering the Discussion Forum – Similar to Assignment 1:

Discussion Forum – Same instructions as in Assignment 1:

# Engineering Ethics Assignment 5

## Written Report on Application of an Ethical Theory to a Code of Ethics

### Introduction to the Assignment:

Each of the theories we have studied so far embodies and emphasizes one or several fundamental moral principles widely adhered to by people. Often times these very same principles lie at the foundation of the various engineering codes of ethics.

In this assignment you are to choose one of the three moral theories discussed in the articles (preferably the one you find most interesting and plausible) and compare it to either the section of the NCEES code entitled “Obligation to Society” or the NSPE “Fundamental Cannons and Guidelines”. Please thoroughly answer the questions below in your report on this assignment and email it to [engineering.ethics@ttu.edu](mailto:engineering.ethics@ttu.edu).

### Questions to be Answered in Your Report:

Submit a report of at least 600 words outlining your views and your reasons regarding the following questions/instructions.

1. Which portion(s) of the code do you think best reflect the main principles of the theory you have chosen? Explain your answer.
2. Which portion(s) of the code do you think conflict with the principles of the theory you have chosen?
  - a. Explain your answer.
  - b. If you do not think that any portions of the code conflict with the theory you have chosen, identify which portions of the code better reflect one of the other two ethical theories. Explain your answer.
3. Please respond to both parts of this question:
  - a. Given your answer to 1 above, what does this similarity tell us about the code of ethics? Explain your answer.
  - b. Given your answer to 1 above, what does this similarity tell us about the theory you have chosen? Explain your answer.
4. Please respond to both parts of this question:
  - a. Given your answer to 2 above, what does this conflict (if any) tell us about the code of ethics? Explain your answer.
  - b. Given your answer to 2 above, what does this conflict (if any) tell us about the theory you have chosen? Explain your answer.

# Engineering Ethics Assignment 6

## Viewpoints of Others

Consider one (1) of the following “viewpoint” articles in the text:

- ❖ Great Achievements and Grand Challenges by Wm. Wulf..... Page 93
- ❖ Ethical Leadership - A Vital Engineering Skill ..... 131
- ❖ Inspiring Others to Ethical Action..... 137
- ❖ Tomorrow’s Engineer-What Do We Really Need? ..... 139
- ❖ Perspectives on Customs in Different Cultures ..... 144
- ❖ Ethics and Political Contributions ..... 151

Write and submit via email to [engineering.ethics@ttu.edu](mailto:engineering.ethics@ttu.edu) a 500 word report

- (a) Summarizing the article.
- (b) Explaining whether you agree with the viewpoint of the author, and why.

# Engineering Ethics Assignment 7

## Analysis of Case Studies

### A. Approach to Resolving Ethical Issues for Future Reference:

1. Read any two (2) assigned cases in the text and notice how the NSPE Board of Ethical Review considers the case, documents its deliberations, and reaches a conclusion. Doing this assignment will give you an idea about how a group of engineers might handle the study and resolution of ethical issues in your future employment.

### B. Critical Thinking Case Studies: (a total of 10 cases to be assigned)

1. Read the assigned ethics cases in the text:
2. For each of the cases, briefly outline your thoughts on the following:
  - a. What are the moral issues highlighted by the case?
  - b. What are the various options available to a central character?
  - c. What should be or should have been done and WHY?
  - d. Which portion(s) of your discipline’s code of ethics would give you guidance in this situation?

*(If your discipline does not have a code of ethics, use the NSPE code)*

### C. For five (5) of these cases, identified by the instructor, enter the *Discussion Forum*

- a. Discuss what should be done or should have been done... and WHY.
- b. Read, seriously consider, and respond to the position(s) of others in the forum.
- c. Describe how (or if) your position(s) changed after considering the views of others in the Discussion Forum... and WHY.

### D. Of the remaining five (5) cases:

1. Choose any four (4) of these not used in Item C above to analyze and discuss in a written report. Doing this will help increase the breadth of cases you are exposed to while encouraging you to develop and defend your views on each case (~400 words each):
  - a. Listing the moral issues highlighted by the case.
  - b. Listing the various options available to a central character.
  - c. Discussing which portion(s) of your discipline’s code of ethics would provide guidance for the situation.
  - d. Indicating which of your options would be your personal choice about what should be done or should have been done and WHY.

# **Engineering Ethics Assignment 8**

## **DRAFT Position Paper Entitled “Engineering Ethics and Its Impact on Society”**

This assignment is to develop a DRAFT position paper of approximately 1,200 words on “Engineering Ethics and Its Impact on Society”. Prepare in digital format and transmit to the instructor via email.

### **Instructions:**

1. Develop a position on a topic of interest to you that is directly related to the impact of engineering ethics on the profession of engineering and society.
2. Include an abstract of what you intend to write about (~150-200 words)
3. Summarize how your chosen topic has an **impact on society**.
4. Describe how one of the ethical theories you have studied in this course is applicable to your chosen topic. Your discussion should go into some detail about how the theory applies to this topic (e.g. be specific about what form of the theory you are applying, how the method of the theory would apply, etc.).
5. Describe why you think your position would be useful in guiding future engineering decisions related to all or any portion of society.
6. If you were to argue “against” or “criticize” the position you have taken, on what would your argument be based? And how would you respond to these arguments? Note: It is important to consider genuine potential criticisms of your approach and not simplistic arguments which are easily refuted.
7. What changes would you expect in the practice of engineering if all engineers adopted the position you have taken?
8. What benefits do you see for society if engineers held consistently and tightly to your position?
9. Would there be any drawbacks if engineers held consistently and tightly to your position?

### **Structure and Citation:**

- A. Your paper entitled “**Engineering Ethics and Its Impact on Society**” must include the following sections:
  - a. Abstract
  - b. Introduction
  - c. Summary
  - d. Body (response to instructions/questions in 1 – 8 above)
  - e. Conclusion
- B. You are free to use outside research sources to supplement your discussion. Sources should be rigorous, reliable and (ideally) recognized. Acceptable research sources include technical books, peer reviewed journals, publications from government agencies, and so forth. Wikipedia, Answers.com, and similar sites are not credible sources for the purposes of this course. **You will need to cite all paraphrases and direct quotes in the text of your paper and include a works cited page.**<sup>2</sup>

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<sup>2</sup> You are free to use whichever citation style you are most familiar with. Absent any preference on your part, we suggest either MLA or Chicago style.

## Engineering Ethics Assignment 9

### FINAL Position Paper Entitled *Engineering Ethics & Its Impact on Society*

#### A. Final Paper (~1,200 words)

- a. Sections of the Final Paper are same as the Draft Paper above
- b. Carefully consider the instructor's constructive criticism of the Draft Paper
- c. Address revisions of Draft in view of instructor's critical feedback

## Engineering Ethics Assignment 10

### Analysis of *Incident at Morales* ©2005 and *Gilbane Gold* ©1989 (Engineering Ethics movies)

Access to the movies and the other documents and instructions for this assignment will be on the Course Website.

## Proctored Final Exam

**Part 1: Questions based on intuition and moral theory articles**

**Part 2: Case study analysis<sup>3</sup>**

### Information

- ❖ As part of the enrollment fee, students will be provided a 372-page book entitled *Engineering Ethics, Concepts, Viewpoints, Cases and Codes*, 2<sup>nd</sup> Edition © 2008.
- ❖ Unless prior agreement is obtained, written assignments must be submitted by Email.
- ❖ Evaluations will be based on depth of thought, clarity and completeness, rather than on whether or not your response agrees with the instructor or the text.
- ❖ Upon successfully completing the course, the student's grade will be reported to the Texas Tech University Registrar.
- ❖ Students from other universities will need to request the Tech Registrar to transfer their records to their own university. Instructions for requesting the transfer will be provided upon completion of the course.
- ❖ **Note: Students are allowed six (6) months from date of enrollment to complete the course.**
- ❖ **Extension Policy: If an extension is necessary, the cost will be \$50 per month starting from the course deadline date.**

**Email:** [engineering.ethics@ttu.edu](mailto:engineering.ethics@ttu.edu)

**Web Site:** [www.nicee.org](http://www.nicee.org)

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<sup>3</sup> The case study used in the final will be one that was NOT covered in previous assignments.