

# Resources for Teaching Engineering Ethics

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**Abstract** – While the internet is an incredible tool in assisting someone researching ethical issues, there are also many other sources of information. From Professional Ethics class notes to textbooks written on the subject, an inquiring person will find many resources worldwide in assisting him/her with their research. This paper describes these resources and explores what they offer to ethics in engineering.

**Index Terms** – Engineering ethics, teaching resources, and ethics resources

## INTRODUCTION

It is important for engineers to act professionally and ethically on the job. In some instances, however, making an ethically-balanced decision is extremely difficult. For this reason, there are several resources for engineers to use to help them make well-informed, ethical decisions. Resources include, but are not limited to lecture notes, case studies, professional societies, the internet, online forums, textbooks, ethical centers, and actual court cases. Each resource has its own advantages and limitations.

Although lecture notes are readily available, they only provide a limited perspective for the reader. Case studies provide practical situations to apply ethical theory, but they detach the reader from the situation. Professional societies draft ethical guidelines from the experience of veteran engineers, but they cannot give an answer for every situation.

The internet is easily accessible, but some sites are not professional in nature, and they can mislead new engineers. Online forums give insight to situations from the perspective of everyday individuals, but discussions are posted, so feedback cannot be given in real time. Textbooks provide a reference for core ethical beliefs, standards, and theory, but they can be very expensive. Ethical centers provide personalized development to identify and improve ethical values, but they are also expensive and may not be readily accessible. Finally, court cases provide a precedent for engineers to follow, but they can mislead engineers to think something is okay because someone else got away with it.

This paper describes these resources and explores what they offer to ethics in engineering. The resources which are easily available to classroom environment and least expensive are described.

## TYPES OF ETHICAL RESOURCES

There are many ethical resources which can be classified in to the following types:

1. Class Lecture Notes
2. Case studies
3. DVD and Videos
4. Professional Societies
5. Internet
6. Online Forums
7. Text Books
8. Ethical Centers
9. Actual Court Cases

## CLASS LECTURE NOTES

In classes like “Professional Ethics,” several ethical issues are discussed in depth. The notes and information derived from those discussions/projects can be beneficial in researching a particular ethical issue. Although this course is taught at UWF and the notes/presentations are very useful, this course is also taught at Universities all over the nation. Some of the most popular results of our internet research included:

- (a) Georgia Tech’s Professional Ethics for Computer Professionals:
  - o [http://www.cc.gatech.edu/classes/AY2003/cs4001b\\_summer/](http://www.cc.gatech.edu/classes/AY2003/cs4001b_summer/)
- (b) San Diego State University’s Professional Ethics Course
  - o <http://www-rohan.sdsu.edu/faculty/giftfire/>
- (c) North Carolina State University’s Professional Engineering Ethics
  - o <http://www4.ncsu.edu/~jherkert/mds320.html>

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**CASE STUDIES**

When researching a particular ethical issue, it is sometimes helpful to examine other cases which deal with a similar ethical issue. Typically, these come in the form of a case study. The textbook used for the Professional Ethics course provides many case studies which can be examined for ethical issues. Case studies narrate a situation and its outcome in terms of the ethical issues at stake. Typically, each case study deals with one main ethical issue, and allows the reader to fully understand the situation before deciding upon a resolution.

Some of the useful websites that provide case studies (in addition to our textbook) are:

- (a) San Diego University Ethical Case Studies  
<http://ethics.sandiego.edu/resources/cases/HomeOverview.asp>
- (b) Texas A&M University Ethical Case Studies  
<http://ethics.tamu.edu/>
- (c) OnlineEthics.org Collection of Case Studies  
<http://onlineethics.org/eng/cases.html>

**VIDEOS AND DVDs**

There are numerous Videos [4] and DVDs[5] illustrating the ethical dilemma simulating real life situations. These are excellent resources to start an ethics class so that the students can appreciate the importance of ethical choices in workplace and their ethical and professional responsibility as future engineers. They ponder about the importance of ethical dimensions in the engineering professional.

**PROFESSIONAL SOCIETIES**

Professional Societies are helpful organizations that can provide guidance for ethical issues. Two of the largest professional engineering societies that provide assistance to engineering ethics are the National Society for Professional Engineers (NSPE) and the Institute of Electrical and Electronic Engineers (IEEE).

The NSPE ethical web site is available at <http://www.nspe.org/ethics/home.asp>. The NSPE has a well detailed Code of Ethics as well as extensive ethical resources available.

The IEEE ethical web site is available at: [http://www.ieee.org/portal/site/mainsite/menuitem.818c0c39e85ef176fb2275875bac26c8/index.jsp?&pName=corp\\_level1&path=about/whatis&file=code.xml&xsl=generic.xsl](http://www.ieee.org/portal/site/mainsite/menuitem.818c0c39e85ef176fb2275875bac26c8/index.jsp?&pName=corp_level1&path=about/whatis&file=code.xml&xsl=generic.xsl)

The IEEE Code of Ethics is a ten-point code that dictates how engineers shall conduct themselves with respect to ethical concerns.

Professional Societies also provide counseling for engineers who find themselves in an ethical dilemma

**INTERNET**

The internet is probably the greatest source for ethical research. It is a gateway that provides access to Professional

Societies Codes of Ethics, online case studies, Ethics class notes, and many other resources. However, in addition to all this, there are entire web sites dedicated to the study of engineering ethics.

One of these sites is OnlineEthics.org. This great resource provides essays, case studies, and many other resources valuable to anyone researching an ethical subject. The web site is available at <http://onlineethics.org/>.

**ONLINE FORUMS**

There are individuals all over the world that seek ethical guidance from peers online. Many of these individuals have discussions posted at the online forums listed below.

- (a) American Society of Mechanical Engineers:  
<http://www.asme.org/bboard/>
- (b) NSPE Discussion Forums <http://www.asme.org/bboard/>

**TEXT BOOKS**

Several books have been written dedicated to the study of ethics and how they apply to engineering. Prevalent books are listed below and there are many others fine books.

- *Engineering Ethics, 2<sup>nd</sup> Edition*  
Author: Charles Fleddermann  
ISBN: 0131408259  
Publisher: Prentice Hall (2003)
- *Engineering Ethics: Concepts & Cases*  
Authors: Charles E. Harris, Jr., Michael S. Pritchard, and Michael J. Rabins  
ISBN: 0534605796  
Publisher: Wardsworth (Thomson learning) Inc. (2005)
- *Introduction to Engineering Ethics*  
Authors: Mike W. Martin and Roland Schinzinger  
ISBN: 0072339594  
Publisher: McGraw-Hill College (1999)
- *Engineering, Ethics and the Environment*  
Authors: Alastair S. Gunn, P. Aarne Vesilind  
ISBN: 0521589185  
Publisher: Cambridge University Press

**ETHICAL CENTERS**

Ethical centers typically help individuals identify their core beliefs and enhance their core values. The Murdough Center for Engineering Professionalism at Texas Tech University's College of Engineering is such an establishment. Their mission statement dictates what an ethical center should do for its community. According to the institution,

“The Mission of the Murdough Center for Engineering Professionalism is to provide engineering ethics and professionalism education, research, and communications to students, faculty, staff, and engineers in industry, government and private practice, other professionals, and citizens in the community, state, and nation. The goal of the Center is to increase the awareness of the professional

and ethical obligations and responsibilities entrusted to individuals who practice engineering.”

The Murdough Center for Engineering Professionalism is sponsored by Texas A&M. Texas A&M also has its own center for ethics which is located at:

<http://ethics.tamu.edu/>

**ACTUAL COURT CASES**

A tragic incident involving the design of a 1000 ft antenna by an engineering company and the hoisting of the antenna by a construction company led to the deaths of several construction workers. The case addresses the liability designers have to the safety of construction workers. Complete details of the case, as well as video documentation of the event can be found at:

<http://ethics.tamu.edu/ethics/tvtower/tv3.htm#Video>

Several current engineering disasters and court cases have been analyzed by John Uff. A collection of his analysis of engineering ethics cases can be found at the following site:

[www.raeng.org.uk/news/publications/ingenia/issue13/Uff.pdf](http://www.raeng.org.uk/news/publications/ingenia/issue13/Uff.pdf)

**COMPARATIVE SUMMARY**

Resource	Advantages	Limitations	Comments
<b>Class Lecture Notes</b>	Readily Available, good synopsis of current ethical beliefs	Only provides a limited perspective of ethical issues	Used routinely by the team
<b>Case Studies</b>	Provides a practical situation to apply ethical theory	Detachment from the situation. The student isn't personally involved.	Used routinely by the team
<b>Professional Societies</b>	Drafted from the experience of seasoned engineers	Does not give an answer for every ethical situation that can arise.	Will be used commonly by the team in the future
<b>Internet</b>	Easily accessible and retrievable	Some sites are not professional and may give misguided advice.	Commonly used by the team
<b>Online Forums</b>	Gives insight to situations from the perspective of everyday individuals	Because the discussions are posted, feedback can not be given in real time	Not commonly used by the team
<b>Text Books</b>	A reference for core ethical beliefs, standards, and theory	Textbooks are expensive and time-consuming to read every detail	Used commonly by the team
<b>Ethical Centers</b>	Personalized development to identify and	Centers are expensive and often not readily	Not used commonly by the team

	improve ethical values	accessible location	
<b>Actual Court Cases</b>	Decisions were made as to exactly where responsibility starts and stops	May give an unwarranted precedents and convey the idea, "They got away with it, why can't I?"	Will be used commonly by the team in the future

**CONCLUSION**

With the development and expansion of the internet, information is more available now than ever before to the common computer user. The internet provides several resources for researching the ethical considerations and professional ethics codes for most any subject. The internet provides access to such organizations' codes of ethics such as the Institute of Electrical and Electronic Engineers (IEEE) and the National Society of Professional Engineers (NSPE). However, it is also possible to obtain information regarding ethical issues from less-popular internet sources, such as legal documents describing previous legal cases and ethics-based chat rooms.

While the internet is an incredible tool in assisting someone researching ethical issues, there are also many other sources of information. From Professional Ethics class notes to textbooks written on the subject, an inquiring person will find many resources worldwide in assisting him/her with their research.

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All web addresses used within this report are copied directly from the source web page. For information about all web sites cited, please see the related web address.

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- [3] "What? Now We Have to Make a Profit and Be Ethical?" <http://www.business2.com>
- [4] "Gilbane Gold Video", published by the NSPE Education Foundation and the National Institute for Engineering Ethics. <http://www.nspe.org/ethics/eh1-gold.asp>.
- [5] "Incident at Morales – an engineering story", National Institute of Engineering ethics, 2005 <http://www.niee.org>