Engineering in Society
Suggestions for Teaching

Suggestions for Teaching
(Kevin Macnish and Rob Lawlor)

Since compiling the first edition of the e-book in 2013, we have been incorporating its use in teaching ethics to engineering undergraduates. We have explored a number of possible approaches, but found the following to be the most effective to date:

1. Set the book as reading for the students a week or two in advance – emphasising how short it is. Have them download the book in the lecture if possible, so that they have it to hand. Emphasise that in the following lecture they will be expected to have read the entire book, but that at 1,000 words a chapter this shouldn't be too demanding.

2. Now that the students have a basic understanding of some of the ways in which engineering and society interact, ask them to complete the following exercise, using the following table:

Cases/Examples	General Ethical Issues

Ask the students to do three things.

a. First, ask them to find specific real life cases which have an ethical dimension (positive as well as negative) using only examples from the e-book. This will ensure that they have read and understood the e-book. This should not take too long.

b. Continuing the exercise above, ask the students to carry out some additional research, online, in the lecture. (Students can use laptops, tablets or smart phones, or if there is a concern that not all students will have access to a laptop or tablet, you can arrange to hold the lecture in a computer cluster. Students could work on their own, or in pairs or small groups. Typically, we tend to have the students work in pairs or small groups.) Again, ask the students to fill in the two columns, as before, but this time finding examples online. Students will typically go for the big engineering disasters first, such as the Challenger disaster or Chernobyl. This is fine, but do emphasise that there are other ethical issues, and that ethics includes the positive as well as the negative.

c. Finally, ask them to note more general ethical issues – listing the issues, rather than specific examples. Many of these are listed in the e-book. (See the box below for some initial examples).

To get students started, to give them an idea of what is expected, it can be helpful to give them a couple of suggestions, such as:

Cases/Examples	General Ethical Issues
Challenger disaster Citicorp Building – structural problems Tesla Sharing IP	Risk Honesty and Integrity

3. There are a number of ways in which this session can be taught, and naturally it will depend on practicalities such as the number of students and the number of staff.

    a. With a smaller group of students (or a larger number of staff) it can work well to make the session very activity-focused, leaving the students to work independently, finding examples that interest them. In this case staff may just wonder around and ask what examples the students have found etc.

    b. With a larger group, and only a single member of staff, you might prefer to give the students a little less time on this exercise, and then ask them to give an example they found and a brief summary of what happened. You might consider making your own list of the students' examples on the board.

4. If there is time, you might also choose to pick one or two particular cases for further discussion.

Clearly, these are only illustrative examples of how one might teach a session using this e-book. One could follow these directions step by step, or one could focus on some parts, and exclude others. Alternatively, we are sure that there are plenty of other approaches one could take. Obviously, if you try this and find any improvements feel free to let us know!

Engineering in Society Worksheet

Cases/Examples	General Ethical Issues
Challenger disaster Citicorp Building – structural problems Tesla Sharing IP	Risk Honesty and Integrity