# Assignment 2: Academic White Paper on an Engineering Problem

Engineers use technology to help solve problems. But these problems don't come neatly packaged like homework problems. Solving problems involves identifying or even anticipating them and then choosing or developing the means of solving them. Solving problems also requires support for the idea in the form of approval and resources. A document called a white paper plays a key role in this process. The purpose of a white paper is to make the case for a particular application of technology as the solution to a problem.

There are two general types of white papers:

> **Commercial** white papers promote a technological product or process as the solution to a problem for the purpose of selling it to make money. The emphasis in these documents is on company and product image. They are very much like advertising and tend to be brief and relatively simple.
>
> **Academic** white papers are much more detailed and technical. The term "academic" does not mean that these white papers are mere classroom exercises, but rather signifies their educational and informative function. The emphasis is on carefully defining a problem and presenting a reasoned argument for a particular solution. Academic white papers are written to seek approval for and generate interest in an idea with the goal of eventually gaining support for research and development. They function as a kind of "concept stage" that precedes a formal project proposal. The audience for a white paper is engineers who are interested in the topic or working in relevant areas. They are disseminated through publication, via websites or listservs, at professional conferences, or within government or industry organizations.

- Commercial white papers promote technology solutions to sell them for a profit.
- Academic white papers promote technology solutions to gain support for research and development.

For this assignment, you are going to write an **academic** white paper on a technological solution of your choice. You will need to do research on both the problem and the proposed solution, using sources from the library and, if appropriate, from websites. The problem and/or the solution can be current or may be futuristic—that is, the problem and/or the solution might not yet exist but can be reasonably anticipated based on currently available information. **You are encouraged to choose a topic that represents a problem you would be interested in working on in the future.** See **Topics** below for further guidelines.

## Purpose

By doing this assignment, you will learn and practice how to:

- Conduct library research using science and engineering databases
- Research and analyze an engineering problem
- Discuss a solution or solutions and potential applications
- Develop and present a persuasive argument
- Paraphrase and summarize information from sources to support your argument
- Cite your sources and format a bibliography using an accepted engineering style
- Write in a specialized technical genre

## Due Dates and Copies

This assignment will be due **in class** on the following dates, depending on your section:

- ❑ **Thursday lab sections (2, 4, 6): Thursday, 11/1 or Friday, 11/2**
- ❑ **Monday lab sections (1, 3, 5): Wednesday, 11/7 or Thursday 11/8**

Please turn in **one copy** only. This assignment will be evaluated by your writing instructor.

## Topics

As noted above, you are encouraged to choose your topic so that the research will be of future use to you. A few restrictions on topics apply:

- Your topic **must be researchable and feasible**. Published information must be available and you must be able to obtain it within the timeframe of the assignment.
- Your topic **cannot involve an already established solution** (such as catalytic converters as a solution to pollution caused by automobile emissions). However, your topic may involve a solution that is in development but not yet implemented (such as alternative fuels).

Specific examples of topics will be discussed in class. **All topics must be approved by your writing instructor and may be changed only with permission.**

## Research Requirements

A white paper must be based on reliable information, which usually means formally published (peer- or editor-reviewed) information—books, journal articles, and conference proceedings. **Where appropriate**, authoritative and credible web sources may be included. Web sources might be included if, for example, a topic were so cutting edge that little research had actually been published. Your paper cannot rely completely on Web sources—**you must include information from at least five formally published sources**.

Your sources, whether they are formally published or from the Web, must be suitable for college-level academic work on a technical subject. That means, for instance, no general encyclopedias, no popular magazines like *Time* or *Newsweek*, no general newspaper articles, and no general web sources such as Wikipedia. If you are in doubt about a source, ask. These types of sources are appropriate for learning more about a topic but should not be used within the paper itself.

For each source, you must provide the following information as a record of your research process:

1. Complete identification of the source
2. Database or search method and search terms you used to find it
3. Justification for the source, including an evaluation of its quality and a brief description of the type of information it provides

## Length and Format

The white paper should be 5-7 pages double-spaced or the equivalent. Use a standard 12 pt font and 1-inch margins. The white paper should include the following sections with headings:

- **Abstract**
- **Introduction**
- **Definition of the Problem**
- **Potential Solution**
- **Conclusions**
- **References**

Additional subheadings are optional. Headings should be distinguished from the text; specific formatting is up to you. Number your pages. Your research process notes are separate from the paper and should be attached at the end.

Use IEEE or author-date (ASCE or APA style) format for your citations and list of references. This will be covered in class.

## Grading Criteria

In class, we will cover how to select appropriate information, "frame" your discussion, and organize and present your research. Much of the grade will be based on the quality of your research, including appropriateness of sources as reflected in your research process notes. We will also look closely at the quality of the argument, including your explanation of the problem and your support for your solution. Adherence to citation and bibliography formats will also be evaluated.