

Simulated Conference Meets Academic, Advising, and Library Goals for Freshman Engineering Students

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Abstract – First-year engineering students hold a mock professional conference designed to meet the instructional objectives of the Freshman Program’s academic and advising components, and the Engineering Library at the University of Pittsburgh’s School of Engineering. The Annual Sustainability Conference is the result of collaboration between these three groups that creates a student-centered learning environment to help freshmen make informed decisions about their future educational and career goals in engineering. Students research various fields of engineering and learn about companies, jobs and “hot topics” in their area of interest. In the process of creating a mock conference paper on sustainability, students learn library skills and resources, how to conduct research, and how to write technical papers and make oral presentations.

Problem Statement

The Freshman Program at the University of Pittsburgh has an academic and an advising component. The mission of both components is to create a first year experience that promotes the student’s continued pursuit of an engineering degree. In addition, the academic component has the mission of introducing the students to the necessary computer tools to meet the needs of their future departments, introduce the concept of teamwork, and improve the communication skills of the students. Part of the Engineering Library’s mission has been to work with freshmen in order to give them a solid orientation to library research in a university setting. The problem is how to create a curriculum that can satisfy all these missions.

Academic Concerns

The primary purpose of teaching is to facilitate student learning. Traditional teaching methodologies have been shown to put students in a role of passive rather than active learning. [1] In addition, traditional instructional methods have also been shown to be very inadequate in terms of the promotion of deep learning and long-term retention of important concepts. Students in traditional classrooms acquire most of their “knowledge” through classroom lectures and textbook reading. A troubling fact is, after instruction, students often emerge from our classes with serious misconceptions [2-6]. The Engineering School is attempting to solve this academic concern and meet the mission of introducing teamwork by using cooperative learning in the new integrated freshman curriculum [7,8]. In addition to providing a different learning environment, it is also promoting the students' communication skills. However, even with this type of instruction, the traditional engineering problem solving course does not provide enough

opportunities for written and oral presentation assignments. Thus, there is a need for students to gain additional writing experiences within the curriculum.

Advising Concerns

The main objective in first year student advising is to assist each student in making a smooth transition from high school to college; a secondary objective is to aid first year engineering students in identifying their major. The School of Engineering's award winning mentoring program aspires to address the need of involving the whole student in their degree program. As the needs of these students change, the mentoring and advising component will continue to evolve based on these changes.

Library Concerns

The Bevier Engineering Library is one of 14 libraries in the University of Pittsburgh's University Library System. The library has approximately 65,000 books, 76,000 microforms, and over 1,000 journal titles. Extensive electronic resources are also available to support the teaching and research of faculty, students, and staff. The Engineering Library presents students with a modern academic research environment that can be overwhelming at first.

It is a goal of the Engineering Library to present library research as a necessary skill-set for successful engineers. Engineering is an increasingly interdisciplinary field. Real world problems that engineers of the future will face may combine knowledge and understanding from several fields outside of their areas of expertise. While it is not reasonable to expect engineers to have mastery over all subjects, it is reasonable to expect them to be able to find and analyze relevant information as needed. Engineering graduates should be able to teach themselves new concepts and apply information to new and unfamiliar situations. This ability is listed in ABET guidelines as an objective for a competent engineer. [10] Unfortunately, it is common to hear junior and senior students say they do not know how to conduct research within the literature of engineering. Introducing library skills during the first semester demonstrates the fundamental importance of these skills in engineering education.

Historical Context

From the Fall of 1996 to 1999, a collaboration between the freshman academic program and the library began with the design of a research project in which students investigated a high profile engineering failure. Goals of this assignment included raising awareness of engineering's role in society, learning how to use library resources, and learning how to write a technical paper. [11] From the library's perspective, this was valuable interaction with the students and an opportunity to expose them to the library in the context of a specific assignment. However, the project stood in relative isolation from the rest of the curriculum, and the relevance of library skills to practicing engineers may not have been clear. The Mentoring Program also began in 1996 with its effort to ease the transition from high school to the university by creating teams of freshman that were headed by junior and senior level engineering students. [12] Although collaboration had occurred between the academic and advising programs and between the academic and library programs, it wasn't until 2000 that all three were fully integrated.

In the Fall of 2000, the new Freshman Academic Director proposed that a simulated professional conference be held in April 2001 as the focus of freshman year activities. This idea was further refined and resulted in the Second Annual Sustainability Conference in April 2002. This creative approach recognized the real-world role of library resources and research skills in preparing and writing conference papers. This project was not isolated from the rest of the curriculum, but embraced the needs of the Advising, Academic and Library concerns. The faculty, student mentors, and support staff surrounding the students were all involved so that the students would understand the importance of the project. Through the context of a conference, students at the University of Pittsburgh are now introduced to the culture of academic research and the scholarly communication system.

Background

Engineering 0011- Introduction to Engineering Analysis [FALL]:

ENGR 0011 is a required first semester three-credit course, for all entering first semester engineers. It meets twice a week for 2 hours in a computer-equipped classroom. It is an *integrated* course [7,8] (with freshman chemistry, physics, and calculus courses) that has three overall goals:

- To teach the basic skills used by all engineers. These skills include: analytical, programming design, graphical, problem solving, teamwork and communication skills.
- To introduce the role of the computers in engineering problem solving.
- To demonstrate how material in the basic sciences and mathematics is used by engineers to solve practical problems of interest to society.

A portion of this course is taught interactively in a cooperative learning environment where the students work in teams to solve the course requirements. The remainder of the course is taught in a lecture environment, where the emphasis is on the relationship between the engineering sciences and engineering design. Faculty members from various departments within the School of Engineering teach the different sections of the course.

It is the experience of the faculty that students know very little about the actual operation of a computer or how to use computer software as problem solving tools. The students are good at using AOL instant messenger, and finding music files on the web, but when it comes to organizing files in directories, or organizing their thoughts into a structured program, the vast majority of the students are lost. Thus, the main focus of ENGR 0011 is to begin the process of structured thinking.

Engineering 0081 - Freshman Seminar [FALL]:

During the summer registration period, we ask entering students to explain what engineering is and why they want to become an engineer. Very few students can answer this question and if they do, the typical answer is “I don’t know”. ENGR 0081 Freshman Seminar is provided to assist students with addressing this question. This is a required first semester course for all

freshmen engineers. It is a non-credit class, however, students are graded pass/fail based on attendance and participation. In the past, this course was an introduction to engineering where once a week a one-hour lecture on the different fields of engineering would be presented to the students. This design was changed in the Fall 2000 Term to include an additional weekly class meeting with a mentor. These organized mentor meetings help to form a bond between the mentor and first year student and provide the student with information to make their transition successful. Mentors and freshman also gather at other times throughout the week in order to participate in informal teambuilding activities such as: flag football, museum tours, trips to the symphony, etc. In order to establish a close bond between the students and their mentors, classes are limited to 15 students per mentor. With this new design, ENGR 0081 has two main goals:

- Help the students discover the field of engineering they find interesting, and
- Provide peer mentor support to assist the students in the transition to college.

Engineering 0012- Engineering Analysis [SPRING]:

ENGR 0012 is a required second semester three-credit course for all freshmen engineers. It meets twice a week for 2 hours in a computer-equipped classroom. It is also an *integrated* course that has the following overall goals:

- To teach how to program a computer using a number of general-purpose programming languages.
- To promote and encourage good programming practices including a top-down approach.
- To illustrate how the output of one program can be used as the input into another software package.
- To illustrate the role of computer programming in solving engineering problems.
- To illustrate the use of software packages (MSWord, PowerPoint) in communications.

This course is a continuation of ENGR 0011. The main difference is the course material in ENGR 0012 centers more around the use of "C" to solve the given problem, where ENGR 0011 uses "Excel," "UNIX," "HTML" and "Matlab" to produce the required output and/or result. ENGR 0012 is the next step in the development of the student's problem solving skills. In the first semester they are introduced to all the various concepts and skills required to be successful in engineering, in this course they are required to use these skills.

Engineering 0082 - Freshman Seminar [SPRING]:

Freshmen seminar, ENGR 0082, is a continuation of ENGR 0081 and is also a required course for all freshmen engineers. It is a non-credit class, but the freshmen are graded pass/fail based on attendance and participation. The design of the spring seminar session is centered on department selection. The course includes three weeks of department open houses, where each department has the flexibility to do what it chooses. The students are required to visit at least two different departments. Mentors and freshmen continue to gather at other times throughout

the week in order to participate in informal teambuilding activities to further the bond between the freshmen students and their mentors. Classes are limited to 15 students per mentor.

Engineering Library:

The librarians worked with the academic and advising components to integrate library research into the freshman curriculum. The most effective library instruction is curriculum-integrated, which is competency-based and strategic in nature. [12] Given specific goals of the academic and advising components, the librarians designed exercises that would introduce students to information resources, information gathering skills, and critical thinking skills to help them find and analyze information relevant to the requirements of ENGR 0011 and ENGR 0081.

Design of the Library Research Project

In August 2001, the Project Team met to discuss a design for the research project that would meet the objectives of the Academic Program, the Advising Program and the Engineering Library. Emphasis was placed on tailoring activities to meet multiple objectives. The Fall Term research project would provide background and training to prepare the students for the 2nd Annual Sustainability Conference the following spring.

The Project Team agreed that the overall theme of the library research project for the fall term should focus on the student's exploration of an area of engineering that interested them. Frequently, incoming freshman have misconceptions about what engineers really do and how varied engineering careers can be. Research into the realities of engineering careers at this early stage would help students make informed decisions about their educational goals. The advising premise is that this clarity of purpose would promote motivation and commitment to the engineering program.

The Fall Term research project would introduce the students to the technical skills they would need for the Spring Conference and would serve as trial runs for using a prescribed format to write a technical paper, and for presenting that paper to a group of their peers using PowerPoint software. Assignments for the fall term were also designed to introduce the necessary research skills that the students could build upon in order to complete their conference paper in the Spring 2002 Term. The Engineering Librarians utilized the assignments to expose students to resources that they would need throughout their undergraduate program, as well as to present information literacy skills that would continue to serve them as professionals by introducing them to library resources, the research process, and critical thinking skills needed to analyze the validity and utility of information.

Logistics of the Fall Term Library Research Project

Due to the class size of 380 students, the research project was structured to facilitate its management by faculty, advisors, and the library. Although ENGR 0081 itself was a non-credit course, the final paper for ENG 0081 comprised 15 percent of the student's grade in ENGR 0011. Each freshman in ENGR 0081 belonged to a Mentor Group, comprised of 15 freshman guided by one mentor. The librarians met with all of the mentors to explain the purpose and

structure of the project. The mentors were given the responsibility of providing feedback and assistance with the research project, for grading each of the library research components, and for assisting faculty with the evaluation of the final papers and presentations.

The time structure of the assignments was designed so that the students would have their final papers done before they left for the Thanksgiving recess. Their oral presentations would be presented when they arrived back from the break. The students would have three weeks to write their papers, preceded by three weeks to conduct the relevant research. This meant that the project needed to be introduced six weeks prior to the Thanksgiving recess.

To meet that schedule the librarians designed four assignments, one due each week for the first three weeks and the fourth (writing the paper) with a three-week deadline. The assignments were designed to guide students through an information gathering process and a time management process as well. By having weekly deadlines, the students would not be able to leave the project until the night before and would gather information and build skills gradually over a period of six weeks.

Each assignment provided a statement of purpose and a learning objective. Each included a research guide that explained specific library resources and search strategies pertinent to that assignment. In order to clearly present what was expected of them and to limit any room for interpretation, the assignments were highly structured. From the advising perspective, this would ease the transition from high school work to the more independent requirements of higher education. This intensive structuring also made the grading of the assignments more manageable for the mentors.

Content of the Library Research Project

An overview and rationale for the Fall Term research project as a whole was provided to the students [*Appendix 1*] along with a dateline of when each component would be due [*Appendix 2*]. Each component of the research project included a statement of purpose (or learning objective) so the students would understand why they were doing this work. Research/Resource Guides for each assignment were designed in order to supply the students with additional guidance to the resources they would need to consult.

The individual research assignments were to be due each week in order to 1) keep students on a schedule, 2) allow the students to progressively build upon their research skills, and 3) assist the mentors by limiting the occurrence of unrelated questions, thus enabling them to focus their feedback to the students.

The first research assignment was designed to introduce students to the various professional societies in the engineering field as well as the critical thinking process. Advising goals were met by having freshman investigate the information provided by professional societies and asking them to think about “What types of things do ‘X-type’ of engineers do” and “Is that what I want to do?” Since Generation Y students have a tendency to want to use the World Wide Web as their primary (and often only) source of information, the library decided to have the first assignment be web-based in order to capitalize on this inclination, but to utilize it in presenting critical thinking skills. Additional library and academic goals were also met by using this

assignment as a vehicle to introduce information evaluation skills by having the students look at both non-engineering related and engineering society web sites using evaluation criteria.

[Appendix 3]

In assignment two, the concept of “What do engineers do?” was further explored by having students use resources that dealt with career and job information specific to their chosen area. Reference was made to the first assignment with regard to using professional societies web sites as a source for employment information. Reviewing job postings introduced the students to the types of skill sets employers of engineers look for, thus meeting academic and advising goals by asking students to consider “What courses am I going to need to take in order to obtain these skills...and find a job?” The Spring Term Conference was also referred to in this assignment so that they could consider using the company information to identify a service or product they might use as a topic for their conference paper.

[Appendix 4]

The third assignment required students to use electronic indexes to find articles on a topic of interest related to their area of engineering, begin the process of differentiating between an ‘academic’ or ‘scholarly’ journal article versus a ‘trade’ or ‘popular’ journal article, and analyze the article information that they found. [Appendix 5]

Students were asked to submit assignments 2 and 3 using the prescribed format that they would need to use for the final paper. Having these two ‘trial runs’ allowed the students to concentrate on the content, rather than the format, of their final paper.

The fourth, and final, assignment [Appendix 6] was designed to assist them with: pulling together the information they had gathered from the previous three assignments, finding additional research materials to supplement their existing resources, and writing their final technical paper. The student’s oral (PowerPoint) presentation would be based on this same material.

Implementation of the Library Research Project

A 45-minute presentation by the Engineering Library was delivered to each of the six ENG 0011 sections during the fifth week of the Fall 2001 term. This presentation stated the concept that all engineers, regardless of their area of interest, are problem solvers. In order for engineers to solve problems they have to make ‘informed’ decisions, which involves knowing how to gather information and then analyzing it. This process of gathering and analysis was offered to the students as a definition of research. It was explained that the Library Research Project would be an introduction to the research process and would assist them with 1) the ‘challenge’ of determining what area of engineering they wished to pursue, and 2) preparing for the Sustainability Conference in the Spring 2002 term.

The Library Research Project Overview and Outline handouts [Appendix 1 and 2] were distributed and discussed during the library’s presentation. It was explained that a detailed assignment handout and a related research guide would be distributed to them during their weekly mentor group meetings.

Toward the end of the presentation, a general overview of the library system at the University of Pittsburgh via the University Library System Web Site was provided. Resources and services specific to the project were emphasized such as: Instruction sessions on using PITTCat (online catalog), Writing Center location and hours, and the electronic Engineering Subject Guide to Resources. Students were encouraged to come to the Engineering Library for assistance as staff and librarians are there to provide guidance and support.

The Engineering Library met with the mentors in a separate session to discuss the library research project and address any of their questions or concerns. Since the mentors would be assisting with grading the freshman students' weekly assignments, final paper, and oral presentation, the project leaders wanted to insure that the mentors were comfortable with the project and understood the referral process with regard to questions they could not answer. In addition, the Communications Department met with the mentors and gave them guidance on how to assist and provide feedback for the student's oral presentations.

The Academic Program Director created a web site for the ENG 0011 course where he posted all course related instructions and support materials for ENG 0011 and ENG 0081 including all of the materials for the integrated Library Research Project [*Appendices 1-6*]. To further the integration of the library research project with ENGR 0011, students were required to put the data collected in the first three library research assignments onto their web page; the creation of a web page having been an assignment for the ENGR 0011 course.

Within the library, the librarians and staff met to discuss the project. A binder containing the Library Research Project was kept at the front desk of the Engineering Library. All of the library staff became familiar with the project; they were aware of which assignment the students would be working on in any given week, as well as the resources students were being asked to access and use.

The Sustainability Conference

In the spring semester, students were informed that one of the key components of the ENGR 0012 course would be the preparation of a formal written paper for publication and presentation at a conference to be held at the end of the term. Given that the School of Engineering uses an integrated curriculum approach for their freshman courses, students were told that their papers should relate to topics covered in the fall or spring semester of their Physics, Chemistry, Calculus or Engineering classes. Additionally, students were asked to link their chosen topics to an area of engineering using the idea of sustainability in the new millennium as the common conference thread. The key idea was to expand upon the concept of curriculum integration by having students merge material from their core courses with material they had learned in their introduction to engineering seminar courses. Because of the large class size at the University of Pittsburgh (380 students), all papers were required to have two co-authors.

Throughout the semester, students were exposed to all aspects involved in the preparation of a formal paper for publication. These aspects included: responding to a call for papers, being notified of the acceptance of their abstracts, conducting the necessary research, preparing and

submitting a paper for review, conducting a review, and receiving and utilizing the feedback to prepare a final paper. The Engineering Library provided additional guides to the students on how to approach the research process and resources to assist them with writing their conference paper. [Appendices 7,8].

The paper review was a two-step process. After the abstracts were submitted, the ENGR 0012 faculty did an initial review of the abstracts in order to establish the 30+ technical sessions. Once their abstract was approved, students were required to submit (online) an extended outline of their paper. The outlines were available online to the session co-chairs, who then met with their students to discuss the paper outlines. After this meeting, students prepared the draft version of their papers and submitted them electronically. The co-chairs were responsible for reviewing these submissions for technical content. A second meeting with the students, to discuss the reviewers' comments, was then held. In addition to being reviewed by the co-chairs, each paper was also reviewed by a faculty member in the English department. The reviews conducted by the English faculty members focused on writing style, form, and grammar. An additional lesson learned during the Fall 2000 semester was that there was a need to include a peer review in which every student would be assigned another student's paper to review. Thus, in the Spring 2001 Term, a peer review process was implemented. The usefulness of this approach has been widely documented [13-14].

Results

To date, we have 2 years of experience with ENGR 0011 and ENGR 0012. During the first year (2000-2001) we were able to design the basic concept of the writing and library integration into the freshman curriculum, and during the second year (2001-2002) we modified the concept to account for our experiences.

Near the beginning of each semester, students had been quite apprehensive about the prospect of preparing a formal written paper. None had ever been given a writing assignment of this magnitude before. Although the students had done some writing, the task facing them seemed quite daunting. In addition, many students expressed anxiety regarding the fact that they were also being asked to present their papers orally. Comments from students suggested that they felt they would never be able to fill the 10-minute time period allotted them for their presentations. In reality, once students had completed their written papers and had prepared their materials for presentation, most found that they had too much material to fill the 10-minute time slot! Thus, the real challenge faced by most students was condensing their papers into a 10-minute presentation. However, by the end of the year, typical student responses included:

- *I've never written a technical paper like that before. The topic was much more involved - and required you to really understand what you were writing about.*
- *I thought this was a difficult assignment that taught me a lot and was worth doing. It was a lot of work, but after doing it, I felt like I learned a lot. I never had to write a technical paper before and I'm happy that I can now say that I wrote a conference paper.*

- *I learned a lot about a subject that I would not otherwise have learned about. I had never written one of this magnitude, or that required so much in-depth research. We were allowed to pick the topic - which was nice.*
- *I have never written any form of technical paper at all. At first, I was not very excited about the idea of writing such a paper, but I did feel that I had a very valuable experience. I feel that I have learned so much. I also appreciated you forcing us to do rough drafts, so I was able to pace myself and put more effort into it than I otherwise would have.*

At the conclusion of the first year, it was clear that the students felt that all of the time, energy, and hard work they had devoted to the preparation for the conference had paid off. Many expressed that they had experienced a fairly steep learning curve on both the content covered as well as the rules and regulations they were required to follow as they prepared their formal papers. In addition, many students expressed gratitude for the opportunity to participate in such a formal and professional activity.

We also started to get feedback from the faculty teaching the second year courses in the various departments. As one faculty member stated, he was "blown away by the quality of the writing of his students compared to previous years". We discovered that one of the main reasons the writing of our undergraduates had been so poor was because they didn't know how to utilize library resources to write a research paper. The results we are getting this year continue to support the concept that if you teach them how to do it, they will improve their research and writing skills.

As faculty and staff, we learned a lot about what could and could not be expected from the students, how to introduce the material, how to grade the student presentations, what type of handouts and grading keys were required, what could be expected from the mentors, and all the various logistic concerns. The main results we obtained during the first year were primarily administrative issues. For example, all the material listed in the Appendix was created for the second year based on the experience we had during the 2000 - 2001 year. We also discovered that the content in ENGR 0081 and ENGR 0082 had to be totally redesigned. In the second year, we moved the department presentations from the spring semester to the fall, added open house presentations into the spring semester, and extended the peer mentoring into the second semester ENGR 0082 course. An intensive mentor training program was also added and took place the week before the start of the 2001-2002 academic year. During this training week, the mentors were exposed to areas related to advising and diversity in order to develop their communication and mentoring skills. It is clear that for the project to be successful, you must have well organized assignments accompanied by handouts that can assist the students through the process. The assumption that a freshman student would know how to write a technical report was the biggest error we made during the pilot year (2000-2001).

Feedback during the fall term of the second year (2001-2002) supported the changes we made, as the students' acceptance of the library research project was more positive than the first year. Students indicated that while doing this library research project they discovered:

- *“all the possibilities you open by earning a degree in engineering.”... “I thought all engineers were confined to doing research...I found many different things that Materials Science and Mechanical Engineers can do with their degrees.”*
- *“(there are) two societies for each of the disciplines that interest me...I didn’t know that there was anything like this (professional societies) for engineers.”*
- *that “good engineers need to have good written and verbal skills.”*
- *that “engineering is not an individual venture. It takes a lot of working with groups of people from similar and different disciplines of engineering to get a job done right.”*

Summary and Conclusion

All aspects of the first year library project allowed students the opportunity to link the active process of conducting research and writing to sound, scientific content in the form of a conference paper. This activity also provided the instructors with an additional assessment tool outside of the limits of more traditional assessment measures.

The underlying premise is that all students, no matter what their gender, cultural, or demographic backgrounds, can learn! In a recent report on its review of undergraduate education, the Advisory Committee to the National Science Foundation's Directorate for Education and Human Resources concluded that “... while K – 12 programming can expand the pool of those interested in pursuing careers in Science, Mathematics, Engineering, & Technology, it is at the undergraduate level where attrition and burnout can be most effectively prevented. What we in SME&T education must do is to concern ourselves with *all* students, not just those who historically have been represented in science, mathematics, engineering, and technology. Such a breadth of concern has important educational benefits as well, as it will force us to think more about how individuals learn and recognize what research has made clear: that there are differences in learning style which profoundly effect achievement.”[15]

Writing has proven to be an effective way to assist students in articulating their thoughts. In addition, the opportunity to conduct research and then write about a topic of personal interest allows students a chance to demonstrate their understanding in a way traditional assessment measures do not permit. Hence, the integration of research and writing components into a course has enormous potential within both science and engineering communities.

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Fall 2001

Engineering 0011 Research Project – An Overview

As stated in the Course Objectives, this course has been designed to include integration with your other course such as Mathematics, Chemistry and Physics. We have also included a component that integrates this course with your seminar course, ENG 0081. The purpose of this integration is to expand your communication and writing skills by researching and then delivering a presentation on the field/area of engineering you find interesting. Between these two courses, we are providing information on each of the fields of engineering offered here at the University of Pittsburgh. This information is in the form of weekly presentations from the various departments. It is now time for you to research the area of engineering that you believe is right for you. To help you in this selection process, this course has a library research component that will require you to use the library and its resources to further investigate your options.

This research project has the following goals:

- Introduce you to the research steps involved in writing a technical report.
- Introduce you to the procedures in formatting and preparing a written technical report.
- Introduce you to the procedures in creating and presenting an oral technical report.
- Help you explore the field/area of engineering you find interesting.

To accomplish these goals, this research project includes two (2) parts:

PART 1:

A 6-7 page (minimum of five full pages) written technical report. The content of this technical report will also be the basis of your oral-PowerPoint presentation (See PART 2).

The technical report should be formatted using the Paper Format Guidelines posted on the course Web page at <http://civeng1.civ.pitt.edu/~eng11/LibraryProject.html>. These are the same guidelines used by various engineering organizations. Your report should incorporate elements of the three (3) research assignments that are outlined on the **Engineering 0011 Research Project Outline**. Detailed Research Guides will be provided for each of the three (3) research assignments, including a fourth Research Guide to assist you with writing your technical report. These guides will be given to you during your mentoring session and will also be posted on the course web site.

Your Technical Report will be due on November 20, 2001.

PART 2:

A 7-10 minute oral presentation using a minimum of twelve (12) and maximum of twenty-five (25) PowerPoint slides. Use bullets instead of large amounts of text in the PowerPoint presentation. Graphics should also be incorporated into each slide. This presentation will be given to your mentoring class.

Your PowerPoint Presentation will be due on November 26, 2001

Fall 2001

Engineering 0011 Research Project Outline

WEEK 1

Purpose of Research Assignment 1: Learn what professional support is available to engineers in your area/field of interest and develop critical analysis skills in evaluating Web Sites.

Tasks: Use **Research Guide 1** to Investigate Professional Societies via their Web Site(s) and learn to critically evaluate Websites. **1.5 – 2 pages.**

Assignment 1 - DUE DATE: Research Assignment 1 will be due the day/time you meet with your group mentor the week of **October 8-12, 2001.**

WEEK 2

Purpose of Research Assignment 2: Learn about a specific field of engineering. What kind of work do engineers in this field do and what is their working environment?

Tasks: Use **Research Guide 2** to discover what the work environment is for engineers in your area of interest. Learn what kind of companies employ engineers in this area. **1.5 - 2 pages**

Assignment 2 - DUE DATE: Research Assignment 2 will be due the day/time you meet with your mentor group the week of **October 15-19, 2001.**

WEEK 3

Purpose of Research Assignment 3: Learn how to do a literature review. Engineers must often complete a review of current literature in their fields for the projects they are working on.

Tasks: Use **Research Guide 3** to research an interesting product or service that is related to your area/field of engineering. **1.5 – 2 pages.**

Assignment 3 - DUE DATE: Research Assignment 3 will be due the day/time you meet with your group mentor the week of **October 22-26, 2001.**

FINAL REPORT -- WEEKS 4 - 6

Purpose of Final Report - Assignment 4: Learn how to write a technical report. Engineers write technical reports to communicate the results of their work to others.

Tasks: Use **Research Guide 4** to assist you with writing a technical report that incorporates Research Assignments 1-3. This technical report must include a reference list citing the books, journals, magazines, and Web sites that you have used in Assignments 1-3. **5 - 10 pages.**

Final Report - DUE DATE: Your final paper will be due on **November 20, 2001**

PLEASE NOTE: THE DETAILED RESEARCH GUIDES (1-4) WILL BE DISTRIBUTED TO YOU VIA YOUR MENTOR DURING YOUR GROUP MENTOR MEETINGS.

RESEARCH GUIDE - 1**Investigate Professional Societies/Associations and Critically Evaluate Web Sites**

Purpose of Research Assignment 1: Learn what professional support is available to engineers in your area/field of interest and develop critical analysis skills in evaluating Web Sites.

LENGTH: 1.5 – 2 pages in length. Each of the below parts should be about 1–2 paragraphs.

DUE DATE: During your meeting time with your group mentor the week of October 8-12, 2001.

PART 1:

A: Identify a Professional Society or Association that deals with an area of engineering that interests you. You can use one of the following ways to identify professional societies in many fields of engineering:

- **Engineering Subject Guide (List of Associations):**
<http://www.library.pitt.edu/subjects/science/engineering/#assoc>
- Use a search engine, such as Google, AltaVista, etc. and do a search such as:
+chemical +engineering +association

B: Look at the Web site of the society or association you have chosen and describe its mission, services, resources, etc. Answer the following questions:

1. Who are the members of this society? (Size of membership? Who are the members-students, engineers, faculty, others?)
2. Why does this association exist? What is their purpose? (Services, conferences, publications, etc.)
3. Is there a student chapter of this association in the School of Engineering? How could this association help you as an undergraduate?
4. Do you think you would want to join this organization, either now or in the future? Why or why not? How would it be useful to you as an engineer?

PART 2: Examine the following (2) Web sites:

<http://www.library.ucsf.edu/tobacco/index.html>

<http://www.courttv.com/>

and then answer the following 4 questions about them. Write 1-2 sentence answers for each question. You may want to use the attached Evaluating Web Information Guide to further assist you with your answers:

1. Is the author a legitimate author? How can you tell?
2. Is the site biased? How?
3. Do you believe the information presented on this site is accurate? Why?
4. Is the site well-designed? Why do you think so?

PART 3: Analyze the Web site of the professional society/association you chose in Part 1 and answer the same (above) 4 questions. Again, write 1-2 sentence answers for each question and use the same evaluation criteria from the attached Evaluating Web Information Guide to assist with your answers.

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EVALUATING WEB INFORMATION GUIDE

These are some things to consider when looking at Web Sites OR...Do you *really* believe this source? Why? It's as easy to put bad information up on the Web as it is to put good information up. How do you tell the difference? Developing a healthy skepticism and the skills to critically analyze information will help you sort through the tons of information you can find on the web.

CONTENT

Author/Authority

- Is it clear who the author is?
- Are the author's qualifications stated? Is this person really an expert?
- Is there a way to contact the author for more information?

Purpose/Point of View

- Is the author trying to sell you something or convince you of something?
- Does the author have a reason to lie, exaggerate, or only tell you part of the story?
- What type of page is it?

.org - Organizational – purpose is to promote the organization

.com - Business – sell products

.edu - Educational – promote learning, but watch student homepages

.gov - Governmental – inform citizens

a tilde (~) combined with **.edu**, **.net**, **.com**, etc. – Personal; many different purposes.

Accuracy

- Does the information appear to be reliable and correct? Do you see errors?
- Are sources listed?

Currency

- Does the site state when it was first created?
- Does the site indicate when it was last revised? Last updated?

FUNCTIONALITY AND DESIGN

Organization of Information/ Navigability

- Can you tell from the first page how the site is organized?
- Are links easy to identify?
- Are links logically grouped?
- Is there a Site Index (a 'text' overview of all the information) on the site?
- Does the site have its own search engine for searching within the site?
- Are there 'dead' links; i.e. links to 'nowhere'?

Design

- Do the type styles and background make the page clear and readable?
- Do the graphics and images enhance the text or are they distracting?
- Is the layout consistent from page to page?

RESEARCH GUIDE - 2

Job and Company Profiles

Purpose of Research Assignment 2: Learn about a specific field of engineering. What kind of work do engineers in this field do and what is their working environment?

LENGTH AND FORMAT:

- 1.5 – 2 pages in length.
- Your paper **must** be formatted according to the Paper Format Guidelines. These guidelines can be accessed via the Eng0011 – Library Project Web Site at: <http://civeng1.civ.pitt.edu/~eng11/LibraryProject.html>
- Please cite ALL of the resources you use (books, Web Sites, etc.).

DUE DATE: During the meeting with your group mentor the week of October 15- 19, 2001

PART 1: *What do engineers, in general as well as in your area of interest, do?*

- Locate materials (books, Web Sites, etc) that provide an overview of careers in engineering as well as overviews of careers in your specific area of interest.
- Write 2 - 3 paragraphs about careers in engineering and careers in your area of interest.

PART 2: *What types of jobs do engineers in your area of interest have?*

- Find 2 current job/position descriptions in your field/area of engineering.
- Make a print-out or photocopy of each of the 2 job descriptions you find*.
- Write 2 - 3 paragraphs about these positions.

*NOTE: Please attach the photocopies or print outs of the actual job descriptions you find to your paper.

PART 3: *What types of companies hire engineers from your area of interest?*

- Identify 2 companies that hire engineers in your area of interest.
- Write 2 - 3 paragraphs about the two companies you select. Discuss the types of products and services each company offers. Describe the working environment in each company: such as salaries, location(s), hours, etc. Is this the type of company you would want to work for? Why or why not?

*NOTE: While researching companies, you may want to identify one current process, product, or service from that interests you and consider using this as the subject topic of your Spring Term report.

Please use the attached Resources To Use For Research Assignment 2 to assist you with completing this assignment.

Ask at the front desk of the Engineering Library if you need assistance with any of these resources.

RESOURCES TO USE FOR RESEARCH ASSIGNMENT 2

□ How to Find Materials about Careers in Engineering (PART 1):

- Use **PittCat** (online catalog) to locate book materials. The Engineering Library has several career books that are specific to the field of engineering.

Some examples of a **keyword search** that you might enter/type in PittCat to find these materials would be:

*career and guides and engineering
engineering and vocational guides*

- The Placement and Career Services Center (at the University of Pittsburgh) provides many services for students and alumni of the University of Pittsburgh. Career counselors are assigned to the different areas which students major in at the University. The career counselor for engineering majors, Chris Francovic, has created a list of Web sites related to careers in the field of engineering. You can access this list of Web sites at: **<http://www.placement.pitt.edu/d/advisor/Chris-Frankovic>**
- Occupational Outlook Handbook: U.S. Department of Labor / Bureau of Labor Statistics
<http://www.bls.gov/ocohome.htm>
Revised every two years, the *Handbook* describes what workers do on the job, working conditions, the training and education needed, earnings, and expected job prospects in a wide range of occupations.

□ How to Find Job / Position Descriptions (PART 2):

- Pittsburgh Technology Council Web Site (for local positions): **<http://www.pghtech.org>**
- Job Web Sites:
 - **jobs.com**
 - **headhunter.net**
 - **flipdog.com**
 - **monster.com**
- You can also find job positions using the information you found while doing Research Assignment 1:
 - The Web site of the professional association/society that you looked at last week may have a section of their site called *Careers* or *Jobs*.
 - Also, depending upon the type of association you chose, they may publish a **print journal** or **trade magazine** that will have a job posting section. (*More in-depth information about using Journals and Trade Magazines will be covered in next week's Research Assignment 3*)

□ How to Find Information about Companies (PART 3):

You can access all of the electronic databases that the University Library System (ULS) provides via the **Online Resources** Section of the **ULS Web site**. At **<http://www.library.pitt.edu>** locate the (blue) 'Online Resources' section, click on the last item titled **electronic resources a-z**. Once you are on this list, databases can be found in alphabetical order, so to find **Business and Company Resource Center**, click on the '**B**' at the top of the page.

- **Business and Company Resource Center (via InfoTrac)**: Provides content in the following areas: periodical articles, news articles and press releases; detailed information for U.S. and international companies and associations.
- **Thomas Register of Manufacturers (can only be accessed in the library)**: This database is the most comprehensive directory of U.S. and Canadian manufacturers, listing over 158,000 industrial products and services companies.

Once you locate a company, you may want also want to look at the company's Web site for additional information. Keep in mind the evaluation criteria you used in Research Assignment 1 when looking at the Web sites for these companies.

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RESEARCH GUIDE - 3

Review of Current Literature in the Engineering Field

Purpose of Research Assignment 3: Learn how to do a literature review. Engineers must often complete a review of current literature in their fields for the projects they are working on.

LENGTH AND FORMAT:

- 1.5 – 2 pages in length.
- Your paper **must** be formatted according to the Paper Format Guidelines. These guidelines can be accessed via the Eng0011 – Library Project Web Site at: <http://civeng1.civ.pitt.edu/~eng11/LibraryProject.html>
- Please cite ALL of the resources you use (articles and books).

DUE DATE: During the meeting with your group mentor the week of October 22 - 26, 2001

Select one topic related to your area of interest (either a product, a service or an issue) and then do a literature search on this topic.

WHERE WOULD I GET A TOPIC IDEA? You may have heard about an issue or topic in either one of your classes or in one of the department presentations or you may have come across an interesting product or service while working on last week's assignment - *Part 3: What types of companies hire engineers from your area of interest?*

PART 1: Find Articles About Your Product, Service, or Issue:

- **Find 6 articles** about your topic using the article indexing databases listed on the attached Resources to Use for Research Assignment 3.
- Create a reference/citation list of ALL 6 articles including the database(s) you used to find them.
- Out of these 6 articles, **select 2 or 3 articles** and write a 1 - 2 paragraph summary about each. What does each article tell you about your topic?
- Write 1 - 2 paragraphs describing the **types** of articles that you found. Some of the articles you find will be considered to be **scholarly** articles and some will be considered to be **magazine/trade articles**. Use the *Scholarly vs. Magazine/Trade* chart on the attached, Resources to Use for Research Assignment 3, to assist you with telling the difference. When would you want to use one type and when would you want to use the other? Why did you decide to use/write about the 2 - 3 articles you chose instead of the other references/articles that you found?

PART 2: Find Books Related to Your Topic:

- Do a keyword search in PittCat to find book materials related to your topic.
- Write a brief paragraph describing what you would learn about your topic if you read the whole book. Please keep in mind that this assignment is NOT a book report, so you do not need to read the book in its entirety. Instead, read the chapters or sections in the book that apply to your topic and skim the other chapters to look for other information that might pertain to it.
- Write a brief paragraph on how the information in the book differs from the information in the articles that you found.

Please use the attached Resources To Use For Research Assignment 3 to assist you in completing this assignment.

Ask at the front desk (Engineering Library) if you need help in using any of these Resources.

RESOURCES TO USE FOR RESEARCH ASSIGNMENT 3

□ How to Find Articles Related to Your Product, Service or Issue (PART 1):

- Go to the **Engineering Subject Guide** section of the University Library System’s Web Site at: <http://www.library.pitt.edu/subjects/science/engineering/>
- Select the second link titled: **Databases**
- There are many databases listed, but for this assignment you need to only use the following:
 - **Academic Search Elite**
 - **EI Compendex**
 - **Expanded Academic ASAP**
 - **IEEEExplore**
 - **INSPEC**
 - **MedLine Express**
- After you ‘click on’ (select) the title of the database you wish to search, information about the database will appear, as well as the ‘connect/access’ link that will take you to the actual database.

PLEASE NOTE:

- You might find that you have chosen an area of research that has not had many articles written about it. If this is the case, try to do a search on another, but related, topic or try a different database.
- Whereas many of the databases will provide the full-text of the article online, some will only provide the **citation**. A citation typically includes the following information: *title of article, author of article, the journal name, date, volume, issue, etc.* If this is the case with one of the articles you find, you will need to search **PITTCat** to find out **1)** if the University of Pittsburgh Library System subscribes to the journal or magazine your article is in and **2)** where the journal or magazine is located. Journals are shelved alphabetically by the title of the journal.
- **Scholarly** journal articles contain very advanced information that freshmen are not expected to fully understand. When reading a scholarly article study its **format** (how the information is presented) and get what you can about its content. Don’t worry about fully understanding the content!

**HOW TO TELL THE DIFFERENCE BETWEEN
MAGAZINE/TRADE ARTICLES AND SCHOLARLY JOURNAL ARTICLES**

Magazine/Trade Articles ...	Scholarly Journal Articles ...
<ul style="list-style-type: none"> ▪ Provide news and interest stories about engineering industries and professions. ▪ Articles are usually written by a reporter and are written from a non-scholarly perspective. ▪ Discuss developments before ‘scholarly’ articles or books. ▪ Articles do not go through the peer-review process; thus they are not considered as authoritative as scholarly journal articles. ▪ Often look ‘entertaining,’ with photographs and graphics. 	<ul style="list-style-type: none"> ▪ Contain research-based, in-depth information about new research and developments. ▪ Articles are written by a researcher or research team, and are peer reviewed ▪ Less timely than magazines. ▪ Articles are written from a scholarly perspective, using scholarly methods. ▪ Articles assume the reader already knows the subject area well and thus contain ‘advanced’ concepts.

□ How to Find Other Materials Related to Your Topic (PART 2):

- Use the keyword search in **PittCat** (online library catalog) to find a book that applies to your topic. PittCat can be accessed via the ULS Web Site at: <http://www.library.pitt.edu>
- Books generally contain broader topics, while journal and magazine articles are about one specific topic. You might have to keep this in mind while searching for books. For example, instead of searching for a book about a specific type of **bridge design**, search for a book(s) about **bridges** in general.

~ **PLEASE ASK AT THE DESK (Engineering Library) FOR HELP WITH ANY OF THE ABOVE RESOURCES~**

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RESEARCH GUIDE - 4

Writing Your Final Technical Report / Paper

Purpose of Technical Report - Assignment 4: Learn how to write a technical report. Engineers write technical reports to communicate the results of their work to others.

LENGTH AND FORMAT:

- At least **5 full** pages but less than **7 full** pages.
- Your paper **must** be formatted according to the *Paper Format Guidelines*. These guidelines can be accessed via the Eng0011 – Library Project Web Site at: **<http://civeng1.civ.pitt.edu/~eng11/LibraryProject.html>**
- Please cite/provide references for **ALL** of the resources you use: articles, books, Web sites, etc.

DUE DATE(s): This paper is due in lecture on **November 20th**.

Your PowerPoint presentation, based on this paper, is due during the week of **November 26th**.

This final report/paper will use the research you have already completed in Research Assignments 1-3. You may need to do additional research to find supplemental resources in order to write a complete technical paper. Your thoughts on the research process, in addition to your reflection upon a career in engineering, must also be presented.

The attached example guide will:

- Provide the questions you must address for each section (7 sections total).
- Provide you with a general idea of what your paper should look like.

Research Resources and Reminders

How to Find Materials to Assist You with Writing a Technical Report/Paper:

Guides that assist you with writing are often referred to as style manuals, because different styles or types of writing require that you use specific guidelines. You are required to use the formatting guidelines that are provided on the ENG0011 Web Site. However, other technical writing handbooks (or style manuals) may provide you with additional writing assistance. To find technical report writing guides that the ULS libraries have, use the **keyword** search in **PittCat** (online catalog) and use the following terms:

technical writing and handbook

How to Find Additional Articles and Books:

Review the steps you went through to find articles and books on your topic in Research Assignment 3. Use these same electronic Indexes and PittCat to locate additional materials to support your paper as necessary. Please ask at the front desk of the Engineering Library if you need any assistance.

How to Cite the Resources You Use:

Remember to list all of the books, journals and Web Sites you used in the Literature Review portion of this assignment. Use the conference guidelines for citing items. You can find additional information about how to cite electronic information (such as Web sites) at: **<http://www.library.pitt.edu/research/citing>**

Other Resources to Assist You with Writing Your Paper/Report:

The Writing Center: **<http://www.english.pitt.edu/resources/writecent.html>** can assist you if you have questions about the writing process as well as use of language, grammar, spelling, etc. The Writing Center is (physically) located in 501 of the Cathedral of Learning. Their hours are: Monday - Wednesday, 9 am - 8 pm / Thursday, 9 am - 6 pm / and Friday, 9 am - 3 pm. Writing Center personnel will also be available to help students (appointments are not necessary) between the hours of 1 to 4 pm, Tuesdays through Thursdays, at the Encyclopedia Alcove table on the ground floor of Hillman Library.

GUIDE TO WRITING YOUR FINAL TECHNICAL REPORT / PAPER

Your paper will follow the same formatting guidelines you used in Research Assignments 2 and 3 and must address the questions that follow the sections listed below in the outline example

PLEASE NOTE:

- Do NOT label the section headings of your paper with the word(s): *Section 1, Section 2*, etc. These headings have been included in the below outline in order to show you 1) how many sections there will be in this paper and 2) the questions that should be answered for each section. So any text with an ① in front of it should not appear on your paper. Each of your sections will have varying lengths (number of paragraphs). **Don't Forget:** You can also use **sub-headings** and **bullets** in the text of your paper.
- Do NOT use the exact title and section heading titles that have been given below, they are JUST examples. Your main title and section heading titles will depend upon the area of engineering you have chosen and what you have decided to write about it.

CAREER OPTIONS IN MECHANICAL ENGINEERING OR....WHY WORKING WITH THERMODYNAMICS WILL ROCK

Your Name¹

① Title Section (in one column format) with your name.

*Abstract --- This section should be approximately 150 words and should be a **summary** of what this paper is about. It should be italicized. A helpful 'tip': You may want to write your abstract **after** you have finished your paper.*

Index Terms --- Don't forget to provide about four terms (in alphabetical order and separated by commas) that will summarize your paper.

MECHANICAL ENGINEERS ARE GENIUSES AND I CAN'T WAIT TO BE ONE

① Section 1:

The first section of your paper should provide an **introduction** to what you are going to talk about in the rest of the paper.

YOU CAN DO MANY INTERESTING THINGS AS A MECHANICAL ENGINEER

① Section 2:

What do engineers generally **do** in this area/field of engineering that you have chosen to write about?

COMPANIES THAT HIRE MECHANICAL ENGINEERS

① Section 3:

Describe some companies, products and services in your selected area of engineering.

PROFESSIONAL SOCIETIES ARE IMPORTANT

① Section 4:

In this section **discuss professional societies that support this area of engineering.**

INTERESTING ISSUES FACING MECHANICAL ENGINEERS TODAY

① Section 5:

Describe some issues or challenges facing this area of engineering now and/or in the future. Some of the articles you found while doing Research Assignment 3 may provide information for this section. Look at the Resources to Use for Research Assignment 3 guide again for a refresher on how to find additional articles or book materials.

SKILLS MECHANICAL ENGINEERS NEED

① Section 6:

In conclusion, what **skills do you think are needed** to be a successful engineer? What types of skills were required for the job descriptions you found?

REMARKS

① Section 7:

What were you surprised to learn during this research project? How has your perspective on engineering change?

¹ Your Name, University of Pittsburgh, Engineering 0011, Fall 2001, yourname@pitt.edu
Put name of Mentor Here

GUIDE TO CONDUCTING RESEARCH FOR YOUR CONFERENCE PAPER

HOW TO APPROACH THE RESEARCH PROCESS

Complex topics have no single right answer and no single source of answers. You will need to assess all of the information you uncover while researching your conference paper topic. Sometimes people can become overwhelmed or frustrated in the middle of doing research. By allowing yourself time to develop an understanding of your topic, looking at it from different angles and thinking about the ‘big picture’ of your research, you will lessen your frustration.

- Plan your **research strategy**. Finding an overview article in an encyclopedia or a general book on your topic can often help generate additional ideas, leads, and terms that you can use to search for more information on your topic. Textbooks are also a good overview resource.
- Keep a **list of terms or search phrases** that work. Keep adding or deleting to your list as you come across related concepts, broader or narrower concepts, synonyms, etc.
- Critically **evaluate** your source of information (Remember: Authority, Currency, Content, Point of View and Level of Presentation). <http://www.library.pitt.edu/research/eval/>
- While doing your research, remember to write down the **citation** for the source(s) you use. The elements (or parts) of the citation are: the author’s name(s), title of book or article, journal title, page(s), date, etc. Each element that makes up the citation is called a field: author’s name occurs in the author field, title of article occurs in the title field, etc. Citations are very important because: (1) You will need to provide this information in your Reference List. (2) This is your evidence that you found other people (colleagues, experts, scholars, etc.) that agree with/support your research topic. And (3) if you ever need to find this source again, the citation is the way to identify it.
- When you are taking notes, try to remember to **make connections** between your sources. Ask yourself: “How does this idea fit in with what I have already read or know?” “Is it similar?” “Does it contradict or does it support what I have read so far?” “What is the point of view?” “Are there any biases?” “Does it make sense?” “What additional information do I still need to find out?”

YOUR RESEARCH STARTING POINTS

- ❑ **Engineering Research at the University of Pittsburgh**
<http://www.library.pitt.edu/research/engineering/>
Provides information about the different types of library resources (books, articles, patents, reports, etc) that are used for doing research and how to find the information within them.
- ❑ **Engineering Subject Guide**
<http://www.library.pitt.edu/subjects/science/engineering/>
Provides access/entry into the electronic resources (databases, electronic journals, etc) that you will need to use for your conference paper research.

REMEMBER:

YOU CAN ALWAYS ASK A LIBRARIAN FOR ASSISTANCE WITH USING ANY OF THE ABOVE RESOURCES.

DATABASES

The majority of the resources you will use for your research will be library databases.

- A **database** is an organized collection of electronic/computer records that uses specific software for accessing the information contained within. When reference is made to databases within the context of library resources, often what is being referred to are online indexes or indexing databases.

- An **index** is a guide to the contents of a file, document, or a group of documents. Indexes are typically arranged by subject, author, or keyword. Most library databases provide indexing and abstracting for articles that have appeared in journals, magazines, or newspapers. An indexing database will provide you with enough information to locate an article in a journal or magazine. Some key indexing databases that index articles from engineering related journals would be *EI Compendex*, *INSPEC*, and *SciFinder Scholar*.
- However, not all library databases are indexes. Some databases are **catalogs**, like PITTCat, which contains records that reflect what the Pitt library system has in its collection and where those items (i.e. the books, journals, sound recordings, maps, etc.) are located. So once you identify an article in an index database, you may need to search a catalog database next in order to locate the journal that article is in. There are other types of library databases, such as **reference** databases. An online dictionary or an online encyclopedia would be an example of a reference database.
- The University of Pittsburgh's library system subscribes to several hundred databases you can access for any of your research needs. An important thing to remember: When you use these databases, you are searching concentrated sources of scholarly information in specified subject areas, as opposed to doing a Web search that includes a high proportion of commercial and irrelevant results.

3 GUIDELINES ON HOW TO SEARCH JUST ABOUT ANY DATABASE

(1) LEARN ABOUT THE DATABASE.

Know what you are searching for or ask yourself "Why am I going to use this database? Databases usually provide online documentation as to the scope of the database including:

- **What TYPE OF DOCUMENT (Books, Articles, Conference Papers) are you looking for?**
Do you want to find books? Then you would need to search an online catalog database such as PITTCat to find out what book titles the Pitt libraries own. Looking to find articles? Then you need to search a database that indexes articles.
- **What SUBJECT is covered (or not covered) in the database?**
Just as you wouldn't search PittCat (catalog) to find articles, don't expect to find scholarly engineering articles in a newspaper index. After you figure out what type of documents you want to find, you need to think about what subject area. Don't get discouraged if you pick a database that seems to be subject appropriate, but you don't seem to be getting the results you want. You may have chosen an area of research that has not had many articles written about it. If this is the case, try to do a search on another, but related, topic or try a different database. Please don't hesitate to ask at the front desk of the library for help; librarians are here to assist you in determining which database to choose.
- **Is the information FULL-TEXT or is CITATION/ABSTRACT only?**
More and more electronic indexes are providing the full-text of the article within the database, but just as many only provide the citation. A **citation** typically includes the following information: *title of the article, author of article, the journal name, date, volume, issue, pages, etc.* This same citation information is also what you will use for your Reference List at the end of your paper. If you use an indexing database that only provides the citation of the article, then you will need to search **PITTCat** to find out:
 - 1) If University of Pittsburgh Library System subscribes to the journal or magazine that contains your article and
 - 2) Where the journal or magazine is located. Journals are shelved in the University Library System, including the Engineering Library, alphabetically by the title of the journal.
- **What YEAR/DATES are covered?**
Most databases only index article information as far back as the past five to ten years (i.e. early 1990's). You could spend hours searching for information about something that happened in the 1970's only to find out that the database you have chosen to search only goes back to 1989!

However, there are some that do go back further; One example would be SciFinder Scholar, which indexes articles, papers, etc. back to 1907. NOTE: In order to find older materials, it is often necessary to use the print indexes instead of the indexing databases.

(2) USE ALL THE SEARCH FEATURES AVAILABLE TO YOU.

Even though the content may differ from one database to another, the way to find the content and/or use the database will often be very similar. The following search features are available, in some form, in every database:

▪ USE OPERATORS TO COMBINE SEARCH TERMS

Boolean Operators (AND, OR and NOT) are used to link concepts in database searching.

Use **AND** to narrow a search. Both words must be present in the records you retrieve.

Ex. moon **AND** orbit - Retrieves all records with moon and orbit.

Use **OR** to expand a search. Your search will retrieve records with either of the terms present.

Ex. (moon **OR** lunar) **AND** orbit - Retrieves all records with lunar orbit and all records with moon orbit.

Use **NOT** to exclude records containing the word that follows the NOT operator.

Ex. (lunar **AND** orbit) **NOT** moon - Retrieves all the records with lunar and orbit, but discards any records with moon.

Proximity Operators: are used in electronic searching to find words that occur near each other. For example, if you are looking for information about “fatigue fracture” as a concept, you could use proximity searching to specify that the word "fatigue" should occur within one word of the word "fracture". Sometimes quotes around the terms are used, sometimes a symbol is used: fatigue w/ fracture.

▪ USE TRUNCATION AND/OR LIMITERS

Truncation:

Using a truncation symbol, usually an asterick (*) or question mark (?), helps you to find all of the variants of your keyword:

engineer* would find: engineer, engineers, engineering, engineered

comput? would find: compute, computer, computers, computing, and also computational

Limiters:

Help you restricts the results/matches made during a computer search by adding other criteria to your search. You can usually limit your search by the date, language, and for some databases that index more than just articles, by type of document (such as paper, book, article, etc.). Field limiters can also help you limit search terms by which field the word occurs in. Remember, citations are made up of fields: author field, title field, etc. Therefore, you could construct a search that would only find articles that have the words **fatigue fracture** in the title field.

▪ PRINTING AND DOWNLOADING OPTIONS ARE ALWAYS AVAILABLE

Emailing the results to yourself is sometimes an option

▪ HELP OPTIONS ARE AVAILABLE

Almost ALL databases have a ‘built-in’ help guide to assist you with that particular database. The library also has print help guides for certain databases.

(3) READ THE SCREEN.

Most database interfaces will have a place (or several places) on the screen where they will list what the available options and features are for the database you have selected. These are usually located on the left or right side or on the top or bottom of the screen. These options/features will often change based on where you are in your search. For example: once you get a list of results from your search, look for the printing, downloading, or emailing options. Overall, it is important to focus on the general concepts of how to search, rather than the specifics of each individual database interface. So, if you remember that each database should have some of the search features listed above under section (2), you can easily learn how to search any new database.

AND REMEMBER...YOU CAN ALWAYS ASK A LIBRARIAN IF YOU NEED ASSISTANCE.

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GUIDE TO WRITING YOUR CONFERENCE PAPER

Since you have already written and submitted the abstract and outline for your *Second Annual Sustainability in the New Millennium Conference Paper*, this guide is to assist you with writing the final content of your paper.

WHAT DO WE MEAN BY SUSTAINABILITY?

For the complete definition(s) of sustainability as it pertains to your conference paper, please refer to the handout titled: *WHAT IS SUSTAINABILITY?* For your paper, you can use any definition for sustainability. However, there should be some form of discussion that deals with the trade off issues of cost versus environment versus quality of life. Your conference paper should include at least a half of a page discussion on how your topic impacts sustainability.

AUDIENCE/PURPOSE:

You should always keep in mind your audience and the purpose of your conference paper throughout the writing process. Think about who your audience is - who will be reading this paper, who will be attending your conference presentation - and then ask yourself: What is unique about my contribution to knowledge in this field or what is my point? How can I make my paper easy for the audience to understand? How can I make my research interesting to the audience?

LENGTH:

Your conference paper (the abstract, introduction, body and conclusion) should be **6 (six)** pages in length. The reference list and appendices can extend the length of your paper to be a total of **8 (eight)** pages. Your paper should not exceed 8 pages. **AT LEAST HALF OF ONE (1) PAGE** of your paper should address the issue of sustainability

OTHER RESOURCES TO ASSIST YOU WITH WRITING YOUR CONFERENCE PAPER

❑ HOW TO FIND TECHNICAL WRITING GUIDES:

Guides that assist you with writing are often referred to as style manuals, because different styles or types of writing require that you use specific guidelines. For your conference paper, you are required to use the formatting guidelines provided on the ENG 0012 Web Site. However, other technical writing handbooks (or style manuals) may provide you with additional writing assistance. To find technical report writing guides that the ULS libraries have, do a **keyword** search in **PITTCat** and use the following search terms: **technical writing** and **handbook**

❑ WRITING CENTER AT THE UNIVERSITY OF PITTSBURGH:

<http://www.english.pitt.edu/resources/writecent.html>

The Writing Center can assist you if you have questions about the writing process as well as use of language, grammar, spelling, etc. The Writing Center is (physically) located in 501 of the Cathedral of Learning. Their hours are: Mon. - Wed., 9 am - 8 pm / Thurs., 9 am - 6 pm / and Fri., 9 am - 3 pm.

❑ WRITING GUIDE WEB SITES:

Academic Writing: Research Papers (University of Wisconsin's Writing Center)

<http://www.wisc.edu/writing/Handbook/PlanResearchPaper.html>

Quoting and Paraphrasing (University of Wisconsin's Writing Center)

<http://www.wisc.edu/writing/Handbook/QuotingSources.html>

Writing Guidelines for Engineering and Science Students (Virginia Tech)

<http://fbox.vt.edu/eng/mech/writing/index.html>

Online Writing Resources (Southern Illinois University)

<http://www.siu.edu/~write/resources.html#anchor1370435>

Biomedical Writing Course (Guide)

<http://www.inter-biotec.com/biowc/biowc.html>

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Use the paper formatting guidelines provided on the ENG 0012 Web Site for formatting your Conference Paper. These are the same formatting guidelines you used last term for ENG 0011.

THE PARTS OF YOUR CONFERENCE PAPER

Your name

Abstract --- Your abstract should be approximately 150 words and should be **a summary** of what this paper is about. Your abstract should be written in the present tense, should follow/include the chronology of the paper, and should be clear and concise. The abstract is a very important part of your paper since it is often used (by your audience) to decide whether they will read your paper or attend your presentation. It should be italicized. A helpful 'tip': You may want to write your abstract **after** you have finished your paper.

Index Terms --- Don't forget to provide about four terms (in alphabetical order and separated by commas) that will summarize your paper.

INTRODUCTION

The INTRODUCTION to your conference paper should:

- Provide the **topic** of your paper, including some background information.
- Discuss the **scope** of the paper, that is, what will the paper cover. The scope will help you limit your research to the main and/or related issues, but insures that you still address your topic question.
- State the **purpose/aim** of your paper and the definitions of terms.
- Present your **perspective/stance** on the topic question.

Sometimes it is easier, and a good idea, to wait and write the introduction to your paper AFTER you have written the body of your paper.

BODY

The BODY of your paper is comprised of multiple paragraphs that make up the sections and subsections of your paper. An easy way to start writing a paragraph is to decide:

- What is the main point you want to make?
- What is the evidence/ theory/ research supporting this point?
- How can you make your writing easy for your audience to understand?

Write a sentence for your main point and then remember that everything else in the paragraph needs to relate to the topic

sentence in some manner, such as an illustration, explanation, elaboration, clarification or development. To support your claims, you will need to use evidence from your reading and research and remember to cite your references as part of your discussion.

Once you have developed paragraphs for each section, think about how the main points relate to each other. How are the ideas linked? All of the sections of your paper should flow in a logical manner. Subsections should show a logical connection by referring back to the ideas presented in the section. **Remember:** At some point in the body of your paper you must address (at least half of a page) the issue of sustainability.

CONCLUSION

The CONCLUSION is where you summarize your paper and should relate/reflect back to the main topics that were covered in the body of your paper. You should never introduce any new 'ideas' in your conclusion.

REFERENCE LIST

The REFERENCE LIST cites (lists) the resources you used in researching your topic. The purpose of the Reference List is not only to provide the information that would be needed to find the article you used at a later date, it also is the evidence that other experts, scholars, colleagues support aspects of your research topic. Use the paper formatting guidelines provided on the ENG 0012 Web Site for examples on how to cite your sources. It is important that citations be presented correctly, consistently and clearly so that your audience -and often yourself- can easily locate the original source. You will need to find, use, and list a **MINIMUM of SIX (6)** sources for your conference paper. These six sources should consist of at least: **2** journal articles, **2** books (textbooks and reference books included), and **2** Web Sites.

Additional information about how to cite electronic information (such as Web sites) can be found at: <http://www.library.pitt.edu/research/citing>

APPENDICES

APPENDICES are supplementary parts (or attachments) to the main body of your paper. You are not required to have appendices for your conference paper, but you can include them if necessary to support information presented in your paper.

