



Serendipitous Advantages of a Multi-Disciplinary Senior Seminar Course for Engineering Students

Prof. Bijan Sepahpour, The College of New Jersey

Bijan Sepahpour is a registered Professional Engineer and a Professor of Mechanical Engineering at the College of New Jersey (TCNJ). He is currently serving as the chairman of the ME department at TCNJ. Prof. Sepahpour has been actively involved in the generation of design-oriented exercises and development of laboratory apparatus and experiments in the areas of mechanics of materials and dynamics of machinery for undergraduate engineering programs. He has advised on over forty (40) Senior Design Projects and his teams of students have received five (5) National Championships and three Best Design Awards. In the recent years, he has challenged himself with the creation an effective methodology for successful Invention and Innovation. Professor Sepahpour did his undergraduate studies at TCNJ and has advanced degrees from New Jersey Institute of Technology (NJIT). He is the recipient of two (2) Best Paper Awards from the American Society for Engineering Education (ASEE) Divisions of Mechanical Engineering (ME) and Experimentation and Laboratory Oriented Studies (DELOS). He has served as the Chair of the Divisions of ME and DELOS of the ASEE. Prof. Sepahpour is an active member of American Society of Mechanical Engineers (ASME) and ASEE and has published and presented extensively through these societies.

Serendipitous Advantages of a Multi-Disciplinary Senior Seminar Course for Engineering Students

Abstract

Traditionally, in a typical Senior Seminar course, the engineering schools aim to enhance the abilities of their soon-to-be-graduates in their marketability and transition into graduate school. Such exercises may range from building an optimal resume, preparations for answering the forty (40) formidable questions at an interview, understanding fit, and learning how to search for and maximize the chances for obtaining good packages in pursuit of graduate studies. Most, if not all of such activities may be addressed through four to five relatively short sessions. However, in a more comprehensive course, offering ten 80-minute sessions (or 12 one-hour sessions), elements of engineering ethics, sustainable design, green engineering, and a general understanding of the global economy may be added to the agenda. In this process, the facilitators may recognize the advantages of having a class of multi-disciplinary engineering students for creation of some exciting and relevant exercises for the above “added” topics. This paper presents the contents and the sequence of the activities in a well-balanced Senior Seminar course designed for engineering students with diverse backgrounds. The course has been offered in this mode for the past five (5) years and there is considerable assessment data available to support its effectiveness.

I – Introduction

The College of New Jersey (TCNJ) offers 4-year ABET-Accredited undergraduate engineering programs in:

1. Biomedical Engineering with the choice of ME or ECE tracks/ concentrations,
2. Civil Engineering,
3. Computer Engineering,
4. Electrical Engineering,
5. Mechanical Engineering, and
6. Engineering Science with:
 - a) The Management Track and choices of ME or ECE concentrations, and
 - b) The Policy Track.

Although a Winter and two Summer sessions are offered, the standard Academic Year is comprised of a Fall and a Spring semester.

All seniors in “all” engineering programs and concentrations are required to complete a “Senior Professional Seminar”. As in many conventional settings, the format, the requirements, and the set of activities of the seminar enable the seniors to make sound and informed decisions regarding their transition into a professional environment or pursuit of graduate studies. However, as compared to its past version; what has made this re-formatted seminar much better received and interesting to the soon-to-be-graduates may have to do with the supplemental activities and challenges incorporated into it.

II – Revision of the Senior Professional Seminar at TCNJ

The average class sizes at the School of Engineering at TCNJ are about 24 students - with a range of 18 to 30. The senior seminars however, are exceptions to this range. They do have the largest enrollments ranging from 30 to 42 students. But this is by design as discussed here.

Five years ago, we decided to re-evaluate and revise our senior seminar course. In this process, we designed and added a few more exciting challenges. These challenges, exposures, and additional activities have provided the participants with the opportunity to: a) reflect upon and show-case their future goals, b) develop a true understanding of the significance of ethics in the day to day function of an engineering professional, and c) enhance their ability to better understand and handle engineering ethical dilemmas.

Although the course is not team-taught, there are at least one faculty from each program who has been involved in the design, coordination and conducting of these seminars. The ultimate goal is to have the majority of the faculty in the school involved in conducting one or two seminar sections on a rotation basis.

The outline of the course is enclosed in the appendices. The course, in its current format, has gained considerable respect and value by all engineering programs at the school. This is primarily because while being equivalent to a One-Credit course, it may “partially” address several soft ABET requirements that may be challenged otherwise. These are listed here for reference;

- f) an understanding of professional and ethical responsibility;**
- g) an ability to communicate effectively;**
- h) the broad education necessary to understand the impact of engineering solutions in a global and societal context;**
- i) a recognition of the need for and an ability to engage in life-long learning;**
- j) a knowledge of contemporary issues;**

We certainly hope (if not believe) that these supplemental activities have also helped in self-fine-tuning of the moral compass of the participants. Two of the most important such additions are presented next.

III – The Ethics Component

All engineering students at TCNJ are required to take the “Society, Ethics, and Technology” (SET) course. This course is to be taken in the second semester of the sophomore year but certainly no later than the end of the junior year. The course focuses on the impact of technology on the society and prepares the students to better identify and evaluate the ethical dilemmas that have resulted primarily due to the above impact.

With the developed background in the SET course; the senior seminar facilitators may engage the participants with a more focused set of engineering dilemmas. The assigned ethics cases are chosen from a large array of scenarios related to many different engineering fields. Each of them

more directly relates to a certain field and as a result, handled by a higher degree of interest from the participants majoring in that particular field. Although the cases are assigned to the groups, the groups have the liberty of choosing their own. Usually, however, they do approach the coordinator to get his/her blessing for the proposed alternative case(s).

The specific requirements set in the universal outline of the assignment are primarily there to provide guidance for a comprehensive analysis. The outline of this exercise is enclosed in the appendices for your review. Each of the discipline-specific groups meets outside the seminar time to discuss, plan, and address the requirements of the challenge. All members of each group will participate in making a PowerPoint presentation of their unique case to the rest of the participants in the seminar. The outline of the assignment is given to the class two weeks prior to the presentations. The requirements and the rubrics of the evaluation process are carefully and comprehensively reviewed at this time.

The number of members in each group must be in the range of a minimum of four (4) to a maximum of seven (7). The time allotted for each of the presentations is based on the following formula:

Max allotted Time: { 5 + [1.5 (# of members)] } Minutes.

Min. Time: 11 Minutes

Max. Time: 16 Minutes

To better prepare the groups for this exercise, a series of four (4) short videos with focus on engineering ethical dilemmas are presented. *However, by this time, an “Engineering Code of Ethics” assignment has been given and completed by all participants. [Please see the outline of this exercise in the appendices.]* As a result, the group is much better equipped in identifying which canon(s) may have been violated. These are supplemented by the criteria for “whistle blowing” in light of the Challenger tragedy and the strong recommendations of Roger Boisjoly in this process.

IV – Sustainable Design and Green Engineering Component

The other important addition to the course is an exciting assignment under the title: *Your Field and its Contributions; Sustainable Design; Respect for Environment, and Green Engineering.* The outline of this exercise is also enclosed in the appendices. This is a most well received exercise by all of the participants. It is clear that they take high pride in presenting their field, its contributions, a short history, and significant milestones and contributors in its evolution. However, they are also required to identify ten (10) areas of environmental concerns that are caused by their field. They need to choose three of these ten, elaborate on the details of the damage(s) caused, and propose practical and meaningful solutions to reverse the process(es).

Each team must come up with a professional “Mission Statement” and a “pledge” in taking steps and committing towards producing “Sustainable and Environmentally Friendly” designs and processes.

Again, all members of each group will participate in making a PowerPoint presentation for this exercise using a similar format as in the Ethics exercise. We have alternated the sequence of the

presentation of these two exercises and have experienced very similar results in terms of timing and levels of interest.

To better prepare the groups for this task, a series of short DVDs are presented that focus on: a) the concerns of the environmentalists within the context of economic realities, b) successful cases that prove green engineering and sustainable design may be achieved in a cost-effective manner, and c) the energy crisis and the delicate balance of the interdependencies of economies of the world. Viewing of these programs are spread over the course of two weeks in order to increase the gestation/reflection time and cover other time-based exercises of the seminar.

V – Evaluation of the PowerPoint Presentations

All participants are involved in the in the evaluations of the two sets of oral presentations in the seminar. They evaluate the presentations of all groups except their own. The rubrics and the number of points assigned to the different components of the tasks, are clear for a comfortable and relatively objective assessment.

There are several advantages with this approach among which, each participant develops a better understanding and in turn, better compliance with the requirements of similar future projects and presentations. Each presentation is followed by a period of questions and answers. Due to his/her prior familiarity with the cases, the facilitator may bring up some interesting points of observation or ask the presenting group (or the entire class) relevant and challenging questions.

The scores are averaged out and compared with those of the seminar coordinator. Although the student participants are generally slightly more generous in their evaluations than the convener, they are more or less accurate and the differences are proportionally the same due to perhaps a bias error.

Groups with best presentations are identified and (symbolic) awards are given to each of the presenting members. This is done for each of the two sets of presentations in a given seminar.

It should be obvious that we need to balance the population of each section of the Senior Professional Seminar with at least one group from each of the disciplines in the school. If there are two groups of the same major, a) two different cases would be assigned (for the Ethics Cases) and b) these two groups from any discipline should not present on the same session.

VI – Contemporary Issues – Just a Start

Although still in the evolving stages, a set of important challenges for the human race and specifically the next generation of the engineers are organized and presented to the groups. The author presented the first iteration of this package two years ago at the “end of the seminar”. This year, with some minor changes and additions, it was presented “before” the two major additions discussed above.

We hope that being exposed to the “statements” of these serious problems and near future challenges has raised the degree of curiosity and hopefully awareness of these groups.

Although not quantifiable, it was clear that the earlier presentation of this material further improved the quality of the presentations and the degree of seriousness that the presenting groups took in their work. A partial list of the more important challenges is provided below.

1. World's Population
2. G-20 / Biggest Economies of the World
3. International Monetary Fund (IMF)
4. Emerging Economies
5. Global Agricultural Output
6. World Conflicts
7. Position and the Challenges of US in the World

Energy Crisis	Swiss Banks	Rain Forests
Renewable Energy	Boeing VS Airbus	IT and its Impact on the World
A Global Economy?	ESA vs NASA	US Position and Role in the World Conflicts
N. American Treaty	State of Africa	
Oil Cartels	Hunger	Leading Role in Sustainable Design and Green Engineering
Drug Cartels	Global Disease	

8. *14 Grand Challenges for engineering* [By: National Academy of Engineering (NAE)]

#	Challenge	#	Challenge
1	Make solar energy economical	8	Engineer better medicines
2	Provide energy from fusion	9	Reverse-engineer the brain
3	Develop carbon sequestration methods	10	Prevent nuclear terror
4	Manage the nitrogen cycle	11	Secure cyberspace
5	Provide access to clean water	12	Enhance virtual reality
6	Restore and improve urban infrastructure	13	Advance personalized learning
7	Advance health informatics	14	Engineer the tools of scientific discovery

9. The Millennium Project [15 Global Challenges Facing Humanity]

#	Challenge	#	Challenge
1	Sustainable Development and Climate Change	8	Health Issues
		9	Capacity to Decide
2	Clean Water	10	Peace and Conflict
3	Population and Resources	11	Status of Women
4	Democratization	12	Transnational Organized Crime
5	Long-term Perspectives	13	Energy
6	Global Convergence of IT	14	Science and Technology
7	Rich-Poor Gap	15	Global Ethics

10. Expectations of the Public from the Engineer
11. Your Role in the Future of USA and the World?

VII – Assessment Results

The anonymous electronic results of the course and the instructor are generally positive with a range of good to very good to excellent in all areas. Although not mandatory, over 80% of the seminar participants in all (three sections of Fall 2014) sections completed that survey. We consider this rate as an indicator for the level of appreciation of the students involved. However, to better focus on the specific attributes of this course; we have chosen to use the “Students Survey of knowledge” as described below.

For all Junior and Senior level engineering courses, a survey on the Students Perception on the degree of success in achieving the objectives of the course is conducted upon completion of the course. Although TCNJ has shifted towards electronic evaluation of the courses and the instructors (as described above), these short surveys are conducted separately using paper. This way, we insure (nearly) 100% participation. These sets of surveys are later inputted into an excel program to assess how the “package” of the entire courses in the program synergistically contribute towards satisfying “Student Outcomes $a \rightarrow k$ ”.

Summary of the assessment results for three different sections offered in *Fall of 2014* is enclosed in the appendices. As shown, all objectives of the seminar, in all three sections of the seminar, appear to have been well achieved. These are consistent and highly comparable to the results we have been obtaining in the prior four (4) years with perhaps a slight improvement in the last two objectives.

One recommendation that has been made by a good percentage of the participants is to move the seminar to the second semester of the Junior year. The faculty of the school are looking at such a possibility as well as linking some of the activities of this group of students with those of the freshmen in the “Introduction to Engineering” seminar.

VIII – Conclusions and the Serendipitous Advantages

The proposed format of the Senior Professional Seminar at TCNJ not only covers all of what is expected of a typical senior seminar, it further enhances the knowledge, the confidence level as well as appreciation for the sister engineering fields and their contributions. In summary, the revisions made to this seminar class, and particularly, the addition of the two major challenges into the course, along with their corresponding supporting elements has:

1. increased the level of interest and enthusiasm of all participants in all sections of the Senior Professional Seminar at TCNJ,
2. led to a much higher level of appreciation and respect among the seminar participants for other fields and their practitioners,
3. enhanced the sense of pride and confirmation of the choice of the major and fields by the participants,

4. considerably added to the background and confidence level of the participants when it comes to identifying ethical dilemmas and appreciating the challenges for each group of professionals in their respected fields,
5. led to acknowledging that the Engineering Code of Ethics of different fields have significantly more in common as compared with their minor difference, and
6. exposed to and most probably quipped the majority of the participants with the tools for self-fine-tuning of their moral compass.

It is interesting to note that while the course is comprised of participants with multiple disciplines, the group exercises are conducted by the members of the same fields. The above gains were not at all embedded or incorporated in our design process. But we have embraced and further nourished these set of serendipitous advantages. As facilitators, we feel privileged to work with such energetic and fine young force of our great nation. Certainly, we have learned a lot more from them, than they from us.

We hope that engineering education community examines the possibility of adopting, or partially adopting this successfully proven model and share their findings and recommendations with the rest of us in future conferences.

Appendices

ENG 099 - Senior Professional Seminar Fall 2014

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Office Hours:
Monday 10:00 - 11:00 AM
Thursday: 10:00 - 11:00 AM
Other hours by appointment

Prerequisites: Senior Standing

Description:

Orientation course to aid students in making the transition from college to graduate school/ industry. Topics include career planning, resume preparation, interviewing techniques, professional responsibilities, ethics, graduate and continuing education.

**Text: Professional Issues: a Guide for Undergraduate Engineering Students, Martin A. Fromowitz
Handbook: TCNJ Career Handbook – 2014-2015**

Course Objectives:*

- Objective 1. To help students to find, apply for, and obtain an available position that will satisfy their life goals [g, i].
- Objective 2. To explain the importance of a professional engineering license and professional societies [i, j].
- Objective 3. To educate students to recognize an ethical problem and how to deal with it [f, g, h].
- Objective 4. To have the students learn the Code of Ethics of Three different fields/Societies/Institutes; compare their similarities and differences [f, g, h].

Topics Covered:

- 1. The job market, available positions, and professional groups.
- 2. How to write letters of introduction, resume, thank you letters, and acceptance letters.
- 3. How to prepare for, dress, and interview for a position.
- 4. Explanations of patent, copyright, and trademark laws
- 5. Code of ethics and ethical issues in engineering
- 6. The professional engineer license and completing the application for the FE exam
- 7. Graduate school

Performance Criteria:

- Objective 1
 - Students can write effective resume [A]
 - Students can provide reasonable answers to typical interview questions [B, F]
 - Objective 2
 - Ensure that students understand the importance of professional registration [G]
 - Objective 3
 - Ensure that students can recognize an ethical dilemma and demonstrate their ability to fully analyze it and deal with it [D]
 - Students develop reasonable awareness for the need for Green and Sustainable Designs [E]
 - Objective 4
 - Ensure that students fully recognize the significance of the Code of Ethics in their field [C, D]
-

The Department of Biomedical Engineering at the College of New Jersey prepares its graduates:

1. To contribute to the economic development of New Jersey, the nation and /or the global community through the ethical practice of engineering;
2. To become successful in their chosen career path, whether it is in the practice of engineering, in advanced studies in engineering or science, or in other complimentary disciplines;
3. To assume leadership roles in their chosen profession;
4. To enhance career skills through life-long learning.

The Department of Civil Engineering at the College of New Jersey prepares its graduates:

1. To contribute to the economic development of the country through the practice of engineering;
2. To become successful in their chosen career path, whether it is in the practice of engineering, in advanced studies in engineering or science, or in other complimentary disciplines;
3. To make progress towards leadership roles in industry or public service;
4. To maintain career skills through life-long learning and be on the way towards achieving professional licensure

The department of Electrical and Computer Engineering at The College of New Jersey prepares its graduates:

1. To contribute to the economic development of New Jersey and the nation through the ethical practice of engineering;
2. To become successful in their chosen career path, whether it is in the practice of engineering, in advanced studies in engineering or science, or in other complementary disciplines;
3. To assume leadership roles in industry or public service through engineering ability;
4. To maintain career skills through life-long learning and be on the way towards achieving professional licensure.

The Department of Mechanical Engineering at the College of New Jersey prepares its graduates:

1. To contribute to the economic development of New Jersey and the nation through the practice of engineering and related fields;
2. To succeed in their chosen career path, whether it is in the practice of engineering, in advanced studies in engineering or science, or in other complementary disciplines;
3. To assume leadership roles in industry or public service;
4. To enhance career skills through life-long learning and be on the way towards achieving professional licensure.

Program Outcomes: *(What TCNJ Engineering students are expected to know and be able to do at graduation. What knowledge, abilities, tools and skills the program gives the graduates to enable them to accomplish the Educational Objectives)*

The Program Outcomes listed below are expected of all graduates. **Bolded** items below are specific to this course.

- a) an ability to apply knowledge of mathematics, science, and engineering;
- b) an ability to design and conduct experiments, as well as to analyze and interpret data;
- c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- d) an ability to function in multidisciplinary teams;
- e) an ability to identify, formulate, and solve engineering problems;
- f) **an understanding of professional and ethical responsibility;**
- g) **an ability to communicate effectively;**
- h) **the broad education necessary to understand the impact of engineering solutions in a global and societal context;**
- i) a recognition of the need for and an ability to engage in life-long learning;
- j) a knowledge of contemporary issues;
- k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Evaluation:

- A. Complete resume
 - B. Answers to typical interview questions
 - C. Ethics Case analysis and class presentation
 - D. Code of Ethics assignment
 - E. Your Field and Green Engineering presentation
 - F. Achieving Your Professional Goals Paper
 - G. Participation and attendance
-

ENG 099 - Senior Professional Seminar

Code of Ethics Assignment

- 1. Study Chapter three (3) of your text (Professional Ethics and Engineering).**
- 2. In 100-150 words, describe/summarize the highlights/your most important findings in this chapter.**
- 3. Depending on Your Major/Area of Specialty, conduct an Internet Search to find the Society that best represents your field (such as IEEE, ASCE, or ASME, etc.).**
- 4. In that site, search for the "Code of Ethics" of the Society.**
- 5. Make a Hard Copy of the portion that lists the "Fundamental Principles and Canons" (only). This should be no more than 2/3 of a page.**
- 6. Locate the "Code of Ethics" of TWO (2) other societies.**
- 7. Compare the "Code of Ethics" of the three societies and in 80-120 typed words, comment on:
 - a) What do these codes have in common and**
 - b) What differentiates one from the others?****

ENG 099 - Senior Professional Seminar

Ethical Dilemmas in Engineering

The requirements for this assignment are based on the contents of the two DVDs that contain cases and issues that are related to *Ethical Dilemmas in Engineering*. It may be advantageous to read/review the corresponding requirement (given below) before viewing the DVDs.

Requirements:

1. *In each of the four cases of the first DVD (Professional Ethics and Engineering):*
 - a) Describe the "Focal Point" of the Ethical Dilemma at hand. Use a short paragraph (with 40-50 words) for each description.
 - b) In "one" sentence, point to the Engineering Code(s) of Ethics that may have been (or would be) violated.
2. *For the Ethics and Engineering: The Challenger Case; describe:*
 - a) The position that the "Whistle Blowing" engineer had taken (just before and right after the time of the disaster),
 - b) His recommendations to the young engineers [after his harsh experience], and
 - c) The three recommended conditions [referred to (in the program)] which call for "Whistle blowing".

For description of each of the sections "a, b, and c" (in #2), use a very short paragraph (with 30- 40 words) to complete the task.

Ethical Case Analysis

Requirements for the Task

Each Team* of [Civil, Bio-Medical, Management, Mechanical, and Electrical & computer Engineering] majors will:

1. Carefully examine the corresponding Ethical Dilemma at hand. [This will happen after EACH member has studied the case.]
2. Following the instructions/questions raised for your specific case, come up with a consensus regarding:
 - i- What are the major issues at hand?
 - ii- What has caused the above issues to surface?
 - iii- What aspects of the Code of Ethics of your field have been violated/not fully exercised (if any)?
 - iv- As a potential council/panel, what are your conclusions?
 - v- If applicable; as a potential council; what would your recommendations be (potentially with regard to prevention, punishment, etc.)?
3. Each team will share (with the rest of the class) its:
 - i- Description of the case,
 - ii- Summary of findings,
 - iii- Analysis of the Case.
4. Power-Point Presentation → Required (in TWO weeks). ALL team members MUST participate in the presentation. Max allotted Time: [5 + (1.5 x # of members)] Minutes.
Min. Time: 11 Minutes
Max. Time: 16 Minutes
5. Have your Presentation ready on Memory Stick (and not on an e-mail) for “quick loading”.
6. A Printout of the Presentation with: Two Slides on each page, Double-sided and stapled.
7. Dress Code: Business Casual → Professional
8. Grade Distribution is provided on the Next Page/Back.

** If the # of students in any of the groups (of different majors) exceeds seven (7), additional teams for that major will be formed.*

Examples:

1. Group of 8 to 14 → 2 teams of 4 to 7 members,
2. Group of 15 to 21 → 3 teams of 5 to 7 members

Your Name:

Your #:

<i>Requirement</i>	<i>Points for the Team (#1)</i>	<i>Points for the Team (#2)</i>	<i>Points for the Team (#3)</i>	<i>Points for the Team (#4)</i>	<i>Points for the Team (#5)</i>	<i>Points for the Team (#6)</i>	<i>Points for the Team (#7)</i>	<i>Points for the Team (#8)</i>
<i>Describes the Scenario / Actual Case at hand clearly</i>	1 - 15	1 - 15	1 - 15	1 - 15	1 - 15	1 - 15	1 - 15	1 - 15
<i>Identifies the parameters causing the Dilemma</i>	1-15	1-15	1-15	1-15	1-15	1-15	1-15	1-15
<i>Presents a clear, concise, and complete Analysis</i>	1-20	1-20	1-20	1-20	1-20	1-20	1-20	1-20
<i>Correlates to and Identifies with the Code of Ethics</i>	1-10	1-10	1-10	1-10	1-10	1-10	1-10	1-10
<i>Makes sound recommendations for prevention/etc.</i>	1-15	1-15	1-15	1-15	1-15	1-15	1-15	1-15
<i>Overall Quality of the Presentation</i>	1-15	1-15	1-15	1-15	1-15	1-15	1-15	1-15
<i>Dress Code</i>	1-5	1-5	1-5	1-5	1-5	1-5	1-5	1-5
<i>Printout of the Presentation</i>	1-5	1-5	1-5	1-5	1-5	1-5	1-5	1-5
<i>Total Points Earned</i>								
<i>Letter Grade</i>								
<i>Team #</i>	<i>#1</i>	<i>#2</i>	<i>#3</i>	<i>#4</i>	<i>#5</i>	<i>#6</i>	<i>#7</i>	<i>#8</i>

Your Field and its Contributions, Sustainable Design, Respect for Environment, and Green Engineering

Each Team* of Civil, Bio-Medical, Management, Electrical, Mechanical, and computer Engineering majors will:

1. a) Identify different areas of their field of study/practice, b) discuss the evolution of the field by marking the most important breakthroughs and contributors to their field, and c) present the results to the rest of the class.
 2. Brainstorm, Research, Identify and generate a list of 7 → 10 areas / acts (related to the field of that group) that are causing damage to the environment.
 3. Choose three areas [from your list of 7 → 10 problem areas / acts,] and propose a realistic and concise solution / alternative approach to eliminate/minimize/significantly reduce the negative impact/effects of these problem areas.
 4. As future designers and engineers of our great nation and as citizens of the planet Earth, how would your team be able to make contributions towards taking steps (in the right direction) to reduce/eliminate man-caused damage to the Eco-Systems of the planet?
 5. Generate a MISSION statement and a PLEDGE for your group/team.
 6. Power-Point Presentation → Required (in TWO weeks). ALL team members MUST participate in the presentation. Max allotted Time: [5 + (1.5 x # of members)] Minutes.
Min. Time: 11 Minutes
Max. Time: 16 Minutes
 7. Have your Presentation ready on Memory Stick (and not on an e-mail) for “quick loading”.
 8. A Printout of the Presentation with: Two Slides on each page, Double-sided and stapled.
[No Need for a Color Print.]
 9. Dress Code: Business Casual → Professional
 10. Grade Distribution is provided on the Next Page/Back.
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** If the # of students in any of the groups (of different majors) exceeds seven (7), additional teams for that major will be formed.*

Examples:

1. Group of 8 to 14 → 2 teams of 4 to 7 members,
2. Group of 15 to 21 → 3 teams of 5 to 7 members

Section: *Friday-FR*

Your Name: _____

Your #: _____

Requirement	Points for the Team (#1)	Points for the Team (#2)	Points for the Team (#3)	Points for the Team (#4)	Points for the Team (#5)	Points for the Team (#6)	Points for the Team (#7)	Points for the Team (#8)
<i>Describe the Major Areas of the field, its evolution/Milestones</i>	1 - 20	1 - 20	1 - 20	1 - 20	1 - 20	1 - 20	1 - 20	1 - 20
<i>Identify areas of concern for Damage to the Environment</i>	1-15	1-15	1-15	1-15	1-15	1-15	1-15	1-15
<i>Propose acceptable solutions to remedy the above concerns</i>	1-15	1-15	1-15	1-15	1-15	1-15	1-15	1-15
<i>How the Proposals Contribute positively and Reduce Damage</i>	1-15	1-15	1-15	1-15	1-15	1-15	1-15	1-15
<i>Quality of the Mission Statement and the Pledge</i>	1-10	1-10	1-10	1-10	1-10	1-10	1-10	1-10
<i>Overall Quality of the Presentation</i>	1-15	1-15	1-15	1-15	1-15	1-15	1-15	1-15
<i>Dress Code</i>	1-5	1-5	1-5	1-5	1-5	1-5	1-5	1-5
<i>Printout of the Presentation</i>	1-5	1-5	1-5	1-5	1-5	1-5	1-5	1-5
<i>Total Points Earned</i>								
<i>Letter Grade</i>								
<i>Team #</i>	<i>#1</i>	<i>#2</i>	<i>#3</i>	<i>#4</i>	<i>#5</i>	<i>#6</i>	<i>#7</i>	<i>#8</i>

Student Survey of Knowledge Earned
School of Engineering
ENG 099 - 01 – Senior Professional Seminar - Fall 2014

This survey will assess your perception of how much knowledge/experience you have gained in this course. Listed below are the performance criteria used to meet the course's educational objectives. For each criteria listed, please indicate with a check ✓ mark, the degree of knowledge/experience gained in different areas of the course.

N = 38

Course Objective	Performance Criteria of Course Objectives	Student perception of knowledge gained in course				
		Strongly Agree (2)	Partially Agree (1)	Do not Agree (0)	Avg.	%
1	I am Aware of the Existing Resources for obtaining Information about Available Positions in my field.	26	12	--	1.68	87
	Proficient in writing an effective and well-balanced Resume and capable of Fine-Tuning it for a Particular Position.	31	7	--	1.82	
	Knowledgeable about the Anatomy of an Interview; its significance and how to prepare myself.	28	9	1	1.71	
2	Aware of my Professional Interests and prepared to take the necessary steps to achieve my Short and Long-term Goals.	29	9	--	1.76	88
	Understand the Significance of Continuing Education and Licensure for enhancing my Professional Development and Success.	29	9	--	1.76	
3	Completely familiar with the Code of Ethics of Several Professional (Engineering) Societies and capable of comparing their similarities and differences.	30	8	--	1.79	94
	Capable of: Identifying Engineering Ethical Dilemmas; Providing Analysis; Offering Solutions and making Suggestions to Prevent their Recurrence.	37	1	--	1.97	
4	Have developed a broader and deeper understanding of the role of technology and the impact of engineering solutions in a global and societal context.	30	8	--	1.79	92.5
	Have a better understanding of the role and contributions of other fields of engineering, as well as the possibilities for implementing Green Engineering and Sustainable Design.	35	3	--	1.92	

Student Survey of Knowledge Earned
School of Engineering
ENG 099 - 02 – Senior Professional Seminar - Fall 2014

This survey will assess your perception of how much knowledge/experience you have gained in this course. Listed below are the performance criteria used to meet the course’s educational objectives. For each criteria listed, please indicate with a check ✓ mark, the degree of knowledge/experience gained in different areas of the course.

N = 35

Course Objective	Performance Criteria of Course Objectives	Student perception of knowledge gained in course				
		Strongly Agree (2)	Partially Agree (1)	Do not Agree (0)	Avg.	%
1	I am Aware of the Existing Resources for obtaining Information about Available Positions in my field.	25	10	--	1.71	87
	Proficient in writing an effective and well-balanced Resume and capable of Fine-Tuning it for a Particular Position.	29	6	--	1.83	
	Knowledgeable about the Anatomy of an Interview; its significance and how to prepare myself.	24	11	--	1.69	
2	Aware of my Professional Interests and prepared to take the necessary steps to achieve my Short and Long-term Goals.	31	4	--	1.89	93.6
	Understand the Significance of Continuing Education and Licensure for enhancing my Professional Development and Success.	30	5	--	1.86	
3	Completely familiar with the Code of Ethics of Several Professional (Engineering) Societies and capable of comparing their similarities and differences.	32	3	--	1.91	98
	Capable of: Identifying Engineering Ethical Dilemmas; Providing Analysis; Offering Solutions and making Suggestions to Prevent their Recurrence.	35	--	--	2.0	
4	Have developed a broader and deeper understanding of the role of technology and the impact of engineering solutions in a global and societal context.	33	2	--	1.79	98
	Have a better understanding of the role and contributions of other fields of engineering, as well as the possibilities for implementing Green Engineering and Sustainable Design.	34	1	--	1.92	

Student Survey of Knowledge Earned
School of Engineering
ENG 099 - 03 – Senior Professional Seminar - Fall 2014

This survey will assess your perception of how much knowledge/experience you have gained in this course. Listed below are the performance criteria used to meet the course’s educational objectives. For each criteria listed, please indicate with a check ✓ mark, the degree of knowledge/experience gained in different areas of the course.

N = 30

Course Objective	Performance Criteria of Course Objectives	Student perception of knowledge gained in course				
		Strongly Agree (2)	Partially Agree (1)	Do not Agree (0)	Avg.	%
1	I am Aware of the Existing Resources for obtaining Information about Available Positions in my field.	24	6	--	1.80	90
	Proficient in writing an effective and well-balanced Resume and capable of Fine-Tuning it for a Particular Position.	23	7	--	1.77	
	Knowledgeable about the Anatomy of an Interview; its significance and how to prepare myself.	25	5	--	1.83	
2	Aware of my Professional Interests and prepared to take the necessary steps to achieve my Short and Long-term Goals.	24	6	--	1.80	89
	Understand the Significance of Continuing Education and Licensure for enhancing my Professional Development and Success.	23	7	--	1.77	
3	Completely familiar with the Code of Ethics of Several Professional (Engineering) Societies and capable of comparing their similarities and differences.	25	5	--	1.83	95
	Capable of: Identifying Engineering Ethical Dilemmas; Providing Analysis; Offering Solutions and making Suggestions to Prevent their Recurrence.	29	1	--	1.97	
4	Have developed a broader and deeper understanding of the role of technology and the impact of engineering solutions in a global and societal context.	27	3	--	1.90	95.8
	Have a better understanding of the role and contributions of other fields of engineering, as well as the possibilities for implementing Green Engineering and Sustainable Design.	28	2	--	1.93	