Course Description
This American University course adds to your NSLC experience by introducing you to the concept of sustainable design. Engineers do a good deal more than build and fix things. As problem solvers, engineers can play a fundamental role in facing environmental challenges - or in making them worse. In this class we will look at the nature, effects, and challenges of contemporary design. We will focus specifically on sustainable transportation, buildings, and energy. We will examine some of the major challenges driving the need for sustainable design and explore possible solutions. Some questions we will discuss are: What does it mean to design products that are good for people and for the planet? How do we ensure that we design products without negative social and environmental impacts? Using a combination of lectures, films and discussion sessions, we will combine your NSLC field trips and workshops with in-class discussions about the effects of technologies and the challenges of studying and practicing engineering in the 21st century world.

Session 1: Introductions
What is this course about?

- Key concepts:
  - Sustainability
  - Cradle-to-Cradle

What is engineering? How do engineers affect our everyday lives?

Class exercise: A design assignment – the ultimate soda container

Session 2: Engineering and a Sustainable Future
What is sustainability?
The Next Industrial Revolution: Sustainable engineering

- Technological optimism vs. technological pessimism

Class discussion: “Cradle to Cradle” (film excerpt)

Session 3: Sustainable design examples
- Transportation
- Artificial intelligence
- Buildings

Class discussion: How to apply “Cradle to Cradle” principles to engineering?

Session 4: Energy and Sustainability
- Sustainable energy and engineering
- Emerging energy technologies

Class discussion: Redesign an engineering system or a product (examples will be provided in class) using sustainable energy.
Assignments
All assignments are due 30 days after the completion of your NSLC program.

1. Class Participation
   - 25% of final grade
   - Attendance is mandatory. Missed classes without a documented emergency situation will result in a lower grade. While in class, it is expected that you will participate in class discussions and exercises, both as a contributor and an active listener.

2. Response Paper (1 page)
   - 10% of final grade
   - Please write a response paper of 500 words on any three of the readings assigned. In your response paper, discuss what you found interesting in the readings and offer a critique.

3. Posting Op-Eds to Course Website (2 posts of 300 words each)
   - 15% of final grade
   - Please post at least 2 times to the course website. Each post should be around 300 words.
   - For each post, please write a short opinion piece arguing for or against the wider use of major engineering/technological breakthroughs. Be sure to briefly consider a) key risks and benefits associated with this new technology; and b) any ethical concerns that you think relevant. For ideas, take a look at www.wired.com, www.treehugger.com, or the Technology section of the New York Times for news about technological breakthroughs.
   - You will also be expected to comment at least 2 times on others’ posts.

4. Sustainable Design Video (8-10 minutes)
   - 50% of final grade
   - Please prepare a video on a particular sustainable design problem. The video should be informative and also provide general guidelines for adopting sustainability principles for a particular engineering issue. You have three choices:
     1. Imagine you need to design a classroom for a school anywhere in the world. First, describe where the school is situated. Then, please describe your design in detail including building materials, choices for energy generation and so on. Explain and justify the choices you make. Note that you should feel free to include schematics and other visual representations of your ideas. And, since this is a concept piece, you should not be too concerned about budget constraints. Please be sure to discuss the social and environmental impact of your classroom.
     2. Imagine you are designing a new mode of transport or improving an old mode of transport. Please describe your design in detail including building materials and choices for energy generation. Explain and justify the choices you make. Discuss the mode of transport’s range (can it travel between cities or is it intended for neighborhood use?) and its intended users (commuters, travelers, soccer moms, kids etc). Feel free to include schematics and other visual representations of your ideas. Since this is a concept piece, you should not be too concerned about budget constraints. Please be sure to discuss the social and environmental impact of your mode of transport.
     3. Choose your own sustainable engineering problem and create a video that discusses sustainable materials, energy, intended users, and impact. Please have your idea approved ahead of time by your professor.
Two Credit Option
If and only if you are enrolled in the two credit option, you must complete the additional assignment. This fourth assignment will be worth 40% of your final grade. The weightings given to the assignments above will be altered accordingly.

Two Credit Additional Assignment: Briefing Paper (1500 words)
Imagine that you are the president’s top science policy advisor. Think about a new technology you saw or heard about during your NSLC field trips. What recommendation would you make for the adoption of that technology? Please focus specifically on the social, cultural and environmental impacts of the technology you have chosen. Describe how engineers can respond to public concerns about that particular technology.

Paper Requirements
All papers must meet the following minimum standards:
- You should provide a title, your name, and the date of submission at the top of the first page.
- Each page, except the first, needs to be numbered.
- Papers should have no grammatical or spelling errors. Try to convey your ideas in simple sentences, and proofread your work carefully before turning it in.
- References to authors must be cited using a standard citation method. (See: Kate L. Turabian, A Manual for Writers of Term Papers, Theses, and Dissertations, or a similar reference work for guidance.) Either footnotes or endnotes are acceptable. When an author’s work is paraphrased, credit must be given to the author, preferably in the body of your paper and in a footnote/endnote. Anything quoted must be indicated with quotation marks and a citation. A quote used without quotation marks is plagiarism, even if the author is cited.

Submitting Assignments & Grades
Your assignments are due 30 days after the end of your NSLC program.

Your assignments must be submitted by email via the class’ Blackboard site. Instructions for submitting assignments will be provided in class.

When submitting your work, the subject line of your e-mail MUST contain the following information:
- Your last name
- Course taken
- Professor’s Name
- Dates of Session

Example – subject: Smith, Engineering, Prof. Dixit, 6/1-6/14

Your grade (A to F) will be based on successful and timely completion of the written assignments listed below. An “A” grade will only be awarded for superior work that demonstrates a mastery of the concepts discussed in class and reflects thorough and thoughtful research conveyed in well written assignments. A “B” grade will be awarded for good work, and a “C” grade for average work. Substandard, incomplete, or otherwise unacceptable work will receive either a “D” or “F”.

Once your work has been graded, you will be sent an official American University transcript. You will be asked to complete a transcript request form on the first day of classes. Please be sure that you fill this form out carefully and accurately.

Finally, please keep a copy of all materials submitted to your professor, as the originals will not be returned.
Academic Integrity
All students are governed by American University’s Academic Integrity Code. The Academic Integrity Code details specific violations of ethical conduct that relate to academic integrity. By registering, you have acknowledged your awareness of the Academic Integrity Code, and you are obliged to become familiar with your rights and responsibilities as defined by the code. All of your work (whether oral or written) in any and all classes is governed by the provisions of the Academic Integrity Code. Academic violations include but are not limited to: plagiarism, inappropriate collaboration, dishonesty in examinations whether in class or take-home, dishonesty in papers, work done for one course and submitted to another, deliberate falsification of data, interference with other students' work, and copyright violations. The adjudication process and possible penalties are listed in American University's Academic Integrity Code booklet, and is also available on the American University website. Being a member of this academic community entitles each of us to a wide degree of freedom and the pursuit of scholarly interests; with that freedom, however, comes a responsibility to uphold the high ethical standards of scholarly conduct.

The full code is available on-line at http://www.american.edu/academics/integrity/code.htm.

CALVIN AND HOBBES

Reading List
All readings will be available online. Some readings may change during the course.

Required Articles and Book Chapters


Various authors, Science: Special Issue on Sustainability and Energy, vol. 315, Iss. 5813 (9 February, 2007)

William McDonough and Michael Braungart, Readings on “the New Paradigm” at http://www.mcdonough.com/writings_new_paradigm.htm (Read “The cradle to cradle alternative” and any ONE other article)

Sustainable design examples:
- http://www.wired.com/politics/law/magazine/16-10/sl_joachim
- American University’s School of International Service’s new building http://www.mcdonoughpartners.com/pr_AUSIS_071113.shtml


Logging onto the Blackboard course site

Step one of two, change your log-in information:
1) Go to https://my.american.edu.
2) Log in with your Username and Password that is provided on the first day of class (if you have forgotten or lost this information, please contact collegecredit@american.edu).
3) In the menu on the right side of the screen, click on “Technology.”
5) Enter new password.
6) Re-click on the “Technology” tab.
7) Under “Personalized Links,” choose “Synchronize Password,” and on the new page choose “Synchronize My Passwords!” This can take up to 10 minutes to change your password.
8) Also, make sure to forward your AU email to whatever address you will be checking over the summer. To do this, click on the “Technology” tab, under “Personalized Links” choose “Forward my AU E-mail Account,” enter your email address, and click “Forward my email!”

Step two of two, log on to the Blackboard site:
1) Go to https://blackboard.american.edu/.
2) Click on “User Login.”
3) Enter your Username (the same Username used for the previous step that was given to you on the first day of class) and Password (the changed password from the previous step).
4) Click “Login.”
5) Under “My Courses” on the right side of the screen, you will find a link to our course.
6) You now have access to all of the provided course material, discussion boards, and the assignment turn-in page. All material is organized by session or topic according to the buttons on the left side of the course page.

For any questions with your username or password, please contact collegecredit@american.edu.