University of Illinois at Chicago
Office of Continuing Education Graduate Course

CI 494E-Special Topics in Curriculum, Instruction and Evaluation:
Principles of Engineering
4 graduate semester hours
Summer 2010 (July 19-December 3, 2010)

To Register online, visit:
https://www.oce.uic.edu/oce/ocepublic/courses/description.asp?CourseID=1339

Tuition: $1540 for 4-hour graduate credit

Instructor:
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Pre-requisite for Course Participation:

Course Description:
4 graduate hours. An independent study course for graduates of the Project Lead The Way® “Principles of Engineering” Summer Training Institute. Project Lead the Way (PLTW) is an eight-course national high school program that centers on developing better problem-solving skills by immersing students in real-world engineering problems. Students explore technology systems and engineering processes to find out how mathematics, science, and technology help people. Principles of Engineering is one of these courses and the Summer Training Institute prepares teachers for teaching this course to high school students.

This UIC graduate course builds upon Project Lead the Way teacher training institutes by providing participants the opportunity to experience the engineering design process from product conception to three-dimensional modeling.
Textbook:

![Engineering by Design](image.png)

by Gerard Voland

Prentice Hall, 640 pages, paperback
ISBN-10: 0131409190

Design Project:

Students work on the design and 3-D modeling of a product that is somehow related to one of the projects or activities in the Principles of Engineering course. No formal lectures take place; rather, each student works independently with guidance and oversight from their faculty adviser to identify a problem to be solved, write technical specifications, identify design alternatives, identify criteria to select the best design approach, and model the proposed product in three dimensions using Autodesk Inventor. The design project culminates with an end-of-term presentation. A final report summarizes the entire design effort.

Each student shall:

- read the pertinent chapters of “Engineering by Design,” the text for this course, to learn how engineers design products
- regularly interact with and submit progress reports to the faculty adviser
- give a final oral presentation and mock product demonstration
- submit a final report

Textbook Topics:

- Role of engineers in society
- Identifying a design topic, needs vs. wants, prospective customer survey
- Design alternatives, evaluation criteria
- Decision matrix
- Technical specifications
- User interface
Proposed Final Report Outline:

1. Statement of Work
   Concisely state your design project goals.
   (What is the product supposed to do?)

2. Assessing Customer's Needs and Wants
   Who is your prospective customer?
   What are the customer's needs, and how were they determined?

3. Design Alternatives
   Describe at least three different approaches that you believe show
   promise of meeting or exceeding the design specifications. Draw a
   block diagram for each.

   Which of these is the lowest-risk approach and why?
   Which of these is the highest-risk approach and why?
   Which of these approaches is technically the most difficult?
   Which of these may potentially yield the least expensive product?

4. Evaluation Criteria and Selection of Best Design Approach
   What evaluation criteria went into determining which of the design
   alternatives you had selected?

   Evaluate each of your design alternatives according to the criteria
   stated above. (Present these evaluations in a decision matrix.)
   Which design alternative did you select?

5. Three-Dimensional Modeling
   Present the three-dimensional Autodesk Inventor model of the product that you have
   designed.

   Step-by-step instructions of how to use the product, including drawings of
   the user interface.

7. Conclusion
   Summarize the entire project in one page for readers who don't have time or interest to
   read the entire report.
Deliverables and Due Dates:

**Friday, July 23, 2010**

Meet with the course instructor to discuss and finalize a design project topic.

**Friday, November 19, 2010**

The final oral presentation, and mock product demonstration, are to take place on or before this date. The presentation may be done remotely using Skype® remote desktop and teleconferencing software.

**Friday, December 3, 2010**

The final report is to be delivered to the course instructor on or before this date.

It will be expected that POE teachers who enroll for graduate credit will submit weekly progress reports.

For questions and/or further information contact Dr. Vladimir Goncharoff at the email address above.