CENG-EE-ME 264L: SOPHOMORE DESIGN

Catalog Data:
CENG/EE/ME 264L Catalog Description: CENG-EE-ME 264L SOPHOMORE DESIGN
(0-2) 2 credits. Prerequisite: sophomore standing. This course focuses on the design process including project management and teamwork; formal conceptual design methods; acquiring and processing information; design management tools; design for manufacturability, reliability, maintainability, sustainability; design communication: reports and presentations; ethics in design; prototyping designs; case studies.

Textbook:
Material to be distributed in class and directed to be viewed online.

Instructors: Office hours: posted outside our doors
Dan Dolan
Office: CM 246B
Phone: 605-394-1273
E-Mail: daniel.dolan@sdsmt.edu

Charles R. Tolle
Office: EEP 323
Phone: 605-394-6133
Email: charles.tolle@sdsmt.edu
Office Hours: M,T 1:00pm-3:00pm and W 2:00pm-4:00pm or by appointment.

Course Related Emails: All course related email will contain the following email subject line:
264L: subject of the email

Email filters will be set to capture said email to its proper email folder. Note, our email spam filters will most likely treat your email as junk if you don’t follow these rules – thus we won’t receive it and it will not count as turned in.

Course Related Submissions: All course related submissions and reports will submitted in a single unified pdf file format. If the submission is from your team the file name will begin with “TeamXX-report-name.pdf”.

Course Objectives:
The objectives of this course are to provide students with an introductory understanding of:
1. The use of modern design tools and software to augment the product development process and communicate the results,
2. Prototyping of an actual product
3. Good teaming philosophy
4. Design Thinking

Class Schedule:
Monday 12:00-12:50, EEP254
Tuesday 12:00-12:50, EEP254

Web Access:
D2L and the course web page will be utilized for posting assignments and handouts.
Dr. Tolle’s class webpage can be located via the following link:
http://freya.sdsmt.edu/faculty/tolle/teaching/fall2016/index.html
Past Course Website (also linked from above):
http://www.hpcnet.org/sophomoredesign

We will also be using a new teaming tool named CATME:
http://info.catme.org

Topics:
The course will focus on the development of a product. These products have a prototyping cost limited to $20.00 per team member – paid for by the team members in general. Typically, teams are made of 4-5 members so total project cost is limited to $80~$100. The laboratory will be used to design and manufacture small team projects using campus manufacturing resources.

Computer Usage:
Students should be knowledgeable in the use of graphical design software, as well as the basics of Microsoft Office, and the WEB.

Outline CENG/EE/ME 264L:
1. The design process
2. Functional requirements
3. Alternative concepts generation and analysis
4. Concept selection and decision matrix
5. Professional ethics
6. Analysis and simulation in the design process
7. Entrepreneurial thinking
8. Thinking outside of the box
9. Nondisclosure agreement
10. Prototyping
11. Teaming philosophy
12. Software design tools
13. Product development, systems engineering, and communication of results
**MECHANICAL ENGINEERING Department:**

We realize that building upon traditions of excellence requires continual development of active partnerships among the faculty, the students, and our constituents. In keeping with these objectives, the mechanical engineering program produces graduates who are able to perform at a level that meets or exceeds industry expectations. Our students will be able to achieve the objectives listed below within a few years of graduation through attainment of the outcomes listed below at the time of graduation.

**Objective (1) Lead and/or manage effective engineering design analyses**

**Outcomes**
- Apply skills in engineering science and mathematics;
- Practice effective analysis;
- Conduct data analyses and analyses verification.

**Objective (2) Lead and/or manage effective engineering design teams:**

**Outcomes**
- Apply effective engineering design skills;
- Demonstrate teaming proficiency;
- Participate in research and professional development.

* evaluated in this course

**ELECTRICAL AND COMPUTER ENGINEERING Department Objectives:**

**COURSE OUTCOMES:**

Upon completion of this course students will have demonstrated the ability to:
1. Write a problem definition statement including needs and/or customer objectives
2. Introduction to organized development and structured projects
3. Use modern design tools,
4. Use modern manufacturing tools,
5. Introduction to formal documentation and communication of findings in written and oral form
6. Working within a multi-disciplinary engineering team

**RELATION OF COURSE TO ECE DEPARTMENT OBJECTIVES:**

These course outcomes fulfill the following program objectives:
(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.**
(d) **An ability to function on multi-disciplinary 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.

The following table indicates the relative strengths of each course outcome in addressing the program objectives listed above (on a scale of 0 to 4 where 4 indicates a strong emphasis).

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LABORATORY:
ECEs rapid prototyping machine (MakerBot), CNC circuit board manufacturing, VMC, and turning center use are available through the specialists in CAMP and ECE. Basic manufacturing machines (Drill press, band saw, etc.) are available to you after you have passed proper training in safety and use.

ASSESSMENT AND EVALUATION:
Incoming assessment will evaluate student readiness for open-ended design problems. Outgoing assessment will consider teaming, design, and manufacturing knowledge.

GRADING:
You will be graded primarily on your course project; daily teaming and learning activities, preliminary design presentation, preliminary design report (25% of course grade), final design presentation, and final design report (25% of course grade). Attendance is critical for good teamwork, therefore your course grade is lowered one letter grade for every three unexcused absences.

ADA INFORMATION:
Students with special needs or requiring special accommodations should contact the instructor and/or the campus ADA coordinator, Ms. Megan Reder-Schopp, at 394-6988 at the earliest opportunity.

FREEDOM IN LEARNING:
Under Board of Regents and University policy student academic performance may be evaluated solely on an academic basis, not on opinions or conduct in matters unrelated to academic standards. Students should be free to take reasoned exception to the data or views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled. Students who believe that an academic evaluation reflects prejudiced or capricious consideration of student opinions or conduct unrelated to academic standards should contact the dean of the college that offers the class to initiate a review of the evaluation.

USE OF ELECTRONIC DEVICES:
Students are expected to be attentive in class. You should not be using your tablet or phone during class time for anything other than work for this course or an emergency. Cell phones are to be set to quiet or vibrate during class, and should not be used other than for course activities or emergencies.

PREPARED BY: Dan Dolan and Kazem Sohraby, August, 2014.