

1. Course number and name

EE 416: Electrical Engineering Design

2. Credits and contact hours

3.0 (one lecture hour per week plus 6 lab hours per week)

3. Instructor's or course coordinator's name

Patrick Pedrow

4. Text book, title, author, and year

Karl T. Ulrich and Steven D. Eppinger. 2016. *Product Design and Development* (6th ed.). McGraw Hill Education.

5. Specific course information

- a. *Catalog description:* Electrical engineering design of specific projects including design specification; written and oral presentations and reports.
- b. *Prerequisites or co-requisites:* EE 415 with a C or better; ENGLISH 402 with a C or better, or concurrent enrollment, or ENGLISH 403 with a C or better, or concurrent enrollment; certified major in EE, Cpt S, or Cpt E; senior standing.

6. Specific goals for the course

At the end of this course, students must be able to:

- Iteratively improve an engineering design including simulations; models; and construction and evaluation of a prototype. (1, 2, 4, 5, 6, 7)
- Work effectively within a multidisciplinary engineering team environment. (3, 4, 5, 7)
- Communicate effectively with professionals such as clients, stakeholders, manufacturers, software vendors, and other persons who are experts within various sub-disciplines. (1, 2, 3, 4, 5, 7)
- Demonstrate engineering professional skills including safety considerations; awareness of pertinent contemporary issues; evaluation of broader impacts in multiple contexts such as global, economic, environmental, and cultural/societal. (2, 4, 7)
- Deliver a professional quality design that meets the client's preferences and meets primary stakeholders' needs. (2, 4, 5, 7)
- Describe engineering progress at face-to-face technical design reviews. (1, 2, 3, 4, 5, 6, 7)
- Demonstrate proficiency with technical writing by producing a progress report; a final report; and by presenting at a poster session. (3, 4, 5, 6, 7)
- Effectively utilize an online collaboration resource that includes a technical and professional chat stream, to enhance engineering teamwork. (3, 4, 5, 7)
- Generate and protect engineering intellectual property. (2, 3, 4, 5, 7)

7. Brief list of topics to be covered

- Prototype activities including fabrication of a prototype followed by testing, validation, and review of the design's technical specifications,
- Iterative design activities including engineering analyses, modeling, and simulations,
- Project management activities including Gantt chart updates; review of student primary tasks; work plan updates; and as appropriate use of project management tools such as total quality management, total quality control, lean six sigma, agile engineering design, etc.,
- Writing activities including monthly reports, progress report, final report, and a poster,
- Teamwork including online collaboration resource containing a chat stream for archiving discussions regarding technical and professional issues,
- Oral communication including biweekly design reviews and a poster session,
- Students read, discuss, and utilize refereed journal articles, standards, application notes, manufacturer's specification sheets, etc.,
- Students analyze broader impacts of contemporary technical and non-technical issues. Teams consider impacts of their design in all pertinent ethical, global, economic, societal, cultural, and environmental contexts,
- Teams specify design limitations, make recommendations for future work, and draw conclusions regarding the team's design.