ESG 441 Engineering Science Design IV (Required)

Course website: http://www.matscieng.sunysb.edu/esg440-1/

Course Catalog description:

Student groups carry out the detailed design of the senior projects chosen during the first semester. A final and detailed design report is prepared.
3 credits

Pre- or Corequisite(s): ESG 440 Engineering Science Design III

Text(s) or other required material: None

Course learning outcomes:

- Understanding the process of taking a design and turning into a functioning prototype
- Understanding of the engineering process of design with iterative improvements and finding solution to problems which arise
- Maintain a budget while working within a defined time frame
- Enhancement of team-work skills
- Enhancement of written and oral communication skills

Topics Covered:

- Process of turning a design into a working prototype

Class/ Laboratory Schedule:

ESG	441	Engineering Science Design IV	LEC	1	TUTH	3:50 PM	5:10 PM

Contribution of Course to meet requirement of Criterion 5:

ESG 441 is the second class in a two-semester sequence which is dedicated to the students' senior capstone design project. The course aims to take the skills developed by students in previous design courses, as well as general engineering and major-specific engineering education and apply those skills to an original design project. This semester is focused upon production of a working prototype of their senior design project. The groups work to address any design issues that may arise during preliminary testing or overcome any issues related to manufacturability or cost of components. Through written and oral progress reports, the groups document their progress and adhere to their budget and time constraints. Towards the end of the semester, the groups present posters to the local ASM International chapter. Also, written and oral presentations are given regarding their entire year-long design process.

Like with ESG 440, many of the program outcomes are addressed during ESG 441. Prior knowledge of mathematics, science and engineering is culminated while improving their product design and creating a prototype. The entire design must be made within the constraints of a budget, and needs to address feasibility in terms of manufacturability and environmental impact. Design groups are generally made up of students with different specializations in engineering science resulting in multi-disciplinary teams who work together to solve the problem. Throughout the semester, the students must deal with engineering problems that arise during prototype fabrication. Finding solutions that stay within budget and time constraints is critical. During the semester, engineering ethics are addressed through discussions with each group during the prototype building process. During this semester, there is minimal formal class room instruction. The students specifically need to investigate engineering issues with prototype building on their own and through interactions with faculty advisors. Throughout the semester both oral and written communication skills are developed through in-class presentations and written assignments. This capstone design experience extends the classroom knowledge that has been acquired by getting students to think

about practical solutions to engineering problems. In addition, students are encourage to participate in University-wide programs such as URECA, which highlights design projects in engineering, and DARE, which encourages the entrepreneurial spirit of students. In the end, through collaboration with machinists and faculty mentors, the senior design projects are demonstrated with working prototypes.

The work in both ESG 440 and ESG 441 supports the program objectives of Engineering Science. By bringing together all the knowledge acquired through classroom and laboratory education in the culmination of the design of an actual product, students are given a taste of what a career in science and engineering entails. All of the products or product improvements that are designed are novel and increase the innovative and competitive nature of this country. By working on multi-disciplinary teams to solve a problem, the students are better prepared for leading teams in the future particularly in engineering design. Students are encouraged to participate in University-wide programs to showcase their work and share the knowledge they have gained. In addition, in both the ESG 440 fall semester and ESG 441 spring semester, the students attend a local ASM International chapter meeting to give poster presentations. This allows them to interact with the greater scientific community to foster lifelong partnerships. Throughout the year discussions between the professor and students on issues of personal safety and the welfare of the community as a result of their product occur. Students are continually engaged in the issue of engineering ethics in both the classroom and through interactions with faculty mentors and members of ASM International who are outside the University.

Relationship of course to program outcomes:
a:10% b: 9% c: 9% d:9% e:9% f:9% g: 9% h: 9% i:9% j:9% k: 9%

Person(s) who prepared this description and date of preparation:

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