LAFAYETTE COLLEGE

Office of the Director of Engineering

ES 101 Introduction to Engineering

Course description:

This course teaches the fundamentals of engineering design methodology. Students will use engineering design processes to aid them in: recognizing the need for an engineering solution, defining constraints, specifying requirements, and modeling an engineering solution, among other aspects of engineering design. Instructors integrate societal contexts of engineering practice into the projects and examine the ethical implications of engineering solutions.

Outcomes

Upon completion of this course, students will:

- recognize that engineering at Lafayette and beyond is innovative and exciting.
- understand the engineering design process.

In support of the outcomes listed above, students will:

- have had an introductory design experience (ABET outcome c)
- have had experiences using engineering equipment, tools, software, and hardware appropriate to the topic of the course (ABET outcome k, will be assessed)
- have a working knowledge of engineering graphics and basic CAD skills (ABET outcomes g & k)
- have an introductory understanding the societal context of engineering relevant to the topic of the course (ABET outcome f, will be assessed)
- gain experience in visually and orally conveying engineering information, e.g., create and present a poster (ABET outcome g)

Overview of Course Model:

- Course topics, laboratory activities, and projects will be determined by the faculty teaching the course
- All sections must use the common set of outcomes shown above, but may add additional outcomes for their section(s).
- The course will be taught in two 7-week modules. Modules should not be structured as an introduction to a specific discipline of engineering. Modules should focus on engineering

design methodology that is transferable to any/all disciplines, although, modules may and are anticipated to be weighted in a particular discipline depending on the topic and faculty member expertise.

- ◊ Although the course modules will not be an introduction to a specific discipline, this is not to say that they will or should be sterile with regard to discipline. Faculty approach problems and structure courses with their disciplinary backgrounds. These disciplinary approaches should not be ignored, but on the contrary, should be embraced. Exposing students to two modules emphasizes that engineering design has common themes among various disciplines and yet the approaches to those themes differ depending on the discipline, faculty member, and problems being discussed. As the course description notes, ES 101 teaches 'the fundamentals of the engineering method through design projects' as its common theme.
- ◊ One of the primary goals of ES101 is to inspire students about their future in Engineering. This not only helps students to become passionate about engineering, it also helps in retention. Although all faculty are inspirational, some students are more/less inspired by any given faculty member. If a first year student has a uninspiring experience in ES101, we are more likely not to retain the student. The two segment model helps to mitigate this risk by exposing the students to more than one faculty member/discipline in engineering.

Operational Details:

- ◊ A typical schedule of a faculty member teaching two sections is shown below :

	Weeks 1-7			Weeks 8-14		
	Monday	Wednesday	Friday	Monday	Wednesday	Friday
11:00-12:15	Lecture	Lab	Lecture	Lecture	Lab	Lecture
12:45-2:00	Lecture	Lab	Lecture	Lecture	Lab	Lecture

- ◊ Faculty will typically teach the same 7-week module twice per section that they offer.
- ◊ Faculty will typically teach two sections of the course.
- ◊ Students will take two different 7-week segments. They will rank their preference for topics and will be placed in their top choice.
- ◊ Students will not be placed in 2 modules taught by faculty in the same discipline.
- ◊ The course meets for (3) 1.25 hour sessions per week. Faculty are encouraged to devote one of these meetings for hands-on activities, e.g., labs that utilize the laboratory facilities in the engineering building.
- ◊ Faculty teaching ES101 will provide the Director of the Engineering Division with a description of their module that should be roughly 125 words. This description should be written in such a way that the module will have broad appeal and should not be written as an introduction or a description of a specific engineering discipline. Sample module descriptions will be made available once they are written.
- ◊ Students will be allowed to rank their preferences in choosing ES101 module sections.

- ◊ Faculty are free to adjust the meeting time of their course by +/- 15 minutes to allow for longer meetings for laboratory activities or lectures as long as that adjustment in the time is done during the noon hour.
- ◊ Courses should meet for at least 3 academic hours (150 minutes) per week.
- ◊ Graphics (CAD, Visio, and Sketch-Up) will be taught through four 30 minute instruction sessions along with a series of online tutorials. The four instruction sessions will be scheduled throughout the semester (2 per module) and will be held during the regularly scheduled meeting time +/- 15 minutes. Students are required to attend the Graphics instruction sessions. Formal tutoring sessions will be scheduled to support the needs of the students who need instruction beyond the tutorials and instruction sessions.
- ◊ The component of prior versions of ES101 designed to inform students of the various disciplines of engineering at Lafayette will be taught as a required co-curricular activity. These include alumni speakers, former and present students, graduate schools, representatives from local companies and organizations. Many of these events will be held from 7-9 PM on Monday nights. This time will be part of the ES101 schedule. These events will be coordinated with the departments along with the assistance of the Director's office.
- ◊ ES 101 faculty will meet periodically throughout the semester to discuss elements of the course.
- ◊ Engineering Studies does not currently have teaching resources allocated to ES101, however, the program will be encouraged to have faculty participate in the discussions with the ES101 faculty group.
- ◊ Anticipated Grading Scheme: 40% Module 1, 40% Module 2, 10% Graphics, 10% Co-Curricular. Students must successfully complete each component to pass the course.