

**ABE 4042C**  
**Biological Engineering Design I**  
**2018 Course Syllabus**

**1. Catalog Description:** *2 credits. Design of engineered agricultural and biological systems and devices. Problem definition analysis, synthesis, project management, economic, environmental and social impacts. Individual and team projects. (Offered Fall).*

**2. Pre-requisites and Co-requisites:** *none.*

**3. Course Objectives:**

The objective of this course is to introduce students to the techniques of the engineering design process. Students who complete this course will have demonstrated an understanding of the engineering design process from problem definition to finished product. Students will learn to:

- develop specific design objectives and criteria from poorly defined needs descriptions
- gather and evaluate design information,
- conceptualize designs to meet objectives and criteria,
- evaluate designs,
- develop and document designs,
- work in teams,
- manage design projects and
- communicate design needs and accomplishments with clients, peers, suppliers, and managers.

**4. Contribution of course to meeting the professional component for ABET:** This course contributes two (2) credit hours toward meeting the minimum 48 credit hours of Engineering Topics in the basic-level curriculum for the Bachelor of Science Degree in Agricultural and Biological Engineering.

**5. Relationship of course to ABET program outcomes:** From the list of (a) through (k) program outcomes listed below, this course addresses outcomes 1 through 7. **Of these, 1, 3, 4, and 6** are assessed.

ABET Program Outcomes:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics;
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors;
3. an ability to communicate effectively with a range of audiences;
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts;

5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives;
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions; AND
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

**6. Instructor:** Richard V. Scholtz, III

- Office location: 107 Rogers Hall
- Telephone: 352-392-1864 x 107
- E-mail address: rscholtz@ufl.edu
- Office hours: Monday, Wednesday, and Friday - Period 4 (10:40 – 11:30 am), or by appointment.

**7. Teaching Assistant:** Fernando Aristizabal

- Office location: 280 Rogers Hall, Center for Remote Sensing
- Telephone: 352-392-1864 x 290
- E-mail address: fernandoa@ufl.edu
- Office hours: TBD.

**8. Lecture Meeting Times:** Wednesday - Period 7 (1:55 – 2:45 pm)

**9. Discussion and Laboratory Meeting Times:** Friday - Periods 7 & 8 (1:55 – 3:50 pm)

**10. Meeting Location:** 110 Rogers Hall.

**11. Textbooks, Materials and Software Required:**

1. NCEES. 2008. *FE Supplied-Reference Handbook*, Eighth Edition. National Council of Examiners for Engineering and Surveying. Clemson, SC. 258 pages. (\$18 for a print copy @ [www.ncees.org](http://www.ncees.org))
2. USB Flash Drive (≥1 GB).
3. Daily Calendar (e.g. Daytimer), PDA, phone or laptop computer w/ calendar application.
4. Composition or lab notebook.
5. Access to Microsoft Office 2007 or compatible Office Suite (word processor, spreadsheet, presentation programs compatible with the \*.docx, \*.xlsx and \*.pptx formats).
6. Other handout material as it becomes available.

**12. Source Materials:**

1. Christianson, L. & R. Rohrbach. 1986. *Design in Agricultural Engineering*. American Society of Agricultural Engineers. St. Joseph, MI. 312 pages.
2. **Dym, C. & P. Little. 2008. *Engineering Design: A Project Based Introduction. Third Edition. John Wiley& Sons, Inc. New York. 352 pages.***
3. Pahl, G., W. Beitz & J. Feldhusen. 2007. *Engineering Design: A Systematic Approach. Third Edition. Springer-Verlag New York, LLC. New York. 617 pages.* Keller, J. and R.D.

Bliesner. 1990. Sprinkle and Trickle Irrigation. Van Nostrand Reinhold. New York. 652 pages.

4. Petroski, H. 1998. Invention by Design: How Engineers Get from Thought to Thing. Harvard University Press. Cambridge, MA. 256 pages.
5. Voland, G. 2003. Engineering By Design. Prentice Hall. Second Edition. New York. 575 pages.

### 13. Course Outline:

#### Lecture Topics:

- Introduction/Time Management
- Learning from Failure
- Design
- Resources
- Communication
- Standards, Specifications and
- Documentation
- Teamwork and Management
- Scheduling
- Manufacturing
- Materials and Components
- Synthesis and Analysis
- Safety and Liability
- Cost Estimation and Economy
- Planned Creativity
- Testing and Evaluation
- Business Practices

### 14. Attendance and Expectations:

Attendance is required – Lectures will cover material from various references, so it is imperative that students make every effort to attend classes and take good notes. Students are especially encouraged to ask questions during lectures. A part of most class periods will be used for teams to meet and coordinate their projects. Teams will maintain a record of attendance.

All deliverables will comply with the requirements and due date specified at the time of assignment (no deliverable will be made due earlier than 3 business days after assignment).

**No late deliverable will be accepted.**

The student is expected to manage their time efficiently, and should anticipate spending three times the length of lectures studying and preparing deliverables outside the classroom. The student should focus on the following: assignments, preparing both design and laboratory reports, review of notes and lecture materials, and assigned readings.

This class will predominately utilize USCS units, though there is significant interaction with SI units. Mastery of both systems is required.

**15. Announcement Policy:** Students will be held responsible for *all* announcements made in class, which includes *any and all* changes to this syllabus and the course lecture schedule. Students are expected to attend all lectures and laboratory periods scheduled.

**16. Grading Policy:** Official individual grades will only be available at the end of the semester. While many project grades will be determined at the completion of each project, individual

grades will be modified based on team and self-assessments conducted throughout the semester.

**90% Design Deliverables.**

*There will be four design projects throughout the semester, worth 10%, 10%, 30% and 40%. Details will be specified at a later date. Students will be required to maintain digital copies of all materials for their digital portfolio. A team web site will be maintained with all germane project information, which will be uploaded at the end of the semester. Team project grades will be modified relative team and self-assessment forms.*

**5% Executive Summaries and Homework Assignments.**

*There will be field trip/guest speaker executive summaries, weighted by assigned word content. Other assignments will be periodically assigned as well.*

**5(+)% Assessments and Participation.**

*Students will have the opportunity to assess the performance of teammates, as this will be the primary way to distinguish grades amongst the team. Students will also periodically set personal course goals and will periodically fill out self-evaluation forms monitoring their performance. Student participation and attendance will be monitored. Class attendance will be measured periodically and attendance at team meetings is to be recorded.*

**17. Grading Scale:**

A:	91-100%	C:	71-76%
A-:	89-90%	C-:	69-70%
B+:	87-88%	D+:	67-68%
B:	81-86%	D:	61-66%
B-:	79-80%	D-:	59-60%
C+:	77-78%	E:	< 59%

**18. Make-up Grade Policy:** The arrangements for-make any assignments should be made before the date in question unless there is an emergency situation. In which, reviews will be on a case by case basis.

**19. Professionalism and Academic Honesty:** Students should also strive to think and act as professionals, an idea that is embodied by the *Engineering Code of Ethics*. Students should extend all guests both professional and common courtesy. The instructor reserves the right to assess penalty points toward the class, or toward individuals who have chosen to disregard these guidelines.

Students will be *strictly held* to the University of Florida's policy on Academic Honesty. Suspected violations will result in no points awarded (failure) for the deliverable, and the offending student will be referred to the Dean of Students Office and Office of Student Judicial Affairs. Dropping or replacing the lowest grade will not be an option under these

cases. Any and all disputes regarding the suspected infraction will be handled by the Student Judicial Affairs according to Regulations of the University of Florida.

In the process of enrolling and registering for classes at the University of Florida, every student has signed and presumably understands the following statement: "I understand that the University of Florida expects its students to be honest in all their academic work. I agree to adhere to this commitment to academic honesty and understand that failure to comply with this commitment may result in disciplinary action up to and including expulsion from the University." The following information will be placed on examinations. On my honor, I have neither given nor received unauthorized aid on this examination.

- 20. Accommodation for Students with Disabilities:** Students requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation the level and type of accommodation of required to meet the student's disability.
- 21. UF Counseling Services:** Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:
  - University Counseling Center, 301 Peabody Hall, 392-1575, Personal and Career Counseling.
  - SHCC mental Health, Student Health Care Center, 392-1171, Personal and Counseling.
  - Center for Sexual Assault/Abuse Recovery and Education (CARE), Student Health Care Center, 392-1161, sexual assault counseling.
  - Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling.
- 22. Use of Library Materials:** These items are university property and should be utilized with other users in mind. Never remove, mark, modify nor deface resources that do not belong to you. If you're in the habit of underlining text, do it only on your personal copy. It is inconsiderate, costly to others, and dishonest to use common references otherwise.
- 23. Software Use:** All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.