Biological Systems Engineering
A Curricular Program in the College of Engineering
Department of Agricultural and Biosystems Engineering
Iowa State University

The mission of the Biological Systems Engineering degree program is to serve Iowa, the US, and the world, by training innovative engineers who can solve problems and create opportunities related to biorenewables production and processing, environmental quality, and food processing. Our graduates will be able to integrate physical and biological sciences with engineering design principles, and will be prepared for professional practice and/or post-graduate educational opportunities.

Student Enrollment, Fall 2013: 80

Students Graduated (Summer 2012, Fall 2012 and Spring 2013): 5

Program Educational Objectives

Using the knowledge, skills, and abilities from their biological systems engineering degree, our graduates improve the human condition through successful careers in a wide variety of fields. They are effective leaders, collaborators, and innovators who address environmental, social, technical, and business challenges. They are engaged in life-long learning and professional development through self-study, continuing education, or graduate/professional school. – *Ratified by ABE External Advisory Committee, Fall 2011*

Intended Student Outcomes

Graduates of the Biological Systems Engineering curriculum should have, at the time of graduation:

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 within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
d) an ability to function on interdisciplinary 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, economic, environmental, and societal context
i) a recognition of the need for, and the 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

Successful attainment of these intended student outcomes is determined by assessing student competencies (before and after graduation) in these areas: engineering/technical knowledge, general knowledge, continuous learning, quality orientation, initiative, innovation, cultural adaptability, analysis and judgment, planning, communication, teamwork, integrity, professional impact, and customer focus. These competencies are related to the intended student outcomes as follows:

Map of Competencies to Student Outcomes

Iowa State University Biological Systems Engineering Program Outcomes		Competency													
		Engineering Knowledge	General Knowledge	Continuous Learning	Quality Orientation	Initiative	Innovation	Cultural Adaptability	Analysis and Judgment	Planning	Communication	Teamwork	Integrity	Professional Impact	Customer Focus
(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 within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	✖		✖	✖	✖	✖	✖	✖	✖	✖	✖			✖
(d)	an ability to function on interdisciplinary 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, economic, environmental, and societal context	✖	✖	✖				✖	✖						
(i)	a recognition of the need for, and the 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	✖		✖	✖	✖		✖	✖						