BIOLOGICAL AND AGRICULTURAL ENGINEERING - BS

Graduates from the Biological and Agricultural Engineering program, will after several years, have:

- Successfully entered the biological and agricultural engineering profession.
- Successfully pursued graduate education and research at major universities in biological and agricultural engineering, and related fields.
- Advanced into leadership positions in their chosen fields, professions and society.
- Engaged in life-long learning through professional licensure and professional development.
- Contributed to the impact of the profession by creating inclusive, global, and culturally relevant engineering solutions.

Students learn to apply fundamental knowledge of biological and physical sciences, mathematics, and engineering principles to formulate and solve engineering problems. Engineering design is integrated throughout the curriculum, along with opportunities to develop communication, learning, and teamwork skills, culminating in a capstone design experience. Electives in the curriculum allow the student to focus in one of the following areas:

- **Environmental and Natural Resources Engineering**—design and management of systems affecting soil, water, and air resources.
- **Renewable Energy Engineering**—design and development of biomass, wind and solar energy systems.
- **Food and Bioprocess Engineering**—design and development of systems for processing and handling of food and agricultural products and processes involving cells, enzymes, or other biological components.
- **Machine Systems Engineering**—design and development of machines and machine systems for food, feed and fiber production and processing.

Students select courses with the assistance of the academic advisor in an individualized advising system. Faculty members assist with professional development and job placement for students.

The biological and agricultural engineering program is jointly administered by the College of Agriculture and Life Sciences and the College of Engineering. The department is one of the largest in North America and is consistently ranked as one of the top programs in the nation.

For graduates to become successful practicing biological and agricultural engineers, students need to acquire a set of skills, knowledge, and behaviors as they progress through the curriculum. We have established the following program outcomes outlining what students are expected to know and be able to do upon completion of the curriculum. At the time of graduation, students should have:

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
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The Bachelor of Science program in Biological and Agricultural Engineering is accredited by the Engineering Accreditation Commission (EAC) of ABET, https://www.abet.org (https://www.abet.org/).

Program Requirements

First Year		
Fall		**Semester Credit Hours**
CHEM 107	General Chemistry for Engineering Students	3
CHEM 117	General Chemistry for Engineering Students Laboratory	1
ENGL 104	Composition and Rhetoric	3
ENGR 102	Engineering Lab I - Computation	2
MATH 151	Engineering Mathematics I [1]	4
American history (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history) [2]		3
	Semester Credit Hours	**16**
Spring		
ENGL 210	Technical and Professional Writing	3
ENGR 216/ PHYS 216	Experimental Physics and Engineering Lab II - Mechanics	2
MATH 152	Engineering Mathematics II	4
PHYS 206	Newtonian Mechanics for Engineering and Science	3
POLS 206	American National Government	3
	Semester Credit Hours	**15**
Second Year		
Fall		
BAEN 201	Analysis of Biological and Agricultural Engineering Problems	3
BIOL 111	Introductory Biology I	4
ENGR 217/ PHYS 217	Experimental Physics and Engineering Lab III - Electricity and Magnetism	2
MATH 251	Engineering Mathematics III	3
MEEN 221	Statics and Particle Dynamics	3

PHYS 207	Electricity and Magnetism for Engineering and Science	3
	Semester Credit Hours	**18**
Spring		
BAEN 301	Biological and Agricultural Engineering Fundamentals I	3
BAEN 320	Engineering Thermodynamics	3
CHEM 222	Elements of Organic and Biological Chemistry	3
CVEN 305	Mechanics of Materials	3
MATH 308	Differential Equations	3
MEEN 222/ MSEN 222	Materials Science	3
	Semester Credit Hours	**18**
Third Year		
Fall		
BAEN 302	Biological and Agricultural Engineering Fundamentals II [3]	3
BAEN 340	Fluid Mechanics	3
BAEN 354	Engineering Properties of Biological Materials	3
BAEN 375	Design Fundamentals for Agricultural Machines and Structures	3
ECEN 215	Principles of Electrical Engineering	3
	Semester Credit Hours	**15**
Spring		
BAEN 365	Unit Operations for Biological and Agricultural Engineering	3
BAEN 366	Transport Processes in Biological Systems	3
BAEN 370	Measurement and Control of Biological Systems and Agricultural Processes	3
POLS 207	State and Local Government	3
Mathematics elective [4]		3
	Semester Credit Hours	**15**
Fourth Year		
Fall		
BAEN 399	Professional Development [5]	0
BAEN 479	Biological and Agricultural Engineering Design I	3
Language, philosophy and culture (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#language-philosophy-culture) [2]		3
Social and behavioral sciences (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#social-behavioral-sciences) [2]		3
BAEN elective [6]		3
ENGR elective [7]		3
	Semester Credit Hours	**15**
Spring		
BAEN 480	Biological and Agricultural Engineering Design II [3]	3
American history (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history) [2]		3
Creative arts (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#creative-arts) [2]		3
BAEN elective [6]		3
Technical elective [8]		3
	Semester Credit Hours	**15**
	Total Semester Credit Hours	**127**

1. Entering students will normally be given a placement test in mathematics. Test results will be used in selecting the appropriate starting course which may be at a higher or lower level.
2. The three hours of international and cultural diversity (http://catalog.tamu.edu/undergraduate/general-information/degree-information/international-cultural-diversity-requirements/) and three hours of cultural discourse (http://catalog.tamu.edu/undergraduate/general-information/degree-information/cultural-discourse-requirements/) courses, as required for graduation, may be met by courses that also satisfy a core curriculum course.
3. All undergraduate students must take at least two (2) specific courses in their major designated as writing intensive.
4. Select from CHEN 320; CVEN 302; MATH 304, MATH 417; MEEN 357; STAT 211.
5. All engineering students are required to complete a high-impact experience in order to graduate. The list of possible high-impact experiences is available in the BAEN advising office.
6. Select from BAEN 400-478 (http://catalog.tamu.edu/undergraduate/course-descriptions/baen/), BAEN 485, BAEN 489.
7. Select from BAEN 400-478 (http://catalog.tamu.edu/undergraduate/course-descriptions/baen/), BAEN 485, BAEN 489; CHEN 451, CHEN 455/SENG 455, CHEN 460/SENG 460; CVEN 301/EVEN 301, CVEN 303, CVEN 336, CVEN 339/EVEN 339, CVEN 402/EVEN 402, CVEN 450, CVEN 455, CVEN 458/EVEN 458, CVEN 462/EVEN 462; ISEN 303; MEEN 363, MEEN 364, MEEN 441, MEEN 442, MEEN 444, MEEN 460; MTDE 333; SENG 310, SENG 312, SENG 321; Other courses may be approved by request to the advising office.
8. Select from AGSM 473, ANSC 307/FSTC 307, ANSC 312, ANSC 320, ANSC 326/FSTC 326, ANSC 327/FSTC 327; BESC 320, BESC 357, BESC 367, BESC 401, BESC 402, BESC 403; BIOL 351, BIOL 451; ECCB 351, ECCB 407, ECCB 444; FSTC 305, FSTC 312, FSTC 313, FSTC 406/POSC 406, FSTC 457/ANSC 457, FSTC 470/ANSC 470, FSTC 487/ANSC 487 ; GEOG 390; GEOL 410; MMET 307; NUTR 410/ FSTC 410; POSC 309, POSC 326, POSC 427; SCSC 301, SCSC 311, SCSC 405. Other courses may be approved by request to the advising office.

A grade of C or better is required for all math, science, and engineering courses.