

BIOLOGICAL SYSTEMS ENGINEERING, BS

Biological systems engineering (BSE), an accredited engineering program in the College of Agricultural and Life Sciences, applies engineering principles to natural systems and machinery design that impact production of food, water, energy, and more. Uniquely positioned at the intersection of engineering and sustainability with multiple flexible study options to match a wide range of interests, students can follow defined tracks in ecological and environmental engineering, food or bioprocess engineering, machinery systems engineering, or customize their classes using the general option.

Students benefit from a high faculty to student ratio and individualized advising that fosters teamwork. They have access to all resources for UW–Madison students in the College of Engineering, plus those available to students in the College of Agricultural and Life Sciences. Admission is not competitive, meaning all students who meet the criteria are admitted. The program provides a broad education in physical sciences and engineering, but also teaching skills in fabrication, electronics, design, product development, and management.

The BSE program, like all undergraduate engineering programs on the UW–Madison campus, is accredited by ABET (the Accreditation Board for Engineering & Technology) and prepares students for licensure as a professional engineer. Students who graduate from the program are well prepared for research and engineering careers in industry or government, or to continue their studies in graduate school.

LEARN THROUGH HANDS-ON, REAL-WORLD EXPERIENCES

BSE offers hands-on courses and experiences. Senior-level design courses challenge students to develop solutions, build and test prototypes, and analyze results. Students integrate practical work experience through co-operative education (co-op) programs where students earn full-time salaries while working for a firm or through for-credit internships (paid or unpaid).

BUILD COMMUNITY AND NETWORKS

The program fosters community building through advising, coursework, and outside activities. Students can join the UW–Madison student chapter of the professional American Society of Agricultural and Biological Engineers (ASABE) to meet professionals, tour companies, explore career paths, and participate in national design competitions. Additionally, the department hosts student events, such as our fall mixer or harvest meal, to allow students to get to know each other and the faculty.

CUSTOMIZE A PATH OF STUDY

All students take core engineering courses, then specialize in areas including machinery systems, ecological and environmental engineering, food engineering, or bioprocessing. Students can also develop their own customized focus areas. Many students also complete certificates

in sustainability or renewable energy. Undergraduates can also pursue Honors in Research or work in a faculty lab for research experience.

MAKE A STRONG START

All first year CALS students take a [CALS First-Year seminar](https://guide.wisc.edu/undergraduate/agricultural-life-sciences/#requirementstext) (<https://guide.wisc.edu/undergraduate/agricultural-life-sciences/#requirementstext>). These seminars allow students to explore different areas of study, learn how to access campus resources, and make friends and connections. In all BSE courses, instructors offer homework help sessions to support students and encourage the formation of study groups.

GAIN GLOBAL PERSPECTIVE

Students can choose from study abroad options, including courses taught in English, offered through the College of Agricultural and Life Sciences, the College of Engineering, or campus-wide opportunities. Recent students have traveled to China, France, Costa Rica, Africa, Ireland and more. Programs occur over full semesters or during summer and winter breaks. International internships, many with summer options, offer additional opportunities to gain global experience. Students can explore studying abroad as a BSE major utilizing the Biological Systems Engineering Major Advising Page. Students work with their advisor and the CALS study abroad office to identify appropriate programs.

HOW TO GET IN

HOW TO GET IN

CURRENT UW-MADISON STUDENTS

Entry to this professional program requires students to meet the five admission requirements detailed below. Students are admitted as pre-Biological Systems Engineering until they meet the admission criteria listed below. **Admission eligibility must be confirmed by the department.**

1. Must complete a minimum of 24 degree credits.
2. Must complete a minimum of 17 graded credits of calculus, statistics, chemistry, statics, and physics courses required for a BSE degree.
3. Must have a math and science grade point average (M&SGPA) of at least 2.65 with a minimum grade of C in every course used to calculate the M&SGPA. The M&SGPA is based on:
 - a. MATH (<https://guide.wisc.edu/courses/math/>) courses numbered 221 and above (MATH 228 is excluded)
 - b. STAT (<https://guide.wisc.edu/courses/stat/>) courses numbered 324 and above
 - c. CHEM (<https://guide.wisc.edu/courses/chem/>) courses (all)
 - d. PHYSICS (<https://guide.wisc.edu/courses/physics/>) courses numbered 201 and above
 - e. E M A 201
 - f. BSE 380
4. For any course that a student repeats, only the most recent grade will be used in the M&SGPA calculation. Any transfer course from another university that is included in the previous list must be included in the GPA calculation.
5. Must be in good academic standing—i.e., not on academic probation or dropped status.

6. Must successfully complete introductory chemistry (CHEM 103 & CHEM 104, or CHEM 109, or equivalent) and math through MATH 222.

Students must meet the admissions criteria listed above before they receive admission to the Biological Systems Engineering professional degree program. Students with fewer than 30 credits at the time they declare the pre-BSE major must achieve full admission to the professional program within three regular semesters from the time of pre-BSE major declaration. Students with 30 or more credits at the time they declare the pre-BSE major must achieve full admission within two regular semesters of transferring into the program. Students who do not meet full admission criteria according to these time limits will not be allowed to continue in the pre-BSE program.

PROSPECTIVE UW-MADISON STUDENTS

All prospective UW-Madison students must apply through the Office of Admissions and Recruitment (<https://www.admissions.wisc.edu/>).

Students interested in this major should select Biological Systems Engineering as the first choice major on their UW-Madison application. Admitted students who enroll at UW-Madison and attend Student Orientation, Advising, and Registration (SOAR) with the College of Agricultural and Life Sciences have the option to declare pre-Biological Systems Engineering at SOAR. More information is available here (<https://cals.wisc.edu/academics/undergraduate/future-students/>).

REQUIREMENTS

UNIVERSITY REQUIREMENTS

All undergraduate students must complete both the following Core General Education (Core GenEd) and University Degree and Quality of Work requirements. The requirements below apply to students whose first term at UW-Madison or whose earliest post-high school college attendance at any institution is Summer 2026 or later.

Students whose first term at UW-Madison or whose earliest post-high school college attendance at any institution occurred before Summer 2026 should refer to the archived Guide (<https://guide.wisc.edu/archive/>) for the requirements that apply to them.

CORE GENERAL EDUCATION (CORE GENED) REQUIREMENTS

Civics & Perspectives 3 credits of Civics & Perspectives coursework.

Communication & Literacy 6 credits of Communication & Literacy coursework. This requirement may be partially satisfied by a qualifying placement test score. More information: <https://go.wisc.edu/qualifyingenglishplacement> (<https://go.wisc.edu/qualifyingenglishplacement/>)

Humanities & Arts 6 credits of Humanities & Arts coursework.

Mathematics & Quantitative Reasoning 6 credits of Mathematics & Quantitative Reasoning coursework. This requirement may be partially satisfied by a qualifying placement test score. More information: <https://go.wisc.edu/qualifyingmathplacement> (<https://go.wisc.edu/qualifyingmathplacement/>)

Natural Science & Wellness

Complete both:

- 6 credits of Natural Science & Wellness or Natural Science & Wellness + Laboratory coursework.
- one course must be in Natural Science & Wellness + Laboratory coursework.

Social & Behavioral Science

3 credits of Social & Behavioral Science coursework.

Total Credits 30 credits.

For more information see the policy (<https://policy.wisc.edu/library/UW-1095/>).

UNIVERSITY DEGREE AND QUALITY OF WORK REQUIREMENTS

All undergraduate degree recipients must complete the following minimum requirements. Requirements for some programs will exceed these requirements; see program requirements for additional information.

Total Degree 120 degree credits.

Residency

Complete 30 credits in residence. A course is considered "in residence" if it is taken when in undergraduate degree-seeking status and:

- is offered by UW-Madison and completed on the UW-Madison campus or at an approved off-site location, or
- is offered by UW-Madison in an online or distance format, or is completed during participation in a UW-Madison study abroad/study away program.

Quality of Work

Achieve at least the minimum grade point average specified by the school, college, and/or academic program.

Math

Demonstrate minimal mathematics competence by:

- placing above MATH#160;96, or
- successfully completing MATH#160;96, or
- successfully completing a more advanced mathematics course such as MATH#160;112, MATH#160;113, MATH#160;114, MATH#160;141, MATH#160;211, or MATH#160;221.

English Language

If required to take the UW-Madison English as a Second Language Assessment Test (MSN-ESLAT), demonstrate minimal English language competence by:

- earning credit for ESL#160;118, or
- achieving a qualifying MSN-ESLAT placement test score.

Language

Complete one:

- 2 high school units of a single language other than English, or
- one course with the second semester Language designation.

Major Declaration

Declare and complete the requirements for at least one major.

COLLEGE OF AGRICULTURAL AND LIFE SCIENCES REQUIREMENTS

CALS GRADUATION REQUIREMENTS

Cumulative Credits	<ul style="list-style-type: none"> Students must earn 120 degree credits. Students declared in Biological Systems Engineering BS must earn 125 degree credits.
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Quality of Work	Students must maintain a minimum cumulative grade point average of 2.000 to remain in good standing and be eligible for graduation.
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Residency	Students must complete 30 degree credits in residence at UW–Madison after earning 86 credits toward their undergraduate degree.
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In addition to the university's general requirements, all undergraduate students in CALS must satisfy a set of college and major requirements. Courses may not double count within university requirements, CALS college requirements, or major requirements. A course may count toward university requirements and a college and/or a major requirement; similarly, a course counted toward college requirements may also be used to satisfy a university and/or a major requirement.

CALS COLLEGE REQUIREMENTS

CALS First-Year Seminar	1 credit. See the full list of eligible courses below or use this link: https://go.wisc.edu/calsfirstyearseminars (https://go.wisc.edu/calsfirstyearseminars/)
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Ethnic Studies	3 credits with the Ethnic Studies designation.
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Communication A	Complete either: <ul style="list-style-type: none"> 1 course with the Communication A designation, or satisfaction of Communication A based on UW Placement Test.
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Quantitative Reasoning A	Complete either: <ul style="list-style-type: none"> 1 course with the Quantitative Reasoning A designation, or satisfaction of Quantitative Reasoning A based on UW Placement Test.
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Introductory Chemistry	Complete one: <ul style="list-style-type: none"> CHEM#160;103 CHEM#160;108 CHEM#160;109
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CALS International Comparisons	3 credits. See the full list of eligible courses below or use this link: https://go.wisc.edu/calsinternationalcomparisons (https://go.wisc.edu/calsinternationalcomparisons/)
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Communication B	1 course with the Communication B designation.
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Quantitative Reasoning B	1 course with the Quantitative Reasoning B designation.
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Biological Science	5 credits with the Biological Science designation.
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Additional Science	3 credits with the Biological, Physical, or Natural Science designations.
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Science Breadth	3 credits with the Biological, Physical, Natural, or Social Science designations.
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Humanities	6 credits with the Humanities or Literature designation.
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Social Sciences	3 credits with the Social Sciences designation.
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Capstone Learning Experience	Each major articulates the required capstone learning experience.
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CALS First-Year Seminars

Code	Title	Credits
AN SCI 135	Grand Challenges and Career Opportunities in Animal and Dairy Sciences	1
BIOCHEM 100	Biochemistry First-Year Seminar	1
COUN PSY 125	The Wisconsin Experience Seminar	1
F&W ECOL 101	Orientation to Wildlife Ecology	1
F&W ECOL 105	Environment, Pollutants, and You	3
GENETICS 155	Freshman Seminar in Genetics	1
INTEGSCI 100	Exploring Biology	2
INTEGSCI 140	Exploring Service in STEM	1
INTER-AG 155	Issues in Agriculture, Environment, and Life Sciences	1
LSC 155	First-Year Seminar in Science Communication	1
MICROBIO 150	Microbiomes and Microbiology - First-Year Seminar	1
PLANTSCI/AGROECOL 100	First-Year Seminar in Agroecology and Plant Science	1
PL PATH 155	Food Frontlines: Security, Sustainability, and Survival	1
SOIL SCI 155	First-year Seminar in Soil and Environmental Sciences	1

Learning Community/Student Group Courses

The following learning community/student group courses are approved as CALS First-Year Seminars.

COUN PSY 117	PEOPLE First Year Seminar	1
INTEGSCI 110	BioHouse Seminar: Biology for the 21st Century	1
INTER-AG 117	GreenHouse Roots Seminar	1
INTER-AG 140	CALS QuickStart: Foundations	1
INTER-AG 175	WISE Seminar	1

CALS International Comparisons

Code	Title	Credits
The 3 credit requirement may be fulfilled as either a stand-alone 3 credit course or as a set of courses as listed below.		
A A E/ENVIR ST 244	The Environment and the Global Economy	4
A A E 319	The International Agricultural Economy	3
A A E/NUTR SCI 350	World Hunger and Malnutrition	3
A A E 352	Global Health: Economics, Natural Systems, and Policy (approved for enrollments Summer 2021 and later)	4

AAE/INTL ST 373	Globalization, Poverty and Development	3	NUTR SCI/INTER-AG 421	Global Health Field Experience (UW Mobile Clinics and Health Care in Uganda)	3
AAE/INTL ST 374	The Growth and Development of Nations in the Global Economy	3	INTER-AG 321	Study Abroad Pre-Departure Seminar	3
AAE/ECON 473	Economic Growth and Development in Southeast Asia	3	& INTER-AG/NUTR SCI 421	and Global Health Field Experience (UW Global Health Community Health and Asset-Based Community Development in Sri Lanka)	3
AAE/ECON 474	Economic Problems of Developing Areas	3	INTER-AG 321	Study Abroad Pre-Departure Seminar	3
AAE/ECON/INTL BUS 462	Latin American Economic Development	3	& INTER-AG/NUTR SCI 421	and Global Health Field Experience (UW Agriculture, Health and Nutrition in Uganda)	3
AAE/ECON 477	Agricultural and Economic Development in Africa	3	INTER-AG/NUTR SCI 421	Global Health Field Experience (UW Health, Education and Tanzanian Culture)	3
AGROECOL 377	Global Food Production and Health	3			
AN SCI/DY SCI 370	Livestock Production and Health in Agricultural Development	3			
ASIAN/HISTORY/POLI SCI 255	Introduction to East Asian Civilizations (approved for enrollments Summer 2021 and later)	3-4			
C&E SOC/SOC 341	Labor in Global Food Systems (approved for enrollments Summer 2020 and later)	3			
C&E SOC/ENVIR ST/SOC 540	Sociology of International Development, Environment, and Sustainability	3			
CSCS 500	Global Health and Communities: From Research to Praxis	3			
DY SCI 471	Food Production Systems and Sustainability	3			
ENTOM/ENVIR ST 201	Insects and Human Culture-a Survey Course in Entomology	3			
ENTOM/ENVIR ST 205	Our Planet, Our Health (approved for enrollments Fall 2026 and later)	3			
ENTOM/ZOOLOGY 371	Medical Entomology: Biology of Vector and Vector-borne Diseases	3			
F&W ECOL/ENVIR ST 100	Forests of the World (approved for enrollments Summer 2020 and later)	3			
F&W ECOL/ENVIR ST/ZOOLOGY 360	Extinction of Species	3			
LSC 251	Science, Media and Society (approved for enrollments Summer 2020 and later)	3			
PL PATH/BOTANY 123	Plants, Parasites, and People	3			
PL PATH 311	Global Food Security	3			
PLANTSCI 370	World Vegetable Crops	3			
The following study abroad courses fulfill the CALS International Comparisons requirement. Only the specific course numbers and titles listed, including Topics titles (in parentheses), are approved to meet the CALS International Comparisons requirement.					
BIOCHEM 307	Study Abroad: Introduction to Biological Sciences Research in Japan (approved for enrollments Fall 2026 and later)	3			

NAMED OPTIONS WITHIN THE MAJOR

Students may complete the Biological Systems Engineering General Program or select a Named Option. The course requirements on this page represent the general program. Students are encouraged to consider one of the Named Options (Food and Bioprocess Engineering; Machinery Systems Engineering; or Ecological and Environmental Engineering). Links to learn more about these options, including the course requirements, are included below.

View as [list](#) or [grid](#)

- **BIOLOGICAL SYSTEMS ENGINEERING: ECOLOGICAL AND ENVIRONMENTAL ENGINEERING (HTTPS://GUIDE.WISC.EDU/ UNDERGRADUATE/AGRICULTURAL-LIFE-SCIENCES/BIOLOGICAL-SYSTEMS-ENGINEERING/BIOLOGICAL-SYSTEMS-ENGINEERING-BS/BIOLOGICAL-SYSTEMS-ENGINEERING-ECOLOGICAL-ENVIRONMENTAL-ENGINEERING-BS/)**
- **BIOLOGICAL SYSTEMS ENGINEERING: FOOD AND BIOPROCESS ENGINEERING (HTTPS://GUIDE.WISC.EDU/ UNDERGRADUATE/AGRICULTURAL-LIFE-SCIENCES/BIOLOGICAL-SYSTEMS-ENGINEERING/BIOLOGICAL-SYSTEMS-ENGINEERING-BS/BIOLOGICAL-SYSTEMS-ENGINEERING-FOOD-BIOPROCESS-ENGINEERING-BS/)**
- **BIOLOGICAL SYSTEMS ENGINEERING: MACHINERY SYSTEMS ENGINEERING (HTTPS://GUIDE.WISC.EDU/ UNDERGRADUATE/AGRICULTURAL-LIFE-SCIENCES/BIOLOGICAL-SYSTEMS-ENGINEERING/BIOLOGICAL-SYSTEMS-ENGINEERING-BS/BIOLOGICAL-SYSTEMS-ENGINEERING-MACHINERY-SYSTEMS-ENGINEERING-BS/)**

Complete one of the following: 5-9

CHEM 109 Advanced General Chemistry (Recommended)

CHEM 103 & CHEM 104 General Chemistry I and General Chemistry II

Biology

BSE 349 Quantitative Techniques for Biological Systems 3

Complete one additional Biological Science Breadth Course; the following courses are preferred choices: 2-5

BIOLOGY/ BOTANY/ ZOOLOGY 151 Introductory Biology

ZOOLOGY 153 Introductory Biology

BIOLOGY/ BOTANY 130 General Botany

BIOLOGY/ ZOOLOGY 101 Animal Biology

AN SCI/ DY SCI 101 Introduction to Animal Sciences

MICROBIO 101 General Microbiology

MICROBIO 303 Biology of Microorganisms

PLANTSCI 110 Introduction to Plant Science and Technology

Physics

E M A 201 Statics 3

PHYSICS 202 General Physics 5

Foundation

BSE 270 Introduction to Computer Aided Design 3

BSE 380 Introductory Data Science for the Agricultural and Life Sciences 3

BSE 310 Project Economics & Decision Analysis (preferred) 3
or I SY E 313 Engineering Economic Analysis

Core

BSE 249 Engineering Principles for Biological Systems 3
or CBE 250 Process Synthesis

BSE 365 Measurements and Instrumentation for Biological Systems 3

BSE 308 Career Management for Engineers 1

Total Credits 53-60

GENERAL PROGRAM REQUIREMENTS

Code Title Credits
M E 361 Thermodynamics 3
or CBE 310 Chemical Process Thermodynamics

BSE 464 Heat and Mass Transfer in Biological Systems 3

E M A 303 Mechanics of Materials 3

Complete one of the following courses: 3-4

M E 363 Fluid Dynamics

MAJOR REQUIREMENTS

Code	Title	Credits
Major Requirements		
Common Requirements		53
General Program Classes and Technical Electives		43
Capstone		5
Total Credits		101

COMMON REQUIREMENTS

The Biological Systems Engineering program requires completion of a minimum of 125 credits to be eligible for graduation. Note that this is higher than the minimum for other CALS programs.

Code	Title	Credits
Mathematics and Statistics		
MATH 221	Calculus and Analytic Geometry 1	5
MATH 222	Calculus and Analytic Geometry 2	4
MATH 234	Calculus--Functions of Several Variables	4
MATH 319	Techniques in Ordinary Differential Equations	3
or MATH 320	Linear Algebra and Differential Equations	
STAT 324	Introduction to Statistics for Science and Engineering	3

Chemistry

CIV ENGR 310	Fluid Mechanics	
CBE 320	Introductory Transport Phenomena	
Complete a minimum of three of the following:		6-9
BSE 301	Land Information Management	
BSE 364	Engineering Properties of Food and Biological Materials	
BSE/ ENVIR ST 367	Renewable Energy Systems	
BSE/CIV ENGR/ SOIL SCI 372	On-Site Waste Water Treatment and Dispersal	
BSE 405	Artificial Intelligence in Agriculture	
BSE 460	Biorefining: Energy and Products from Renewable Resources	
BSE 461	Food and Bioprocessing Operations	
BSE 472	Sediment and Bio-Nutrient Engineering and Management	
BSE 473	Water Management Systems	
BSE/M E 475	Engineering Principles of Agricultural Machinery	
BSE/M E 476	Engineering Principles of Off-Road Vehicles	
M E/BSE 474	Fluid Power	
AN SCI/BSE 344	Digital Technologies for Animal Monitoring	
BSE 305	Introduction to Precision Agriculture	
BSE 571	Small Watershed Engineering	
Complete a minimum of 9 credits of coursework numbered 300 or above non-BSE engineering courses		9
Total Credits		27-31

TECHNICAL ELECTIVES

Select courses from one or more of the following four technical elective categories to bring the total number of credits in the General Program Area or in the selected specialization area to 43.

A. INTRODUCTION TO ENGINEERING COURSES

Code	Title	Credits
INTEREGR 170	Design Practicum	3

B. INDEPENDENT STUDY/INSTRUCTION COURSES

CALS or CoE courses with a 001, 299, 399, or 699 course number. No more than 3 credits of coursework in this category can be used to meet technical elective requirements.

C. UPPER-LEVEL COURSES

Part 1. Upper-Level Engineering Courses

This includes BSE courses not taken to meet other curricular requirements. This does not include independent study/instruction courses.

Code	Title	Credits
Any Engineering course numbered 300 or above		
E M A 202	Dynamics	3

Part 2. Upper-Level Science Courses

This includes BSE courses not taken to meet other curricular requirements. This does not include independent study/instruction courses.

Code	Title	Credits
Advanced biological, natural, and physical science courses (i.e., courses with a B, N, or P designation)		
CHEM 341	Elementary Organic Chemistry	3
CHEM 342	Elementary Organic Chemistry Laboratory	1
CHEM 343	Organic Chemistry I	3
CHEM 344	Introductory Organic Chemistry Laboratory	2
CHEM 345	Organic Chemistry II	3
CHEM/M S & E 421	Polymeric Materials	3
PLANTSCI/ ATM OCN 532	Environmental Biophysics	3

D. LOWER-LEVEL SCIENCE AND ENGINEERING COURSES, BREADTH COURSES

Elementary and intermediate biological, natural, and physical science courses except elementary and intermediate math courses; College of Engineering courses numbered 100 through 299; College of Agricultural and Life Sciences courses, Institute of Environmental Studies courses, and/or School of Business courses. Independent study/instruction courses cannot be counted in this category. No more than 12 credits of coursework in this category can be used to meet technical elective requirements.

CAPSTONE

Code	Title	Credits
BSE 508	Biological Systems Engineering Design Practicum I	2
BSE 509	Biological Systems Engineering Design Practicum II	3
Total Credits		5

LEARNING OUTCOMES

LEARNING OUTCOMES

1. Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. 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. Display effective communication with a range of audiences.
4. 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. Display teamwork skills, functioning effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

6. Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. Acquire and apply new knowledge as needed, using appropriate learning strategies.

FOUR-YEAR PLAN

FOUR-YEAR PLAN SAMPLE BIOLOGICAL SYSTEMS ENGINEERING FOUR-YEAR PLAN—GENERAL PROGRAM

Students must complete at least 125 total credits to be eligible for graduation.

First Year

Fall	Credits Spring	Credits
MATH 221	5 MATH 222	4
CHEM 109	5 BSE 310	3
Biological Science course	3 General Education courses	6
General Education course	3 CALS First Year Seminar	1
16		14

Second Year

Fall	Credits Spring	Credits
E M A 201	3 BSE 308	1
MATH 234	4 BSE 349	3
BSE 249	3 MATH 320	3
BSE 270	3 PHYSICS 202	5
BSE 380	3 BSE General Program Elective	3
16		15

Third Year

Fall	Credits Spring	Credits
STAT 324	3 INTEREGR 397 (COMM B)	3
E M A 303	3 M E 363	3
M E 361	3 BSE 365	3
Non-BSE engineering course numbered 300 or higher	3 BSE 508	2
INTEREGR 170	3 BSE General Program Elective	3
Elective	3 CALS International Comparisons	3
18		17

Fourth Year

Fall	Credits Spring	Credits
BSE 509	3 BSE 464	3
Non-BSE engineering course numbered 300 or higher	3 Non-BSE engineering course numbered 300 or higher	3
Technical Electives	4 Technical Electives	4

BSE General Program Elective	3 Elective	3
General Education course	3	
16		13

Total Credits 125

ADVISING AND CAREERS

ADVISING AND CAREERS

ADVISING

All students are assigned an advisor when they join the department. First-year students work with a professional staff advisor; more advanced students transition to a faculty advisor in their specialization area. The BSE department promotes personalized advising through accessible appointments and requires advising meetings at least once each semester.

CAREER OPPORTUNITIES

BSE graduates have great careers developing new products, processes, and systems to protect soil, air, and water quality while meeting demand for food, materials, and energy. Alumni hold positions in research and engineering in organizations developing off-road equipment, food production, renewable energy systems, animal housing, environmental control systems, irrigation and drainage systems, and with engineering consulting companies. Earning a BSE degree puts students on track to become a professional engineer and take the Fundamentals of Engineering (FE) exam, the first step toward licensure which opens even more career opportunities.

WISCONSIN EXPERIENCE

WISCONSIN EXPERIENCE

STUDENT ORGANIZATIONS

The American Society of Agricultural and Biological Engineers (ASABE) Pre-professionals Club (<https://win.wisc.edu/organization/asabe/>) connects students to professional development opportunities.

UW-Madison offers many other student groups to encourage networking and development of leadership skills. Some cater to agricultural interests, while others focus on engineering and biosciences. Many food and bioprocess engineering students are active in the Food Science Club. Other options include Minorities in Agriculture, Natural Resources and Related Sciences (<https://win.wisc.edu/organization/manrrs/>), Engineers for a Sustainable World (UW-Madison Chapter) (<https://win.wisc.edu/organization/esw-uwmadison/>), and more. Many student organizations exist to support engineering students who identify as Native American, Black, Latinx, or part of the LGBTQIA+ community in professional development and academic success.

Find more student organizations (<https://win.wisc.edu/organizations/>).

COMPETITIVE TEAMS

The BSE department is the home of several engineering design teams that compete in one of several National Student Design Competitions through the American Society of Agricultural and Biological Engineers (ASABE). The Quarter-Scale Tractor Team (<https://win.wisc.edu/organization/qstt/>) designs and builds a small-scale tractor judged by industry experts and put to the test in performance events against other national and

international university teams. The Robotics Student Design Competition allows students to develop skills in robotic systems, electronics, and sensing technologies by simulating a fully autonomous robotic solution to a common agricultural process.

Many BSE students participate in or hold leadership positions in other engineering design competition teams, such as Formula SAE (<https://vehicles.wisc.edu/formula/formulaabout.html>), SAE Clean Snowmobile (<https://vehicles.wisc.edu/SNOWMOBILE/SNOWMOBILEabout.html>), ASCE Concrete Canoe (<https://win.wisc.edu/organization/concretec canoe/>), Human Powered Vehicle Challenge (<https://hpvc.slc.engr.wisc.edu/new/>), Collegiate Wind Power Competition, (<https://energy.wisc.edu/news/uw-madison-team-compete-2022-collegiate-wind-competition/>) Baja Team (<https://vehicles.wisc.edu/BAJA/BAJAabout.html>), and UW Hybrid. (https://vehicles.wisc.edu/hybrid/team/mechanical_team.html)

INTERNSHIPS

Internships are an excellent way for students to ground what they have learned in practical applications. Students also participate in co-operative (co-op) education programs where they earn full-time salaries while working for a company. The program supports students in finding co-ops and internships and provides flexibility in class plans for opportunities that occur during fall or spring semesters. Students learn of pre-professional internships through on-campus career fairs – primarily by those hosted by the CoE and CALS – and through regular email announcements. Students also have opportunities to intern with professors performing research over the summer. Although not a program requirement, school credit may be earned for internships.

RESEARCH EXPERIENCE

Many professors in BSE and across campus provide opportunities for students to gain hands-on experience in research labs. Undergraduate researchers learn how knowledge is constructed, gain independence, and increase their self-confidence. These benefits are an advantage in any career path. BSE students are sought out by research groups across campus and governmental agencies because of their unique research experiences.

GLOBAL ENGAGEMENT

The program supports study abroad and international experiences with flexible scheduling. In addition to study abroad programs and internships, students can volunteer with student organizations like Engineers Without Borders (<http://ewbuwmadison.weebly.com/>). Students can choose to fulfill their CALS International Comparisons requirement with an appropriate study abroad course.

COMMUNITY ENGAGEMENT AND VOLUNTEERING

BSE students participate in campus-wide volunteer programs like Badger Volunteers, offering their expertise in education, sustainability, and public health to support community organizations. In addition, BSE students volunteer through student organizations to work on special projects related to engineering. Past projects included the fabrication of bioreactors for communities in Uganda or Habitat for Humanity projects in Madison.

RESOURCES AND SCHOLARSHIPS

RESOURCES AND SCHOLARSHIPS

Students in the College of Agricultural and Life Sciences receive more than \$1.25 million in scholarships annually from a standard application (<https://cals.wisc.edu/academics/undergraduate-students/financing-your-education/cals-scholarships/>).

Each year dozens of outstanding Biological Systems Engineering students are awarded scholarships from funds designated exclusively for this major. These funds seek to support students based on many different criteria, such as financial need, specific academic interests, extracurricular involvement, and academic success.

RESOURCES

BSE students have full access to the resources of both the College of Agricultural and Life Sciences and the College of Engineering, including Career Services, Study Abroad programs, access to specialized engineering software, and computer labs.

The Biological Systems Engineering Shop (<https://bse.wisc.edu/shop-information/shop-info-for-students/>) provides students hands-on experience with machining equipment commonly used in industry. Students can learn machining and metal fabrication techniques, as well as woodworking skills, and improve their understanding of design and assembly processes. Training and support are available for all skill levels. In addition, BSE students have access to all College of Engineering fabrication shops and the UW Makerspace (<https://making.engr.wisc.edu/>).

Other resources in the Agricultural Engineering Building include a dedicated student computer lab and a student lounge available for group study or individual work. Department-wide social events are also held here.

ACCREDITATION

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Accredited by the Engineering Accreditation Commission of ABET, <https://www.abet.org> (<https://www.abet.org/>), under the commission's General Criteria and Program Criteria for Biological and Similarly Named Programs.

PROGRAM#EDUCATIONAL OBJECTIVES#FOR THE BACHELOR OF SCIENCE IN BIOLOGICAL SYSTEMS ENGINEERING

The Biological Systems Engineering Department recognizes that our graduates will choose to use acquired knowledge and skills to pursue a wide variety of career and life goals. Whether they choose a professional career, pursue further education, or engage in volunteer work, our graduates will:

1. Develop exceptional problem-solving, leadership, teamwork, and communication skills in the intersecting fields of biological systems and engineering, covering various scales, from microbial to global.

2. Utilize skills to make meaningful contributions to communities in addressing pressing societal and ecological challenges.
3. Be prepared for professional licensure and career development in the public, private, or nonprofit sectors.

Note: Undergraduate Program Educational Objectives and Student Outcomes, number of degrees conferred, and enrollment data are made publicly available at the Biological Systems Engineering#Undergraduate Program website (<https://bse.wisc.edu/undergraduate-studies/>). (In this Guide, the program's Student Outcomes are available through the "Learning Outcomes" tab.)