

# BIOLOGICAL SYSTEMS ENGINEERING: MACHINERY SYSTEMS ENGINEERING

Machinery systems engineering is what many students initially perceive biological systems engineering to be. These engineers are trained to design machines for production agriculture and construction. Concepts covered in this field include power transmission, traction, hydraulic power, and crop handling, such as planting and harvesting.

Over the past 50 years, machines have improved production efficiency in all aspects of life. Machinery systems engineers have played a key role in moving society from the highly manual culture of the early 20th century to the highly technical culture of the late 20th century. Even with these advances, the job of the machinery systems engineer is not complete. Concern for our natural environment and worker safety, and the constant desire to reduce costs and energy consumption while improving production efficiency, will continue to challenge machinery systems engineers.

## REQUIREMENTS

Code	Title	Credits
<b>Major Requirements</b>		
Common Requirements		53
Specialization & Technical Electives		43
Capstone		5
<b>Total Credits</b>		<b>101</b>

## COMMON REQUIREMENTS

See Major Requirements (<http://guide.wisc.edu/undergraduate/agricultural-life-sciences/biological-systems-engineering/biological-systems-engineering-bs/#requirementstext>).

## MACHINERY SYSTEMS ENGINEERING SPECIALIZATION

This is a named option that will appear on the student's transcript upon completion.

Code	Title	Credits
BSE 405	Intelligence and Automation in Agriculture	3
BSE/M E 475	Engineering Principles of Agricultural Machinery	3
BSE/M E 476	Engineering Principles of Off-Road Vehicles	3
E M A 202 or M E 240	Dynamics Dynamics	3
M E 306 or E M A 303	Mechanics of Materials Mechanics of Materials	3
E M A/M E 307	Mechanics of Materials Lab	1
M E 342	Design of Machine Elements	3

M E 310 or M E 311	Manufacturing: Polymer Processing and Engineering Manufacturing: Metals and Automation	3
M E 361	Thermodynamics	3
M E 363	Fluid Dynamics	3
AGRONOMY 100 or DY SCI/ AN SCI 101 or SOIL SCI 301	Principles and Practices in Crop Production Introduction to Animal Sciences General Soil Science	4
Complete one of the following BSE breadth courses:		2-3
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 460	Biorefining: Energy and Products from Renewable Resources	
BSE 461	Food and Bioprocessing Operations	
BSE 464	Heat and Mass Transfer in Biological Systems	
BSE 472	Sediment and Bio-Nutrient Engineering and Management	
BSE 473	Water Management Systems	
BSE 571	Small Watershed Engineering	
<b>Total Credits</b>		<b>34-35</b>

## TECHNICAL ELECTIVES

See Major Requirements (<http://guide.wisc.edu/undergraduate/agricultural-life-sciences/biological-systems-engineering/biological-systems-engineering-bs/#requirementstext>).

## CAPSTONE

See Major Requirements (<http://guide.wisc.edu/undergraduate/agricultural-life-sciences/biological-systems-engineering/biological-systems-engineering-bs/#requirementstext>).

## FOUR-YEAR PLAN

### SAMPLE BIOLOGICAL SYSTEMS ENGINEERING FOUR-YEAR PLAN—MACHINERY SYSTEMS ENGINEERING NAMED OPTION

#### First Year

Fall	Credits	Spring	Credits
MATH 221 <sup>1</sup>		5 MATH 222	4
CHEM 109 <sup>2</sup>		5 BSE 170 or INTEREGR 170	2-3
LSC 100 (or other COMM A)		3 BSE 310	3
Humanities		3 Elective	3
		Ethnic Studies	3

16

15-16

**Second Year**

<b>Fall</b>	<b>Credits</b>	<b>Spring</b>	<b>Credits</b>
MATH 234		4 BSE 308	1
BSE 249		3 BSE 349	3
E M A 201		3 M E 361	3
Biological Science Course		3 STAT 324	3
Elective		3 PHYSICS 202	5
	<b>16</b>		<b>15</b>

**Third Year**

<b>Fall</b>	<b>Credits</b>	<b>Spring</b>	<b>Credits</b>
BSE 270		3 BSE 365	3
BSE/M E 475		3 BSE/M E 476	3
MATH 320		3 BSE 508	2
M E 240		3 M E 310 or 311	3
M E 306		3 M E 363	3
M E/E M A 307		1 CALS International Studies	3
	<b>16</b>		<b>17</b>

**Fourth Year**

<b>Fall</b>	<b>Credits</b>	<b>Spring</b>	<b>Credits</b>
BSE 380		3 BSE 405	3
BSE 509		3 INTEREGR 397	3
M E 342		3 Technical Electives	6
AGRONOMY 100, DY SCI 101, or SOIL SCI 301		3-4 Humanities	3
BSE Breadth Requirement		3	
	<b>15-16</b>		<b>15</b>

**Total Credits 125-127**

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

1

MATH course dependent on placement score and transfer credit evaluation.

2

If CHEM 103 & CHEM 104 are taken in place of CHEM 109, it is suggested to take CHEM 103 in the fall semester and CHEM 104 in the spring semester of the first year.