

2021 CHECKLIST: Biological Systems Engineering: Mach Sys

Student _____
 Student ID _____
 Telephone No. _____
 Expected Graduation Month and Year _____

University General Education Requirements

Each course taken to meet a university general education requirement can be used to meet a CALS B.S. requirement and/or a requirement of the major.

Crds	Sem/Yr Taken	Grd	Requirement	Course Taken to Meet Requirement
_____	_____	_____	Communication Part A Course (3 credits) LSC 100 or any course with a <i>Comm-A</i> designation in Course Search & Enroll. May be satisfied by placement test.	_____
_____	_____	_____	Communication Part B Course (3 credits) Any course with a <i>Comm-B</i> designation in Course Search & Enroll. InterEGR 397 or PATH-BIO 370 will also count as a tech elective.	_____
_____	_____	_____	Ethnic Studies Course (minimum of 3 credits) Any course with an <i>Ethnic Studies</i> designation in in Course Search & Enroll.	_____
_____	_____	_____	Humanities Courses (minimum of 6 credits). Courses with a <i>Humanities</i> or <i>Literature</i> breadth designation in Course Search & Enroll.	_____
_____	_____	_____	Social Science Course (minimum of 3 credits) Any course with a <i>Social Science</i> breadth designation in Course Search & Enroll.	_____

CALS Bachelor of Science Degree Requirements

Each course taken to meet a CALS B.S. requirement can be used to meet a university general education requirement and/or a requirement of the major.

Crds	Sem/Yr Taken	Grd	Requirement	Course Taken to Meet Requirement
_____	_____	_____	International Studies Course (minimum of 3 credits). For a list of eligible courses see the Guide or CALS website.	_____
_____	_____	_____	First-Year Seminar Course (1 credit minimum). BSE 170 (2, S) preferred. For a list of eligible courses see the Guide or CALS website. Waived for students who transfer into CALS after freshman year.	_____

BSE Major Requirements Common to All Option Areas (Machinery Systems)

Crds	Sem/Yr Taken	Grd	Requirement	Course Taken to Meet Requirement
			MATH 221 (5) Calculus and Analytic Geometry	
			MATH 222 (4) Calculus and Analytic Geometry	
			MATH 234 (3) Calculus - Functions of Several Variables	
			MATH 320 (3) [recommended] Linear Algebra and Differential Equations (<i>pre-req</i> : MATH 222) or MATH 319 (3) Techniques in Ordinary Differential Equations (<i>pre-req</i> : MATH 222)	
			STAT 324 (3) (preferred) Introductory Applied Statistics for Engineers (<i>pre-req</i> : MATH 221) or other intro Statistics above 300	
			CHEM 109 (5) Advanced General Chemistry or CHEM 103 (4) General Chemistry and CHEM 104 (5) General Chemistry	
			BSE 380 Introductory Data Science for the Agricultural and Life Sciences (3, F) (preferred) or COMP SCI 310 (3,S) Problem Solving Using Computers (<i>pre-req</i> : MATH 222)	
			Biological Science Course: AGRON 100 (4,F) or DY SCI 101 (4,F) are preferred for Machinery Systems students and satisfy the Production Agriculture requirement. Any other Biological breadth course may be used if the PA requirement is met with Soil Sci 301. Additional credits may be counted as Cat D Technical Electives.	
			EMA 201 (3) Statics (<i>pre-req</i> : MATH 222)	
			PHYSICS 202 (5) General Physics (<i>pre-req</i> : MATH 211 or 221)	
			BSE 270 (3,F+Su) Intro to Computer Aided Design	
			Engineering Econ Course: BSE 310 Project Economics & Decision Analysis (3, S) (preferred) or ISYE 313 (3) Engineering Economic Analysis	
			BSE 249 (3, F) Engr. Principles for Biological Systems (<i>pre-req</i> : MATH 221), or CBE 250 (3) Process Synthesis (<i>pre-req</i> : Chem 329 or con reg). Note that CBE 250 is a prerequisite for CBE 310 and CBE 320 and must be taken by students who plan on enrolling in CBE 310 and CBE 320.	
			BSE 349 (3,S) Biological Concepts for Engineers (<i>pre-reqs</i> : MATH 222, CHEM 104 or 109, introductory biology course)	
			BSE 365 (3,S) Measurements and Instrumentation for Biological Systems (<i>pre-reqs</i> : full admission status)	
			BSE 308 (1,S) Career Management for Engineers	
			BSE 508 (2,S) Biological Systems Engineering Design Practicum I (<i>pre-req</i> : full admission status)	
			BSE 509 (3,F) Biological Systems Engineering Design Practicum II (<i>pre-reqs</i> : BSE 508, full admission status)	

BSE Major Requirements for the Machinery Systems Engineering Specialization

Crds	Sem/Yr Taken	Grd	Requirement	Course Taken to Meet Requirement
			BSE 475 (3,F) Engineering Principles-of Ag Machinery (<i>pre-reqs</i> : EMA 202 or ME 240, full admission status)	
			BSE 476 (3,S) Engr. Principles of Off-Road Vehicles (<i>pre-reqs</i> : ME 361, EMA 202 or ME 240, full admission status)	
			Production Agriculture Course: complete one of: AGRON 100 (4,F), DY SCI/AN SCI 101 (4,F) or SOIL SCI 301 (4,F). AGRON or DY SCI will also satisfy the Biological Sci requirement on p 1. [effective 2022]	
			ME 240 or EMA 202 (3) Dynamics (<i>pre-reqs</i> : EMA 201, MATH 222)	
			ME 306 (3) Mechanics of Materials (<i>pre-reqs</i> : EMA 201, MATH 222)	
			ME 307 (1) Mechanics of Materials Lab (<i>pre-reqs</i> : ME 306 or con reg)	
			ME 313 (3, S) Manufacturing Processes (<i>pre-reqs</i> : ME 306)	
			ME 342 (3) Design of Machine Elements (<i>pre-reqs</i> : ME 306)	
			ME 361 (3) Thermodynamics (<i>pre-reqs</i> : EMA 202, MATH 234)	
			ME 363 (3) Fluid Dynamics (<i>pre-reqs</i> : ME 361)	
			BSE Breadth Course. One course from the following: 367 (3,S+Su+F), 372 (2,F), 460 (3,S), 461 (3,F), 464 (3,S), 472 (3,S), 473 (3,F), 571 (3,S), 642 (2,S)	
			Category A Technical Electives. Introduction to Engineering Course: BSE 170 (2,S), INTEREGR 170 (3)	
			Category B Technical Electives. Independent Study/Instruction Courses: CALS or CoE courses with a 001, 299, 399, or 699 course number. No more than 3 credits of coursework allowed in this category.	
			Category C Technical Electives. Upper-Level Engineering and Science Courses: Upper-level engineering courses includes engineering courses with a 300 or greater course number, any BSE courses not taken to meet other curricular requirements, and EMA 202 (or ME 240) when not taken to meet another curricular requirement. Upper-level science courses includes all advanced level courses with a biological, natural and/or physical science breadth designation plus CHEM 341, 342, 343, 344, 345, 421 and AGRONOMY/ASM OCN/SOIL SCI 532. Independent study/instruction courses (BSE or otherwise) cannot be included in this category.	
			Category D Technical Electives. Lower-Level Science and Engineering Courses, Breadth Courses: Elementary and intermediate biological, natural and physical science courses except elementary and intermediate math courses; CoE courses with a 100 or 200 level designation; CALS 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 allowed in this category.	

TOTAL credits in machinery systems engineering specialization area must be no less than **43**

Free Electives

Crds	Sem/Yr Taken	Grade	Course

_____ TOTAL for Degree – Minimum 125 Credits Required (no course can be counted twice)

To be admitted to the degree-granting designation of ABE (biological systems engineering), a student must have:

1. A minimum of 24 degree credits.
2. A minimum of 17 graded credits of calculus, statistics, chemistry, biology, computer science, statics and physics courses required for a BSE degree. Advanced Placement credits cannot be counted.
3. A BSE *Math and Science Grade Point Average* (MSGPA) of at least 2.65 with a minimum grade of C in every course used to calculate the MSGPA. The MSGPA is based on the following (and only the following) courses: all math courses 217 and above (except Math 228); statistics courses 224 and above; all chemistry courses (i.e., all CHEM courses); up to three biology courses (i.e., any courses with a UW-Madison "Biological" breadth designation); computer science courses 302 and above (except CS 402); EMA 201; and Physics courses 201 and above. For any course that a student repeats, only the most recent grade will be used in the calculation. Any transfer course from another university that is included in the previous list must be included in the GPA calculation. There is no limit on the number of courses a student can retake or on the number of times a student can retake a specific course.
4. Successful completion of introductory chemistry (Chem 103/104 or 109 or equivalent) and math through Math 222.

Four Year Road Map Machinery Systems Engineering Specialization

Yr	Sem.	Course	X	Crds	Sem. Total
1	Fall	MATH 221 <i>Calculus and Analytic Geometry</i>		5	16
		Ethnic Studies/International Studies/Humanities/Social Science		3	
		CHEM 109 <i>Advanced General Chemistry*</i>		5	
		LSC 100 <i>Science and Storytelling</i> or other Comm A course		3	
1	Spring	MATH 222 <i>Calculus and Analytic Geometry</i>		4	15
		Biological Science Course		3	
		BSE 380 <i>Introductory Data Science for the Agricultural & Life Sciences</i>		3	
		BSE 170 <i>Product Design Practicum</i>		2	
		Ethnic Studies/International Studies/Humanities/Social Science		3	
2	Fall	MATH 234 <i>Calculus - Functions of Several Variables</i>		4	16
		EMA 201 <i>Statics</i>		3	
		BSE 249 <i>Engineering Principles for Biological Systems</i>		3	
		PHYSICS 202 <i>General Physics</i>		5	
		Ethnic Studies/International Studies/Humanities/Social Science		3	
2	Spring	BSE 349 <i>Biological Concepts for Engineers</i>		3	17
		BSE 308 <i>Career Management for Engineers</i>		1	
		EMA 202 <i>Dynamics (or ME 240)</i>		3	
		ME 361 <i>Thermodynamics</i>		3	
		ME 306 <i>Mechanics of Materials</i>		3	
		ME 307 <i>Mechanics of Materials Lab</i>		1	
		STAT 324 <i>Introductory Applied Statistics for Engineers</i>		3	
3	Fall	MATH 320 <i>Linear Algebra and Differential Equations</i>		3	15
		BSE 270 <i>Introduction to Computer Aided Design</i>		3	
		BSE 475 <i>Engineering Principles of Agricultural Machines</i>		3	
		ME 363 <i>Fluid Dynamics</i>		3	
		BSE 310 <i>Project Economics and Decision Analysis</i>		3	
3	Spring	InterEGR 397 <i>Engineering Comm.</i> or other Comm B course		3	17
		BSE 476 <i>Engineering Principles of Off-Road Vehicles</i>		3	
		BSE 508 <i>Biological Systems Engineering Design Practicum I</i>		2	
		ME 313 <i>Manufacturing Processes</i>		3	
		ME 340 <i>Dynamic Systems</i>		3	
		BSE 365 <i>Measurements and Instrumentation for Bio Systems</i>		3	
4	Fall	BSE 509 <i>Biological Systems Engineering Design Practicum II</i>		3	14
		ME 342 <i>Design of Machine Elements</i>		3	
		Technical Electives		5	
		BSE Breadth Requirement Course		3	
4	Spring	Technical Electives		8	15
		Humanities/Social Science/Ethnic Studies/International Studies		6	
		Free Electives		3	
				Total	125

Notes: Need 125 credits to complete degree. If Chemistry 103 & 104 is taken in place of Chemistry 109, it is suggested to take Chemistry 103 in Fall semester and Chemistry 104 in Spring semester of year 1.