

2021 CHECKLIST: Biological Systems Engineering: Nat. Res.

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 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 (Natural Resources)

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: ZOOLOGY 151 (5), ZOOLOGY 153 (3), BOTANY 130 (5), ZOOLOGY 101 (3), MICROBIO 101 (3), MICROBIO 303 (3), or any other MICROBIO breadth course. Credits taken above 3 may be counted as Category D Technical Electives.	
			E M A 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 217), or CBE 250 (3) Process Synthesis (<i>pre-reqs</i> : Chem 329 or Chem 343 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-req</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 Natural Resources & Environment Engr. Specialization

Crds	Sem/Yr Taken	Grd	Requirement	Course Taken to Meet Requirement
			BSE 201 (1,F) Land Surveying Fundamentals [BSE 301(3,F) eff 2022]	
			BSE 372 (2,F) On-Site Waste Water Treatment	
			BSE 472 (3,S) Sediment & Bio-Nutrient Engineering & Management	
			BSE 473 (3,F) Irrigation and Drainage System Design	
			BSE 571 (3,S) Small Watershed Engineering	
			SOIL SCI 230 (3,S) Soil: Ecosystem and Resource, or SOIL SCI 301 (4,F) General Soil Science (<i>pre-req:</i> CHEM 103)	
			EMA 303 (3) or ME 306 (3) Mechanics of Materials (<i>pre-reqs:</i> EMA 201, MATH 222)	
			CIV ENGR 310 (3) Fluid Mechanics (<i>pre-reqs:</i> EMA 202, MATH 234), or ME 363 (3) Fluid Dynamics (<i>pre-reqs:</i> ME 361)	
			ME 361 (3) Thermodynamics (<i>pre-reqs:</i> EMA 202, MATH 234)	
			BSE Breadth Course. One course from the following: 367 (3,S+Su+F), 460 (3,F), 461 (3,S), 464 (3,S), 475 (3,F), 476 (3,S), or 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 natural resources & environment engineering specialization area must be no less than **43**

Four Year Road Map

Natural Resources and Environmental Engr 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
		Soil Sci 230 <i>Soil: Ecosystem and Resource</i>		3	
		BSE 170 <i>Product Design Practicum</i>		2	
		BSE 380 <i>Introductory Data Science for the Agricultural & Life Sciences</i>		3	
		Biological Science Course		3	
2	Fall	MATH 234 <i>Calculus - Functions of Several Variables</i>		4	17
		E M A 201 <i>Statics</i>		3	
		BSE 201 <i>Land Surveying Fundamentals</i> (BSE 301 eff 2022)		1	
		BSE 249 <i>Engineering Principles for Biological Systems</i>		3	
		BSE 270 <i>Introduction to Computer Aided Design</i>		3	
		Ethnic Studies/International Studies/ Humanities/Social Science		3	
2	Spring	BSE 349 <i>Biological Concepts for Engineers</i>		3	15
		PHYSICS 202 <i>General Physics</i>		5	
		BSE 472 <i>Sediment & Bio-Nutrient Engr. & Management</i>		3	
		STAT 324 <i>Introductory Applied Statistics for Engineers</i>		3	
		BSE 308 <i>Career Management for Engineers</i>		1	
3	Fall	MATH 320 <i>Linear Algebra and Differential Equations</i>		3	16
		BSE 310 <i>Project Economics and Decision Analysis</i>		3	
		CIV ENGR 310 <i>Fluid Mechanics</i>		3	
		BSE 372 <i>On-Site Waste Water Treatment</i>		2	
		BSE 473 <i>Irrigation and Drainage System Design</i>		2	
		Technical Elective		3	
3	Spring	E P D 397 <i>Technical Comm.</i> or other Comm B course		3	17
		BSE 508 <i>Biological Systems Engineering Design Practicum I</i>		2	
		E M A 303 <i>Mechanics of Materials</i>		3	
		BSE 571 <i>Small Watershed Engineering</i>		3	
		BSE 365 <i>Measurements and Instrumentation for Bio Systems</i>		3	
		Humanities/Social Science/Ethnic Studies/International Studies		3	
4	Fall	BSE 509 <i>Biological Systems Engineering Design Practicum II</i>		3	15
		M E 361 <i>Thermodynamics</i>		3	
		Technical Elective		3	
		BSE Breadth Requirement Course		3	
		Humanities/Social Science/Ethnic Studies/International Studies		3	
4	Spring	Technical Electives		6	15
		Humanities/Social Science/Ethnic Studies/International Studies		6	
		Free Elective		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, and move Biological Science to the fall semester of year 2. Soil Sci 301 is offered Fall semesters and is a 4 credit alternative to Soil Sci 230.