Department of Agricultural and Biosystems Engineering - North Dakota State University **AGRICULTURAL ENGINEERING CONCENTRATION CURRICULUM GUIDE - FALL 2023***

Advisor

Student ID#

FALL SPRING General Education Electives 300 See www.ndsu.edu/registrar/gened for approved courses. Gen Gen /400 /400 Crs Course Crs Course Grade Grade Ed Ed Level² Gen Ed Course Grade Level² Crs **ABEN 110** Introduction to ABEN 3 **ABEN 348** Ag Technology Expo Α ENGR 327 3 CHEM 121 General Chemistry I ME 212 3 3 Fund.of Visual Communication Α S 3 ENGL 110³ College Composition I С ME 221 Engineering Mechanics 1 3 В 3 MATH 165 Calculus I R CHEM 122 General Chemistry II 3 S В 3 CHEM/BIO Elective (see side bar and back) 3 С С 3 3 **ENGL 120** College Composition II D (Double-count with A or B) ENGR 327 **MATH 166** 4 Calculus II 3 G ● (Double-count with A or B above) 3 17 16 W Biomaterials Processing ABEN 255 Comp. Aided Analysis/Design **ABEN 263** 3 **General Education Categories:** С **PHYS 252** COMM 110 Fund Public Speaking Univ Physics II 4 S 3 G - Global Perspectives • A - Humanities/Fine Arts Engineering Mechanics II L - Co-requisite Lab ME 222 3 PHYS 252L Univ Physics II Lab B - Social/Behavioral Sciences R - Quantitative Reasoning C - Communication ME 223 Mechanics of Materials 3 MATH 266 Intro Diff Equations 3 D - Cultural Diversity S - Science & Technology MATH 259 Multivariate Calculus 3 ME 350 3 Thermodynamics 3 MATH 128 Intro to Linear Algebra Computer Elective (see back) 3 W Gen Ed Elective (see side bar) 2 **Program Electives** 18 17 Select courses in consultation with your advisor Crs Grade IME 460 Eval Engr Data (or STAT 330) 3 3 **ABEN 377** Modeling in ABEN 3 3 Course CE 309 Fluid Mechanics (or ME 352) ABEN 482 Inst and Measurement 3 3 3 3 ABEN Electives - 9 cr. req ABEN 358 Elecric Energy Appl in Ag ENGL 320, 321, 324, or 459 Intensive Writing 3 3 С 3 ABEN 391 Seminar 1 ABEN Elective (see side bar and back) CHEM/BIO Elective (see side bar and back) 3 ABEN Elective (see side bar and back) 3 Gen Ed Elective (see side bar) 3 A/B CHEM/BIO/ENVIRO Science Electives⁴ - 9 cr. req Complete your Degree Audit this semester 16 ABEN 487 Design Project I ABEN 486 Design Project I 2 2 ENGR 327 Ethics, Engr, & Tech A/D 3 3 Tech Elective (see side bar and back) 3 Engineering Economy CHEM/BIO Elective (see side bar and back) 2 2 3 Tech Electives - 8 cr. req ABEN Elective (see side bar and back) 3 Gen Ed Elective (see side bar) 3 A/B Tech Elective (see side bar and back) 5 Gen Ed Elective (see side bar) 3 A/B Business or Communication Elective (see pg 2) 3 Complete your Application for Graduation by 3rd week of 17 15 Adv Biosciences - 9 cr. req (double-count with Electives above)⁵ Minimum Degree Total The last 30 credits must be earned in residence at NDSU.

Student:

- ¹ Use this column to tally grades; use "T" for transfer courses and "IP" for courses currently in progress.
- 2 Use this column to tally 36 credits of 300/400 level courses required for graduation.
- ³ First year students with a composite ENGL ACT sub-score ≥ 18 should register for ENGL 120 (unless transfer credit for ENGL 120 is received). If ENGL 120 is completed with a grade of "C" or better, credits will be awarded for ENGL 110 with a passing grade (P). For more details on NDSU's English Placement process, go to https://bulletin.ndsu.edu/academic-policies/undergraduate-policies/english-and-math-placement/#englishplacement/text ABEN courses may not be used to fulfill CHEM/BIO/ENVIRO Science Electives.
- ⁵ A minimum of 3 credits must be from non-ABEN courses in the Advanced Bioscience Courses list on page 2.
- *As a student at NDSU, it is your responsibility to know the requirements of your degree. To ensure all degree requirements are met, meet with your academic advisor regularly and follow your Academic Requirements Report found on Campus Connection. Required ABEN courses are typically offered only once per year, ABEN electives are typically offered only once every two years, and all course offerings are subject to change.

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AGRICULTURAL ENGINEERING CURRICULUM GUIDE CONTINUED

The following electives are approved. Alternatives may be available with advisor approval.

Advanced Bioscience Courses

Select 9 credits from the courses listed below. At least 3 credits must be from non-ABEN courses. Additional courses may be available in consultation with your advisor; qualifying courses must have a biological science component with one or more prerequisites.

ABEN Courses eligible for Advanced Bioscience Courses						
Course #	Course Name	Cr.	Prerequisites			
ABEN 444	Transport Processes	3	ABEN 263, ME 352 or CE309, and MATH 266			
ABEN 452	Bioenvironmental Sys Design	3	CE 309 or ME 350			
ABEN 456	Biobased Energy	3	Junior standing in Engineering or Science			
ABEN 458	Process Engr for Food, Biofuels	3	Junior standing			
ABEN 464	Resource Conserv & Irrigation	4	CE 309			
ABEN 484	Drainage & Wetland Engr	3	CE 309 or SOIL 433			

	Soil Fertility & Fertilizers	3	SOIL 210, CHEM 121, CHEM 121L	
COII 251			OOIL 210, OFILIN 121, OFILIN 121L	
301L 331	Soil Ecology	3	SOIL 210	
SOIL 410	Soils and Land Use	3	SOIL 210, CHEM 121, CHEM 121L	
SOIL 444	Soil Genesis	3	SOIL 210	
SOIL 465	Soil & Plant Analysis	3	SOIL 210, CHEM 121, CHEM 121L	

PLSC Courses						
Course #	Course Name	Cr.	Prerequisites			
PLSC 320	Princ.of Forage Product	3	PLSC 110			
PLSC 335	Seed Tech & Production	2	PLSC 110			
PLSC 350	Sugarbeet Production	2	PLSC 110 or PLSC 210			
PLSC 411	Genomics	3	BIOL 150, STAT 330			
PLSC 431	Intermediate Genetics	3	PLSC 315			

ADD'L Options						
Course #	Course Name	Cr.	Prerequisites			
BIOL 364	General Ecology	3	BIOL 150 or BIOL 151			
BOT 380	Plant Physiology	3	BIOL 150			
ANSC 357	Animal Genetics	3	PLSC 315, STAT 330			
RNG 452	Geo Info Sys in Range Sci	3	RNG 336			
BOT 414	Plant Systematics	3	BIOL 151, BIOL 151L			

Suggested Computer Electives				
CE 212	Civil Engineering Graphic Comm.	3		
CSCI 122	Visual Basic	3		
CSCI 160	Computer Science I	4		
ECE 173	Introduction to Computing	3		
GEOG 455	Introduction to GIS	4		
IME 380	CAD/CAM for Manufacturing	3		
ME 213	Modeling of Engineering Systems	3		

S	Suggested Business or Communication Electives May count as GenEd D or G, but not A or B.	
ACCT 102	Fundamentals of Accounting	3
ACCT 200	Elements of Accounting I	3
AGEC 242	Intro to Agricultural Mgmt	3
AGEC 244	Agricultural Marketing	3
AGEC 246	Intro to Agricultural Finance I	3
COMM 212	Interpersonal Comm	3
COMM 214	Persuasive Speaking	3
COMM 216	Interculutural Comm	3
COMM 260	Prin/Internet Web-Base Design	3
ECON 201	Principles of Microeconomics	3
ECON 202	Principles of Macroeconomics	3
MGMT 301	Mgmt for non-business majors	3
MRKT 301	Mrkt for non-business majors	3

AGRICULTURAL ENGINEERING CURRICULUM GUIDE CONTINUED

	The Agricult	ural Engineering concentration has three suggested ampha	ocic ar	0261	
	Machine Systems	ural Engineering concentration has three suggested empha Processing Systems	1515 at	Natural Resources and Environmental System	ms
	Select electives with emphasis on machine, power, structural and	Select electives with emphasis on combining engineering,		Select electives with emphasis on areas that contrib	
	electrical/electronic systems to solve problems involving engineering aspects of food, feed and fiber production.	biological, and physical sciences in the application of engineer principles to handling and processing of biomaterials for food a non-food products.		solving problems in environmental engineering, na resources management, hydrology, irrigation, drair watershed management, and waste manageme	atural nage,
	Course # Course Name Cr.	Course # Course Name	Cr.	Course # Course Name	Cr.
	ABEN 358 Electric Energy App in Ag 3	ABEN 358 Electric Energy App in Ag	3	ABEN 358 Electric Energy App in Ag	3
	ABEN 452 Bioenvironmental Systems Design 3	ABEN 444 Transport Processes	3	ABEN 444 Transport Processes	3
/es	ABEN 458 Process Engr for Food, Biofuels/products 3	ABEN 450 Bioprocess Engineering	3	ABEN 452 Bioenvironmental Systems Design	3
ABEN Electives	ABEN 464 Resource Conservation & Irrigation 4	ABEN 452 Bioenvironmental Systems Design	3	ABEN 458 Process Engr for Food, Biofuels/prod.	3
음	ABEN 473 Agricultural Power 3	ABEN 456 Biobased Energy	3	ABEN 464 Resource Conservation & Irrigation	4
N N	ABEN 478 Machinery Analysis & Design 3	ABEN 458 Process Engr for Food, Biofuels/products	3	ABEN 484 Drainage & Wetland Engineering	3
AE	ABEN 479 Fluid Power Systems Design 3				
	ASM/SOIL/NRM 264 Natural Resource Mgmt Syst. 3	ASM/SOIL/NRM 264 Natural Resource Mgmt Syst.	3	ASM/SOIL/NRM 264 Natural Resource Mgmt Syst.	3
	ANSC 220 Livestock Production 3	BIOL 111/L Concepts of Biology/Lab	3/1	BIOL 111/L Concepts of Biology/Lab	3/1
	ENT 210 Insects, Humans & the Environment 3	BIOL 124/L Environmental Science/Lab	3/1	BIOL 124/L Environmental Science/Lab	3/1
	NRM 322 Environmental Law & Policy 3	BIOL 150/L General Biology I/Lab	3/1	BIOL 150/L General Biology I/Lab	3/1
/es	PLSC 110 World Food Crops 3	BIOL 151/L General Biology II/Lab	3/1	BIOL 151/L General Biology II/Lab	3/1
ectiv	PLSC 215 Weed Identification 1 PLSC 225 Principles of Crop Production 3	CFS 210 Introduction to Food Science & Tech CFS 370 Food Processing I	2	CHEM 121L General Chemistry I Lab	3/1
Ä	PLSC 225 Principles of Crop Production 3 PLSC 320 Principles of Forage Production 3	CFS 370 Food Processing I CFS 450 Cereal Technology	3	CHEM 122L General Chemistry II Lab CHEM 240 Survey of Organic Chemistry	3/1
juce	PLSC 320 Principles of Forage Production 3 PLSC 323 Principles of Weed Science 2	CHEM 121L General Chemistry I Lab	1	ENT 210 Insects, Humans & the Environ.	3
Scie	PLSC 335 Seed Technology & Production 3	CHEM 122L General Chemistry I Lab	1	NRM 322 Environmental Law & Policy	3/1
mical/Biological/Environmental Science Electives	SOIL 210 Intoduction to Soil Science 3	CHEM 240 Survey of Organic Chemistry	3	MICR 202/L Introduction Microbiology/Lab	3/1
nen	SOIL 217 Introduction to Meterology & Climatology 3	MICR 202/L Introduction Microbiology/Lab	3/1	MICR 350/L General Microbiology/Lab	3/1
uu o	SOIL 410 Soils and Land Use 3	MICR 350/L General Microbiology/Lab	3/1	PLSC 110 World Food Crops	3
P.	SOIL 480 Soils and Pollution 3	NRM 322 Environmental Law & Policy	3	PLSC 215 Weed Indentification	1
Ę.		PLSC 110 World Food Crops	3	PLSC 225 Principles of Crop Production	3
gica		PLSC 215 Weed Identification	1	PLSC 315 Genetics	3
olo		PLSC 225 Principles of Crop Production PLSC 315 Genetics	3	PLSC 320 Principles of Forage Production PLSC 323 Principles of Weed Science	3
JE/Bi		RNG 225 Natural Resource & Agro-Ecosystems	3	PLSC 335 Seed Technology & Production	2
cal/		SOIL 210 Intoduction to Soil Science	3	RNG 225 Nat. Resource & Agro-Ecosystems	3
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hemic		SOIL 410 Soils and Land Use	3	SOIL 210 Intoduction to Soil Science	3
Chemic		SOIL 410 Soils and Land Use SOIL 480 Soils and Pollution	3	SOIL 217 Intro to Meterology & Climatology	3
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Notes

Projected ABEN Course Offerings								
Semester	Requ	uired	Elective		Graduate			
Fall	110-3	486-2	358-3	473-3	658-3	679-3		
ODD	255-3		458-3	479-3	673-3	765-3		
Years					790-1			
Spring	263-3	482-3	45	456-3		682-3		
EVEN	377-3	487-2	444-3		656-3	758-3		
Years		391-1	478-3		678-3			
Fall	110-3	486-2	358-3	473-3	652-3	684-3		
EVEN	255-3		452-3	479-3	673-3	747-3		
Years			484-3		679-3	790-1		
Spring	263-3	482-3	444-3	464-4	644-3	682-3		
ODD	377-3	487-2	478-3		664-4	750-3		
Years		391-1			678-3	758-3		

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