

Department of Agricultural and Biosystems Engineering - North Dakota State University

AGRICULTURAL ENGINEERING CONCENTRATION CURRICULUM GUIDE - FALL 2022\*

Student: \_\_\_\_\_ Student ID # \_\_\_\_\_ Advisor \_\_\_\_\_

	FALL					SPRING					General Education Electives			
	Course	Crs	Grade <sup>1</sup>	300 /400 Level <sup>2</sup>	Gen Ed	Course	Crs	Grade <sup>1</sup>	300 /400 Level <sup>2</sup>	Gen Ed	Gen Ed	Course	Crs	Grade
Freshman (<27 crs)	ABEN 110 Introduction to ABEN	3				ABEN 348 Ag Technology Expo	1		1		A	ENGR 327	3	
	CHEM 121 General Chemistry I	3			S	ME 212 Fund.of Visual Communication	3				A		3	
	ENGL 110 <sup>3</sup> College Composition I	3			C	ME 221 Engineering Mechanics 1	3				B		3	
	MATH 165 Calculus I	4			R	CHEM 122 General Chemistry II	3			S	B		3	
	CHEM/BIO Elective (see side bar and back)	3				ENGL 120 College Composition II	3			C	C		3	
						MATH 166 Calculus II	4				D ■ (Double-count with A or B above)		3	
Sophomore (27-59 crs)											G ● (Double-count with A or B above)		3	
		16					17				W		2	
	ABEN 255 Comp. Aided Analysis/Design	3				ABEN 263 Biomaterials Processing	3				<b>General Education Categories:</b> A - Humanities/Fine Arts B - Social/Behavioral Sciences C - Communication D - Cultural Diversity ■  G - Global Perspectives ● L - Co-requisite Lab R - Quantitative Reasoning S - Science & Technology W - Wellness			
	COMM 110 Fund Public Speaking	3			C	PHYS 252 Univ Physics II	4			S				
	ME 222 Engineering Mechanics II	3				PHYS 252L Univ Physics II Lab	1			L				
	ME 223 Mechanics of Materials	3				MATH 266 Intro Diff Equations	3							
Junior (60 - 89 crs)	MATH 259 Multivariate Calculus	3				ME 350 Thermodynamics	3		3					
	MATH 128 Intro to Linear Algebra	1				Computer Elective (see back)	3							
	Gen Ed Elective (see side bar)	2			W									
		18					17				<b>Program Electives</b> Select courses in consultation with your advisor.			
	IME 460 Eval Engr Data (or STAT 330)	3		3		ABEN 377 Modeling in ABEN	3		3					
	CE 309 Fluid Mechanics (or ME 352)	3		3		ABEN 482 Inst and Measurement	3		3					
Senior (90 + crs)	ENGL 320, 321, 324, or 459 Intensive Writing	3		3	C	ECE 301 Electrical Engineering I	3		3					
	ABEN Elective (see side bar and back)	3				ABEN 391 Seminar	1		1					
	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				
											<b>CHEM/BIO/ENVIRO Science Electives<sup>4</sup> - 9 cr. req</b>			
		15				*Complete your Degree Audit this semester	16							
	ABEN 486 Design Project I	2		2		ABEN 487 Design Project II	2		2					
	ENGR 327 Ethics, Engr, & Tech	3		3	A	Tech Elective (see side bar and back)	3							
	IME 440 Engineering Economy	2		2		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				
	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				<b>Tech Electives - 8 cr. req</b>			
											<b>Adv Biosciences - 9 cr. req (double-count with Electives above)<sup>5</sup></b>			
		15				*Complete your Application for Graduation by 3rd week of semester	17							

The last 30 credits must be earned in residence at NDSU.

<sup>1</sup> Use this column to tally grades; use "T" for transfer courses and "IP" for courses currently in progress.

<sup>2</sup> Use this column to tally 36 credits of 300/400 level courses required for graduation.

<sup>3</sup> 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/#englishplacementtext>

<sup>4</sup> ABEN courses may not be used to fulfill CHEM/BIO/ENVIRO Science Electives.

<sup>5</sup> 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.

Minimum Degree Total

131

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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 Courses				
Course #	Course Name	Cr.	Prerequisites	
SOIL 322	Soil Fertility & Fertilizers	3	SOIL 210, CHEM 121, CHEM 121L	
SOIL 351	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

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	Intercultural 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 Agricultural Engineering concentration has three suggested emphasis areas:																	
	Machine Systems						Processing Systems						Natural Resources and Environmental Systems					
	Select electives with emphasis on machine, power, structural and electrical/electronic systems to solve problems involving engineering aspects of food, feed and fiber production.						Select electives with emphasis on combining engineering, biological, and physical sciences in the application of engineering principles to handling and processing of biomaterials for food and non-food products.						Select electives with emphasis on areas that contribute to solving problems in environmental engineering, natural resources management, hydrology, irrigation, drainage, watershed management, and waste management.					
	Course #	Course Name	Cr.	Course #	Course Name	Cr.	Course #	Course Name	Cr.	Course #	Course Name	Cr.						
ABEN Electives	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 358	Electric Energy App in Ag	3						
	ABEN 452	Bioenvironmental Systems Design	3	ABEN 444	Transport Processes	3	ABEN 444	Transport Processes	3	ABEN 444	Transport Processes	3						
	ABEN 458	Process Engr for Food, Biofuels/products	3	ABEN 450	Bioprocess Engineering	3	ABEN 452	Bioenvironmental Systems Design	3	ABEN 452	Bioenvironmental Systems Design	3						
	ABEN 464	Resource Conservation & Irrigation	4	ABEN 452	Bioenvironmental Systems Design	3	ABEN 458	Process Engr for Food, Biofuels/prod.	3	ABEN 458	Process Engr for Food, Biofuels/prod.	3						
	ABEN 473	Agricultural Power	3	ABEN 456	Biobased Energy	3	ABEN 464	Resource Conservation & Irrigation	4	ABEN 464	Resource Conservation & Irrigation	4						
	ABEN 478	Machinery Analysis & Design	3	ABEN 458	Process Engr for Food, Biofuels/products	3	ABEN 484	Drainage & Wetland Engineering	3	ABEN 484	Drainage & Wetland Engineering	3						
	ABEN 479	Fluid Power Systems Design	3															
Chemical/Biological/Environmental Science Electives	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	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	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	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	BIOL 150/L	General Biology I/Lab	3/1						
	PLSC 110	World Food Crops	3	BIOL 151/L	General Biology II/Lab	3/1	BIOL 151/L	General Biology II/Lab	3/1	BIOL 151/L	General Biology II/Lab	3/1						
	PLSC 215	Weed Identification	1	CFS 210	Introduction to Food Science & Tech	2	CHEM 121L	General Chemistry I Lab	3/1	CHEM 121L	General Chemistry I Lab	3/1						
	PLSC 225	Principles of Crop Production	3	CFS 370	Food Processing I	3	CHEM 122L	General Chemistry II Lab	3/1	CHEM 122L	General Chemistry II Lab	3/1						
	PLSC 320	Principles of Forage Production	3	CFS 450	Cereal Technology	3	CHEM 240	Survey of Organic Chemistry	3	CHEM 240	Survey of Organic Chemistry	3						
	PLSC 323	Principles of Weed Science	2	CHEM 121L	General Chemistry I Lab	1	ENT 210	Insects, Humans & the Environ.	3	ENT 210	Insects, Humans & the Environ.	3						
	PLSC 335	Seed Technology & Production	3	CHEM 122L	General Chemistry II Lab	1	NRM 322	Environmental Law & Policy	3/1	NRM 322	Environmental Law & Policy	3/1						
	SOIL 210	Intoduction to Soil Science	3	CHEM 240	Survey of Organic Chemistry	3	MICR 202/L	Introduction Microbiology/Lab	3/1	MICR 202/L	Introduction Microbiology/Lab	3/1						
	SOIL 217	Introduction to Meterology & Climatology	3	MICR 202/L	Introduction Microbiology/Lab	3/1	MICR 350/L	General Microbiology/Lab	3/1	MICR 350/L	General Microbiology/Lab	3/1						
	SOIL 410	Soils and Land Use	3	MICR 350/L	General Microbiology/Lab	3/1	PLSC 110	World Food Crops	3	PLSC 110	World Food Crops	3						
	SOIL 480	Soils and Pollution	3	NRM 322	Environmental Law & Policy	3	PLSC 215	Weed Indentification	1	PLSC 215	Weed Indentification	1						
				PLSC 110	World Food Crops	3	PLSC 225	Principles of Crop Production	3	PLSC 225	Principles of Crop Production	3						
				PLSC 215	Weed Identification	1	PLSC 315	Genetics	3	PLSC 315	Genetics	3						
				PLSC 225	Principles of Crop Production	3	PLSC 320	Principles of Forage Production	3	PLSC 320	Principles of Forage Production	3						
				PLSC 315	Genetics	3	PLSC 323	Principles of Weed Science	3	PLSC 323	Principles of Weed Science	3						
				RNG 225	Natural Resource & Agro-Ecosystems	3	PLSC 335	Seed Technology & Production	2	PLSC 335	Seed Technology & Production	2						
				SOIL 210	Intoduction to Soil Science	3	RNG 225	Nat. Resource & Agro-Ecosystems	3	RNG 225	Nat. Resource & Agro-Ecosystems	3						
				SOIL 410	Soils and Land Use	3	SOIL 210	Intoduction to Soil Science	3	SOIL 210	Intoduction to Soil Science	3						
				SOIL 480	Soils and Pollution	3	SOIL 217	Intro to Meterology & Climatology	3	SOIL 217	Intro to Meterology & Climatology	3						
							SOIL 410	Soils and Land Use	3	SOIL 410	Soils and Land Use	3						
							SOIL 480	Soils and Pollution	3	SOIL 480	Soils and Pollution	3						

Notes

Projected ABEN Course Offerings					
Semester	Required		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	456-3		644-3 682-3
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