



**SOUTH DAKOTA BOARD OF REGENTS
ACADEMIC AFFAIRS FORMS**

Substantive Program Modification Form

UNIVERSITY:	SDSU
CURRENT PROGRAM DEGREE:	Bachelor of Science (B.S.)
CURRENT PROGRAM MAJOR/MINOR:	Agricultural Systems Technology
CURRENT SPECIALIZATION:	N/A
CIP CODE:	01.0201
UNIVERSITY DEPARTMENT:	Agricultural & Biosystems Engineering
BANNER DEPARTMENT CODE:	SABG
UNIVERSITY COLLEGE:	Agricultural, Food & Environmental Sciences
BANNER COLLEGE CODE:	3F

University Approval

To the Board of Regents and the Executive Director: I certify that I have read this proposal, that I believe it to be accurate, and that it has been evaluated and approved as provided by university policy.

Dennis D. Hedge

Vice President of Academic Affairs or
President of the University

3/28/2024

Date

1. This modification addresses a change in:

- | | |
|--|---|
| <input checked="" type="checkbox"/> Total credits required within the discipline | <input checked="" type="checkbox"/> Total credits of supportive course work |
| <input checked="" type="checkbox"/> Total credits of elective course work | <input type="checkbox"/> Total credits required for program |
| <input type="checkbox"/> Program name | <input type="checkbox"/> Existing specialization |
| <input type="checkbox"/> CIP Code | <input type="checkbox"/> Other (explain below) |
| <input type="checkbox"/> Modification requiring Board of Regents approval
<i>Must have prior approval from Executive Director or designee</i> | |

2. Effective date of change: 2024-2025 Academic Year

3. Program Degree Level:

Associate Bachelor's Master's Doctoral

4. Category:

Certificate Specialization Minor Major

5. If a name change is proposed, the change will occur:

- On the effective date for all students
 On the effective date for students new to the program (enrolled students will graduate from existing program)

Proposed new name:

6. Is the program being modified associated with a current articulation agreement?

Yes No

a. If yes, will the articulation agreement need to be updated with the partner

institution following the approve of the program change? Please explain:

7. Primary Aspects of the Modification:

Existing Curriculum

Proposed Curriculum (highlight changes)

Pref.	Num.	Title	Cr. Hrs.	Pref.	Num.	Title	Cr. Hrs.
Systems General Education Requirements			32	Systems General Education Requirements			32
Systems General Education Requirements - Electives			18	Systems General Education Requirements - Electives			18
		SGR #1	3			SGR #1	3
		SGR #1	3			SGR #1	3
		SGR #2	3			SGR #2	3
		SGR #3	3			SGR #3	3
		SGR #4	3			SGR #4	3
		SGR #4	3			SGR #4	3
Systems General Education Requirements - Required			14	Systems General Education Requirements - Required			14
ECON	201	Principles of Microeconomics (SGR #3)	3	ECON	201	Principles of Microeconomics (SGR #3)	3
MATH	114	College Algebra (SGR #5)	3	MATH	114	College Algebra (SGR #5)	3
PHYS	101	Survey of Physics (SGR #6)	3	PHYS	101	Survey of Physics (SGR #6)	3
PHYS	101L	Survey of Physics Lab (SGR #6)	1	PHYS	101L	Survey of Physics Lab (SGR #6)	1
CHEM OR CHEM	106- 106L 112- 112L	Chemistry Survey & Lab (SGR #6) (3,1) General Chemistry I & Lab (SGR #6) (3,1)	4	CHEM OR CHEM	106- 106L 112- 112L	Chemistry Survey & Lab (SGR #6) (3,1) General Chemistry I & Lab (SGR #6) (3,1)	4
Major Requirements			88	Major Requirements			80
ACCT	210	Principles of Accounting I	3	ACCT	210	Principles of Accounting I	3
				AGED	274	Agribusiness Sales	3
AST	119	First Year Seminar	1	AST	119	First Year Seminar	1
AST	273	Agricultural Computer Applications	3	AST	273	Agricultural Computer Applications	3
				AST	313	Farm Machinery Systems Mgmt	2
				AST	313L	Farm Machinery Systems Mgmt Lab	1
AST	333	Soil and Water Mechanics & Lab	2	AST	333	Soil and Water Mechanics & Lab	2
AST	333L	Soil and Water Mechanics & Lab	1	AST	333L	Soil and Water Mechanics & Lab	1
AST	342	Applied Electricity	2	AST	342	Applied Electricity	2
AST	342L	Applied Electricity Lab	1	AST	342L	Applied Electricity Lab	1
AST	390	Seminar	1	AST	390	Seminar	1
AST	412	Fluid Power Technology	2	AST	412	Fluid Power Technology	2
AST	412L	Fluid Power Technology Lab	1	AST	412L	Fluid Power Technology Lab	1
AST	423	Rural Structures	2	AST	423	Rural Structures	2
AST	423L	Rural Structures Lab	1	AST	423L	Rural Structures Lab	1
AST	426	Technology Applications for Precision Agriculture	2	AST	426	Technology Applications for Precision Agriculture	2
AST	426L	Technology Applications for Precision Agriculture Lab	1	AST	426L	Technology Applications for Precision Agriculture Lab	1
AST	443	Food Processing and Engineering Fundamentals	2	AST	443	Food Processing and Engineering Fundamentals	2
AST	443L	Food Processing and Engineering Fundamentals Lab	1	AST	443L	Food Processing and Engineering Fundamentals Lab	1
AST	463	Agricultural Waste Management	3	AST	463	Agricultural Waste Management	3
AST OR AST	494	Internship (1)	1	AST OR AST	494	Internship (1)	1
AST OR AST	496	Field Experience (1)		AST OR AST	496	Field Experience (1)	
AST	497	Cooperative Experience (1)		AST	497	Cooperative Experience (1)	
AST OR AST	213- 213L 313- 313L	Ag, Industrial & Outdoor Power & Lab (2,1) Farm Machinery Systems Management & Lab (2,1)	3	AST OR AST	213- 213L 313 313L	Ag, Industrial & Outdoor Power & Lab (2,1) Farm Machinery Systems Mgmt & Lab	3
BIOL	101	Biology Survey I	2	BIOL	101	Biology Survey I	2
BIOL	101L	Biology Survey I Lab	1	BIOL	101L	Biology Survey I Lab	1
BLAW	350	Legal Environment of Business	3	BLAW	350	Legal Environment of Business	3
				FIN	280	Personal Finance	3

Existing Curriculum

Proposed Curriculum (highlight changes)

Pref.	Num.	Title	Cr. Hrs.	Pref.	Num.	Title	Cr. Hrs.
GE	121	Engineering Design Graphics I (1)	2	GE	121	Engineering Design Graphics I (1)	2
AND				AND			
GE	123	Computer Aided Drawing (1)		GE	123	Computer Aided Drawing (1)	
OR				OR			
PRAG	427	Precision Ag Data Mapping (2)		PRAG	427	Precision Ag Data Mapping (2)	
MATH	120	Trigonometry	3	MATH	120	Trigonometry	3
PRAG	203	Introduction to Precision Agriculture	2	PRAG	203	Introduction to Precision Agriculture	2
PRAG	203L	Introduction to Precision Agriculture Lab	1	PRAG	203L	Introduction to Precision Agriculture Lab	1
PRAG	340	Climate Risk Management with Precision Agriculture	3	PRAG	340	Climate Risk Management with Precision Agriculture	3
				PRAG	345	Principles and Implications of Chemical Application Systems	3
PS	103	Crop Production	2	PS	103	Crop Production	2
PS	103L	Crop Production Lab	1	PS	103L	Crop Production Lab	1
PS	213	Soils	2	PS	213	Soils	2
PS	213L	Soils Lab	1	PS	213L	Soils Lab	1
				STAT	281	Introduction to Statistics	3
				OR			
				MATH	120	Trigonometry	
		Technical Electives Select <u>32</u> credits from the following courses. It is strongly recommended that students choose one of the following emphasis areas.	32			Technical Electives Select <u>15</u> credits from the following courses. It is recommended, but not required that students choose one of the following emphasis areas.	15
		Business Emphasis				Business and Management Emphasis	
		Any 200 level or above selected from ACCT, AS, BADM, BLAW, DSCI, ECON, ENTR, FIN, MKTG, PS, STAT	3			Any 200 level or above selected from ACCT, AS, BADM, BLAW, DSCI, ECON, ENTR, FIN, MKTG, PS, STAT,	3
		Science electives selected from BIOL, CHEM, MICR, PHYS,	3			Science electives selected from BIOL, CHEM, MICR, PHYS,	3
				ACCT	210	Principles of Accounting I	3
AGEC	271	Farm and Ranch Management	3	AGEC	271	Farm and Ranch Management	3
AGEC	354	Agricultural Marketing and Prices	3	AGEC	354	Agricultural Marketing and Prices	3
AGEC	364	Introduction to Cooperatives	3	AGEC	364	Introduction To Cooperatives	3
AGEC	371	Agricultural Business Management	3	AGEC	371	Agricultural Business Management	3
				AGEC	430	Agribusiness Marketing & Prices	3
AGEC	454	Economics of Grain and Livestock Marketing	3	AGEC	454	Economics of Grain and Livestock Marketing	3
AGEC	471	Advanced Farm & Ranch Management	3	AGEC	471	Advanced Farm & Ranch Management	3
				AGEC	473	Rural Real Estate Appraisal	2
				AGEC	473L	Rural Real Estate Appraisal Lab	1
AGEC	478	Agricultural Finance	3	AGEC	478	Agricultural Finance	3
AGEC	479	Agricultural Policy	3	AGEC	479	Agricultural Policy	3
				AGEC	484	Trading In commodity Futures and Options	3
AGEC/ BLAW	352	Agricultural Law	3	AGEC/ BLAW	352	Agricultural Law	3
				BLAW	433	Real Estate	3
				BLAW	453	Principles and Procedures of Valuation	3
				ENTR	236	Innovation and Creativity	3
				ENTR	237	Entrepreneurship Development	3
				FIN	420	Student Managed Investment Fund	3
				HRM	460	Human Resource Management	3

Existing Curriculum

Proposed Curriculum (highlight changes)

Pref.	Num.	Title	Cr. Hrs.	Pref.	Num.	Title	Cr. Hrs.
				LDR	210	Foundations of Leadership	3
				LDR	435	Organizational Leadership and Team Development	3
MGMT	360	Organization and Management	3	MGMT	360	Organization and Management	3
				MKTG	370	Marketing	
				MKTG	474	Personal Selling	3
				OM	363	Introduction to Supply Chain Management	3
				OM	415	Logistics and Transportation Management	3
		Farm Operations Emphasis				Farm Operations Emphasis	
		Any 200 level or above courses from AGECE, AST, BADM, ACCT, AS, ECON, PS, ENTR	8-9			Any 200 level or above courses from AGECE, AST, BADM, ACCT, AS, ECON, PS, ENTR	8-9
		Science Electives selected from CHEM, PHYS, BIOL, MICR	3-4			Science Electives selected from CHEM, PHYS, BIOL, MICR	3-4
AGEC	271	Farm and Ranch Management	3	AGEC	271	Farm and Ranch Management	3
AGEC	354	Ag Marketing and Prices	3	AGEC	354	Ag Marketing and Prices	3
AS OR DS	101-101L 130-130L	Introduction to Animal Science & Lab (3,1) Introduction to Dairy Science & Lab (2,1)	3-4	AS OR DS	101-101L 130-130L	Introduction to Animal Science & Lab (3,1) Introduction to Dairy Science & Lab (2,1)	4
				DS	130	Introduction To Dairy Science	2
				DS	130L	Introduction To Dairy Science Lab	1
PRAG	423	Soil Fertility and Plant Nutrient Management	3	PRAG	423	Soil Fertility and Plant Nutrient Management	3
				PRAG	424	Wheat Production	2
				PRAG	425	Soybean Production	2
				PRAG	426	Corn Production	2
PRAG	440	Crop Management with Precision Farming	2	PRAG	440	Crop Management with Precision Farming	2
PRAG	440L	Crop Management with Precision Farming Lab	1	PRAG	440L	Crop Management with Precision Farming Lab	1
PS	223			PS	223	Principles of Plant Pathology	2
PS	223L			PS	223L	Principles of Plant Pathology Lab	1
				PS	313	Forage Crop and Pasture Management	3
				PS	345	Non-Chemical Weed Management	3
				PS	433	Field Crop Diseases and Management	3
PS OR PS	405 & 405L 407 & 407L	Entomology and Lab (2, 1) Insect Pest Management and Lab (2, 1)	3	PS OR PS	405 & 405L 407 & 407L	Entomology and Lab (2, 1) Insect Pest Management and Lab (2, 1)	3
				PS	407	Insect Pest Management	2
				PS	407L	Insect Pest Management Lab	1
				RANG	205	Intro To Range Management	2
				RANG	205L	Intro To Range Management Lab	1
				RANG	215	Intro To Integrated Ranch Management	3
		Precision Ag Emphasis				Precision Ag Emphasis	
		Any course 300 level or above selected from AST, CSC, ET, CEOG, PHYS, or PS	1			Any course 300 level or above selected from AST, CSC, ET, CEOG, PHYS, or PS	1
AST and AST	213, 213L	Ag, Industrial and Outdoor Power and Lab (credit 2, 1)	3	AST and AST OR	213, 213L	Ag, Industrial and Outdoor Power and Lab (credit 2, 1)	3

Existing Curriculum

Proposed Curriculum (highlight changes)

Pref.	Num.	Title	Cr. Hrs.	Pref.	Num.	Title	Cr. Hrs.
OR AST and AST	313, 313L	Farm Machinery Systems Mgmt and Lab (credit 2, 1)		AST and AST	313, 313L	Farm Machinery Systems Mgmt and Lab (credit 2, 1)	
CSC	130	Visual Basic Programming (COM)	3	CSC	130	Visual Basic Programming (COM)	3
ET	210	Introduction to electronic Systems	3	ET	210	Introduction to electronic Systems	3
ET	210L	Introduction to Electronic systems lab	1	ET	210L	Introduction to Electronic systems lab	1
ET	232	Digital Electronics and Microprocessors	3	ET	232	Digital Electronics and Microprocessors	3
ET	232L	Digital Electronics and Microprocessors Lab	1	ET	232L	Digital Electronics and Microprocessors Lab	1
ET	240	Techniques of Servicing	3	ET	240	Techniques of Servicing	3
GEOG	372	Introduction To GIS	2	GEOG	372	Introduction To GIS	2
GEOG	372L	Introduction To GIS Lab	1	GEOG	372L	Introduction To GIS Lab	1
GEOG	483	UAS Remote Sensing	2	GEOG	483	UAS Remote Sensing	2
GEOG	483L	UAS Remote Sensing Lab	1	GEOG	483L	UAS Remote Sensing Lab	1
PRAG	304	Electrical Diagnostics for Farm Machinery	2	PRAG	304	Electrical Diagnostics for Farm Machinery	2
PRAG	304L	Electrical Diagnostics for Farm Machinery Lab	1	PRAG	304L	Electrical Diagnostics for Farm Machinery Lab	1
PRAG	345	Principles and Implications of Chemical Application Systems	3	PRAG	345	Principles and Implications of Chemical Application Systems	3
PRAG	440	Crop Management with Precision farming	2	PRAG	440	Crop Management with Precision farming	2
PRAG	440L	Crop Management with Precision Farming lab	1	PRAG	440L	Crop Management with Precision Farming lab	1
STAT	281	Introduction to Statistics	3	STAT	281	Introduction to Statistics	3
		Processing Emphasis				Processing Emphasis	
ABE	444	Unit Operations of Biological Materials Processing	3	ABE	444	Unit Operations of Biological Materials Processing	3
ABE	444L	Unit Operations of Biological Materials Processing Lab	1	ABE	444L	Unit Operations of Biological Materials Processing Lab	1
AS OR DS	101- 101L 130- 130L	Introduction to Animal Science & Lab (3,1) Introduction to Dairy Science & Lab (2,1)	3-4	AS OR DS	101- 101L 130- 130L	Introduction to Animal Science & Lab (3,1) Introduction to Dairy Science & Lab (2,1)	3-4
AS	241	Introduction to Meat Science	2	AS	241	Introduction to Meat Science	2
AS	241L	Introduction to Meat Science Lab	1	AS	241L	Introduction to Meat Science Lab	1
AS	350	Meat Prod Safety/HACCP	3	AS	350	Meat Prod Safety/HACCP	3
DS	460	Dairy Product Processing I	4	DS	460	Dairy Product Processing I	4
DS	460L	Dairy Product Processing I Lab	1	DS	460L	Dairy Product Processing I Lab	1
DS	421	Dairy Plant Management	3	DS	421	Dairy Plant Management	3
DS	421L	Dairy Plant Management Lab	1	DS	421L	Dairy Plant Management Lab	1
MICR	231	General Microbiology	4	MICR	231	General Microbiology	4
MICR	231L	General Microbiology Lab	0	MICR	231L	General Microbiology Lab	0
MICR	311	Food Microbiology	2	MICR	311	Food Microbiology	2
MICR	311L	Food Microbiology Lab	2	MICR	311L	Food Microbiology Lab	2
PS	308	Grain Grading & Lab	1	PS	308	Grain Grading & Lab	1
PS	308L	Grain Grading Lab	1	PS	308L	Grain Grading Lab	1
						Product Testing & Validation Emphasis	
				ABE	234	Digital Tools for Agricultural and Biosystems Engineering	3

Existing Curriculum

Proposed Curriculum (highlight changes)

Pref.	Num.	Title	Cr. Hrs.	Pref.	Num.	Title	Cr. Hrs.
				AST	303	Design Management Experience	2
				AST	303L	Design Management Experience Lab	1
				ET	210	Introduction to Electronic Systems	3
				ET	210L	Introduction to Electronics Systems Lab	1
				ET	240	Introduction to Servicing	3
				ET	370	Data Acquisition	3
				ET	370L	Data Acquisition Lab	3
				GE	225	Survey of Machine Tool Applications	1
				GE	241	Applied Mechanics	3
				GE	265	Industrial Safety	3
				INFO	101	Introduction to Informatics	3
				PRAG	304	Electrical Diagnostics for Farm Machinery	2
				PRAG	304L	Electrical Diagnostics for Farm Machinery	1
				PS	345	Non-Chemical Weed Management	3
Electives			0	Electives			8
Summary of Credits in Agricultural Systems Technology (B.S.)							
System General Education Requirements			32	System General Education Requirements			32
Major Requirements			88	Major Requirements			80
Electives			0	Electives			8
Total number of hours required for major			102	Total number of hours required for major			94
Total number of hours required for degree			120	Total number of hours required for degree			120

8. Explanation of the Change:

The Department of Agricultural & Biosystems Engineering has reviewed the Agricultural Systems Technology major. The following changes were identified:

- Removed the Precision Ag emphasis. Currently within Agricultural Systems Technology, one of the emphasis areas students can choose to take courses from is the Precision Ag emphasis, which was created prior to the bachelor’s degree in Precision Agriculture was offered as an undergraduate degree. For the 2024-2025 catalog, the Precision Agriculture major will be adding emphasis areas. One of the three emphasis areas within the Precision Agriculture major will be machinery systems, this emphasis area is very similar to the current Precision Ag emphasis within AST. When discussing program offerings with potential undergraduate students visiting SDSU, a point of confusion is often the difference between an Agricultural Systems Technology major with the Precision Ag emphasis vs. a Precision Agriculture major. By realigning emphasis areas to better fit under the corresponding majors, the department will better serve students.
- Removed the Processing emphasis from Agricultural Systems Technology. This is primarily due to the lack of interest in that area. The program has not had an Agricultural Systems Technology student complete the Processing emphasis in numerous years. The AST program will continue to require AST 443-443L Food Processing and Engineering Fundamentals. This course gives a sufficient background in processing to prepare students for a career path in the processing industry. It is not uncommon for a graduate to gain employment at an Ethanol plant, soybean processing plant, or other processing facilities post-graduation, and the degree does prepare them for that career path.
- Added an emphasis area titled Product Testing and Validation. One area many students pursue careers is working with equipment manufacturers on the product testing. To better prepare graduates to be successful in these positions, this emphasis area has been designed to include

courses that will strengthen the student's ability to test newly designed, prototype machines. This emphasis area will also better prepare students for careers working with farm machinery at equipment dealerships, supporting the equipment that is utilized for all areas of crop and livestock production.

- Moved ACCT 210 Principles of Accounting I from a major requirement to the Business and Management Emphasis and replaced ACCT 210 with AGEC 274 Agribusiness Sales. AGEC 274 is a new course and aligns very closely with the skillsets required of an AST graduate. A large percentage of AST students obtain career paths that is directly or indirectly related to sales. This course will better prepare students to be successful in those career paths. ACCT 210 has been moved to the Business and Management emphasis as it aligns well with students seeking a strong business background.
- Rather than choosing AST 213-213L Ag, Industrial and Outdoor Power & Lab or AST 313-313L Farm Machinery Systems Management and Lab, students will now be required to take both courses. This requirement dates back many years, and as machinery systems and power systems have advanced, it is now essential students take both courses to prepare for a career in the farm machinery industry. Machinery has advanced and it is essential to the ag industry that our graduates have a strong background in this area to ensure adequate support of ag equipment.
- Added FIN 280 Personal Finance to Major Requirements. This course covers common topics such as real estate planning, health insurance, life insurance, etc. that all students need to understand, no matter what career path they choose.
- Removed the requirement that all students take MATH 120 Trigonometry and will now require students to choose from MATH 120 Trigonometry OR STAT 281 Introduction to Statistics. The emphasis areas allow students to take different paths, and this allows them to select a math course that best aligns with the chosen emphasis area.
- Required PRAG 345 Chemical Applications Systems in Agriculture. This course focuses on spray application systems and was created 5 years ago for the Precision Ag program. With its machinery focus, it is also essential that AST students complete this course.