

Assessment of Student Learning in the Agronomy-Ag Mechanics Division 2016 – 2017 Academic Year

Part 1 – Agronomy and Diversified Agriculture Program Learning Outcome Assessment

Students majoring in Agronomy or Diversified Agriculture are expected to meet the following learning outcomes upon completion of their degrees.

1. Students will be able to effectively communicate in oral and written form.
2. Students will be able to gather, assimilate, and process information to reach sound logical conclusions in their chosen career pathway.
3. Students will be able to apply economic principles of accounting, marketing and budgeting to agronomy enterprises.
4. Students will be able to exhibit required knowledge and skills consistent with their chosen field of study. (Technical Competence)
5. Learning outcome specific for the Agronomy Industry Management Option.
 - a. Students will be able to apply economically sound and environmentally sustainable agricultural crop production practices in the Great Plains.
6. Learning outcome specific for the Diversified Agriculture Option.
 - a. Students will be able to apply economically sound and environmentally sustainable crop and livestock production practices in the Great Plains.

Assessment of Agronomy and Diversified Agriculture program outcomes includes the following tools.

1. Course Competency
 - a. Technical knowledge is directly measured in several key courses.
2. Capstone Project
 - a. Students interested in having their own farm or diversified operation take the AGR 2943 Capstone course in which a farm/ranch business plan is developed. These business plans are assessed using a rubric based on program learning outcomes.
3. Internship Employer Surveys
 - a. The results from these surveys provide feedback on outcome number 4 (technical knowledge and skills) from the employer perspective.

Course Competency Summary for Assessing Agronomy and Diversified Ag Program Outcomes

Course competency is an important tool for assessing the following two program outcomes.

1. Students will be able to exhibit required knowledge and skills consistent with their chosen field of study. (Technical Competence)
2. Learning outcome specific for the Agronomy Industry Management Option.
 - a. Students will be able to apply economically sound and environmentally sustainable agricultural crop production practices in the Great Plains.

	AGR 1203 Principles of Soils	AGR 2303 Soil Fertility	AGR 2354 Pest Mgmt.	AGR 2383 Irrigation Mgmt.	AGR 2404 Crop Mgmt.	AEQ 2323 Precision Farming
# of Students	26	18	10	12	6	21
% of course outcomes met	86%	84%	90%	97%	100%	85%

Overall, students are meeting the outcomes in these courses that provide the essential knowledge and skill training in Agronomy. Some students are struggling with the chemical aspects of Principles of Soils and in Soil Fertility, which had the lowest overall success rate for the second straight year. Currently, agronomy and most diversified ag students are taking Plant Science for their problem solving general educational course. Therefore students are not taking Chemistry. In course changes are being implemented to improve in this area, but if a noticeable deficiency continues, a Chemistry course requirement may be necessary.

New precision farming software and planting equipment was added during the spring semester of 2016. The instructor of this course (Brad Ramsdale) will be attended a training conference from Ag Leader during summer 2016 in order to become more knowledgeable on teaching with the software. These results have had a positive impact on certain outcomes in the course. However, this group of students struggled with “big picture” applications in precision farming. Outcomes are being restructured to develop better assessment of more technical skills and applications in the course. Applied math problems continue to be a struggle for some students in Soil Fertility and Pest Management.

Capstone Project Assessment Summary for Agronomy and Diversified Agriculture Majors

Rubric Assessment Scale: 1 = Unsatisfactory, 2 = Needs growth, 3 = Satisfactory, 4 = Outstanding

	2010	2011	2012	2013	2014	2015	2016	2017
Number of Projects Evaluated*	9	3	9	8	11	10	4	13
Program Outcome								
1. Written Communication	3.3	2.7	3.0	3.1	2.9	3.1	3.5	3.0
2. Gather and assimilate information	2.6	3.3	3.1	3.0	3.2	3.1	3.5	3.2
3. Analyze, interpret and apply information	2.4	2.3	3.1	3.0	3.2	3.1	3.5	3.0
4. Apply economic principles to ag enterprises	2.2	2.3	3.2	3.0	2.9	3.1	3.5	3.1
5. Humane livestock management	2.5	2	3.2	2.5	2.0	2.5	--	3.1
6. Livestock waste and facility management	2.5	3	3.0	2.8	2.4	2.5	--	3.1
7. Livestock husbandry practices	2.5	3	3.0	3.2	2.0	3.1	--	3.0
8. Cultural practices are sustainable	2.5	3.5	3.3	3.0	3.2	3.0	3.8	3.0
9. Pest management practices are sustainable	2.7	3	3.3	2.8	2.9	3.1	3.8	3.0
10. Soil management practices are sustainable	2.7	3	3.3	2.8	2.8	2.8	3.8	3.0
11. Water management practices are sustainable	2.7	3	3.3	2.9	3.0	3.1	3.8	3.0

* Projects were either crop production only, livestock management only, or diversified; thus not every project was used for outcomes 5 to 11.

Discussion

The capstone projects are most effective in assessing the program outcomes 1 to 4 in the table above. Capstone projects continue to be strong and students are demonstrating the ability to combine multiple learning experiences into comprehensive farm/ranch business plans. The changes in the Diversified Agriculture curriculum to require a minimum of 3 courses in both agronomy and livestock management have initially resulted in more detailed diversified operation business plans than previously.

Use of Results to Improve Student Learning

Capstone project assessment does not indicate any major changes are necessary in curriculum.

Internship Employer Survey Results for Agronomy and Diversified Agriculture Majors

Scale: 5 = excellent, 4 = Above average, 3 = Average, 2 = Below Average, 1 = Very Poor

	Average 2011 to 2015	2016
Appearance	4.38	4.5
Dependability/Supervision	4.42	4.6
Cooperation/Attitude	4.20	4.6
Respect/Personality	4.34	4.9
Communication	3.87	4.3
Attendance/Punctuality	4.56	4.5
Quality of Work/Safety	4.33	4.4
Supervisory Ability/Leadership	3.82	3.8
Technical Knowledge	4.15	4.2
Overall Employability Rating	4.36	4.8
Total	4.24	4.46
Number of Students Evaluated	54	10

Discussion

Employer ratings for student interns continue to be very strong and do not raise any concerns regarding our educational programs. Overall employability of our students is rated at above average to excellent. Supervisory ability and leadership is generally the lowest rating, which would be expected for a student intern that is only 1 year into their college education. Communication skills were noticeably higher for this group of students indicating that our efforts across the curriculum are having a positive impact. Particularly, the new Learning Communities course structure.

Use of Results to Improve Student Learning

Since our programs are career driven, employer feedback is an important part of evaluating our students. The vast majority of employers acknowledge that they would hire the student permanently if available. Efforts will be continued in all classes to relate instructor-student communication to necessary career based communication.

Part 2 – Irrigation Technician Certificate

Program Student Learning Outcomes

- Students will gain a foundational knowledge in electricity and mechanized irrigation systems in order to effectively and safely service, repair, troubleshoot, and install center-pivot systems.
- Students will be able to interact professionally with colleagues and clients.

Assessment of Irrigation Technician Certificate

1. Course Competency
 - a. Technical knowledge is directly measured in several key courses.
2. Post-graduation surveys
 - a. Technical knowledge
 - b. Professionalism

Course Competency Summary

	AEQ 2801 Reinke Certification	AEQ 1501 Intro to Electric Code	AEQ 1503 DC Circuits	AEQ 1513 AC Circuits	AEQ 1172 Industrial Safety	AEQ 2404 Mechanized Irrigation
# of Students	8	9	14	13	10	8
% of outcomes met	100%	89%	79%	85%	100%	100%

Discussion and Changes to Improve Student Learning

Our Ag Mechanics instructor, Dan Stehlik, has continued to develop more hand's-on laboratory experiences for all courses. Students are completing the new Reinke Certification course with high success, which provides a good assessment of program based skills. Dan has done an excellent job identifying areas where he needs to expand his knowledge and has attended many professional development opportunities in these course topic areas. Basic electricity courses continue to be the area where students have struggled the most and Dan has continued to try new approaches to improve student learning in these courses.

Post-graduation surveys

We have now had 19 students complete the Irrigation Technician Certificate, but not all of these students are working in the industry. A post-graduation survey will be conducted after year 5 (2018-2019) of the program for further assessment.

Part 3 – Ag Chemical Application Certificate and Agricultural Welding Certificate

Both of these programs are just 1-year old, so limited assessment is available. An upgrade in welding equipment funded through an individual gift now allows for more comprehensive welding training for our students and the opportunity to pursue certification from the American Welding Society. One student successfully achieved the AWS certification in 2016.

The Ag Chemical Application Certificate has been made available to students at York High School through a special Dual Credit partnership. Industry support from Central Valley Ag Coop and Crossroads GPS have assisted in providing the necessary laboratory experiences. Twenty-eight different York High School Students have taken at least one dual credit course at NCTA since the program began in Fall 2015. Two students successfully completed the Ag Chemical Application Certificate in spring of 2017. The certificate was slightly revised in 2016 to add flexibility to the program, both on-campus and with the York HS partnership. Below is the current version with comments for the York HS program.

Agricultural Chemical Application Certificate

Required Courses		
AGR 2201	Commercial Ag Carrier*	1
AGR 2353	Pest Management	3
AEQ 2103	Ag Chemical Application	3
AEQ 2323	Precision Farming	3
<u>Advisor Guided Electives</u>		
A minimum of 2 AGR or AEQ courses.		6

Total Credit Hours 16

* Students come to NCTA for a 2-day workshop to complete the AGR 2201 Commercial Ag Carrier course

Part 4 – Assessment Driven Changes in Agronomy-Ag Mechanics

New Programs

A Certificate in Agriculture was developed and was approved by the Nebraska Coordinating Commission for Post-Secondary Education in June 2017. The certificate is designed to provide an introduction to crop and animal food production systems including a basic understanding of natural resource and agribusiness management. Courses will be delivered through online and dual credit methods. A plan of study will be structured so dual credit students would complete the certificate by high school graduation. Online delivery will target students at other post-secondary institutions without agriculture based curriculum, and could also benefit professionals desiring updates in these agricultural topic areas.

Focusing on dual credit students has several objectives: 1) providing agricultural education opportunities to secondary schools that do not have agricultural programs; 2) stimulate greater interest in agriculture and more students pursuing post-secondary agricultural degrees; 3) prepare students for more effective transitions to post-secondary degree programs in agriculture; and 4) increase the level of agricultural literacy and science literacy among non-agriculture majors.

Course	Credit Hours	Recommended Dual Credit Semester
AGR 1011 Agricultural Careers	1	Fall – Junior
AGR 1103 Crop Science	3	Fall – Junior
ASI 1303 Animal Management	3	Spring – Junior
AGR 1213 Natural Resource Management	3	Fall - Senior
ECN 1103 Intro to Agricultural Economics	3	Spring - Senior
Advisor Guided Elective	3	Fall or Spring Senior
TOTAL	16	

Curriculum Revisions

Minor revisions to descriptions and credit hours occurred for several courses. Industrial Safety was reduced from 2 to 1 credit hours as the instructor has documented that 1 credit hour is sufficient for covering the necessary material. This course is a required part of the Irrigation Technician Certificate. The laboratory section of Pest Management was moved to be included in the Ag Chemical Application course, thus reducing Pest Management by 1 credit hour. The new Ag Chemical Application course (3 credit hours) has been restructured to cover all aspects of applying fertilizers and pesticides safely and efficiently. It will also be the course that is used to prepare students for the Commercial Pesticide Applicators License, which was previously covered in a 1 credit hour course title Pesticide Certification. These changes were made to create a better student learning experience for Ag Chemical Application Certificate students.