

AGRN 372
CROP SCIENCE JUDGING
Fall 2019

I. General Information

AGRN 372 is a 1 s.h. lab. The purpose of the course is to prepare students to compete in regional and national crop judging contests. Skills to be gained include: identifying crops and crop pests; troubleshooting crop problems; and calculating agronomy, pest control and fertility scenarios. Two 1 hr labs per week.

Laboratory: M W, 4:00-4:50 p.m., KH 226

Instructor: Dr. Mark Bernards
321 Knoblauch Hall
Office: 309-298-1569
Mobile: 309-313-5917
Email: ml-bernards@wiu.edu

Office Hours: M 11:00-11:50 a.m.; W 11:00 a.m. -12:50 p.m., F 9:00-9:50 a.m. or by appointment

Reference Texts:

Gerber C, Smith KL. 2014. Corn & Soybean Field Guide. Purdue University Agricultural Communications, West Lafayette, IN

Martin JH, Waldren RP, Stamp DL. 2006. Principles of Field Crop Production, 4th ed. Pearson, Upper Saddle River, NJ.

Nafziger E. (Editor). 2009. Illinois Agronomy Handbook, 24th edition. University of Illinois Extension C1394. Available for download at <http://extension.cropsci.illinois.edu/handbook>

Sheaffer CC, Moncada KM. 2012. Introduction to Agronomy – Food, Crops and Environment, 2nd ed. Delmar, Clifton Park, NY.

Stoller P. 2006. Crop Sciences Laboratory Manual. ITCS Instructional Materials, University of Illinois, Champaign, Illinois.

Other readings will be made available from the professor, through Western Online, the Internet, or Course Reserve at the Malpass Library.

II. University Policies

Student rights and responsibilities: A complete description is available at www.wiu.edu/provost/students.

Disruptive Student Policy: Students who interfere with normal class function or the ability of other students to learn may be asked to leave the class for the day. For repeated offenses, a student may be removed from the course. Details may be found at: <http://www.wiu.edu/vpas/policies/disrupst.php>

Academic Integrity: <http://www.wiu.edu/policies/acintegrity.php> Western Illinois University, like all communities, functions best when its members treat one another with honesty, fairness, respect, and trust. . . It is the student's responsibility to be informed and to abide by all University regulations and policies on Academic Integrity. Plagiarism, cheating, and other forms of academic dishonesty constitute a serious violation of University conduct regulations. Students who engage in dishonesty in any form shall be charged with academic dishonesty. . . Any student, faculty member, or staff person who has witnessed an apparent act of student academic dishonesty, or has information that reasonably leads to the conclusion that such an act has occurred or has been attempted, has an ethical responsibility for reporting said act(s).

The policy for AGRN 372: Any confirmed act of academic dishonesty (especially plagiarism or cheating) will result in the loss of all points associated with that assignment, and may result in an "F" for the course.

Equal Opportunity: <http://www.wiu.edu/policies/affirmact.php> Western Illinois University complies fully with all applicable federal and state nondiscrimination laws, orders, and regulations. The University is committed to providing equal opportunity and an educational and work environment for its students, faculty, and staff that is free from discrimination based on sex, race, color, sexual orientation, gender identity and gender expression, religion, age, marital status, national origin, disability, or veteran status.

Sex-Discrimination and Misconduct: University values, Title IX, and other federal and state laws prohibit sex discrimination, including sexual assault/misconduct, dating/domestic violence, and stalking. If you, or someone you know, has been the victim of any of these offenses, we encourage you to report this to the Title IX Coordinator at 309-298-1977 or anonymously online at: http://www.wiu.edu/equal_opportunity_and_access/request_form/index.php. If you disclose an incident to a faculty member, the faculty member must notify the Title IX Coordinator. The complete Title IX policy is available at: <http://www.wiu.edu/vpas/policies/titleIX.php>

Disabilities: Students with disabilities: In accordance with University values and disability law, students with disabilities may request academic accommodations where there are aspects of a course that result in barriers to inclusion or accurate assessment of achievement. To file an official request for disability-related accommodations, please contact the Disability Resource Center at 309-298-2512, disability@wiu.edu or in 143 Memorial Hall. Please notify the instructor as soon as possible to ensure that this course is accessible to you in a timely manner.

Education Majors: The Illinois State Teaching license requires all education majors to receive a grade of a "C-" or better in this course in order to meet its requirements.

III. Course Expectations and Policies

1. Live the Golden Rule. Treat others with respect and courtesy in your conversation and actions. Turn off and put away electronic devices (phones, tablet computers, laptop computers, etc.) during the class period unless directed to use them for class activities. Inappropriate use of an electronic device will result in loss of participation points for that day.
2. Show up. Attendance and punctuality is expected. Notify the instructor in advance if you have any reason to miss a class period through the O.A.R.S system (<http://wiu.edu/oars>). A minimum of 24 h notice (email or phone) is required if there is any cause to miss a quiz or exam. If you do miss a class, do not ask the instructor "Did I miss anything important?" It is your responsibility to make arrangements to get the information you missed and to make up any missed assignments.
3. Participate. Be prepared for class discussions by completing readings, answering questions, taking notes, asking questions, and working effectively with other students on lecture and laboratory activities.
4. Study. You should plan to spend a minimum of 2 hours outside of class each week to master the material. Reading assignments relating to each lecture/lab will be particularly beneficial.
5. The use of tobacco is prohibited in Knoblauch Hall, nor is it allowed during sessions at the AFL.
6. Students must wear sturdy, close-toed to participate in lab sessions at the AFL. Wearing long pants is highly recommended.

IV. NACTA Crops Contest Description (Course Learning Objectives)

The contest will be divided into four areas with 600 total points as follows:

- a. Agronomic Quiz (150 points)
- b. Math Practical (150 points)
- c. Lab Practical (150 points)
- d. Plant and Seed Identification (150 points)

One hour will be allowed for completion of each section. Additional descriptions and specific rules for each section of the contest follow and will be considered official for the contest.

AGRONOMIC QUIZ

This section will consist of 75 written multiple-choice exam questions worth 2 points each for a total of 150 points. Both general and specific questions will be asked on production of major US grain and forage crops. The International Certified Crop Adviser (ICCA) Performance Objectives will provide an excellent outline of potential topics. They are available from the American Society of Agronomy, 5585 Guilford Road, Madison, WI 53711-5801 (608-273-8080) or online at:

<https://www.certifiedcropadviser.org/exams/icca-performance-objectives>

Topics may include:

- Crop production statistics (major world and U.S. crops) and distribution of US crops
- Crop classification terms (botanical, growth habit, crop utilization, etc.)
- Crop physiology, growth, and development
- Crop quality and quality evaluation, including typical levels for quality factors in various grain and forage crops
- Plant morphology and anatomy
- Plant breeding and genetics, including biotechnology and genetic engineering tools and applications
- Seed industry/technology (seed quality, certification, testing, processing, treatment, intellectual property rights, etc.)
- Planting (cultivar selection, seeding equipment, planting practices, seeding dates, replanting decisions, etc.)
- Pest problems and pest control (insects, diseases, and weeds, biology/life cycle of major crop pests)
- Pest management alternatives (IPM principles, pest scouting and monitoring, role of beneficial insects, etc.)
- Pesticide use (pesticide stewardship, safety, restrictions, formulations, trade/common names of major pesticides)
- Harvesting and storage of grain and forage crops and crop products
- Management of forage crops, including harvest factors and effects on forage quality
- Cropping systems and crop rotations
- Crop environment (light, temperature, and moisture effects on plants)
- Basic soil properties (physical, chemical, and biological)
- Soil fertility (nutrient availability, nutrient movement, plant needs for nutrients, soil pH, organic matter, etc.)
- Nutrient management (soil testing, soil test reports/recommendations, fertilizers and fertilization, liming, etc.)
- Soil water management (irrigation, drainage, erosion, leaching, evapotranspiration, conservation, etc.)
- Tillage and residue management (tillage systems, seedbed preparation, tillage tool selection, etc.)
- Site specific management concepts (GPS, GIS, VRT, grid sampling, field mapping, sensing technology)
- Weather and climatic effects on crop production and management decisions
- Biofuels and biomass production for bioenergy
- Carbon management in agriculture (greenhouse gases, carbon sequestration, carbon credits, global warming)

MATH PRACTICAL

This section will include mathematical problems related to agronomy. It will be scored on the basis of 150 total points. Answers must be rounded off and given in correct units as specified in the problem. Critical information will be given except for commonly known conversion factors. Possible types of problems are listed below:

- Area conversion calculations (Estimate per acre yield from harvest strips or small plots; Calculate areas and yields from irregularly shaped fields; Area covered and time required for given capacity and delivery rate of fertilizer/chemical applicator; Time to complete tillage/harvest operation given area of field, width of equipment, and speed of travel; Obtaining material and cost estimates for fencing materials for given field size, etc.)
- Pesticide application (Calibrate broadcast or band application given number of nozzles, nozzle spacing, output from one or more nozzles, and distance traveled or intended speed of travel; Find amount of chemical formulation to add to a spray tank to meet product or active ingredient label recommendations given tank size and delivery rate; Calculate costs of pesticide application, etc.)
- Fertilizer/lime application (Spreader calibration given amount delivered in a distance traveled or by turning the drive wheel; Fertilizer application rates given carrier analysis and recommended rates in elemental or oxide form or replacement of nutrients removed by the crop; Prepare bulk blends from given rates and available carriers; Calculate costs of fertilizer/lime application; Compare costs of different fertilizers/lime sources)
- Seeding/Planting (Calibration of row planter or grain drill given amount of seed delivered in a distance traveled or by turning the drive wheel a certain number of revolutions; Seeding rates, plant population, and percent seed emergence calculations; Adjusting seeding rates and comparing costs based on PLS)
 - Volume calculations (tank capacity, storage volume for hay, grain bin, or silo)
 - Unit conversions (English to metric units and vice versa)
 - Concentration (ppm, %)
 - Harvest (estimating harvest losses, harvest speed, area covered)
 - Irrigation (application rate for given PSI and GPM, convert gallons to acre-inches)
 - Labor requirements (hours/acre)
 - Pasture carrying capacity (stocking rates based on animal units)
 - Soil erosion loss equation
 - Soil physical properties (bulk density, % soil moisture, water retention in profile):
 - Plant breeding (heritability, % homozygosity, expected genotypic and phenotypic ratios from a cross)
 - Water usage (day, season, species differences)

LAB PRACTICAL

This section will consist of 75 stations worth 2 points each for a total of 150 points. Each station will have photographs or actual samples of various plant materials, fertilizers, pesticides, seed samples, data tables, equipment, insects, diseases, etc. along with specific questions which will require identification, interpretation, calculation, or evaluation of the display material to answer correctly. These stations will represent activities commonly completed in laboratories or field trips in crop production and soil management courses. For example, contestants may have to:

- Identify common crop diseases and disease symptoms (see attached list – copy of list will be provided during contest)
- Identify common crop insects and insect damage (see attached list – copy of list will be provided during contest)
- Identify common field machinery and other agronomic equipment (see attached list – copy of list will be provided during contest)
- Recognize classes of pedigreed seed from standard seed tags and interpret information from a seed bag (germination, purity, seed size, noxious weeds, variety or hybrid identification, genetically modified traits, refuge requirements, treatments applied, recommended seeding rates, planter adjustments, etc.)
- Write the commercial grade and grade determining factors for market grain samples given various quality factors and official FGIS grain standards tables
- Identify specific plant and seed structures, crop growth stages, or developmental characteristics on fresh or pressed plant samples
- Recognize common nutrient deficiency symptoms (N, P, K, S, Fe) on both dicot and grass crops
- Recognize common herbicide injury symptoms on weeds and crops
- Use a soil textural triangle to name soil textural class

- Determine soil texture by feel, distinguish different types of soil structure, relate soil color to soil properties
- Interpret information found in a soil survey or on a soil test report
- Recognize common fertilizer carriers (major nutrient supplied, typical analysis, common name)
- Interpret information on a fertilizer bag or pesticide label
- Recognize common pesticide formulations and their standard abbreviations
- Determine proper sprayer nozzle tip size and type, screens, pressure, etc. for pesticide applications
- Identify and explain the purpose of items such as ag lime, inoculum, seed treatments, soil amendments, etc.
- Identify stored or processed crop products and common livestock feed ingredients made from crops (silage as to type, hay as to type, alfalfa pellets and cubes, soybean meal, cottonseed meal and hulls, wheat bran, corn meal, beet pulp, dried distillers grains, flaked or ground grains, etc.)
- Match various food and/or industrial products with the crops (or classes of a crop) from which they are made.
- Evaluate crop quality by ranking two or more samples of hay, silage, seed, or cotton.
- Interpret data from tables or graphs (analyze a variety trial based on the LSD mean comparison statistic, select the proper spray nozzle tip for given conditions from a manufacturer's spraying equipment manual, read a calibration monograph for a sprayer or planter, interpret crop yield response to different input levels, determine economic threshold from pest counts vs. yield response given control costs, etc.)
- Evaluate various crop production problems from photos, illustrations, or displays.
- Identify or describe common crop production and soil management practices from photos or slides.

NACTA EQUIPMENT IDENTIFICATION LIST (on lab practical)

001	anhydrous ammonia applicator	025	laser land plane
002	bale wrapper	026	moldboard plow
003	bermudagrass sprigger	027	offset disk
004	Boerner divider	028	peanut digger/shaker
005	broadcast fertilizer spreader	029	rod weeder
006	broadcast seeder	030	rotary hoe
007	Carter dockage tester	031	rotary mower
008	chisel plow	032	rotary tiller
009	combine yield monitor system	033	row crop cultivator
010	cotton picker	034	row crop planter
011	cultipacker seeder	035	self unloading forage wagon
012	drainage tile installation system	036	soil probe
013	field cultivator	037	spiketooth harrow
014	field sprayer	038	subsoiler
015	forage chopper	039	swather/windrower
016	forage probe	040	tandem disk
017	global positioning system	041	variable rate control system
018	grain combine	042	Winchester bushel weight apparatus
019	grain drill		<u>Additional Selections</u>
020	grain moisture tester	043	air seeder
021	grain trier	044	continuous flow grain dryer
022	hay baler	045	disk-chisel
023	hay moisture tester	046	grain cart
024	hay rake	047	rotary ditcher

CROP DISEASE IDENTIFICATION LIST (on lab practical)

Samples followed by (s) will be shown on seed only

Small Grains

- 1 powdery mildew
(shown on any small grain)
- 2 stem rust
(shown on wheat or oat)
- 3 leaf rust
(shown on wheat or oat)
- 4 loose smut
(shown on wheat, barley, or oat)
- 5 barley yellow dwarf mosaic
(shown on wheat or barley)
- 6 ergot
(shown on any small grain)
- 7 black point of wheat (s)
- 8 common bunt (s)
- 9 wheat scab (s)

Corn

- 10 common corn smut
- 11 ear rot
- 12 gray leaf spot
- 13 northern corn leaf blight
- 14 southern corn leaf blight
- 15 Gibberella stalk rot
- 16 Fusarium stalk rot

Soybean

- 17 bacterial blight
- 18 brown stem rot
- 19 Phytophthora root rot
- 20 pod and stem rot
- 21 bean pod mottle (s)
- 22 purple stain (s)
- 23 Asian rust

Cotton

- 024 bacterial blight
- 025 Verticillium wilt

Peanut

- 026 Cercospora leaf spot
- 027 Sclerotinia blight

Sorghum

- 028 charcoal rot
- 029 gray leaf spot
- 030 maize dwarf mosaic

Alfalfa

- 031 bacterial wilt
- 032 leaf spot
- 033 Phytophthora root rot

Additional Selections

- 034 Cercospora leaf spot (sugarbeet)
- 035 Goss's wilt (corn)
- 036 Rhizoctonia (sugarbeet)
- 037 sudden death syndrome (soybean)
- 038 tan spot (wheat)

NACTA INSECT IDENTIFICATION LIST (on lab practical)

CODE: (a) adult stage; (l) larval stage

Alfalfa Stored Grain

- | | | | | | | | |
|------------------------------------|---|---|-------------------------|-----|---|-------------------------|------------------------|
| 001 | a | l | alfalfa weevil | 025 | a | granary weevil | |
| 002 | a | | blue alfalfa aphid | 026 | a | sawtoothed grain beetle | |
| 003 | a | | pea aphid | 027 | a | lesser grain borer | |
| 004 | a | | spotted alfalfa aphid | 028 | a | red flour beetle | |
| 005 | a | | potato leaf hopper | 029 | a | l | Indian meal moth |
| <u>Cotton Miscellaneous</u> | | | | | | | |
| 006 | a | | boll weevil | 030 | | l | black cutworm |
| 007 | | l | cotton bollworm | 031 | a | | blister beetle |
| 008 | a | | lygus bug | 032 | a | l | Colorado potato beetle |
| <u>Corn</u> | | | | | | | |
| 009 | a | l | European corn borer | 033 | | l | fall armyworm |
| 010 | | l | Southwestern corn borer | 034 | a | | grasshopper |
| 011 | | l | corn earworm | 035 | a | | spider mite |
| 012 | | l | corn rootworm | 036 | a | | thrips |
| | | | | 037 | a | l | white grub |

013	a	northern corn rootworm	038		l	wireworm
014	a	southern corn rootworm	Beneficials			
015	a	western corn rootworm	039	a	l	lady beetle
Soybean			040	a		lacewing
016	a	green stinkbug	041	a		parasitic wasp
017	a	soybean cyst nematode	Additional Selections			
018	l	green cloverworm	042	a		bird cherry oat aphid (small grains)
019	a	bean leaf beetle	043	a		flea beetle (canola)
Sorghum			044	a		Japanese beetle (soybean)
020	a	chinch bug	045	a		soybean aphid (soybean)
021	a	corn leaf aphid	046		l	wheat midge (small grains)
Small Grains						
022	a	greenbug				
023	a	Russian wheat aphid				
024		l Hessian fly				

CROP AND WEED PLANT AND SEED IDENTIFICATION

1. A total of 75 specimens will be identified in a one-hour time limit. Each sample will be worth 2 points for a total of 150 points. Contestants may move at will among unoccupied stations during the contest, but must stand directly in front of the specimen being viewed and only one contestant may examine a specimen at a time.
2. Crop and weed plants will be shown either as fresh or dried and pressed samples. All seed samples will be mature. Seed may be shown either hulled, or where typical, within surrounding hulls, burs or pods (e.g. wild buckwheat, peanut, Korean lespedeza, rice, etc.).
3. Crop and weed identification materials will be selected from the attached identification list. Items are marked with a (p) for plants that may be shown in the flowering to mature plant stage, (v) for plants that may be shown in the vegetative stage, and (s) if seed identification is required. (The final ten plants and/or seeds on the list were added by the host school.)
4. Plants and seeds will be identified by common name as given on the official identification list provided each contestant. Contestants must fill in bubbles corresponding to the identification code for the specimen as given on the list provided.
5. Hand magnifying lenses will be allowed.
6. Sample specimens may not be moved from their stations. Live plant specimens may be touched carefully to aid in identification, but must not be broken or damaged by the contestant or disqualification may result. Dried, pressed plant specimens cannot be touched. Seeds may be rearranged in their place but may not be removed from their container.

PLANT AND SEED IDENTIFICATION LIST

CODE: (p) flowering to mature plant (live or mount); (v) vegetative plant (live); (s) seed

Cultivated Crops

001	p	v	wheat
002		s	hard red winter wheat
003		s	hard red spring wheat
004		s	soft red winter wheat
005		s	soft white wheat
006		s	hard white wheat
007		s	durum wheat
008	p	v	barley
009		s	six-rowed barley
010		s	two-rowed barley
011	p	v	s rye
012	p	v	s oat
013	p	s	triticale
014	p	v	s rice
015	p	v	corn
016		s	dent corn
017		s	flint corn
018		s	sweet corn
019		s	pop corn
020	p	v	s grain sorghum
021		s	sudangrass
022	p	s	foxtail millet
023	p	s	proso millet
024	p	s	pearl millet
025	p	v	s soybean
026	p	v	fieldbean
027		s	great northern fieldbean
028		s	red kidney fieldbean
029		s	pinto fieldbean
030	s		navy fieldbean
031		s	black turtle fieldbean
032	p	v	cowpea
033		s	blackeye cowpea
034		s	purplehull cowpea
035	p	v	s fieldpea
036		s	Austrian winter fieldpea
037	p	v	s peanut
038	p	v	s green mungbean
039	p	v	s guar
040	p	v	s canola
041	p	v	s cotton
042	p	v	s castor

Cultivated Crops (cont.)

043	p	v	s	flax
044	p	v	s	safflower
045	p	v	s	sesame
046	p	v		potato
047	p	v	s	common buckwheat
048	p	v	s	crambe
049	p	v	s	lentil
050	p	v	s	sugarbeet
051	p	v	s	tobacco
052	p	v		sunflower
053			s	confectionary sunflower
054			s	oilseed sunflower

Forage Grasses

055	p	s	big bluestem
056	p	s	little bluestem
057	p		blue grama
058	p		sideoats grama
059	p	s	buffalograss
060	p	s	Indiangrass
061	p	s	switchgrass
062	p	v	s Kentucky bluegrass
063	p	v	s orchardgrass
064	p	v	s tall fescue
065	p	v	s smooth bromegrass
066	p	v	s bermudagrass
067	p	v	s perennial ryegrass
068	p	v	s reed canarygrass
069	p	v	s timothy
070	p	v	s crested wheatgrass

Forage Legumes

071	p	v	s	alfalfa
072	p	v	s	sweetclover
073	p	v	s	red clover
074	p	v	s	white clover
075	p	v	s	crimson clover
076	p	v	s	arrowleaf clover
077	p	v	s	alsike clover
078	p	v	s	Korean lespedeza
079	p	v	s	birdsfoot trefoil
080	p	v	s	crownvetch
081	p	v	s	hairy vetch

Weeds

082	p	v	s	barnyardgrass
083	p		s	blackseed plantain
084	p		s	buckhorn plantain
085	p	v	s	buffalobur
086	p	v	s	Canada thistle
087	p		s	cheat
088	p	v	s	chickweed
089	p	v	s	cocklebur
090	p	v	s	common lambsquarters
091	p	v	s	common ragweed
092	p	v	s	curly dock
093	p	v	s	dandelion
094	p	v	s	dodder
095	p	v	s	downy brome
096	p		s	eastern black nightshade
097	p	v	s	field bindweed
098	p		s	field pennycress
099	p		s	field sandbur
100	p	v		giant foxtail
101	p	v	s	giant ragweed
102	p		s	goosegrass
103	p		s	greenflower pepperweed
104	p		s	green foxtail
105	p			hedge bindweed
106	p	v	s	henbit
107	p		s	hoary cress
108	p		s	horsenettle
109	p	v		horseweed
110	p	v	s	jimsonweed
111	p		s	johnsongrass
112	p		s	jointed goatgrass
113	p	v	s	kochia
114	p		s	leafy spurge
115	p	v	s	large crabgrass
116	p	v	s	musk thistle
117	p	v		Palmer amaranth
118	p		s	Pennsylvania smartweed
119	p	v	s	perennial sowthistle
120	p	v	s	prickly sida

Weeds (cont.)

121	p	v	s	puncturevine
122	p	v	s	quackgrass
123	p	v	s	redroot pigweed
124	p		s	rescuegrass
125	p	v	s	Russian thistle
126	p		s	shepherdspurse
127	p	v	s	sicklepod
128	p			silverleaf nightshade
129	p		s	spotted knapweed
130	p	v	s	tall morningglory
131	p	v		tall waterhemp
132	p	v	s	velvetleaf
133	p	v	s	Venice mallow
134	p	v	s	wild carrot
135	p	v	s	wild buckwheat
136			s	wild mustard
137	p		s	wild oat
138	p		s	wild sunflower
139	p	v	s	yellow foxtail
140	p	v		yellow nutsedge

Additional Selections

141	p	v		biennial wormwood
142	p	v	s	black medic
143	p			bristly foxtail
144	p	v	s	common burdock
145	p	v		common mallow
146	p			foxtail barley
147	p	v	s	oxeye daisy
148	p	v		pineappleweed
149	p		s	red sorrel
150	p	v	s	white campion

V. Grading Components and Scale

<u>Probable Grade components</u>	<u>Portion</u>
Participation/Attendance	30%
Math Quizzes	15%
Plant & Seed ID quizzes	15%
Lab Practical quizzes	15%
Agronomic quizzes	10%
Final Exam (Mock Contest)	15%

Grading Scale

<u>Percentage</u>	<u>Grade</u>	<u>Percentage</u>	<u>Grade</u>
93.0-100	A	73.0-76.9	C
90.0-92.9	A-	70.0-72.9	C-
87.0-89.9	B+	67.0-69.9	D+
83.0-86.9	B	63.0-66.9	D
80.0-82.9	B-	60.0-62.9	D-
77.0-79.9	C+	<59.9	F

**I reserve the right to adjust the weight of the grade components (this will be announced in class or at Western Online) and to make adjustments to the grading scale downward (e.g., an "A" may begin at 92.5 instead of 93.0).*

Date	Topic	Date	Topic
Aug 19	Introduction	Oct 14	Plant ID 2
Aug 21	Equipment 1	Oct 16	Insect ID 1
Aug 26	Equipment 2	Oct 21	Insect ID 2
Aug 28	Math 1	Oct 23	Troubleshooting 1
Sep 2	Labor Day, no class	Oct 28	Troubleshooting 2
Sep 4	Seed ID 1	Oct 30	Plant ID 3
Sep 9	Seed ID 2	Nov 4	Plant ID 4
Sep 11	Agronomic 1	Nov 6	Math 3
Sep 16	Agronomic 2	Nov 11	Agronomic 4
Sep 18	Seed ID 3	Nov 13	Soils
Sep 23	Seed ID 4	Nov 18	Math 4
Sep 25	Math 2	Nov 20	Fertilizers
Sep 30	Disease ID 1	Nov 25-29	Thanksgiving Break
Oct 2	Disease ID 2	Dec 2	Sprayers 1
Oct 7	Agronomic 3	Dec 4	Seed Tags and Grain Quality
Oct 9	Plant ID 1	Dec 13	Final Exam, 8:00-9:50 a.m.