

**AGRN 176 / HORT 180**  
**PRINCIPLES OF CROP SCIENCE / PRINCIPLES OF HORTICULTURAL SCIENCE**  
**Fall 2019**

## **I. General Information**

AGRN 176 (Principles of Crop Science) is a 4 credit hour course, and is an introduction to science-based principles underlying crop production, including: classification and use of major world crops; plant growth and development in response to environment and management; crop pests and pest protection; plant breeding and genetic improvement. 3 hrs. lect.; 2 hrs. lab.

Lecture: MWF 8:00-8:50 a.m., Knoblauch 152  
Lab (176): 041 - T 8:00-9:50 a.m., Knoblauch 226 or AFL – Agronomy Unit  
042 - T 10:00-11:50 a.m., Knoblauch 226 or AFL – Agronomy Unit  
043 - T 1:00-2:50 p.m., Knoblauch 226 or AFL – Agronomy Unit  
  
Lab (180): 041 - T 10:00-11:50 a.m., Knoblauch 226 or Livestock Center

Instructors:	Dr. Mark Bernards	Dr. Shelby Henning
	321 Knoblauch Hall	B12 Knoblauch Hall
	Office: 309-298-1569	Office: N/A
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Bernards 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.

Henning Office Hours: M W F 9:00- 10:50 a.m.

### **Required Texts:**

McMahon MJ, Kofranek AM, Rubatzky VE. 2011. Plant Science. Growth, Development, and Utilization of Cultivated Plants. Fifth Edition. Prentice Hall, Boston, MA.

### **Reference Texts:**

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

Nafziger E. (Editor). 2009. Illinois Agronomy Handbook, 24<sup>th</sup> 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, 2<sup>nd</sup> 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](http://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 176 / HORT 180: 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](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](mailto: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 (smart watches, 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 7 hours outside of class each week to master the material. Reading assignments relating to each lecture/lab will be particularly beneficial.
5. Complete assignments. Assignments not turned in on the assigned date may have 10% of the total potential points deducted for each day after the due date. The instructor will generally return exams and assignments within 1 week.

6. The use of tobacco is prohibited in Knoblauch Hall, nor is it allowed during sessions at the AFL.
7. Students must wear sturdy, close-toed to participate in lab sessions at the AFL. Wearing long pants is highly recommended.

#### **IV. Course Objectives**

##### Foundational Knowledge

1. Remember basic terminology to be prepared for upper division classes from the following categories:
  - a. Plant classification
  - b. Plant structure
  - c. Plant life cycle, growth and development
  - d. Plant photosynthesis and respiration
  - e. Plant reproduction
  - f. Weed, disease and insect management
  - g. Soil components and management
2. Identify a wide variety of crops from seed and plant structures
3. Correctly identify the growth stage of corn and soybean
4. Identify important weed, disease and insect pests of Illinois crops

##### Application

5. Demonstrate your ability to write a hypothesis and correctly interpret the results of an experiment
6. Classify plants based on taxonomy, life cycle, growth characteristics and use
7. Complete basic calculations important to crop management (e.g., seeding rates, plant populations, yield estimates, grain moisture adjustments, fertilizer and pesticide application)

##### Integration

8. Explain the importance of light, water, CO<sub>2</sub>, plant hormones and essential plant nutrients to normal plant growth and function, and describe how plants respond to deficiencies of these resources
9. Explain how different cropping management practices (variety selection, soil management, planting, pest management, crop rotation, harvest, storage, etc.) affect productivity and profitability
10. Explain how plant breeding and genetic modification is used to improve crop productivity

##### Human Dimension

11. Explain how plant domestication benefited humanity
12. Be able to educate others about the revolutionary changes in crop management over the past 200 years and challenges and opportunities pertaining to crop production in the next 20 years

##### Caring

13. Appreciate the diversity and adaptability of plants and their importance in our personal lives and society
14. Value the importance of the scientific method in advancing crop management practices

##### Learning How to Learn

15. Comprehend assigned reading materials
16. Identify reliable resources for future learning about crop science

#### **V. Grading Components and Scale**

<u>Probable Grade components</u>	<u>Portion</u>
Attendance/Participation	10%
Lab assignments	10%

Lab quizzes	20%
Lecture assignments	10%
Lecture quizzes & Final Exam	50%

#### Grading Scale

Percentage	Grade	Percentage	Grade
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

*\*We 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).*

## VI. Assessment Metrics

**Participation/Attendance:** You are expected to come to class prepared to participate in discussions and activities. Lack of preparedness and/or participation will result in a loss of 2-5% of the final grade. Each student will be allowed 3 "vacation" days (for funerals, interviews, oversleeping, etc). "Vacation" absences that exceed "3" will result in the lowering of the grade 2 points per absence (up to 10% points of the final grade). Absence for WIU-sanctioned activities (such as livestock judging competitions) will not count against "vacation" days. Absence due to illness will be evaluated on a case-by-case basis and where they are legitimate and appropriately reported they will not count against the vacation days. Repeated tardiness will result in a reduction in Participation/Attendance points.

**Laboratory Assignments:** There will be an assignment/activity each laboratory period that will help you better understand the material. You will often be expected to work in small groups. Points will be awarded for accurate completion of the activity and appropriate classroom citizenship.

**Laboratory Quizzes:** There will be a quiz (generally worth 10 points) at the beginning of each laboratory period over material covered in the previous lab assignment(s) and the reading assignment for the current laboratory.

**Lecture Assignments:** There will be some in-class activities and homework assignments to help you better learn the material. Brief reading comprehension quizzes may be given occasionally.

**Lecture Quizzes and Final Exam:** A quiz (generally worth 100 points) will be given approximately every third week. The purpose of frequent quizzes is to help you keep current with the material. The comprehensive final exam will assess your ability to address the course objectives, and will include material covered in lecture and laboratory.

**Extra Credit:** Extra Credit will be available for participating in sessions of the College of Business and Technology 2019 Professional Development Series, Sept 9-18. For more details visit <http://www.wiu.edu/cbt/career/>. Extra Credit will also be available for participating in the School of Ag Career Fair, Oct 2, 2019. To obtain points you will need to write a 1-page summary (your experience and what you learned) at each event.

Date	Topic	Reading
Aug 19	Introduction	Syllabus, pp 2-11
<b>Aug 20</b>	<b>176: Crop seed ID and planting</b> <b>180: Crop seed ID and planting</b>	
Aug 21	Scientific Method and Hypothesis Writing	Hypothesis writing handout
Aug 23	Scientific method and Hypothesis writing review, Data Analysis and Interpretation introduction	Data analysis handout
Aug 26	Data Analysis and interpretation 2	
<b>Aug 27</b>	<b>176: Agronomic Research</b> <b>180: Horticultural Research</b>	pp. 11-15
Aug 28	Structure and function of plant cells & organs	pp. 81-106
Aug 30	Structure and function of plant cells & organs	pp. 81-106
Sep 2	<i>Labor Day, no class</i>	
<b>Sep 3</b>	<b>176 / 180: Plant morphology identification</b>	
Sep 4	<i>Lec Quiz 1</i>	
Sep 6	<i>Review Quiz 1.</i> Plant nomenclature & taxonomy	pp. 197-202
Sep 9	Plant Classification	pp. 197-202, 120-122, 33-43
<b>Sep 10</b>	<b>176 / 180: Identifying and Classifying Crop Plants (AFL)</b>	Plant classification terms handout
Sep 11	Plant Domestication and Centers of Origin	pp. 205-215
Sep 13	Darrin Dodds Guest Lecture on plant production in Southern U.S.	
Sep 16	Plant growth and development and systems for identifying plant growth stage	pp. 110-123, handout
<b>Sep 17</b>	<b>176: Soy &amp; corn growth &amp; development</b> <b>180: Identifying plant growth stage</b>	176: C&S FG pp. 20-40, C&S FG pp. 120-127
Sep 18	Light and Development	pp. 46-48, 124-133
Sep 20	Temperature and Development	pp. 52-56,
Sep 23	Plant growth regulators and Development	pp. 133-141
<b>Sep 24</b>	<b>176: Planting and planters</b> <b>180: Planting and transplanting</b>	
Sep 25	<i>Quiz 2</i>	
Sep 27	<i>Review Quiz 2.</i> Insects	pp. 312-321
Sep 30	Diseases	pp. 321-334
<b>Oct 1</b>	<b>176 / 180: Weed, Disease, Insect Pests</b>	
Oct 2	Weeds	pp. 302-312
Oct 4	IPM	pp. 296-302
Oct 7	Scouting, Troubleshooting and Pesticides	pp. 374-377, 335-336; handout
<b>Oct 8</b>	<b>176 / 180: Scouting, Troubleshooting &amp; Pesticide calculations</b>	
Oct 9	Climate and transpiration	pp. 45-52, 56-59, 246-249
Oct 11	<i>Fall Break, no class</i>	
Oct 14	Water availability and management	pp. 48-52, 241-250 x
<b>Oct 15</b>	<b>176: Corn &amp; Soy Yield estimates</b> <b>180: Yield estimates for vegetables</b>	
Oct 16	<i>Quiz 3</i>	

<b>Date</b>	<b>Topic</b>	<b>Reading</b>
Oct 18	<i>Review Quiz 3. Photosynthesis</i>	pp. 225-235
Oct 21	Harvest & Storage	pp. 346-356
<b>Oct 22</b>	<b>176 / 180 Harvest Losses &amp; Storage</b>	
Oct 23	Respiration & Plant Chemistry	pp. 235-239, 146-156
Oct 25	Food Security	Reading posted at W.O.
Oct 28	Genetics & Sexual propagation	pp. 158-166, 168-170
<b>Oct 29</b>	<b>176: Grain Quality, Moisture, Grading and Seed Laws &amp; testing 180: Seed laws and testing; USDA grading of vegetable crops</b>	pp. 352-353
Oct 30	Plant breeding and biotechnology	pp. 210-221 pp. 166-167
Nov 1	<i>Quiz 4</i>	
Nov 4	Vegetative reproduction	pp. 175-193, 210
<b>Nov 5</b>	<b>176 / 180: Variety selection</b>	pp. 367-370
Nov 6	Global production, use, distribution of grains, fiber, forage crops	pp. 366-414
Nov 8	Global production, use, distribution of horticultural crops	pp. 416-487
Nov 11	Cropping systems	pp. 343-345, 366-367, 17-31
<b>Nov 12</b>	<b>176 / 180: Seed anatomy, germination and emergence</b>	pp. 170-175
Nov 13	Landscape design and ecological function	pp. 615-629, 17-31
Nov 15	Precision Agriculture	W.O. reading
Nov 18	Introduction to soils	pp. 62-75
<b>Nov 19</b>	<b>176 / 180: Soil properties</b>	pp. 62-75
Nov 20	<i>Quiz 5</i>	
Nov 22	Tillage, soil seedbed & hydroponics	pp. 266-280, posted reading
<i>Nov 25-29</i>	<i>Thanksgiving Break</i>	
Dec 2	Factors influencing plant nutrient availability	pp. 250-259
<b>Dec 3</b>	<b>176 / 180: Soil fertility and fertilizers; similarities and differences hort vs. ag fertilizers, course evaluation</b>	pp. 288-292
Dec 4	Essential nutrients for plants	pp. 254, 259-263
Dec 6	History and Future of plant production	pp. 2-11
<b>Dec 9</b>	<b><i>Final Exam, 8-10 a.m., KH 152</i></b>	