

ILLINOIS VALLEY COMMUNITY COLLEGE



COURSE OUTLINE

DIVISION: Natural Sciences Business

COURSE: AGR 1000 - Introduction to Field Crop Science

Date: 3/30/16

Credit Hours: 4.0

Prerequisite(s): None

Delivery Method:

<input checked="" type="checkbox"/> Lecture	3 Contact Hours (1 contact = 1 credit hour)
<input type="checkbox"/> Seminar	0 Contact Hours (1 contact = 1 credit hour)
<input checked="" type="checkbox"/> Lab	2 Contact Hours (2-3 contact = 1 credit hour)
<input type="checkbox"/> Clinical	0 Contact Hours (3 contact = 1 credit hour)
<input type="checkbox"/> Online	
<input type="checkbox"/> Blended	

Offered: Fall Spring Summer

IAI Equivalent –**Only for Transfer Courses**-go to <http://www.itransfer.org>: **AG 903**

CATALOG DESCRIPTION:

The basic principles of plant growth, including human and environmental influences and the theoretical and practical application of agronomic principles to crop production. Includes the historical and economic importance of crop plants for food, feed, and fiber; origin, classification, and geographic distribution of field crops; environmental factors and agronomic problems; crop plant breeding, growth, development, and physiology; cropping systems and practices; seedbed preparation, tillage, and crop establishment; pests and controls; and harvesting, storing, and marketing practices.

GENERAL EDUCATION GOALS ADDRESSED

[See last page for Course Competency/Assessment Methods Matrix.]

Upon completion of the course, the student will be able:

[Choose up to three goals that will be formally assessed in this course.]

- To apply analytical and problem solving skills to personal, social and professional issues and situations.
- To communicate successfully, both orally and in writing, to a variety of audiences.
- To develop an awareness of the contributions made to civilization by the diverse cultures of the world.
- To understand and use contemporary technology effectively and to understand its impact on the individual and society.
- To work and study effectively both individually and in collaboration with others.
- To understand what it means to act ethically and responsibly as an individual in one's career and as a member of society.
- To develop and maintain a healthy lifestyle physically, mentally, and spiritually.
- To appreciate the ongoing values of learning, self-improvement, and career planning.

EXPECTED LEARNING OUTCOMES AND RELATED COMPETENCIES:

[Outcomes related to course specific goals. See last page for more information.]

Upon completion of the course, the student will be able to:

1. identify and explain the importance of crops on world food production.
 - Competency 1.1 – Students will be able to identify and discuss the relationship between world population and food supply.
 - Competency 1.2 – Students will be able to discuss and identify crop contributions that are important to humankind, the GDP, the state gross product, and the balance of trade.
 - Competency 1.3 – Students will be able to discuss and identify crop contributions that are of historical significance.
 - Competency 1.4 – Students will be able to discuss and identify crop contributions that are of economic importance.
 - Competency 1.5 – Students will be able to identify and discuss crop origins.
 - Competency 1.6 – Students will be able to identify and discuss the plant classification system.
 - Competency 1.7 – Students will be able to identify and discuss the geographic distribution of field crops.
 - Competency 1.8 – Students will be able to identify and discuss grain crops.
 - Competency 1.9 – Students will be able to identify and discuss oil crops.
 - Competency 1.10 – Students will be able to identify and discuss fiber crops.
 - Competency 1.11 – Students will be able to identify and discuss sugar crops.
 - Competency 1.12 - Students will be able to identify and discuss crops that are used for drugs.
 - Competency 1.13 - Students will be able to identify and discuss forage crops.
2. identify and describe the basic principles of plant growth.
 - Competency 2.1 – Students will be able to identify and discuss plant need for air.
 - Competency 2.2 – Students will be able to identify and discuss plant need for light.
 - Competency 2.3 – Students will be able to identify and discuss plant need for water.

- Competency 2.4 – Students will be able to identify and discuss plant response to temperature
- Competency 2.5 – Students will be able to identify and discuss plant need for soil.
- Competency 2.6 - Students will be able to identify and discuss plant anatomy and morphology.
- Competency 2.7 - Students will be able to identify crop seeds and plants
- Competency 2.8 - Students will be able to identify plants by structure and function
- Competency 2.9 - Students will be able to identify and discuss methods of crop propagation.
- Competency 2.10 - Students will be able to identify and discuss plant growth regulators and development today and in the future.
- Competency 2.11 - Students will be able to identify essential elements required for plant nutrition.
- Competency 2.12 - Students will be able to identify and discuss the role of water and water management in crop production.
- Competency 2.13 - Students will be able to identify the components required for photosynthesis to occur.

3. evaluate the theoretical and practical aspects of agronomic principles.
- Competency 3.1 – Students will be able to identify and discuss issues related to air, water, and soil pollution.
 - Competency 3.2 – Students will be able to identify and discuss issues related to organic crops and sustainable agriculture.
 - Competency 3.3 – Students will be able to identify and discuss issues related to energy and crop production.
 - Competency 3.4 – Students will be able to identify and discuss issues related to pesticide use and human health.
 - Competency 3.5 - Students will be able to identify and discuss monocultures, rotations, intercropping, GPS, Organic cropping, seedbed preparation, stand establishment, and conservation tillage systems.
 - Competency 3.6 - Students will be able to identify and discuss crop pests including insects, diseases, weeds, and nematodes.
 - Competency 3.7 - Students will be able to identify and discuss crop harvesting, storing, and marketing practices.
 - Competency 3.8 - Students will be able to identify and discuss crop genetics, crop introduction, crop selection, plant hybridization, plant mutations, genetic enhancement and value added traits.

COURSE TOPICS AND CONTENT REQUIREMENTS:

LECTURE TOPICS:

Class sessions:

- | | | |
|------|--|-------|
| I. | Importance of Crop Plants - Food, Feed, Fiber, Fuel | 2 – 4 |
| | A. Contributions | |
| | 1. To humankind and their welfare | |
| | 2. To the GDP | |
| | 3. To state gross product | |
| | 4. To balance of trade, etc... | |
| | B. Historical Significance | |
| | C. Economics | |
| | 1. Social | |
| | 2. Comparative Advantage | |
| | 3. Markets | |
| | 4. Transportation | |
| | 5. Population | |
| II. | Origin, Classification, and Geographic Distribution of Field Crops | 2 – 3 |
| III. | Important Field Crops of the World | 1 – 3 |
| | A. Grain | |

	B. Oil	
	C. Fiber	
	D. Sugar	
	E. Drug	
	F. Forage	
	G. Biofuel	
IV.	Crop Environmental Factors	4 – 6
	A. Air	
	B. Light	
	C. Moisture (Water)	
	D. Temperature	
	E. Soil	
V.	Agronomic Problems, Perceptions and Questions	3 – 4
	A. World Population and Food Supply	
	B. Pollution - Air, Water, Soil	
	C. Organic and Sustainable Agriculture	
	D. Energy	
	E. Pesticides and Human Health	
VI.	Growth and Development of Crop Plants	4 – 6
	A. Botany of Plants	
	1. Anatomy	
	2. Morphology	
	B. Identification	
	1. Seeds	
	2. Crop Plants	
	C. Form and Function	
	1. Structure	
	2. Function	
	D. Crop Propagation	
	1. Asexual Propagation - Vegetative	
	2. Sexual Propagation – Seed	
	a. Seed Quality	
	b. State Laws	
	c. Crop Improvement Association (certified seed)	
	E. Growth Regulation and Development - Plant Regulators in Agriculture Today and in the Future	
VII.	Crop Physiology	4 – 6
	A. Essential Elements and Plant Nutrition	
	B. Role of Water and Water Management	
	C. Photosynthesis / Respiration	
VIII.	Cropping Systems and Practices	5 – 7
	A. Monoculture	
	B. Rotation	
	C. Multiple Cropping and Intercropping	
	D. GIS/GPS Site Specific Applications	
	E. Organic Cropping Systems	
	F. Seedbed Preparation	
	G. Stand Establishment - Seeding Methods, etc...	
	H. Conservation Tillage Systems and Practices	

I.	Harvesting and Storing	
J.	Cover Crops	
IX.	Integrated Pest Management	4 – 5
A.	Pests Control and Resistance Management	
1.	Insects	
2.	Diseases	
3.	Weeds	
4.	Nematodes	
X.	Crop Breeding and Improvement	3 – 5
A.	Genetics	
B.	Plant Introduction	
C.	Selection	
D.	Hybridization	
E.	Mutation	
F.	Genetic Modification	
G.	Value Added Traits	
H.	Biotechnology	

Lab Topics:

- Agronomy Equipment
- Fertilization and Seed Formation
- Morphology of Grasses and Legumes
- Pest Identification, Scouting and IPM
- Grain Grading and Crop Judging
- Seed Identification, Quality and Certification
- Vegetative and Floral Identification of Crops and Weeds
- Germination, Emergence and Seedling Development of Monocots (Corn) and Dicots (Soybeans)
- Crop Problem Scenarios (Troubleshooting)
- DNA Extraction Exercise
- Biotechnology
- Tour Agronomic Companies
- Yield Checks
- Erosion Lab Using Real Farm Information
- Research Analysis and Interpretation
- Biofuels
- Fertilizers and Applications

Note: Use of live plants or a series of demonstrations from seeds to mature plant will be used.

INSTRUCTIONAL METHODS:

- Lecture
- Discussion
- Student reports
- Lab demonstration
- Hands-on activities

INSTRUCTIONAL MATERIALS:

The most current edition of the following books may be used a textbook or as supporting references:

- *Crop Science: Principles and Practices* - R. Mullen, 4/E, Pearson Custom Publishing
- *Introduction to Plant Science* - R. Parker - Cengage Learning.
- *Plant Science: Growth, Development, and Utilization of Cultivated Plants, 5E* - M. McMahon, A. Kofranek, and V. Rubatzky, Pearson.
- *Principles of Field Crop Production 4/E* - J. Martin, R. Waldren, D. Stamp, and W. Leonard, Pearson.
- *Principles of Crop Production: Theory, Techniques, and Technology, 2/E* – G. Acquaah, Pearson.
- *Introduction to Agronomy: Food, Crops, and Environment* - Sheaffer & Moncada, Cengage Learning
- *Plant and Soil Science: Fundamentals & Applications* - R. Parker, Cengage Learning

STUDENT REQUIREMENTS AND METHODS OF EVALUATION:

A= 90-100

B= 80-89

C= 70-79

D= 60-69

F= 0-59

Exams & Quizzes – 60%

Assignments (written and lab work) - 30%

Student attendance & class/lab participation – 10%

OTHER REFERENCES

Modern Corn and Soybean Production. R. Hoelt, E. Nafziger, R. Johnson, and S. Aldrich, MCSP Publications.
(<http://www.mcsp-pubs.com/>)

Illinois Pesticide Applicator Training Manuals. Pubs Plus, University of Illinois.
<http://web.extension.illinois.edu/privatepsep/>

Plant Pathology - Plant Disease Series (RPD), University of Illinois VISTA.
(<http://www.aces.uiuc.edu/vista/rpd.html>)

Field Crop Scouting Manual. Pubs Plus, University of Illinois. (<https://pubsplus.uiuc.edu/index.html>) *Weeds of the Great Plains*. Nebraska Department of Agriculture.
(<http://www.agr.state.ne.us/forms/nw11.pdf>)

Crop Production. J. Vorst. (<http://www.stipes.com/agriculture.html>).

Corn & Soybean Field Guide. Purdue University. (<http://www.ag.purdue.edu/agry/dtc/Pages/fieldguide.aspx>)

Ag Forage Field Guide, Purdue University – currently not available.
(<https://secure.agriculture.purdue.edu/store/default.asp>)

Crop Production: Evolution, History, and Technology. C. Wayne Smith. Wiley.

Alfalfa Management Guide. D. Undersander, R. Becker, D. Cosgrove, E. Cullen, J. Doll, C. Grau, K. Kelling, M. Rice, M. Schmitt. American Society of Agronomy. *Illinois Agronomy Handbook*, details *Crop Sciences Lab Manual*, ITCS.

Weeds of the South by Charles T. Bryson and Michael S. DeFelice. University of Georgia Press

Weeds of the Midwest by Charles T. Bryson and Michael S. DeFelice. University of Georgia Press

Crop Management CDs <http://www.agriculture.purdue.edu/agcrop/>

Pastures for Horses: A Guide to Rotational Grazing CD

<http://learningstore.uwex.edu/%2FPastures-for-Horses-A-Guide-to-Rotational-GrazingCD-P98.aspx>

Herbicide Mode of Action and Crop Injury Symptoms CD

<http://shop.extension.umn.edu/Default.aspx> *Illinois*

Agricultural Education Curriculum Resources

<http://www.agriculturaleducation.org/curriculum/>

YouTube

History Channel

USDA National Agricultural Statistics Service (NASS)

<http://www.nass.usda.gov/>

How a Corn Plant Develops

<http://www.biologie.uni->

[hamburg.de/bonline/library/maize/www.ag.iastate.edu/departments/agronomy/corngrows.html](http://www.biologie.uni-hamburg.de/bonline/library/maize/www.ag.iastate.edu/departments/agronomy/corngrows.html)

How the Soybean Plant Develops

http://extension.agron.iastate.edu/soybean/production_growthstages.html *Soybean*

Diagnostic Guide

<http://www.plantsci.missouri.edu/soydoc/startup.htm>

Pest Management and Crop Development Newsletter (University of Illinois)

<http://www.ipm.uiuc.edu/bulletin/index.php> *Purdue*

Forage Information

<http://www.agry.purdue.edu/ext/forages/>

University of Illinois IPM

<http://www.ipm.uiuc.edu/fieldcrops/index.html>

Illinois Agricultural Education

<http://www.agriculturaleducation.org>

Illinois High School Curriculum

<http://www.mycaert.com>

Course Competency/Assessment Methods Matrix

AGR 1000 - Introduction to Field Crop Science		Assessment Options																																		
For each competency/outcome place an "X" below the method of assessment that could be used.	Assessment of Student Learning	Article Review	Case Studies	Group Projects	Lab Work	Oral Presentations	Pre-Post Tests	Quizzes	Written Exams	Artifact Self Reflection of Growth	Capstone Projects	Comprehensive Written Exit Exam	Course Embedded Questions	Multi-Media Projects	Observation	Writing Samples	Portfolio Evaluation	Real World Projects	Reflective Journals	Applied Application (skills) Test	Oral Exit Interviews	Accreditation Reviews/Reports	Advisory Council Feedback	Employer Surveys	Graduate Surveys	Internship/Practicum /Site Supervisor Evaluation	Licensing Exam	In Class Feedback	Simulation	Interview	Written Report	Assignment				
	Direct/ Indirect	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	I	I	I	I	D	D										
1.1 – Students will be able to identify and discuss the relationship between world population and food supply.			X					X	X						X																	X			X	X
1.2 – Students will be able to discuss and identify crop contributions that are important to humankind, the GDP, the state gross product, and the balance of trade.			X					X	X						X																	X			X	X
1.3 – Students will be able to discuss and identify crop contributions that are of historical significance.			X					X	X						X																X			X	X	
1.4 – Students will be able to discuss and identify crop contributions that are of economic importance.			X					X	X						X																X			X	X	
1.5 – Students will be able to identify and discuss crop origins.			X					X	X						X																X			X	X	
1.6 – Students will be able to identify and discuss the plant classification system.			X					X	X						X																X			X	X	

1.7 – Students will be able to identify and discuss the geographic distribution of field crops.							X	X													X			X	X
1.8 – Students will be able to identify and discuss grain crops.					X		X	X													X			X	X
1.9 – Students will be able to identify and discuss oil crops.					X		X	X													X			X	X
1.10 – Students will be able to identify and discuss fiber crops.					X		X	X													X			X	X
1.11 – Students will be able to identify and discuss sugar crops.					X		X	X													X			X	X
1.12 - Students will be able to identify and discuss crops that are used for drugs.					X		X	X													X			X	X
1.13 - Students will be able to identify and discuss forage crops.					X		X	X													X			X	X
2.1 – Students will be able to identify and discuss plant need for air.					X		X	X													X			X	X
2.2 – Students will be able to identify and discuss plant need for light.					X		X	X													X			X	X
2.3 – Students will be able to identify and discuss plant need for water.					X		X	X													X			X	X
2.4 – Students will be able to identify and discuss plant response to temperature					X		X	X													X			X	X
2.5 – Students will be able to identify and discuss plant need for soil.					X		X	X													X			X	X
2.6 - Students will be able to identify and discuss plant anatomy and morphology.					X		X	X													X			X	X
2.7 - Students will be able to identify crop seeds and plants					X		X	X													X			X	X
2.8 - Students will be able to identify plants by structure and function					X		X	X													X			X	X
2.9 - Students will be able to identify and discuss methods of crop propagation.					X		X	X													X			X	X
2.10 - Students will be able to identify and discuss plant growth regulators and development today and in the future.			X				X	X													X			X	X
2.11 - Students will be able to identify essential elements required for plant nutrition.					X		X	X													X			X	X

2.12 - Students will be able to identify and discuss the role of water and water management in crop production.				X	X			X	X																					X			X	X	
2.13 - Students will be able to identify the components required for photosynthesis to occur.								X	X																					X			X	X	
3.1 – Students will be able to identify and discuss issues related to air, water, and soil pollution.				X	X			X	X																					X			X	X	
3.2 – Students will be able to identify and discuss issues related to organic crops and sustainable agriculture.				X	X			X	X																					X			X	X	
3.3 – Students will be able to identify and discuss issues related to energy and crop production.				X	X			X	X																					X			X	X	
3.4 – Students will be able to identify and discuss issues related to pesticide use and human health.				X	X			X	X																					X			X	X	
3.5 - Students will be able to identify and discuss monocultures, rotations, intercropping, GPS, Organic cropping, seedbed preparation, stand establishment, and conservation tillage systems.					X			X	X					X		X														X			X	X	
3.6 - Students will be able to identify and discuss crop pests including insects, diseases, weeds, and nematodes.					X			X	X					X		X														X			X	X	
3.7 - Students will be able to identify and discuss crop harvesting, storing, and marketing practices.					X			X	X					X		X														X			X	X	
3.8 - Students will be able to identify and discuss crop genetics, crop introduction, crop selection, plant hybridization, plant mutations, genetic enhancement, and value added traits.					X			X	X					X		X														X			X	X	
																															X			X	X