Credit: 3-4 semester hours

Course Description:
IAI Description: AG 903: Introduction to Crop or Plant Science (3-4 semester hours)
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.

Objectives:
1. The student will be able to identify and explain the importance of crops on world food production.
2. Identify and describe the basic principles of plant growth.
3. Evaluate the theoretical and practical aspects of agronomic principles.

Suggested Texts: (Current Edition)
Principles of Field Crop Production. J. Martin, R. Waldren, and D. Stamp, Pearson.
Principles of Crop Production, Acquaah.
Introduction to Agronomy, Sheaffer & Moncada
Plant and Soil Science, R. Parker, Delmar Cengage Learning

Suggested References and/or Supplemental Texts:
(http://www.mcsppubs.com/)
http://web.extension.illinois.edu/privatepsep/
Plant Pathology - Plant Disease Series (RPD). University of Illinois VISTA.
(http://www.aces.uiuc.edu/vista/rpd.html)
Weeds of the Great Plains. Nebraska Department of Agriculture. (http://www.agr.state.ne.us/forms/nw11.pdf)
Corn & Soybean Field Guide. Purdue University. (http://www.ag.purdue.edu/agry/dtc/Pages/field-guide.aspx)
Ag Forage Field Guide, Purdue University – currently not available.
(https://secure.agriculture.purdue.edu/store/default.asp)
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

Suggested Lab Exercises:
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 Discussion
Tour Seed Company Facility
Yield Checks
Erosion Lab Using Real Farm Information
Research Analysis and Interpretation

Note: Use of live plants or a series of demonstrations from seeds to mature plant development is recommended.

Multimedia:
Purdue Crop Management CDs
http://www.agriculture.purdue.edu/agcrop/
Pastures for Horses: A Guide to Rotational Grazing CD
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

Web Sites:
USDA National Agricultural Statistics Service (NASS)
http://www.nass.usda.gov/
How a Corn Plant Develops
http://www.biologie.uni-hamburg.de/e-online/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
Topics:

I. Importance of Crop Plants - Food, Feed, Fiber, Fuel
   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

III. Important Field Crops of the World
    A. Grain
    B. Oil
    C. Fiber
    D. Sugar
    E. Drug
    F. Forage
    G. Biofuel

IV. Crop Environmental Factors
    A. Air
    B. Light
    C. Moisture (Water)
    D. Temperature
    E. Soil

V. Agronomic Problems, Perceptions and Questions
    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

IX. Integrated Pest Management 4 – 5
   A. Pests Control and Resistance Management
      1. Insects
      2. Diseases
      3. Weeds
      4. Nematodes

X. Harvesting, Storing, and Marketing Practices 1 – 2

XI. Crop Breeding and Improvement 3 – 5
   A. Genetics
   B. Introduction - plant
   C. Selection
   D. Hybridization
   E. Mutation
F. Genetic Modification
G. Value Added Traits
H. Biotechnology