Plant Science 200: Modern Crop Production

Instructor:

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Goals for Course:

At the end of this course students should understand clearly the basics of various agronomic crops, how they relate to their environment, what are the principles of production, management of problems, and the utilization of crops. Emphasis will be placed on agronomic crops that are currently of economic significance in New Jersey or elsewhere in Northeastern United States; and the new crops that hold promise for the future in New Jersey.

Course Objective:

To use a systematic approach to discuss topics in current agronomic crop management practices emphasizing those that increase production, enhance efficiency, and maintain environmental integrity

To develop an understanding of how to obtain, evaluate, and use agronomic and other pertinent agricultural information

Course Outline:

Brief introduction (what is Agronomy? What are agronomic crops? Current contributions to production and economics, worldwide and locally.)

Soil classification, soil conservation and tillage.

Crop classification and morphology (distinguish among the grains, pulses, roots & tubers, fiber, forage, oil crops, etc) and utilization of agronomic crops.

Production practices and problems, and crop utilization (illustrate the principles in crop/seed selection, site selection, land preparation, planting, nutrient supply/pest control, harvesting & utilization; highlight the problems associated with each production & utilization step)

Relationship of agronomic crops to the environment. How do agronomic crops interact with the various components of the environment—soil, air, water, other plants, animals, other life forms, human action, etc.)

Organic/Sustainable Agriculture, Energy Agronomics, Other World Crops, Extended Educational Opportunities

Assignments & Grading:
Exams 1,2,3 = 100 points each

Ag Math = 100 points

Non-Traditional Crop Paper = 100 points

Total = 500 points

Important Rules:

Rutgers Academic Integrity Policy is followed in this course.
Attendance is expected according to Rutgers University Policy: If you miss or plan to miss a class you must report via the University Absence Reporting System. You are responsible for what is presented during the class period.
No Makeup Exams will be given unless approved by the instructor prior to exam or excuse conforms to University rules.
All assignments (Ag math and paper) are due to instructor by 4PM of the due date; 10 points are deducted for every 24 hours late or part thereof (ie. if 25 hours late, 20 points are deducted);
Zero points given for no submission.
You may not take an exam if you walk in late during an exam period after the first person has completed the exam and left the classroom and no extra time will be given to those who arrive late for an exam.
Anyone missing the final exam (without prior arrangements or official excuse) gets a Zero for that exam.
Handouts will be available for one class period following the date they are handed out, many, however, will be available on e Companion.
No special problems for extra credit.
Rules apply to all registered class members regardless of race, gender, nationality, etc.

Topics for Modern Crop Production

Introduction
Crop Importance
Soil Survey/Soil Conservation
Crop Classification and Morphology
Land Preparation/Tillage
Soil Fertility
Crop Variety & Seed Selection
Planting Methods (date, rate, depth, spacing)
Crop Protection-Weeds, Disease, Insects
Irrigation-Moisture Management
Harvesting
Forage Quality/Harvest
Crop Preservation, Storage & Utilization
Alternative Uses/New Crop/Products; Minor Field Crops
Tropical Crops
Energy in Agriculture
Service Organizations—RCE, USDA, NJDA, etc.
Organic /Sustainable Agriculture
References on Reserve in Chang Library:


Electronic References:

2009-2010 Pest Management Recommendations for Field Crops—
http://extension.umd.edu/publications/EB237online/index.cfm

New Jersey Agriculture Statistics Service
www.nass.usda.gov/nj

Rutgers Cooperative Extension
www.rce.rutgers.edu

Penn State Agronomy Guide 2011-2012
http://agguide.agronomy.psu.edu

Northeast Sustainable Agriculture Research & Education
www.nesare.org
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<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Topics Covered</th>
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<tbody>
<tr>
<td>Jan 23</td>
<td>W</td>
<td>Introduction</td>
</tr>
<tr>
<td>Jan 28</td>
<td>M</td>
<td>Crop Stats/Soil Survey</td>
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<tr>
<td>Jan 30</td>
<td>W</td>
<td>Soil Conservation</td>
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<tr>
<td>Feb 4</td>
<td>M</td>
<td>Tillage/OM/Compaction</td>
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<tr>
<td>Feb 6</td>
<td>W</td>
<td>Crop Classification/Crop Anatomy</td>
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<td>Feb 11</td>
<td>M</td>
<td>Corn</td>
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<td>Feb 13</td>
<td>W</td>
<td>Wheat/Sorghum/Forage</td>
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<td>Feb 18</td>
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<td>Soybeans</td>
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<td>Feb 20</td>
<td>W</td>
<td>Crop Variety &amp; Seed Selection</td>
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<td>Feb 25</td>
<td>M</td>
<td>Soil Fertility</td>
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<td>Feb 27</td>
<td>W</td>
<td>EXAM</td>
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<td>Mar 4</td>
<td>M</td>
<td>Soil Fertility</td>
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<td>Mar 6</td>
<td>W</td>
<td>Planting Methods, pop/depth/row width, plant date</td>
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<td>Mar 11</td>
<td>M</td>
<td>Planting Methods, pop/depth/row width, plant date</td>
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<td>Mar 13</td>
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<td>Crop protection—weeds</td>
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<td>Mar 18</td>
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<td>Spring Break</td>
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<td>Mar 20</td>
<td>W</td>
<td>Spring Break</td>
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<td>Mar 25</td>
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<td>Crop protection—insects + diseases</td>
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<td>Mar 27</td>
<td>W</td>
<td>Water/irrigation-moisture management</td>
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<td>Apr 1</td>
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<td>Harvesting</td>
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<td>EXAM</td>
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<td>Apr 8</td>
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<td>Forage Quality/harvest</td>
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<td>Apr 10</td>
<td>W</td>
<td>Forage Quality/harvest cont.</td>
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<td>Apr 15</td>
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<td>Crop preservation, storage and utilization</td>
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<td>Apr 17</td>
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<td>Service Org – CES, NRCS Etc</td>
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<td>Apr 22</td>
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<td>Alternative use/new crops</td>
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<td>Apr 24</td>
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<td>Tropical Crops</td>
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<td>Apr 29</td>
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<td>Energy in Agriculture</td>
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<td>May 1</td>
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<td>Bio-Energy (Paper + Ag Math Due)</td>
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<td>Sustainable/Organic Ag</td>
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NON-CONVENTIONAL (GRAIN OR FORAGE) CROP PRODUCTION—DUE MAY 1ST
(100 points)
Non-conventional crop production. Give botany, uses and management practices of a grain or forage crop other than corn, soybeans, wheat or alfalfa. Must use at least 5 technical/credible literature citations from the library and cite those. Provide such information as soil management, tillage, nutrient and fertility application, varieties, planting date, depth, rate, row spacing, pests and control, water management, harvest method, time and all other practices or information needed to understand and produce the crop.

Agronomic Math—Due MAY 1ST
(100 pts)

1. A soil test for corn calls for 180 lbs/A N, 30 lbs/A P, and 80 lbs/A K. You go to your local fertilizer dealer who has Urea (46%N), Triple Super Phosphate (0-45-0) and Potash (0-0-61). How many pounds of each fertilizer would need to be mixed together to meet all the soil test recommendations. Describe a method to confirm the custom fertilizer applicator you hire applies this total amount with their truck application unit at the proper rate per acre.

2. A grain drill with 10 planter units spaced 6” apart drops approximately 70 seeds/50 ft. of travel from each of the units. What is the seeding rate in seeds/A and in pounds per acre (assume 3000 seeds/lb).

3. A pesticide sprayer has 12 flat fan-nozzles spaced 20” equally across a spray bar. In collecting water from 4 nozzles during 50 ft of travel at 4.5 mph and 20 psi the farmer obtains 20 fluid ounces of water total from the 4 nozzles. How many gallons of water/acre is the farmer applying? If the farmer plans to apply Paramount at 1 pt/A, how much Paramount should the farmer dump in a 200 gallon sprayer tank? If the farmer speeds up to 9 mph what is the farmers’ rate of Paramount application?

4. Devise a method to predict (estimate, calculate) yield of a soybean crop before harvest without physically weighing or sampling the crop.

Secondly, tell how you would determine field loss (grain) at and after harvest with a combine. Consider pre and post combining losses and indicate where they are from. Diagrams would be useful.

5. A farmer is called by two seed salespersons wanting to sell him Land O’ Lakes Sweet Sorghum Seed. One seed lot has 98% purity and 82% germination and costs $50 per 50 lb. bag, the other is 96% pure and 94% germination and costs $60 per 50 lb. bag. If the farmer wants to drill 50,000 pure live seeds/A, which is the better buy? Assuming 5000 seeds/lb, how many 50 lb. bags of seed will the farmer need to buy to plant 100 A?