

AGRONOMY 500

CAPSTONE IN AGRONOMY

Instructor: Stan Duke

Number of Credits: 2 is required

Meeting Place and Time: Rm. 128 or 346, 3:30 P.M. Tuesdays and Thursdays

Purpose of Course: To give students in Agronomy the opportunity to demonstrate that they are an excellent finished product of the Dept. of Agronomy and the UW.

1. Student should demonstrate the ability to synthesize information, predictions, insights, and/or hypothesis into a coherent, logical, and professional document.
2. Student should demonstrate the ability to synthesize information, predictions, insights, and/or hypothesis into a lucid, logical, and professional oral presentation.
3. Student should demonstrate broad knowledge of topics in Agronomy and related to Agronomy and the ability to critically think about these topics.
Ubi dubium ibi libertas (Where there is doubt, there is freedom)
-Roman Proverb
4. Student should demonstrate the ability to utilize a broad array of information sources

Requirements and Percentage of Grade for Each Requirement :

1. Paper (20 page double spaced) on a topic of your choice (approved by instructor). (30%).
2. Presentation (20 min), followed by class discussion, on the topic of your paper. (30%).
3. Critical analyses of topics presented by other students. (10%)
4. Participation in discussions on current topics related to agriculture. (10%)

Topics Covered (not necessarily in the order listed below):

1. History of Agronomy in Wisconsin and the UW - Duke
2. Assessment of Agronomy experiences and courses at the UW - Duke
3. Assessment of your general knowledge of agronomy (written questions) - will not be graded
4. Discussion of papers relevant to Agronomy:
 - a. Borlaug paper (science and anti-science as related to agriculture) - leader-Duke
 - b. Potrykus paper (golden rice) - leader-Duke
 - c. Prakash paper (history of agriculture and the controversies of trans-gene organisms)- leader-Duke

 - Student group led papers
 - d. Chrispeels (agricultural ethics)
 - e. Tillman (effects of agriculture on the environment)
 - f. Gepts (comparison of conventional plant breeding and genetic engineering)
 - g. Others to be determined (to include global warming, population and agriculture, etc)
5. Student presentations

Suggestions for Possible Topics for Agronomy Capstone papers and presentation - 2016

Agriculture: Insights into Past, Present, and Future Issues

- 1. Crops as Industrial Factories in the 21st Century**
Campus Expertise: Irwin Goldman (Horticulture), Shawn Kaeppler (Agronomy)

- 2. Patenting Life Itself: Effects on Agriculture in the 21st Century**
Campus Expertise: Most faculty in Agronomy

- 3. Genetically Engineered Crop Species: Roles in the 21st Century**
Campus Expertise: Bill Tracy (Agronomy), Mike Sussman (Biotech Center)

- 4. The Promise of Biomass Conversion to Energy: Views from the Past and Roads to the Future**
Campus Expertise: Ken Albrecht (Agronomy), Cynthia Henson (Agronomy), Joe Lauer (Agronomy), Dan Undersander (Agronomy)

5. Pest Control and the Food Supply: Perspectives on Pesticides, Plant Breeding, and Genetic Engineering from 1950 to 2050

Campus Expertise: Shawn Kaeppler (Agronomy), Joe Lauer (Agronomy)

6. Roles of the Public and Private Sectors in Agricultural Research in the 21st Century

Why should we subsidize intellectual curiosity?

-Ronald Reagan, campaign speech, 1980

There is nothing which can better deserve our patronage than the promotion of science and literature. Knowledge is in every country the surest basis of public happiness.

-George Washington, address to Congress, 1790

Campus Expertise: Most Faculty

7. Population and Agriculture: Reality and Predictions Since Publication of Paul Erlich's *The Population Bomb*

8. N₂- Fixing Corn: Implications for the 21st Century?

Campus Expertise, Shawn Kaeppler (Agronomy). Jean Michel Ané (Agronomy)

9. The Impact of Agriculture on Biological Diversity

Campus Expertise: Don Waller (Botany), Dan Undersander (Agronomy), Irwin Goldman (Horticulture)

10. Organic Agriculture: Pseudoscience or Science?

We simply can't conclude that science puts too much power in the hands of morally feeble technologists or corrupt, power-crazed politicians and decide to get rid of it. Advances in medicine and agriculture have saved vastly more lives than have been lost in all the wars in history.

-Carl Sagan, *The Demon-Haunted World* 1996

Campus Expertise: Randy Jackson (Agronomy), Bill Tracy (Agronomy)

11. The Impact of New Crops for the 21st Century

Campus Expertise: Ken Albrecht (Agronomy)

12. Effects of Bt Corn, Roundup Ready Crops and Other Transgenics on the Seed Industry

Campus Expertise: Bill Tracy (Agronomy), Bill Tracy (Agronomy), Joe Lauer (Agronomy), Gene Amberson (Wisconsin Crop Improvement Association, retired)

13. Global Warming and Agriculture in the 21st Century

Campus Expertise: Jiwan Palta (Horticulture), Chris Kucharik (Agronomy),

14. Roundup Ready and Other Herbicide Resistant Crops: Are Weeds Doomed

Campus Expertise: David Stoltenberg (Agronomy), Joe Lauer (Agronomy)

15. Crop Yields: Will We Reach the Limits in the 21st Century?

Campus Expertise: Jim Coors (Agronomy, retired), Stan Duke (Botany), Bill Tracy (Agronomy)

16. Industrial Hemp: Is It a Viable Crop for Wisconsin?

Campus Expertise: Mike Casler (Agronomy)

17. The Role of Ag. Extension in the 21st Century

All Extension Faculty

18. How Can Agroecology Contribute to Agriculture?

Randy Jackson (Agronomy), Bill Tracy (Agronomy), David Stoltenberg (Agronomy)

19. Food Security – Past Approaches and Threats and Future Plans and Threats

Stan Duke – (Agronomy)

Collecting and Using Information on Your Topic:

1. Data Gathering

It is a capital mistake to theorize before one has data. Insensibly one begins to twist facts to suit theories, instead of theories to suit facts.

-Sherlock Holmes (in Arthur Conan Doyle's *A Scandal in Bohemia* [1891])

Usually Reliable Sources

Library (Refereed journal articles, books, etc.)

Scientists that have worked in the area

Often Unreliable Sources

Internet

Popular press books

Popular press magazines and newspapers

Television documentaries

2. Analysis of Data, Hypotheses, Theories, and Predictions

To analyze hypotheses, theories, and predictions, a thorough understanding of the data is usually required.

3. Formulating your own Prediction, Theory, or Hypothesis

This is usually the hard part. Critical thinking is usually required.

The perceptions as to the value and meaning of this exercise will vary with each of you.

-Stan Duke

Format for Paper for Agronomy 500 Capstone

Font: 12 pt. (Your choice of style e.g. universal, courier, etc.), (All species names should be in italics, e.g. *Pisum sativum L.*),. (All sections headings should be in bold type)

Spacing: Double space throughout

Page Justification and Pagination: Left or Full justification, number all pages consecutively at bottom center or top center

Margins: Top, Bottom, Left, Right: 1"

Figures and Tables: Not to exceed 40% of the text, excluding references

Paper Length - for 1 credit: 20 pages (includes references, tables, figures)

Citations: List citation within the text immediately after the information cited. Examples: The primary α -amylase in vegetative tissues of all higher plants is localized to the apoplast (Beers and Duke 1988). One expert that I interviewed indicates that increased levels of atmospheric CO₂ in the 21st century will increase productivity of C-3 crop species by as much as 50% (Smith 1997).

List citations in reference section alphabetically by author. Do not number references.

Examples of how to cite references:

Journal Article:

Sun Z, Duke SH, Henson CA. 1995. The role of pea chloroplast α -glucosidase in transitory starch degradation. *Plant Physiology* **108**:211-217.

Book Chapter:

Beck E, Pongrantz P, Reuter I 1981. The amylolytic system of isolated spinach chloroplasts and its role in the breakdown of assimilatory starch. *In* G Akoyunoglou, ed, Proceedings of the Fifth International Congress on Photosynthesis, Vol. 4, Balaban International Science Service, Philadelphia, pp 529-538.

Interview:

Chowderhead I. 1997. Interview, Professor Ima Chowderhead, Dept. of Food Science, University of Wisconsin, 12 April 2009.

Sections of Paper:

TITLE (Center, All CAPS, Bold type)

Author and Affiliation (Center, italic type)

Introduction

This is the first sentence of the Introduction. In this section you will set the stage for the primary discussion in the paper by stating the problem you are addressing or giving background material leading up to the main discussion.

Discussion

Sets of Topics

This section may be subdivided into logical sets of topics.

Conclusions

Concisely summarize your conclusions concerning the topic you have picked

Literature Cited