

I. Catalog Description and Credit Hours of Course:

Designed to familiarize students with site-specific technology, including use of GPS and GIS, through a hands-on experience. Two lectures; two-hour lab. Prerequisite: AO 120/020. (3)

II. Prerequisites:

AO 120/020

III. Purposes or Objectives of the Course:

At the completion of the course, students should be able to:

- A. Understand and be able to use Geographic Information System (GIS) software
- B. Understand and be able to use Global Positioning System (GPS) units
- C. Use GPS guidance systems
- D. Integrate GPS and GIS in the use of variable-rate technology
- E. Work with groups for problem solving, using learned management skills

IV. Expectations of Students:

- A. Lecture, lab and discussion will be based on reading assignments. Therefore students are expected to read assignments before class.
- B. Attendance is important to success in the class.
- C. Any papers that are handed in after the deadline will result in the penalty loss of one letter grade with each day. There will be no exceptions for the late policy.
- D. Academic dishonesty will not be tolerated in any form and will be handled according to University Policy
- E. Policy on group projects is that one must complete the work as a team with each member completing a portion of the end product. However, if a person is not comfortable in receiving the group grade, a person may complete the entire project individually (but this must be in addition to the group work).

V. Course Content or Outline:

- A. Introduction – This course will be hands-on application of site-specific technology, such as GPS and GIS, for the management of natural resources.
- B. Issues in Site-specific Management in Agriculture and Natural Resources
 - 1. Technology and Agriculture
 - 2. Technology and Natural Resources
 - 3. Use of Precision Technologies
 - 4. Soil Fertility – N, P, K
 - A. Manure and Runoff
 - 5. Crop Management Zones
 - 6. Environmental Quality Projects
- C. Sampling Methods and Measurements
 - 1. Grid Sampling
 - 2. Random Sampling

3. Yield Monitors
 4. Yield Maps
 5. Variable Rate Technology
 6. Electro conductivity
- D. Maps
1. Reading
 2. Topography
 3. Coordinate Systems
 4. Projections
- E. Global Positioning Systems
1. What is GPS?
 2. Mapping – points, lines, polygons
 3. Differential GPS
 4. Real-time GPS
 5. Navigation
 6. Post-processing data
 7. Data Conversion for use in GIS
- F. Geographic Information Systems
1. What is GIS?
 2. Data
 - A. Types (Vector and Raster)
 3. Editing
 4. Managing a Database
 5. Mapping
 6. Models
 7. Analyzing
 8. Reporting
 9. Metadata
 10. Standards
 11. Information Sources
 12. Privacy
- G. Remote Sensing and Imagery
1. Aerial Photos
 2. Digital Maps
 3. Remote Sensing
 4. Near-infrared imaging
- H. Spatial Mapping
- I. Geostatistics
- J. Other topics as time allows

VI. Textbook(s) and/or other Required Materials or Equipment:

- A. Clarke, KC. 2001. Getting Started with Geographic Information Systems, 4th ed. Prentice Hall, Inc., Englewood Cliffs NJ

VII. Basis for Student Evaluation:

- A. Weekly lab projects (20 percent)

- B. Lab project and presentation (25 percent)
- C. Group presentations (5 percent)
- D. Four exams (50 percent)
- E. Grading system:
 - A 90-100%
 - B 80-89%
 - C 70-79%
 - D 60-69%