

Irrigation Systems Design - Syllabus - Winter 2019

Linn Benton Community College – Agricultural Sciences Department

Course Numbers	AG 250	CRN: 31187
Course Credits:	3 credits	
Meeting Time & Room:	Lectures: MW 10:00-10:50	WOH 122
	Lab: M 1:00-2:50	WOG 122/Greenhouse
Instructor:	Dr. Stefan Seiter Office: WOH 124 Phone (voice mail): (541) 917-4765 E-mail address: stefan.seiter@linnbenton.edu Website: http://cf.linnbenton.edu/mathsci/aghort/seiters	
Office Hours:	Tuesday and Thursday 10:00-10:50 or by appointment	

Course Description:

This course covers the principles and practices of basic irrigation system design and installation. Topics include soil/water/plant relationships, water conservation, basic hydraulics, crop water requirements and soil characteristics, the process of system design and plan preparation, system parts and components, installation, backflow prevention, public and personal safety, permits and licenses, and drainage systems.

Course Materials:

Required Text: "Principles of Irrigation" from the Irrigation Association. Readings are in the Moodle course management system, online, or from course handouts. Keep a binder to collect materials. Students have to be enrolled in Moodle <http://elearning.linnbenton.edu>. A pocket calculator is also needed.

Course Outcomes

The successful completion of this course will enable you to:

- Demonstrate an understanding of plant-water-soil relationships.
- Identify components and capacity of common horticultural and crop production irrigation systems.
- Design a basic irrigation system considering economic, environmental and crop production factors.
- Describe water conservation measures that are appropriate to the local environment and plant production system.

Waitlist Policy

If the class is full, registered students not attending the first session without advance notice to the instructor will be dropped from the class and students from the waitlist will take their spots. Waitlisted students must get instructor approval to become registered students.

Course Evaluation

You will be evaluated through exams, quizzes, a final project presentation, and lab reports. You have to **let the instructor know in advance** (via email, phone or personal message) if you are not able to take a quiz on the designated date. A makeup quiz will only be made available to students who follow this procedure. Labs require your presence and can not be made up. Keep track of your grades in quizzes and assignments.

Grades:

The grading system for the course is "A-F". Final grades will be based on the percentage of total points earned. A = 90% and above; B = 80 to 89%; C = 70 to 79%; D = 60 to 69%; F = 59% and below

Quizzes	10% (x4)	>	40 %
Lab Participation	3.75 % (x8)	>	30 %
Final Project			30 %

Grading notes: Missing more than two labs will result in 0 % in the lab portion of the grade.

Incomplete Grade: An Incomplete will not be issued. Notify the instructor if you are no longer able to attend class. Students may request Audit status in place of a letter grade before the end of the second week.

Student Integrity:

All students are expected to take exams with integrity, jeopardizing neither their own honesty nor that of other students. Plagiarism will result in 0 points for the assignment and may result in further disciplinary action. Plagiarism is a turning in someone else's work as your own or using sources without proper credit. Do not copy material from the internet or from any other source and present it as your own.

Disabilities Services:

Students who may need accommodations due to documented disabilities, who have medical information which the instructor should know, or who need special arrangements in an emergency, should speak with the instructor during the first week of class. If you have not accessed services and think you may need them, please contact Disability Services, 917-4789.

Classroom Guidelines

- This is your course. You will learn the most if you actively participate in classroom discussions and share your experience and questions. At the same time, respect other students' desire to learn while listening attentively and appreciating other points of view.
- This is your classroom. Take responsibility for it by straightening up tables and chairs when you leave. Clean up the lab and put away equipment at the end of class. Pick up litter.
- Arrive promptly before class begins. If late, enter quietly.
- Turn off your cell phone. Let the instructor know if you need to leave the cell phone on for emergency reasons.
- Use electronic devices only as directed. Anyone who engages in rude, thoughtless, selfish behavior such as use of a cell phone or laptop for instant messages, games, email, web surfing etc., will be excused from the class. The student can return to the next class session only if he or she submits a report reflecting on the behavior and apologizes to the class.
- No food or drink is allowed in the classroom during class time. No tobacco products may be used in the classroom at any time.
- Please remove hats in the classroom. Head coverings worn for religious or medical reasons are acceptable.
- Know basic safety rules. Report any accidents, injuries, or problems immediately.
- Do not come to class when you are ill and are likely to infect others. Academic work can be made up when you return.
- Minor children will not be allowed in the classroom or lab areas for safety reasons. Check with the LBCC family resource center for child care options during in-service school days.
- Security is a primary concern on campus. Be responsible for your things and considerate of other students' belongings.
- Let faculty or staff know if you are experiencing academic difficulties. Assistance is available. The LBCC Learning Center provides students with academic support and a comfortable place to study. For available services go to <http://www.linnbenton.edu/go/learning-center>
- Be aware of Student Rights and Responsibilities. For more information go to <http://www.linnbenton.edu/studentrights/index.html>

Course Schedule - AG 250 - Irrigation Systems

Wk	Monday Lecture	Monday Lab	Wednesday Lecture	Readings: Chapters from "Principles of Irrigation" or Moodle
1 01-07	Course Introduction	Irrigation Overview Irrigation Components	Soil Plant Water Relation - Part 1	Ch 1 Irrigation Systems for Landscape/Turf & Agriculture
2 01-14	Soil Plant Water Relation - Part 2	Water Use - Irrigation Requirement	Quiz 1 Basic Hydraulics	Ch 2 Soil, Plants & Water
3 01-21	Holiday	Holiday	Hydraulic Calculation	Moodle: Master Basic Hydraulics for Chapter 8: Hydraulics
4 01-28	Irrigation System Design Capacity	Design Capacity Irrigation Pipe	Pipe Sizing	Ch 5 Irrigation Sched. Ch. 7 Pipes and Fittings
5 02-04	Quiz 2 Sprinklers	Precipitation Rates Sprinkler Spacing	Valves & Backflow Prevention - Project Description Due	Ch 3 Precipitation Rates Ch 4 Efficiency & Unifo. Ch 6 Control Valves, Specialty V. & Backflow
6 02-11	Drip Systems - Part 1	Drip System Design	Subsurface Drip for Field Crops	Moodle: Drip Irrigation Design Tutorial
7 02-18	Holiday	Holiday	Quiz 3 Electricity for Irrigation	Moodle: Drip Irrigation for Row Crops
8 02-25	Field Crop Sprinklers	Hydraulics 2	Irrigation Pumps	Ch 9 Pumps for Irrigation
9 03-04	Irrigation System Maintenance	Irrigation Scheduling	Quiz 4 Drainage	Moodle: a) Solutions to LS Drainage Problems; b) Agricultural Drainage
10 03-11	Environmental Impact - Water Conservation	TBA	Student Project Reports Due 03/14 Presentations A	Moodle: a) Strategies for Efficient Water Use; b) Environm. Impact of ...
Finals Week	March 20 - 8:00-9:50 Student Project Presentations B			

Dates may change depending on the progress toward learning outcomes and needs of students and the instructor.

Instructions for Irrigation Systems Final Project

Your task

Develop an irrigation system design. Select an actual site for your project. Possible sites include gardens, agricultural fields, lawns, athletic fields, golf courses, or other sites for horticultural or agricultural purposes that you are familiar with. According to your selection, the plants/crops on this site may be ornamentals, fruit trees, turf, row crops, or any other agricultural/horticultural commodity. Select a manageable size (a “manageable” size may differ whether you choose a field crop or an ornamental garden). You may use a single or a mix of irrigation types (e.g. sprinkler, drip, or center pivot, side roll, flood, etc.).

Element of the Project

- Site information for the whole site and distinct sections including area dimension, slope, soil characteristics, shading (if any), crop(s), crop water use, irrigation requirements.
- Irrigation system capacity, water, and power supply.
- Irrigation system design including circuits, valves, laterals and mainlines, pipe sizes, and flow and pressure data, backflow prevention and pumps. Show your calculations for friction losses and sizing of pumps and pipe.
- Irrigation schedule - Show how your schedule meets the needs of the crops during at least three times of the growing season (early, mid and late season)
- References in proper citation format (in report only)

Project Report Format

Submit a typed report using a 12 pt font with 1.5 line spacing. Describe the above mentioned elements of the irrigation system design. Include a sketch of the site showing the site information. Include sketches of the finished design showing the elements of the irrigation system. Also include other relevant information (for example a copy of the soil map). Properly reference all sources of information you used.

Presentation Format

Present the above mentioned elements of the irrigation system design to the class in a 10 minute presentation. Include visuals such as photos, overheads, maps, sketches, powerpoint presentation, etc. Do not present detailed calculations of friction loss, and pump and pipe sizing.

Evaluation

The final project represents 30% of your grade (15 % for the report and 15 % for the presentation). Thirty% of your grade means that it is expected that you spend 20-30 out of class hours on this project. In both, presentation and report, the grade will be based on the completeness and accuracy of the above described elements. In addition, spelling and structure will be evaluated in the report while clarity, organization, oral presentation skill and will be part of the grade in the oral presentation.

Timeline 2019

- Discuss with instructor and submit project description by **January 30**
- Submit project report to instructor by **March 13**.
- Presentation Date **TBA**