Lassen Community College Course Outline

AGR-42 Farm Surveying, Irrigation and Drainage

3.0 Units

I. Catalog Description

Student will be involved in irrigation and drainage problems concerning pumps, motors, sprinkler systems, pipe lines, ditches, and wells. The use of survey or leveling equipment will be applicable to this course as fields are prepared for irrigation systems. This course has been approved for hybrid delivery.

Transfers to CSU only 17 Hours Lecture 102 Hours Lab Scheduled:

II. Coding Information

Repeatability: Take 1 Time Grading Option: Graded

Credit Type: Credit - Degree Applicable

TOP Code: 011600

III. Course Objectives

A. Course Student Learning Outcomes

- 1. Students will be able to properly address irrigation concerns and implement solutions
- 2. Students will be able to implement at least two irrigation systems

B. Course Objectives

Upon completion of this course the student will be able to:

- 1. Explain the effects of poor drainage
- 2. Explain four different types of irrigation systems
- 3. Explain land preparation for different irrigation systems
- 4. Explain water distribution
- 5. Demonstrate farm equipment safety
- 6. Demonstrate proper use of surveying and laser leveling equipment
- 7. Develop a plan to solve poor drainage problems
- 8. Demonstrate an understanding of soil moisture
- 9. Operate different irrigation systems
- 10. Repair, maintain and modify irrigation and drainage systems

IV. Course Content

- A. Theory of leveling
- B. Type of leveling methods used
- C. Land preparation for irrigation
 - 1. Surveying
 - 2. Contours
 - 3. Checks
- D. Distribution and conveyance of water
 - 1. Pipelines
 - 2. Ditches, canals

- 3. Control devices
- 4. Pivot systems
- 5. Basic movement of water
- E. Soil-moisture relations
 - 1. Properties of soil
 - 2. Characteristics of water
 - 3. Soil moisture levels
 - 4. How moisture is held in the soils
 - 5. How soil moisture is measured
- F. Plant moisture, soil relations
 - 1. Identifying drainage problems
 - 2. Soil type and water holding capacity
- G. Application of irrigation water
 - 1. Principles, efficiencies
 - 2. Furrow irrigation
 - 3. Flood irrigation
 - 4. Sub irrigation
 - 5. Sprinkler irrigation including pivot systems
 - 6. Irrigation of specific crops
- H. Drainage of irrigated lands
 - 1. Principles of drainage
 - 2. Field layout
 - 3. Liners and drainage devices
 - 4. Construction of gravity flow systems

V. Assignments

A. Appropriate Readings

Primary sources for course reading will include 'California Farmer' trade journals on water control, and agricultural extension bulletins.

B. Writing Assignments

Students will keep records of irrigation schedules accomplished, record of hours required for completing each task, and records of vapor-transpiration rates. Written evaluation is required.

C. Expected Outside Assignments

- 1. Student will evaluate neighboring irrigation systems and note deficiencies.
- 2. Discuss with irrigation specialists possible solutions to problems encountered.
- 3. Critically evaluate the efficiency of the systems operated.

D. Assignments that Demonstrate Critical Thinking

Student will develop hypothesis using all previously acquired knowledge of why: 1) Some of the crop is producing less in a given area, 2) Variations in crop relative to irrigation system (ex.: highs and lows in sprinkled fields).

VI. Methods of Evaluation

Traditional Classroom Evaluation

- A. Written and practical Tests
- B. Ability to follow instructions intelligently.
- C. Ability to use different irrigation equipment.
- D. Effectiveness in problem solving.

Hybrid Evaluation

All quizzes and exams will be administered during the in-person class time. Students will be expected to complete online assignments and activities equivalent to in class assignments and activities for the online portion of the course. Electronic communication, both synchronous and asynchronous (chat/forum) will be evaluated for participation and to maintain effective communication between instructor and students.

VII. Methods of Delivery

Check those delivery methods for which, this course has been separately approved by the Curriculum/Academic Standards Committee.

☐ Traditional Classroom Delivery	Correspondence Delivery
	Online Delivery

Traditional Classroom Delivery

Lecture, Demonstrations, and practical operation of irrigation systems.

Hybrid Delivery

A combination of traditional classroom and online instruction will be utilized. Every semester, a minimum of 17 hours of class will be taught face-to-face by the instructor and the remaining hours will be instructed online through the technology platform adopted by the District. Traditional classroom instruction will consist of lectures, visual aids, discussions and group activities. Online delivery consists of instructor-generated information, readings, news communications, web links and activities as well as facilitation of forum based discussions and communications.

VIII. Representative Texts and Supplies

Waller, Peter, *Irrigation and Drainage*; 2nd edition, 2018; Springer, ISBN 9783319056982

Primary sources will include equipment manuals specific to repair and maintenance as well as recording systems for tasks accomplished.

IX. Discipline/s Assignment

Agricultural Engineering

X. Course Status

Current Status: Active

Original Approval Date: 2/27/1990

Revised By: Brian Wolf

Curriculum/Academic Standards Committee Revision Date: 11/03/2020

Revised for IPR, no change: 03/15/2022