BUTTE COLLEGE
COURSE OUTLINE

I. <u>CATALOG DESCRIPTION</u>

EH 74 - Irrigation System Design   **3 Unit(s)**

Prerequisite(s): NONE
Recommended Prep: Reading Level III; English Level III; Math Level III

Transfer Status: CSU

51 hours Lecture

This course is a study of the design of irrigation and drainage systems. Emphasis will be placed on pipe sizing, friction loss calculations, pressure requirements, pumping stations, points of connection and backflow prevention devices. The students will learn mathematic equations/calculations used for proper design and installation.

II. <u>OBJECTIVES</u>

Upon successful completion of this course, the student will be able to:
- A. Design irrigation and drainage systems for landscapes and agriculture.
- B. Read and analyze irrigation plans, and ascertain the overall quality of those plans.
- C. Locate and interpret reference data for hydraulics, pumping systems, pipe sizing, friction losses and equipment use specifications.
- D. Complete a set of working drawings for an irrigation and drainage system.
- E. Relate Cross Connection Codes for the State of California to clients and employees and specify the proper Backflow Prevention Device for each application.
- F. Interpret the latest State of California code requirements for landscape and agriculture irrigators.

III. <u>COURSE CONTENT</u>

A. **Unit Titles/Suggested Time Schedule**

Lecture

<u>Topics</u>	<u>Hours</u>
1. Introduction-Why Irrigation and Drainage Is Necessary	2.00
2. Site Information-Gathering and Recording Process	3.00
3. Water Supplies-Points of Connection, Quantity and Quality	6.00
4. Hydraulics-Friction Losses, Feet of Head, GPM (Gallons Per Minute) Flow and Pipe Sizing	6.00
5. Cross-Connection Control and the Need for Backflow Prevention	3.00
6. Pumping Systems-Remotes and Boosters	3.00
7. Head Layout, Piping and Circuit Zoning	6.00
8. Irrigation System Drafting and Plot Plans	6.00
9. Special Systems	6.00
10. Control Systems	3.00
11. Drainage Needs and Design	3.00
12. Specification Writing	2.00
13. Plan Details	2.00
Total Hours	51.00

IV. **METHODS OF INSTRUCTION**
    A. Lecture
    B. Instructor Demonstrations
    C. Guest Speakers
    D. Field Trips
    E. Homework: Students are required to complete two hours of outside-of-class homework for each hour of lecture
    F. Discussion
    G. Problem-Solving Sessions

V. **METHODS OF EVALUATION**
    A. Exams/Tests
    B. Quizzes
    C. Portfolios
    D. Projects
    E. Final Examination
    F. Written Assignments
    G. Short papers

VI. **EXAMPLES OF ASSIGNMENTS**
    A. Reading Assignments
        1. Read the chapter on recording site information in order to understand the necessary tools to use and information to be gathered on the first site visit. Be prepared to discuss in class.
        2. Read the chapter on basic hydraulics to better understand how hydraulics affect an irrigation system. Be prepared to discuss in class.
    B. Writing Assignments
        1. Write a specifications/materials legend for an irrigation plan.
        2. Write an irrigation schedule for a plan that you have drawn, considering evapotranspiration replacement during the window of operation.
    C. Out-of-Class Assignments
        1. Interview a landscape/irrigation contractor about their experience in the trade and whether or not that individual designs the systems they build. Present your findings to the class.
        2. Examine irrigation systems in your neighborhood during and after operation to discern overall effectiveness of the systems observed then report back to the class about what you have seen.

VII. **RECOMMENDED MATERIALS OF INSTRUCTION**
Textbooks:
    A. Hunter Industries. <u>Irrigation System Design</u>. 5th Edition. Hunter Technical Services, 2012.
    B. Rainbird Sales, Inc. <u>Landscape Irrigation Design Manual</u>. 2013 Edition. Rainbird, 2013.
    C. Rainbird Sales, Inc. <u>Low Volume Landscape Irrigation Design Manual</u>. 2012 Edition. Landscape Drip Division, 2012.

Materials Other Than Textbooks:
    A. Student Materials: 1. Drafting equipment (as needed) 2. Three-hole binder 3. Calculator (scientific notation recommended)

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