

**HORT 92.1 Course Outline as of Spring 2012****CATALOG INFORMATION**

Dept and Nbr: HORT 92.1 Title: LANDSCAPE IRRIGATION

Full Title: Landscape Irrigation

Last Reviewed: 12/12/2023

| Units   |      | Course Hours per Week |      | Nbr of Weeks | Course Hours Total |       |
|---------|------|-----------------------|------|--------------|--------------------|-------|
| Maximum | 3.00 | Lecture Scheduled     | 2.00 | 17.5         | Lecture Scheduled  | 35.00 |
| Minimum | 3.00 | Lab Scheduled         | 3.00 | 6            | Lab Scheduled      | 52.50 |
|         |      | Contact DHR           | 0    |              | Contact DHR        | 0     |
|         |      | Contact Total         | 5.00 |              | Contact Total      | 87.50 |
|         |      | Non-contact DHR       | 0    |              | Non-contact DHR    | 0     |

Total Out of Class Hours: 70.00

Total Student Learning Hours: 157.50

Title 5 Category: AA Degree Applicable

Grading: Grade or P/NP

Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP

Also Listed As:

Formerly: AG 91B

**Catalog Description:**

Prepares students to design, install, and maintain a water efficient landscape irrigation system. Topics include basic hydraulics, component identification and terminology, system layout, pipe sizing, and types of valves, heads, and controllers.

**Prerequisites/Corequisites:****Recommended Preparation:**

Eligibility for ENGL 100 or ESL 100

**Limits on Enrollment:****Schedule of Classes Information:**

Description: Prepares students to design, install, and maintain a water efficient landscape irrigation system. Topics include basic hydraulics, component identification and terminology, system layout, pipe sizing, and types of valves, heads, and controllers. (Grade or P/NP)

Prerequisites/Corequisites:

Recommended: Eligibility for ENGL 100 or ESL 100

Limits on Enrollment:

Transfer Credit: CSU;  
Repeatability: Two Repeats if Grade was D, F, NC, or NP

## **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

|                      |                      |            |             |            |           |
|----------------------|----------------------|------------|-------------|------------|-----------|
| <b>AS Degree:</b>    | <b>Area</b>          |            |             | Effective: | Inactive: |
| <b>CSU GE:</b>       | <b>Transfer Area</b> |            |             | Effective: | Inactive: |
| <b>IGETC:</b>        | <b>Transfer Area</b> |            |             | Effective: | Inactive: |
| <b>CSU Transfer:</b> | Transferable         | Effective: | Spring 1988 | Inactive:  | Fall 2018 |
| <b>UC Transfer:</b>  |                      | Effective: |             | Inactive:  |           |

### **CID:**

#### **Certificate/Major Applicable:**

Both Certificate and Major Applicable

## **COURSE CONTENT**

### **Outcomes and Objectives:**

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

1. Describe soil/water relationship.
2. Identify system components on an irrigation plan.
3. Describe and calculate friction loss.
4. Calculate water pressure and flow at key points in a system.
5. Explain the function of backflow prevention devices.
6. Describe the major types of sprinkler heads, valves, and controllers.
7. Space sprinkler heads for uniform application and specified precipitation rate.
8. Select pipe material based on use, water pressure, and flow.
9. Identify and select pipe fittings.
10. Work with others to install PVC pipe, sprinkler heads, and remote control valves.
11. Program a controller for water-efficient system operation.
12. With a small group, perform a water audit to determine system efficiency.
13. Troubleshoot and solve irrigation system problems.
14. Prepare and present a material take-off for an irrigation system.

### **Topics and Scope:**

- I. Basic hydraulics and water movement through pipe
  - A. Static pressure
  - B. Dynamic (operating) pressure
  - C. Flow (GPM)
  - D. Velocity
  - E. Friction loss
  - F. Calculation of water forces at key system points.
- II. Soil and plant water relations
  - A. Soil types and drainage/aeration characteristics
  - B. Soil water holding capacity and rooting depth
  - C. Water use of plant types

- D. Evapotranspiration concept and reference ET
- E. Infiltration rates of soils
- III. Water supply
  - A. City mains and service lines
  - B. Wells, pumps, and storage facilities
- IV. Assembly methods and installation of system components
  - A. Sprinkler heads and nozzles
  - B. Manual and remote control valves
  - C. Backflow prevention devices
  - D. Pressure regulators
  - E. Controllers
- V. Pipe and fittings
  - A. PVC pipe
    - 1. Class and schedule
    - 2. Nomenclature of fittings and connectors
    - 3. Tools, cements, glues, tapes
    - 4. Assembly and installation
  - B. Polyethylene pipe
    - 1. Nomenclature of fittings and connectors
    - 2. Drip and low volume tubing, emitters, and sprayers
    - 3. Retrofit adapters
    - 4. Assembly and installation
  - C. Galvanized steel pipe
    - 1. Nomenclature of fittings and connectors
    - 2. Tools, thread compounds, tapes
    - 3. Assembly and installation
- VI. System planning and layout
  - A. Available water pressure and flow at point of connection
  - B. Watering zones (hydrozones)
  - C. Head selection and placement
  - D. Precipitation rates and head spacing
  - E. Circuiting heads into valve groups
  - F. Location of valves, main lines, and lateral lines
  - G. Sizing valves and pipe
  - H. Location of controller and sizing power and valve wires
  - I. Controller programming and system operation check
- VII. Estimating costs
  - A. Irrigation plan reading and standard symbols
  - B. Material take-off
  - C. Supplier catalogs and price lists
- VIII. Water-efficient system operation
  - A. Water audit method of determining system efficiency
  - B. Use of California Irrigation Management Information System (CIMIS) and other ET data resources
  - C. Implementation of ET data in controller programming
  - D. Troubleshooting problems
  - E. Adjustments and repairs
  - F. Local water agency assistance and resources

**Assignment:**

1. Install a PVC irrigation system

2. Weekly readings in textbook
3. Calculate static, working, and design pressure (worksheets and related assignments)
4. Identify system components (worksheets)
5. Program a basic residential irrigation controller
6. Field trip participation and reports (2-4)
7. Two to three quizzes
8. Midterm and final exam

### Methods of Evaluation/Basis of Grade:

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Field trip reports

Writing  
5 - 15%

**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Calculation, design, and identification worksheets

Problem solving  
20 - 40%

**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Programming of irrigation controller; installation of irrigation system

Skill Demonstrations  
5 - 15%

**Exams:** All forms of formal testing, other than skill performance exams.

Quizzes, midterm, final: multiple choice, true/false, matching items, completion

Exams  
30 - 60%

**Other:** Includes any assessment tools that do not logically fit into the above categories.

Attendance and participation

Other Category  
0 - 10%

### Representative Textbooks and Materials:

Irrigation Design Manual. Rain Bird (current online version)  
California Landscape Contractor Association, California Landscape Standards. CLCA, Sacramento, CA. 1998 (Classic)  
Instructor prepared materials