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**Course Outline for VWT 12**

**VINEYARD SOIL/FERTILIZER/IRRIG**

**Effective: Fall 2004**

I. CATALOG DESCRIPTION:
VWT 12 — VINEYARD SOIL/FERTILIZER/IRRIG — 3.00 units

Introduction to the basic principles of soil science, mineral nutrition, components installation, and plant/water relationships for grape production. Planning, design and maintenance of sprinklers and drip irrigation systems for winery for vineyards. 3 hours

3.00 Units Lecture

**Grading Methods:**
Letter or P/NP

**Discipline:**

| | MIN |
|---|---|
| **Lecture Hours:** | 54.00 |
| **Total Hours:** | 54.00 |

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: 1

III. PREREQUISITE AND/OR ADVISORY SKILLS:

IV. MEASURABLE OBJECTIVES:

**Upon completion of this course, the student should be able to:**

1. identify the principal components of soil and soil profiles
2. explain the genesis and morphology of soils
3. explain water movement in soils
4. describe nutrient availability and uptake by plants
5. describe the basics of soil and plant tissue analysis
6. prepare a plan to study the mineral nutrition needs of a vineyard
7. explain the basic principles of irrigation
8. identify irrigation methods used in a vineyard
9. schedule irrigation for a vineyard
10. diagnose problems related to soils, fertilizers and irrigation
11. describe the relationship between soil type and irrigation method selected
12. describe the reasons for selecting a particular fertilizer and/or fertilizer material for a particular vineyard

V. CONTENT:

A. General Introduction
   1. Concept of soil
   2. Soil profile
   3. Soil as a medium of plant growth
B. Physical Soil Properties
   1. Soil texture
   2. Soil minerals
   3. Soil structure
   4. Effects of structure on plant growth and soil water
   5. Soil and plan tissue testing and analysis
   6. Soil conservation
C. Soil Air and Water
   1. Soil porosity and saturation
   2. Soil water – physical and chemical characteristics
   3. Soil plant water relationships
   4. Moisture states of soil and their measurement
D. Water in Soil Plant Systems
   1. Water storage in soil
   2. Water content and water potential
   3. Water movement in soil
   4. Water stress in plants
   5. Evapotranspiration
E. Managing Soil Water and Irrigation
   1. Water infiltration

2. Water drainage in soil
    a. Natural
    b. Man-made

F. Soil Erosion
1. Causes and effects of water erosion
2. Managing erosion
3. Watershed monitoring and stream protection

G. Fertilizers
1. Grapevine mineral nutrition
2. Essential plant nutrients
3. Fertilizer formulations
4. Vineyard fertilization materials
5. Methods of applying vineyard fertilizers
6. Fertigation and foliar feeding
7. Diagnosing nutrient problems

H. Irrigation Methods
1. Drip
2. Sprinkler
3. Furrow

I. Irrigation Monitoring
1. Mechanical
2. Interpretive

J. Irrigation Scheduling

K. Diagnosing problems related to soils, fertilizers and irrigation

## VI. METHODS OF INSTRUCTION:

A. **Discussion** -
B. **Lecture** -
C. **Audio-visual Activity** - Media presentations
D. **Field Trips** -
E. **Demonstration** -

## VII. TYPICAL ASSIGNMENTS:

A. Weekly reading assignments 1. Read Chapter 16 in Winkler (Irrigation) 2. Read Chapter 4 on Essential Plant Nutrients in the Fertilizer Handbook 3. Write a 2-page paper discussing the factors that determine the number of irrigations required and the amount of water to be applied at each B. Field trips at specified locations

## VIII. EVALUATION:

A. **Methods**

1. Exams/Tests
2. Quizzes
3. Field Trips
4. Class Participation
5. Home Work
6. Final Performance
7. Other:
    a. Methods of Evaluation
        1. Mid-term examinations
        2. Short quizzes
        3. Homework assignments
        4. Student participation in classroom and field trips
        5. Final exam
    b. Sample Problems
        1. The preferred soil for most wine grapes is:
            a. Clay
            b. Loam
            c. Sand
            d. Rocks
        2. Which of the following is not a factor in determining the time and frequency of irrigations?
            a. Soil type and depth
            b. Fertilizer type
            c. Climate
            d. Time of ripening
        3. Excess nitrogen during ripening will tend to divert the sugar produced by the leaves to continued shoot growth
            a. True
            b. False

B. **Frequency**

1. Several mid-term examinations

## IX. TYPICAL TEXTS:


1. - *Western Fertilizer Handbook.* 9th ed., Interstate Publishers, Inc., 1995.
2. A.J. Winkler, James A. Cook, W.M. Kliewer, and Lloyd Lider *General Viticulture.* 2nd ed., University of California Press, 1974.
3. Robert E. White *Soils for Fine Wines.* 1st ed., Oxford University Press, 2003.
4. Keith Shepersky *Drip Irrigation Design Manual.*, Rain Bird Irrigation Company, 0.


## X. OTHER MATERIALS REQUIRED OF STUDENTS: