

# Fruit and Nut Production

PSSC 366  
Spring 2011

<b>Instructors:</b>	Dr. Rich Rosecrance	<b>Office:</b>	223 Plumas
<b>Class Schedule:</b>	MW 8:00 - 8:50	<b>Office Hours:</b>	Rosecrance: MW 10:15-11:45 M 2:30 - 3:30; T 2:30-3:30
<b>Lab Schedule:</b>	W 2:00- 5:00	<b>Email:</b>	rrosecrance@csuchico.edu

**Required Text:** 1. *Tree Fruit Physiology: Growth & Development*, Karen Maib Editor  
2. Reader

## Course Content and Goals

When you have successfully completed this course, you will have met the following objectives, described as learner outcomes by the College of Agriculture:

- **Biological and Physical Sciences** - You will have acquired basic knowledge of one of the biological sciences and its many interrelationships with the other life sciences as well as the physical sciences.
- **Communications** - You will have mastered the primary form of written communications used in the scientific community and will thereby have gained an appreciation for scientific research and publication.
- **Data Evaluation** - You will be able to interpret statistical data from conducted experiments, and will be able to provide meaningful applications of those results.
- **Environmental Concerns** - You will be better able to describe both the positive and negative impacts of agricultural practices on the environment.
- **Problem-solving** - You will apply the principles of experimental design in carrying out experiments to answer agricultural research questions.
- **Teamwork** - Collaborative writing assignments and quizzes will give you the opportunity to share your expertise with classmates and to cooperatively solve problems.

### Assignments and Class Grading Procedure:

Tests and quizzes include objective and problem questions aimed at testing comprehension, ability to integrate ideas, and ability to use information as well as remember it. Most of the lab grade is based on completing lab assignments. You will be asked to do one *PowerPoint* presentations on different fruit and nut crops.

If there is evidence that you have been involved in any form of academic dishonesty, you will receive an "F" grade for the course and a report will be provided to Student Judicial Affairs for further action.

Labs: Labs are always held at the University Farm on Hegan Lane south of town and sometimes at other locations off campus.

Attendance: You earn points toward your final grade by attending lecture and lab and taking part in the week's activities. Most of the time, you will be expected to turn in work during the next lab period. Work turned in late will be penalized 10% per day that it is late. If you miss you assigned lab, you may not be able to catch up on the work you missed.

WebCT Quizzes: Your weekly online quiz will test your preparation in the reading materials, in-class discussions, and labs. You can take the quiz twice. Your higher grade will be recorded. There will be 11 quizzes (one of these is for extra credit). Quizzes will be available on Friday at 5 pm and close Wednesday at 8 am. For these quizzes you may have your textbook and notes open if you wish, but do your own work.

Exams: There will be two midterm exams and a cumulative final exam. Midterm exams will be administered in the lecture hall from 8 to 8:50 am on the indicated days. Missed exams count as zero, unless prior arrangements have been made with me (Rich Rosecrance).

Academic Honesty: All work that you submit should be your own. If you work with others on an assignment, place the names of all of the participants on the assignment. I encourage you to work with others when you study, especially when you study for the exams. When you use written, video, or other sources of information, please cite these sources in your work. Please consult the instructor if you are not certain whether a source should be cited or how to cite a source. To reduce plagiarism, students are required to submit their papers in Turnitin (thru Vista) on the Wednesday that the paper is due

<u>Evaluation</u>	<u>Contribution</u>	<u>Due Date</u>
Lab Exercises	14%	In lab
Presentation	2%	TBA
Lecture/Lab Clicker Quizzes & Assignments	12%	In class
Quizzes	22%	Wed., 8 am
Midterms (2)	24%	See below
Project (1)	14%	Every other Wed.
Final (1)	12%	See below

<u>Grade</u>	<u>Criterion</u>	<u>Point range</u>
A	Unusual ability and distinctive achievement	90% and above
B	Articulate, above-average performance	80-89%
C	Satisfactory performance	70-79%
D	Passing work below the standard required for graduation	63-69%
F	Failure to achieve credit	Below 63%

## Tentative Schedule

Week	Topic	Reading	Quiz	Project	
1	1/24 1/26	Course introduction: overview of fruit tree species grown in California Tree Growth & Development	Chap. 1; <u>Reader</u> : Pomological Species & Cultivars, Fleshy Fruit Types; <u>Vista</u> : Why Ca produce so much fruit	1	
2	1/31 2/2	Chilling, Hardiness, & Vegetative Growth Agronomy Meetings/Colusa Farm Show	<u>Reader</u> : General Environment & Climatic Factors <u>Vista</u> : Frost Control articles	2	
3	2/7 2/9	Controls Vegetative Growth Photosynthesis & Dry Matter Production	Chap. 2; <u>Reader</u> : Tree Structure—Lves, Stems, & Buds; Photosynthesis <u>Vista</u> : Origins of Apples article	3	Select crop
4	2/14 2/16	Plant Growth Regulators Training & Pruning	Chaps 3; <u>Reader</u> : Principles of Training & Pruning <u>Vista</u> : Growth-Regulating Chemicals	4	
5	2/21 2/23	Function of Roots Rootstocks & Grafting	Chaps. 5 & 6; <u>Reader</u> : Rootstocks and Grafting <u>Vista</u> : Orchard Floor Management	5	Tasks I & II
6	2/28 3/2	Alternate Bearing <b>Midterm 1</b>			
7	3/7 3/9	Alternate Bearing cont. Juvenility, Flower Formation, & Pollination	Chaps 8 & 9; <u>Reader</u> : Alternate bearing article <u>Vista</u> : Walnut N article	6	Tasks III & IV
	3/14 3/16	<b>Spring Break</b>			
8	3/21 3/23	Fruit thinning Fruit growth and development	Chaps 8 & 9; 10 <u>Reader</u> : From Flower to Fruits	7	Task V
9	3/28 3/30	Fruit growth and development cont Holiday	Chaps. 10 <u>Vista</u> : N cycling article	8	
10	4/4 4/6	Soil Management & Fertility Olive Production - Bill Krueger Farm Advisor	Chap. 7 <u>Reader</u> : Mineral Nutrition; <u>Vista</u> : Citrus Nitrogen & Reduce Fertilizer Impacts Articles	9	Task VI
11	4/11 4/13	Fertility and Orchard Floor Management <b>Midterm 2</b>			
12	4/18 4/20	Fertility Management cont. Fruit Maturity and Ripening	Chap. 11 <u>Reader</u> : Categories of Fruit Ripening & Postharvest Technology <u>Vista</u> : Plant Tissue Analysis article	10	Task VII
13	4/25 4/27	Water Use & Management Irrigation Management	<u>Reader</u> : IPM Chapter <u>Vista</u> : Plant Nutrition & Soil Fertility Article and View Calcium Powerpoint	11	
14	5/2 5/4	Dr. Franz Niederholzer - Dried Plum Integrated Pest Management in Orchard	<u>Vista</u> : Water Relations & Prune articles	12	Task VIII
15	5/9 5/11	IPM Wrap-Up and Review	<u>Vista</u> :	13	
16		<b>Final Fri. May 20 8-9:50— Tentative.</b>			

**Course Objectives:**

- Students will gain an understanding of the biology of perennial plants-particularly as this relates to perennial agriculture.
- Students will gain a broad understanding of the management requirements of perennial systems- and understand the basics of orchard management from orchard establishment to post harvest treatment of the major perennial crops in the north state.
- Students will be able to look up what they need to know about managing tree crops in the future and know what information sources are available and be able to interpret them.

**PSSC 366 Laboratory Schedule****Laboratory Schedule:**

<u>Week</u>	<u>Date</u>	<u>Topic</u>
1	1/26	Fruit ID lab.
2	2/2	Attend Colusa Farm Show
3	2/9	Pruning & Replant Problem Hodges Nursery
4	2/16	Propagation, Grafting and Budding
5	2/23	CA Olive Ranch, south of Oroville
6	3/2	Almond/prune flowers
7	3/9	Desseret Farms
8	3/16	<b>Spring Break</b>
9	3/23	Frost Control Flower and Fruit
10	3/30	Holiday
11	4/6	Nitrogen, Deficiency & Disease Symptoms Delavalle Lab
12	4/13	Field Trip: Organic Fruit Production
13	4/20	Irrigation Scheduling
14	4/27	Integrated Pest Management
15	5/4	Student Project Presentations
16	5/11	Field Trip: TBA

## TREE FRUIT/NUT CLASS PROJECT

You are asked to select a plot of land 10 to 50 acres in size with the intent of growing tree fruits either with an organic management or with an integrated systems management. You may select any site as long as you can get a soil map of the site. You are asked to develop a plan to plant the land. A complete business plan must be developed for at least 7 years. All major decisions must be explained and well documented.

### The Plan

The bank wants you to develop a complete month-by-month schedule for the development, planting and maintenance of the orchard from January 1, 2010 until after harvest in autumn 2014. You must have a detailed plan describing the orchard you will develop and how you intend to market the fruit. Likewise you must describe buildings, equipment and supplies you will need and the expected expenses.

The purpose of the plan is to **demonstrate to the bank** (and the instructor) **that you understand the horticultural science necessary to be a successful fruit producer.**

Thus, the focus of the project should be on the management decisions you must make, what factors you must consider and, most importantly, **WHY** you have made specific management decisions. You must rely on data from the printed literature to justify your decisions.

Your portfolio and plans should include:

### Tasks

- I. A complete description of the site: description of location, site, slope, soil type, and the important climate meteorological information. Is the site a good site and a wise investment? Why or why not? What crops is the site best suited for? Why and/or why not. On-line soil surveys can be found at <http://casoilresource.lawr.ucdavis.edu/drupal/>
- II. The orchard layout and block plan. Include a map showing roadways, buildings, irrigation system, detail of tree planting scheme, tree spacing, density, layout, trellis, pollinators, etc. Why are rows oriented specific directions? Which irrigation system did you select? What factors influenced the layout of the orchard?
- III. Species, cultivars, rootstocks, number of trees to be ordered, sources of stock, prices, shipping, etc. Present information on expected tree growth (time to fill the space), approximate mature tree size, bloom time, pollinators, time of harvest, productive potential, etc. Why have you made these decisions? Make sure to discuss what nursery you selected to purchase stock.
- IV. Site preparation and maintenance requirements: soil fumigation, herbicides, support systems, ground cover, rotation, etc. Describe sod management program, herbicides, fertility monitoring, and fertilizer application.
- V. Irrigation system to be used. Discuss source of water, water treatment and amount of application. Why was a specific irrigation system selected? What are the advantages and disadvantages of this system? Does the system have multiple use or benefits?

- What is the annual water requirement for your crop? How will determine when to irrigate? How will determine how much time to keep the water pump on?
- VI. Select three major diseases and three major arthropod pests you will try to control. Describe your control methods. How will you deal with weed and vertebrate pests?
  - VII. Fruiting. Approximate the yield for years 1- 5. Discuss fruit thinning practices you will use, anticipated problems, and other economic considerations in the cropping the orchard during these years.
  - VIII. The economic schedule of expenses and cash flow. Project cash flow, annual expenditures, labor requirements, etc. Include how much money you will need from the bank each year to keep the farm working and possible debt reduction.

### **Grading**

The project will be graded on your integration of information about the horticultural production of tree fruit crops into your management scheme. The focus is pomology; how you use science to accomplish your objectives. The graders will be evaluating your plan to accomplish your management objectives and why you have made specific management decisions.

Be sure to thoroughly discuss each of the topics listed above. Use diagrams, tables, charts, etc., if they are useful to understanding the discussion and they are mentioned within the text. Your logical thought pattern should be evident in the discussion. Please submit tasks of the project through Turnitin (in Vista) on the Wednesday that the paper is due.

UC Fruit and Nut Center (<http://fruitsandnuts.ucdavis.edu/>) should be one of the first places you search for information. You need to consult extension literature and/or nursery catalogs that list characteristics such as ripening date, fruit color, size, etc. Some of the local nurseries include: [Sierra Gold](#), [Green Tree](#), [Fowler](#), [Duarte](#), Stukey, and [Burchell](#) nurseries. They all have websites and prices for trees.

**YOUR HORTICULTURAL DECISIONS ARE THE MOST IMPORTANT CONSIDERATION FOR EVALUATIONS.**

**Flower fungicide study**  
**Fungicides**  
**GPS scavenger hunt**  
**Strawberry**