

**COURSE GOALS:**

VCR 212 will provide an extensive background to research and commercial practices related to the physiology of harvested vegetables. The student will become acquainted with a) the comparative physiology of diverse vegetables, b) the commodity characteristics related to quality, c) the responses of selected commodities to maturation, ripening, and senescence, d) research techniques, procedures, and methods unique to postharvest physiology and biology, and e) commercial practices affecting postharvest losses.

**TEXT USED:**

Lecture notes will be supplied by the instructor.

**ENTRY LEVEL:**

Designed for graduate students in the plant and food sciences. Upper Division students may take the course with permission of the instructor. A background in Upper Division plant biology and physiology is required. An introductory knowledge of postharvest technology and physiology (e.g., Plant Science 112, 112L) is desirable, but not required.

**GRADING AND COURSE REQUIREMENTS:**

Two hours of lecture and six hours of laboratory per week. The lectures stress the postharvest responses and requirements of diverse commodities. The three exams covering the lectures (15% for each exam) account for 45% of the grade. The laboratories stress general concepts and research procedures. Each student proposes and outlines a project in the form of a grant request (10% of grade); demonstrates methods and results as work progresses as a laboratory exercise (15% of grade); and presents a 15 min oral report to the class (10%) and a 5 page written (20%) report.

**TOPICAL OUTLINE:**

**Lectures**

Introduction and overview of physiological processes.

General nature of maturation, ripening and senescence.

Significance of respiration as a measure of overall metabolism.

Effects of environmental factors on harvested vegetables.

Relation among water loss, vapor pressure deficit, gas diffusion and relative humidity.

Effect of temperatures (cold, chilling, warm, and hot) on postharvest physiology.

Cause and prevention of chilling injury.

Responses to wounding and physical stress.

Ethylene synthesis and action.

Physiological responses to ethylene, and controlled and modified atmospheres.

Ripening of fruit vegetables (e.g., melons, peppers, tomatoes).

Biochemical and physiological changes taking place during maturation and ripening and senescence.

Postharvest physiology and biology of immature fruit vegetables (e.g., cucumbers, legumes), immature floral vegetables (e.g., artichokes, broccoli), bulky vegetables (e.g., onions, potatoes, sweet potatoes), leaf and stem vegetables (e.g., cabbage, celery, lettuce), mature fruit vegetables (e.g., peppers, tomatoes).

**Laboratory**

Research procedures commonly used: gas analysis, measure respiration and ethylene production, controlled and modified atmospheres, measure temperature, measure relative humidity and water loss, measure firmness and texture.

Biochemical analyses commonly used: measure soluble solids, sugar analysis, extraction and analysis of some important enzymes (e.g., PAL, PPO, POD).

Use of temperature, controlled atmospheres and chemical treatments to extend the storage life and maintain the quality of selected vegetables.

Response of selected commodities to chilling, wounding water loss and other abiotic stresses.

**POTENTIAL COURSE OVERLAP:**

Some of this material is covered in PLS 172, but we go into much more depth in this course.

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**INSTRUCTOR:** Mikal Saltveit  
Mann Laboratory, Vegetable Crops  
752-1815; mesaltveit@ucdavis.edu