210. Epidemiological Approaches to Waterborne Zoonotic Pathogens (1-4)
Lecture—1 hour. Waterborne zoonotic diseases remain a significant cause of human illness. Review key waterborne pathogens; their biology, fate and transport in aquatic systems; on-farm management practices for reducing microbial contamination of California's fresh and marine aquatic resources from livestock production systems. (S/U grading only)—F, W, S, (F, W, S.)

212. Epidemiology of the Zoonoses (4)
Lecture—35 sessions; discussion—5 sessions. Prerequisite: graduate standing or third-year standing in the School of Veterinary Medicine or consent of instructor. Epidemiological, biological and ecological features of some major infections shared by humans and other animals. Wildlife and domestic animal reservoirs of major human and ecological significance are presented to illustrate how knowledge of zoonoses epidemiology is essential for implementing control measures. Offered in alternate years.—W. (W.)

241. Advanced Topics in Canine Genetics and Genomics (2)
Discussion—2 hours. Prerequisite: Genetics 201A, 201C (or equivalents, with consent of instructor). Limited enrollment. In-depth study of topics in canine genomics and genetics. Topics will vary annually, but can include positional cloning, whole genome association, complex traits and linkage disequilibrium. Students will lead discussions on assigned readings. May be repeated for credit when topic differs.—F, W, S, (F, W, S.)

Lecture—2 hours; discussion—0.5 hours; laboratory—0.5 hours. Prerequisite: undergraduate genetics and ecology/conversation biology courses recommended. Class size limited to 20 students; graduate students, 2nd or 3rd year veterinary students; advanced undergraduate students with consent of instructor. Introduction to the field of applied ecological genetics to include applications in conservation ecology, population genetics, population biology, wildlife health and disease ecology. (Same course as Ecol 242.)—F, (F.) Ernest

243. Advanced Topics in Conservation Genetics (2)
Discussion—18 sessions; lecture—2 sessions. Prerequisite: undergraduate genetics and ecology or consent of instructor. Restricted to 16 students. In-depth study of topics related to the application of genetic tools to wildlife conservation. Topics will vary annually, but may include use of non-invasive methods of genetic assessment and monitoring of wildlife populations. Students will lead discussions on assigned readings. May be repeated for credit when topic differs.—F, (F.) Sacks

266. Applied Analytic Epidemiology (3)
Lecture—2 hours; laboratory—2 hours. Prerequisite: Preventive Veterinary Medicine 404 or consent of instructor. Principles and applications in analysis of epidemiological data. Methods of analyzing stratified and matched data, logistic regression for cohort and case-control studies, Poisson regression, survival-time methods. (Same course as Master of Public Health 266.)—S. (S.) Kass

277. Mathematical Models in Epidemiology (3)
Lecture/discussion—2 hours; laboratory—2 hours. Prerequisite: Preventive Veterinary Medicine 403 and Medicine & Epidemiology 405; consent of instructor; although not required, students are encouraged to refresh their knowledge of high school calculus and differential equations. Class size limited to 30 students. Theory of epidemics and mathematical modeling concepts for infectious diseases to include discrete and continuous time models, their use to explore disease dynamics and investigate control strategies for human and veterinary infectious diseases. (Same course as Epidemiology 277.)—S. (S.) Ayl

290. Seminar (1)
Seminar—1 hour. Presentation and discussion of advanced and current topics in population health and reproduction. (S/U grading only)—F, W, S, (F, W, S.)

298. Group Study (1-5)
Prerequisite: consent of instructor.—F, W, S, Su. (F, W, S, Su.)

299. Research (1-12)
Prerequisite: consent of instructor. (S/U grading only)—F, W, S, Su. (F, W, S, Su.)

Surgical and Radiological Sciences (VSR)

299. Special Study for Undergraduates (1-5)
(P/NP grading only)—F, W, S, Su. (F, W, S, Su.)

Upper Division

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only)—F, W, S, Su. (F, W, S, Su.)

Graduate

298. Group Study (1-5)
Prerequisite: consent of instructor. (S/U grading only)—F, W, S, Su. (F, W, S, Su.)

299. Research (1-12)
Prerequisite: consent of instructor. (S/U grading only)—F, W, S, Su. (F, W, S, Su.)

Viticulture and Enology

(College of Agricultural and Environmental Sciences)
David E. Block, Ph.D., Chairperson of the Department
Department Office. 1162 XMI North Building
530-752-0380; http://wineserver.ucdavis.edu

Faculty
Linda F. Bisson, Ph.D., Professor
David E. Block, Ph.D., Professor
(Viticulture and Enology, Chemical Engineering)
Academic Senate Distinguished Teaching Award Roger B. Boulton, Ph.D., Professor
(Viticulture and Enology, Chemical Engineering)
Dario Cantú, Ph.D., Associate Professor
Susan E. Ebeler, Ph.D., Professor
Hildegarde Heymann, Ph.D., Distinguished Professor
Mark A. Matthews, Ph.D., Professor
Ron Runnebaum, Ph.D., Assistant Professor
David R. Smart, Ph.D., Associate Professor
Andrew Walker, Ph.D., Professor
Andrew L. Waterhouse, Ph.D., Professor
Larry E. Williams, Ph.D., Professor

Emeriti Faculty
Douglas O. Adams, Ph.D, Professor Emeritus
L Peter Christensen, Specialist in Cooperative Extension, Emeritus
W Mark Kliwer, Ph.D., Professor Emeritus
Loyd A.ider, Ph.D., Professor Emeritus
Carole P. Meredith, Ph.D., Professor Emerita
Ann C. Noble, Ph.D., Professor Emerita
Corinna S. Ough, Ph D, Professor Emeritus
Vernon L. Singleton, Ph.D., Professor Emeritus
Academic Senate Distinguished Teaching Award
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James T. Lapsley, Ph.D., Research Associate
Andrew J. McErlane, Ph.D., Associate Adjunct Professor
Jennifer L. Nelson, Ph.D., Assistant Adjunct Professor
Anita Oberholster, Ph.D., Assistant Specialist in Cooperative Extension
Kerri L. Steenwerth, Ph.D, Assistant Adjunct Professor

The Major Program
The Viticulture and Enology major provides an interdisciplinary education in the biological and physical principles underlying grape and wine production as well as practical knowledge of grape growing (viticulture) and wine making (enology). This program provides the knowledge base for problem-solving and decision-making in commercial grape and wine production.

Preparatory Requirements. Before transferring into the Viticulture and Enology major, students must complete the following courses with a grade of C- or better and with a combined grade point average of at least 2.500 at the University of California (at least Fall 2011 and on Revised General Education (GE) AIH=Arts and Humanities; SE=Science and Engineering; SS=Social Sciences; ACGH=American Cultures; DD=Dominant Diversity; OL=Oral Skills; QL=Quantitative; SL=Scientific; VL=Visual; WC=World Cultures; WE=Writing Experience
Pre-Fall 2011 General Education (GE): AIH=Arts and Humanities; SE=Science and Engineering; SocSci=Social Sciences; Div=Dominant Diversity; Wrt=Writing Experience
Quarter Offered: F=Fall; W=Winter, S=Spring, Su=Summer; 2017-2018 offering in parentheses
3,000 for similar courses taken at community college for these and all other preparatory courses. In addition, students’ overall UC GPA must be 2.250 or higher. All courses must be taken for a letter grade.

UNITS

Biological Sciences 1A or 2A ………………………… 4-5
Chemistry 2A, 2B, 8A ………………………………… 17
Mathematics 1A, 1B, 7A ……………………………… 3
Physics 1A, 1B or 7A ………………………………… 4-6

Recommendations. Completion of UC Davis equivalents of the following preparatory courses for the major are not required for entry but are highly recommended. Failure to complete these will delay entry into required upper division courses and may thus delay graduation. Some courses may be available at UC Davis during Summer Session:

UNITS

Chemistry BB ……………………………………… 3
Mathematics 16B ………………………………… 3
Biological Sciences 1C or Plant Sciences 2 ………………………………… 4-5
Biological Sciences 2 ………………………………… 3

The Program. The curriculum builds upon a foundation of biology, chemistry, biochemistry and mathematics with specialized courses related to grape and wine production. To complete the program, students must complete particular emphasis on viticulture, enology or economics. Credit may also be earned for foreign language study and internships.

Career Alternatives. Graduates are qualified for careers in the following areas: research. Additionally they may work in related fields such as pest management, nursery production and analytical services.

B.S. Major Requirements:

Preparatory Subject Matter ………………… 44-51

Biological Sciences 1A or 2A and 1C or Plant Sciences 2 ……………………………………… 8-10
Chemistry 2A-2B-2C ………………………………… 15
Chemistry 8A, 8B ………………………………… 6
Plant Sciences 21 or equivalent and adviser approval ………………………………… 0-3
Mathematics 16A-16B …………………………… 6
Physics 1A, 1B or 7A ………………………………… 4-6
Viticulture and Enology 2, 3 …………………………… 6

Depth Subject Matter ………………… 48-54

Biological Sciences 102, 103 or 105 ………………………………… 3-6
Microbiology 102, 102l or 101 ………………………………… 5-7
Plant Sciences 120 or Statistics 106 ………………………………… 4
Viticulture and Enology 101A, 101B, 101C, 110, 118, 120, 123, 124, 125, 126, 128, 135 and in consultation with the adviser, choose 3 of the following courses: 123L, 124L, 125L, 128L. If more than 3 are taken, the extra courses will count as restricted electives in Area B ………………………………… 21-22

Restricted Electives ……………………………….. 28

In consultation with adviser, choose 28 units from three or more of the five areas. At least 12 units must be from one of the following areas: (A) Plant Science, (B) Food Science and Microbiology, or (C) Economics and Business


(B) Food Science and Microbiology area: Biological Sciences 101, Food Science and Technology 102A, 102B, 104, 104L, 108, 109, 110A, 110B, 127, Microbiology

140, 150, 155L, Viticulture and Enology 140.


(D) Language area: Maximum 12 units, not counting course 1, of one of the following languages: French, German, Italian, Portuguese or Spanish. At least one course must be Intermediate or Conversational; qualifying Intermediate or Conversational courses are listed below.

French 8, 21, 22, 38, 58 German 6, 11, 20, 21, 22, Italian 4, 5, Spanish 8, 21, 22, 28, 31, 32, 33.

Courses taught in English will not count as restricted electives in this major.

(E) Internship area: A maximum of eight units of Viticulture and Enology 190X, 192, 198, 290 or 298 may be counted as restricted electives by prior arrangement with adviser. May be increased to 12 units in exceptional circumstances.

Total Units for the Major ………………….. 120-133


Graduate Study. Several graduate groups offer programs of study leading to advanced degrees in the fields of viticulture and enology. For the M.S. or Ph.D. degree, see Agricultural and Environmental Chemistry (A Graduate Group), on page 151, Engineering (Chemical Engineering, on page 156, Ecology (A Graduate Group), on page 250, Food Science (A Graduate Group), on page 340, Integrative Genetics and Genomics (A Graduate Group), on page 380, Horticulture and Agronomy (A Graduate Group), on page 396, Microbiology (A Graduate Group), on page 458, Plant Biology (A Graduate Group), on page 511, Plant Pathology, on page 513, Soils and Biogeochemistry (M. Matthews) and Enology (A Graduate Group), on page 552, and Viticulture and Enology (A Graduate Group), on page 586.

Courses in Viticulture and Enology (VEN)

Lower Division

2. Introduction to Viticulture (2) Lecture—2 hours. Fundamental principles of biology and culture of the grapevine including taxonomy, morphology, physiology, distribution, domestication, utilization, propagation, production system, harvesting, and storage and processing of grapes. Successful completion of the course should prepare students for upper division courses in viticulture. GE credit: SE.—F. (F.) Heymann

3. Introduction to Winemaking (3) Lecture—3 hours. Overview of the history of wine, viticulture, fermentation, winery operations, the physiology of wine consumption, wines produced in California and other major wine-producing regions and the sensory evaluation of wine. GE credit: SE.—S. (S.) Heymann.

90X. Lower Division Seminar (2) Seminar—1 hour; term paper (required)/discussion. Prerequisite: training and consent of instructor. Introduction to current issues surrounding wine and health as they relate to diet, nutrition, and toxicology. May not be repeated for credit. GE credit: SE.—F. (F.) Heymann

99. Special Study for Undergraduates (1-5) (P/NP grading only)

Upper Division

101A. Viticultural Practices (3) Lecture—1.5 hours; discussion/laboratory—3.5 hours. Prerequisite: course 2. Identification, cultivation, and use of the major wine, table, raisin, and rootstock cultivars. Includes practices specific to the fall such as fruit contracts, maturation sampling, harvesting, cover crops, and soil-tests. One field trip required. GE credit: SE.—F. (F.) Walker

101B. Viticultural Practices (3) Lecture—1.5 hours; discussion/laboratory—3.5 hours. Prerequisite: course 2. Theory, principles, and practices of pruning and grapevine propagation. Plant materials and the fruiting system, rootstock control and weed identification, wood diseases, and frost protection. One field trip required. GE credit: SE.—W. (W.) Walker

101C. Viticultural Practices (3) Lecture—1.5 hours; discussion/laboratory—3.5 hours. Prerequisite: course 2. Field oriented experience in the principles and practices of grapevine production, including vineyard establishment, vine training, trellising, canopy management practices, irrigation and water management, and methods of crop adjustment for improvement of fruit quality. One field trip required. GE credit: SciEng|SE.—S. (S.) Heymann

110. Grapevine Growth and Physiology (3) Lecture—3 hours. Prerequisite: course 2. Botanical aspects including morphology and domestication will precede lectures covering flower development and energy budget concepts. Impact of physiologically specific variables such as photosynthesis translocation, mineral nutrition, and water relations on fruit ripening and composition will be covered. GE credit: SciEng|SE.—W. (W.) Matthews

111. World Viticulture (3) Lecture—3 hours. Prerequisite: upper division standing. Study of the diversity of viticulture, both geographical and historical. History of grape growing and its spread throughout the world will be covered, along with discussions of current viticultural practices in different parts of the world, including California. GE credit: SciEng|OL, SE, WE.—S. (S.) Heymann

111L. Critical Evaluation of Wines of the World (1) Laboratory/discussion—3 hours. Prerequisite: course 111 must be taken concurrently, course 125 with a grade of C or better. Critical analysis of wines produced in different parts of the world with emphasis on the relationship between sensory properties of the wines and factors associated with their place of origin. (P/NP grading only) GE credit: SE.—S. (S.) Heymann

115. Raisin and Table Grape Production (2) Lecture—2 hours. Prerequisite: course 2. Overview of the raisin and table grape industries in California and other production areas of the world. Cultural practices associated with raisin and table grape production will also be discussed. GE credit: SciEng|SE.—S. (S.) Williams

118. Grapevine Pests, Diseases and Disorders (3) Lecture—3 hours. Prerequisite: course 2. Various pests and diseases of vinesyards throughout California. Pest/disease identification and control methods (to include sampling techniques) will also be discussed. Integrated management approach to pest control methods will be emphasized. GE credit: SciEng|SE.—F. (F.) Cantu

123. Analysis of Musts and Wines (2) Lecture—2 hours. Prerequisite: Chemistry 2C and 8B or equivalent; Agricultural Management and Range Resources 21 or equivalent. Students enrolled in the lecture only portion of the course will be required to enroll in 1 unit of course 199/299. Fundamental principles of analytical chemistry as they relate to specific methods used in winemaking. GE credit: SciEng|SE.—F. (F.) Waterhouse

123L. Analysis of Musts & Wines Laboratory (2) Lab—3 hours; independent study—3 hours. Prerequisite: Chemistry 2C and 8B, or equivalent, Agricultural Management and Rangeland Resources 21, and course 123 (course 123 may be taken concurrently). Restricted to upper division and graduate students in Viticulture & Enology, other programs of study, and consent of a non-credit. Fundamental principles of analytical chem-
istry as they relate to specific methods used in wine-making. Laboratory exercises demonstrating various chemical, physical, and biochemical methods. Data will be analyzed and results interpreted in weekly lab reports; includes student-designed independent project and written report. GE credit: SciEng, Writing Proficiency, SE, VL, WE, W (F, W) Waterhouse

124. Wine Production (2)
Lecture—2 hours. Prerequisite: course 123 (may be taken concurrently). Biological Sciences 102. Principles and practices of making specific types of wines. Emphasis to grape-variety selection and methods and techniques for winemaking. GE credit: SE, WE. F (F.) Bisson

124L. Wine Production Laboratory (3)
Lecture—3 hours; independent study—3 hours; term paper. Prerequisite: course 124 (may be taken concurrently). Restricted to undergraduate students in fermentation science, viticulture and enology, bio-technology, microbiology, food science and applied plant biology or graduate majors in agriculture and environmental chemistry and horticulture. Current technologies used in production of California table wines; analysis and monitoring of impact of fermentation variables on microbial performance and product quality; student-designed independent research project. GE credit: SciEng | OL, SE, WE. F (F.) Bisson

125. Wine Types and Sensory Evaluation (2)
Lecture—2 hours. Prerequisite: course 124; Plant Sciences 120 or Statistics 106. Open to upper division and graduate students in Viticulture & Enology; offered as an independent study. Principles of sensory evaluation and application to wines. Factors influencing wine flavor, data from sensory analysis of model solutions. GE credit: SciEng | QL, SE. S (S.) Heymann

125L. Sensory Evaluation of Wine Laboratory (2)
Laboratory—3 hours; term paper. Prerequisite: course 125 (may be taken concurrently). Restricted to upper division major in fermentation science or viticulture and enology or graduate students in food science. Sensory evaluation of wines and model systems using discrimination tests, ranking, descriptive analysis and time-intensity analysis. Data analyzed by appropriate statistical tests and results interpreted in extensive weekly lab reports. GE credit: SciEng | QL, SE, VL, WE. S (S.) Heymann

126. Wine Stability (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: course 124. Restricted to students in viticulture and enology, fermentation science, applied plant biology majors, or graduate students in food science, microbiology, horticulture and agronomy. Principles of equilibria and rates of physical and chemical reactions in wines; treatment of unstable components in wines by absorption, ion exchange, refrigeration, filtration, and membrane processes; and protein, polysaccharide, tartrate, oxidative, and color stabilizers. GE credit: SciEng | SE. W (W.) Runnebaum

126L. Wine Stability Laboratory (2)
Laboratory—3 hours; independent study—3 hours. Prerequisite: course 126 (may be taken concurrently); consent of instructor. Restricted to upper division major in fermentation science or viticulture and enology or graduate students in food science, cultural and environmental chemistry, microbiology or by consent of instructor. Practical application of principles of equilibria and rates of physical and chemical reactions to wine stability. GE credit: SciEng | SE, WE. W (W.) Runnebaum

128. Wine Microbiology (2)
Lecture—2 hours. Prerequisite: courses 123 and 124, Microbiology 102 and 102L, or Food Science and Technology 104 and 104L, courses 125 and 126 recommended. Nature, development, physiology, biochemistry, and control of yeasts and bacteria involved in the making, aging and spoilage of wine. GE credit: SciEng | SE, WE. W (W.) Bisson

128L. Wine Microbiology Laboratory (2)
Laboratory—6 hours. Prerequisite: course 123, 124, and 125 (may be taken concurrently). Microbiology 102 or Food Science and Technology 104 and 104L; course 125 and 126 recommended. Restricted to upper division students in fermentation science, viticulture and enology or graduate students in food science. Nature, development, physiology, biochemistry and control of yeasts and bacteria involved in the making, aging and spoilage of wine. GE credit: SciEng | SE, WE, W (W.) Bisson

135. Wine Technology and Winery Systems (5)
Lecture—3 hours; discussion—laboratory—2 hours. Prerequisite: course 124. Process technologies and process systems used in modern commercial wineries. Lectures, demonstrations, problem solving sessions, and possible field trips. Includes grape preparation and fermentation equipment; post-fermentation processing equipment; winery utilities, cleaning systems, and hazardous waste treatment. GE credit: SciEng | SE. S (S.) Block

140. Distilled Beverage Technology (3)
Lecture—3 hours. Prerequisite: Chemistry 88; Food Science and Technology 80 or 80L; Distillation principles and practices; production technology of brandy, whiskey, rum, vodka, gin, and other distilled beverages; characteristics of raw materials, fermentation, distillation, and stabilization of gin and brandy for alternate years. GE credit: SciEng | OL, SE, W (S.) Boulton

181. Readings in Enology (1)
Discussion—1 hour. Prerequisite: course 3. Critical evaluation of selected monographs in enology. Discussion leadership rotates among the students. May be repeated three times for credit. (P/NP grading only.) GE credit: SE. S (S.) Matthews

190X. Winemaking Seminar (1)
Seminar—1 hour; discussion—1 hour. Prerequisite: course 3. Open to Viticulture and Enology majors and graduate students. Outside speakers on a specific winemaking topic chosen for the quarter. Discussion with the speaker hosted by the faculty member(s) in charge. May be repeated three times for credit. (P/NP grading only.) GE credit: SE. S (S.)

192. Internship (1-12)
Internship—3-36 hours. Prerequisite: completion of 84 units. Work experience related to Fermentation Science (Enology or Plant Science (Viticulture)) majors. Internships must be approved and supervised by a member of the department or major faculty, but are arranged by the student. (P/NP grading only) GE credit: SE. S (S.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only). F, W, S (F, W, S.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.) GE credit: SE.

Graduate

200. Introduction to Scientific Methods (2)
Lecture/discussion—1 hour; term paper. Prerequisite: graduate standing or consent of instructor. Processes involved in conducting scientific research. Topics include conducting literature review, formulating hypotheses, and interpreting results. Annotated bibliography and written and oral research proposal.

210. Grape Development and Composition (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 102 and 103, or 105. Anatomy, physiology and biochemistry of grape berry development, with emphasis on the development of grape composition and components. Offered in alternate years. S. Adams, Polito

213. Flavor Chemistry of Foods and Beverages (3)
Lecture/discussion—3 hours. Prerequisite: Chemistry 88, course 123, or Food Science and Technology 103 or consent of instructor. Students will become familiar with basic principles of flavor chemistry, analysis, and formation in fresh and processed foods. Students will critically evaluate flavor chemistry literature. (Same course as Food Science and Technology 213.) S. (S.) Ebel, Heymann

215. Sensometrics (3)
Lecture—3 hours. Prerequisite: Food Science and Technology 117 or the equivalent, course 125 and 125L or Food Science and Technology 107A or 107B. Experimental design and statistical analysis, including multivariate analysis and instrumental data in enology and food-related studies. F (F.) Heymann

216. Sustainable Vineyard Development (3)
Lecture/discussion—3 hours; fieldwork—3 hours; term paper. Prerequisite: course 101A, 101B, 101C, and one of courses 115 and 118 or consent of instructor; course 110, Soil Science 100, Atmospheric Science 133, Agricultural and Resource Economics 140 recommended. Application of plant, meteorological, soil, water, GIS, and economic sciences to sustainable vineyard development. Preparation of a comprehensive study to determine the viticultural and economic feasibility of a given site for raisin, table, or wine grape production. F (F.) Smart

217. Field and GIS Evaluation of Soils (3)
Lecture/laboratory—4 hours; fieldwork—3 hours. Prerequisite: Plant Sciences 120, 205 or 206; Soil Science 100, 105, or 107; course 101C. Applied Biotechnology 180 are recommended; consent of instructor. Principles and practices used to evaluate agricultural soils in the field, including soil pits, soil cores, electrical conductivity meters, ground penetrating radar, georobotics and surface terrain analysis. Use of geographies, soil databases, digital elevation models and geostatistics. Offered in alternate years. W (W.) Smart

219. Natural Products of Wine (3)
Lecture—3 hours. Prerequisite: courses 123 and 124, or natural products background and consent of instructor. Structure, occurrence, and changes due to wine production to the natural products found in wine. Chemicals with a sensory impact will be emphasized, including flavonoids and other phenolics, terpenes and norisoprenoids, pyrazines, alcohol volatiles and other wine constituents. F (F.) Waterhouse

223. Instrumental Analysis of Must and Wine (4)
Lecture—2 hours; laboratory—3 hours; discussion—1 hour. Prerequisite: course 123 or Food Science and Technology 103 required. Biological Sciences 102, 103 or 103L or Biological Sciences 105, Chemistry 107B or Chemistry 115 recommended. Open to upper division students in Viticulture & Enology, Food Science and Technology; students in Food Science, Ag & Environmental Chemistry and Viticulture & Enology graduate groups. Theory and practice of instrumental analysis of wines and musts. Emphasis on the principles of analytical techniques (e.g., CE, GC, HPLC, Mass Spectrometry) and factors determining correct choice of instrumental method. S. (S.) Ebel

224. Advances in the Science of Winemaking (3)
Lecture—3 hours. Prerequisite: course 125 and 126 and graduate standing or consent of instructor. Selected topics in the science and technology of winemaking. Topics drawn from current research of participating faculty. Critical analysis of the technical content of published material. S. (S.)

225. Advanced Sensory Analysis of Wines (3)
Lecture/discussion—2 hours, laboratory—4 hours. Prerequisite: courses 123 and 125 or (Food Science and Technology 107) and Agricultural Management and Rangelands 120 or the equivalent. Sensory descriptive analysis experiments will be designed and conducted for sensory science methods. Data will be analyzed by analyses of
Viticulture and Enology (A Graduate Group)

Andrew L. Waterhouse, Ph.D., Chairperson of the Group

Group Office. 1204 RMI South 530-752-1852; Fax 530-752-0332; http://vengg.ucdavis.edu

Faculty

Douglas O. Adams, Ph.D., Professor (Viticulture and Enology)

Charles W. Bamforth, Ph.D., Professor (Food Science and Technology)

Linda F. Bisson, Ph.D., Professor (Viticulture and Enology)

David E. Block, Ph.D., Professor (Viticulture and Enology, Chemical Engineering)

Roderer B. Boulton, Ph.D., Professor (Viticulture and Enology, Chemical Engineering)

Dario Canli, Ph.D., Associate Professor (Viticulture and Enology)

Susan E. Ebeler, Ph.D., Professor (Viticulture and Enology)

Jean-Karwait Guiraud, Ph.D., Professor (Food Science and Technology)

Hildegarde Heymann, Ph.D., Professor (Viticulture and Enology)

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Li Tian, Ph.D., Associate Professor (Plant Sciences)

M. Andrew Walker, Ph.D., Professor (Viticulture and Enology)

Andrew L. Waterhouse, Ph.D., Professor (Viticulture and Enology)

Larry E. Williams, Ph.D., Professor (Viticulture and Enology)

Affiliated Faculty

Matthew W. Fidelibus, Ph.D., Associate Specialist in Cooperative Extension (Viticulture and Enology)

W. Douglas Graham, Ph.D., Specialist in Cooperative Extension (Plant Pathology)

Andrew J. Meilone, Ph.D., Assistant Adjunct Professor (Viticulture and Enology)

Jean-Jacques Lambert, Ph.D., Assistant Research Soil Scientist (Viticulture & Enology)

Anita Oberholzer, Ph.D., Assistant Specialist in Cooperative Extension (Viticulture and Enology)

Kerri L. Steiner, Ph.D., Assistant Adjunct Professor (Viticulture and Enology)

Graduate Study

The M.S. program offers advanced studies in viticulture and enology, ranging from the genetics, physiology and biochemistry of grapevines to the chemistry, microbiology and sensory aspects of wine. Students in this program will also be exposed to business costs, marketing and sales strategies, and the wine industry as a whole. The program requires comprehensive study of chemical, sensory, and business aspects of viticulture and enology.

Preparation

Applicants to the program are required to have a level of competence equivalent to that of a strong science undergraduate program. Applicants will be encouraged to complete courses in biology, general chemistry, organic chemistry, calculus, and statistics (analysis of variance), biochemistry, microbiology, and economics.

Specific requirements are outlined in detail and may be obtained by visiting http://vengg.ucdavis.edu.

Graduate Advisers. L.F. Bisson, D. Cantle