

VITICULTURE & ENOLOGY (VEN)

College of Agricultural & Environmental Sciences

VEN 002 – Introduction to Viticulture (2 units)

Course Description: Fundamental principles of biology and culture of the grapevine including taxonomy, morphology, physiology, distribution, domestication, utilization, propagation, production systems, harvesting, and storage and processing of grapes. Successful completion should prepare students for upper division courses in viticulture.

Learning Activities: Lecture 2 hour(s).

Grade Mode: Letter.

General Education: Science & Engineering (SE).

VEN 003 – Introduction to Winemaking (3 units)

Course Description: 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. May be taught abroad.

Learning Activities: Lecture 3 hour(s).

Grade Mode: Letter.

General Education: Science & Engineering (SE) or Social Sciences (SS).

VEN 090X – Lower Division Seminar (2 units)

Course Description: Introduction to current issues surrounding wine and health as they relate to diet, nutrition, and toxicology.

Prerequisite(s): Consent of instructor; lower division standing.

Learning Activities: Seminar 1 hour(s), Term Paper, Extensive Writing.

Grade Mode: Letter.

VEN 099 – Special Study for Undergraduates (1-5 units)

Course Description: Special study for undergraduates.

Learning Activities: Variable.

Grade Mode: Pass/No Pass only.

VEN 101A – Viticultural Practices (3 units)

Course Description: Identification, cultivation, and use of the major wine, table, raisin, and rootstock cultivars. Includes practices specific to the fall such as fruit contracts, maturity sampling, harvesting, cover crops, and soil-pests. One field trip required.

Prerequisite(s): VEN 002.

Learning Activities: Lecture 1.50 hour(s), Discussion/Laboratory 3.50 hour(s).

Grade Mode: Letter.

General Education: Science & Engineering (SE).

VEN 101B – Viticultural Practices (3 units)

Course Description: Theory, principles, and practices of pruning and grapevine propagation. Plant materials and the certification process, weed control and weed identification, wood diseases, and frost protection. One field trip required.

Prerequisite(s): VEN 002.

Learning Activities: Lecture 1.50 hour(s), Discussion/Laboratory 3.50 hour(s).

Grade Mode: Letter.

General Education: Science & Engineering (SE).

VEN 101C – Viticultural Practices (3 units)

Course Description: 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.

Prerequisite(s): VEN 002.

Learning Activities: Lecture 1.50 hour(s), Discussion/Laboratory 3.50 hour(s).

Grade Mode: Letter.

General Education: Science & Engineering (SE).

VEN 103 – Commercial Winemaking (4 units)

Course Description: Materials, processes, equipment, and quality control in commercial winemaking. Production stages, timelines, and styles across wine types. Risk assessment and control measures. Basic sensory techniques for understanding wine characteristics.

Prerequisite(s): VEN 003 C- or better; or consent of instructor.

Learning Activities: Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

Enrollment Restriction(s): Pass One is limited to Viticulture & Enology minors & Managerial Economics majors; Pass Two open to all undergraduate majors; Viticulture & Enology minors contact the Viticulture & Enology Advisor for Pass One enrollment information.

Grade Mode: Letter.

VEN 110 – Grapevine Growth & Physiology (3 units)

Course Description: Botanical aspects including morphology and domestication will precede lectures covering flower development and energy budget concepts. Impact of physiological variables such as photosynthesis translocation, mineral nutrition, and water relations on fruit ripening and composition will be covered.

Prerequisite(s): VEN 002.

Learning Activities: Lecture 3 hour(s).

Grade Mode: Letter.

General Education: Science & Engineering (SE).

VEN 111 – World Viticulture (3 units)

Course Description: 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.

Prerequisite(s): Upper division standing.

Learning Activities: Lecture 3 hour(s).

Grade Mode: Letter.

General Education: Science & Engineering (SE); Oral Skills (OL); Writing Experience (WE).

VEN 111L – Critical Evaluation of Wines of the World (1 unit)

Course Description: 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.

Prerequisite(s): VEN 111 required concurrently.

Learning Activities: Discussion/Laboratory 3 hour(s).

Grade Mode: Pass/No Pass only.

General Education: Science & Engineering (SE).

VEN 112 – Soils in Viticulture (3 units)

Course Description: Landscape distribution, physical and chemical processes in viticultural soils. Site evaluation procedures, best soil management practices, vineyard fertilization, and soil health monitoring. *Prerequisite(s):* (CHE 002B or CHE 002BH); BIS 002A; (PHY 001A, PHY 001B (can be concurrent)) or PHY 007A (can be concurrent); or consent of instructor.

Learning Activities: Lecture 3 hour(s).

Enrollment Restriction(s): Open to Viticulture & Enology majors and grad group only or with consent of instructor.

Grade Mode: Letter.

VEN 114 – Fermented Foods (4 units)

Course Description: Physiology, biochemistry, and genetics of microorganisms important in food fermentations. How microorganisms are used in fermentations and how raw materials are converted into finished fermented foods and beverages.

Prerequisite(s): BIS 103; MIC 102; or consent of instructor.

Learning Activities: Lecture 3 hour(s), Term Paper.

Enrollment Restriction(s): Pass One restricted to upper division or graduate level Food Science and Viticulture & Enology majors.

Cross Listing: FST 114.

Grade Mode: Letter.

VEN 115 – Raisin & Table Grape Production (2 units)

Course Description: 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.

Prerequisite(s): VEN 002.

Learning Activities: Lecture 2 hour(s).

Grade Mode: Letter.

General Education: Science & Engineering (SE).

VEN 118 – Grapevine Pests, Diseases & Disorders (3 units)

Course Description: Various pests and diseases of vineyards throughout California. Pest/disease identification and control methods (to include sampling techniques) also will be discussed. Integrated management approach to pest control methods will be emphasized.

Prerequisite(s): VEN 002.

Learning Activities: Lecture 3 hour(s).

Grade Mode: Letter.

General Education: Science & Engineering (SE).

VEN 123 – Analysis of Musts & Wines (2 units)

Course Description: Fundamental principles of analytical chemistry as they relate to specific methods used in winemaking.

Prerequisite(s): CHE 002C; (PLS 021 or PLS 021V); (CHE 008B or CHE 118B or CHE 128B).

Learning Activities: Lecture 2 hour(s).

Grade Mode: Letter.

General Education: Science & Engineering (SE).

VEN 123L – Analysis of Musts & Wines Laboratory (2 units)

Course Description: Fundamental principles of analytical chemistry as they relate to specific methods used in winemaking. 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.

Prerequisite(s): VEN 123 (can be concurrent); CHE 002C; PLS 021 or PLS 021V; (CHE 008B or CHE 118B or CHE 128B).

Learning Activities: Laboratory 3 hour(s), Independent Study 3 hour(s).

Enrollment Restriction(s): Restricted to upper division and graduate students in Viticulture & Enology; others by approval of instructor.

Grade Mode: Letter.

General Education: Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL); Writing Experience (WE).

VEN 124 – Wine Production (2 units)

Course Description: Principles and practices of making standard types of wines, with special reference to grape varieties used and methods of vinification.

Prerequisite(s): VEN 003; VEN 123 (can be concurrent); (BIS 102 or BIS 105).

Learning Activities: Lecture 2 hour(s).

Grade Mode: Letter.

General Education: Science & Engineering (SE); Writing Experience (WE).

VEN 124L – Wine Production Laboratory (3 units)

Course Description: 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.

Prerequisite(s): VEN 124 (can be concurrent).

Learning Activities: Laboratory 3 hour(s), Independent Study 3 hour(s), Term Paper 3 hour(s).

Enrollment Restriction(s): Restricted to undergraduates in fermentation science, viticulture & enology, biotechnology, microbiology, food science and applied plant biology majors; to graduate students in food science, agricultural and environmental chemistry and horticulture.

Grade Mode: Letter.

General Education: Science & Engineering (SE); Oral Skills (OL); Writing Experience (WE).

VEN 125 – Wine Types & Sensory Evaluation (2 units)

Course Description: Principles of sensory evaluation and application to wines. Factors influencing wine flavor, data from sensory analysis of model solutions.

Prerequisite(s): PLS 120 or STA 106.

Learning Activities: Lecture 2 hour(s).

Enrollment Restriction(s): Open to upper division and graduate students in Viticulture & Enology; others by approval of instructor.

Grade Mode: Letter.

General Education: Science & Engineering (SE); Quantitative Literacy (QL).

VEN 125L – Sensory Evaluation of Wine Laboratory (2 units)

Course Description: Sensory evaluation of wines and model systems using discrimination tests, ranking, descriptive analysis and time-intensity analysis. Data will be analyzed by appropriate statistical tests and the results interpreted in extensive weekly lab reports.

Prerequisite(s): VEN 125 (can be concurrent).

Learning Activities: Laboratory 3 hour(s), Term Paper 3 hour(s).

Enrollment Restriction(s): Restricted to upper division major students in fermentation science or viticulture & enology; graduate students in the food science program.

Grade Mode: Letter.

General Education: Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL); Writing Experience (WE).

VEN 126 – Wine Stability (3 units)

Course Description: Principles of equilibria and rates of physical and chemical reactions in wines; treatment of unstable components in wines by adsorption, ion exchange, refrigeration, filtration, and membrane processes; and protein, polysaccharide, tartrate, oxidative and color stabilities.

Prerequisite(s): VEN 124.

Learning Activities: Lecture 2 hour(s), Discussion 1 hour(s).

Enrollment Restriction(s): Restricted to Viticulture & Enology; Fermentation Science, Applied Plant Biology majors; graduate students in Food Science, Microbiology, Horticulture and Horticulture & Agronomy groups.

Grade Mode: Letter.

General Education: Science & Engineering (SE).

VEN 126L – Wine Stability Laboratory (2 units)

Course Description: Practical application of principles of equilibria and rates of physical and chemical reactions to wine stability.

Prerequisite(s): VEN 126 (can be concurrent); VEN 123L; and consent of instructor.

Learning Activities: Laboratory 3 hour(s), Independent Study 3 hour(s).

Enrollment Restriction(s): Restricted to upper division Fermentation Science, Viticulture & Enology majors, graduate students in the Food Science, Agricultural and Environmental Chemistry, Microbiology, or by consent of instructor.

Grade Mode: Letter.

General Education: Science & Engineering (SE); Writing Experience (WE).

VEN 127L – Post-Fermentation Wine Processing Lab (3 units)

Course Description: Sensory and chemical impact of processing on wines; bench-scale analytical results to make and implement processing decisions; principles and theories of equipment operation and scale-up.

Prerequisite(s): VEN 123; VEN 123L; VEN 126; VEN 126L; VEN 135 (can be concurrent); or consent of instructor.

Learning Activities: Laboratory 3 hour(s).

Enrollment Restriction(s): Restricted to upper division or graduate standing.

Grade Mode: Letter.

VEN 128 – Wine Microbiology (2 units)

Course Description: Nature, development, physiology, biochemistry and control of yeasts and bacteria involved in the making, aging and spoilage of wine.

Prerequisite(s): (VEN 123, VEN 124, MIC 102, MIC 103L); VEN 125, VEN 126 recommended.

Learning Activities: Lecture 2 hour(s).

Grade Mode: Letter.

General Education: Science & Engineering (SE).

VEN 128L – Wine Microbiology Laboratory (2 units)

Course Description: Nature, development, physiology, biochemistry and control of yeasts and bacteria involved in the making, aging and spoilage of wine.

Prerequisite(s): VEN 123; VEN 124; VEN 128 (can be concurrent); MIC 103L.

Learning Activities: Laboratory 6 hour(s).

Enrollment Restriction(s): Restricted to upper division major students in fermentation science or viticulture & enology; graduate students in the food science program.

Grade Mode: Letter.

General Education: Science & Engineering (SE); Visual Literacy (VL); Writing Experience (WE).

VEN 135 – Wine Technology & Winery Systems (4 units)

Course Description: Process technologies and process systems that are 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 waste treatment.

Prerequisite(s): PLS 021 or PLS 021V; MAT 016A; MAT 016B; ((PHY 001A, PHY 001B) or PHY 007A).

Learning Activities: Lecture 3 hour(s), Discussion/Laboratory 2 hour(s).

Grade Mode: Letter.

General Education: Science & Engineering (SE).

VEN 140 – Distilled Beverage Technology (3 units)

Course Description: Distillation principles and practices; production technology of brandy, whiskey, rum, vodka, gin, and other distilled beverages; characteristics of raw materials, fermentation, distillation, and aging.

Prerequisite(s): CHE 008B; FST 110A.

Learning Activities: Lecture 3 hour(s).

Grade Mode: Letter.

General Education: Science & Engineering (SE); Quantitative Literacy (QL).

VEN 170 – Grape & Wine Industry Regulation (1 unit)

Course Description: Regulatory and legal issues related to grape growing and winemaking. State and federal regulations for production and sale of alcoholic beverages. Land use, food and chemical safety regulations, crop insurance, wine distribution and importation, and direct-to-consumer sales.

Prerequisite(s): Consent of instructor.

Learning Activities: Lecture 1 hour(s).

Enrollment Restriction(s): Open to Viticulture & Enology undergraduate students and Graduate students only.

Grade Mode: P/NP only.

VEN 181 – Readings in Enology (1 unit)

Course Description: Critical evaluation of selected monographs in enology.

Discussion leadership rotates among the students.

Prerequisite(s): VEN 003.

Learning Activities: Discussion 1 hour(s).

Repeat Credit: May be repeated 3 time(s).

Grade Mode: Pass/No Pass only.

General Education: Science & Engineering (SE).

VEN 190X – Winemaking Seminar (1 unit)

Course Description: Outside speakers on a specific winemaking topic chosen for the quarter. Discussion with the speaker hosted by the faculty member(s) in charge.

Prerequisite(s): VEN 003.

Learning Activities: Seminar 1 hour(s), Discussion 1 hour(s).

Enrollment Restriction(s): Open to Viticulture & Enology majors and graduate students.

Repeat Credit: May be repeated 3 time(s).

Grade Mode: Pass/No Pass only.

General Education: Science & Engineering (SE).

VEN 192 – Internship (1-12 units)

Course Description: 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.

Prerequisite(s): Consent of instructor; completion of 84 units.

Learning Activities: Internship 3-36 hour(s).

Grade Mode: Pass/No Pass only.

General Education: Science & Engineering (SE).

VEN 198 – Directed Group Study (1-5 units)

Course Description: Directed group study. May be taught abroad.

Prerequisite(s): Consent of instructor.

Learning Activities: Variable.

Grade Mode: Pass/No Pass only.

VEN 199 – Special Study for Advanced Undergraduates (1-5 units)

Course Description: Special study for advanced undergraduates. May be taught abroad.

Prerequisite(s): Consent of instructor.

Learning Activities: Variable.

Grade Mode: Pass/No Pass only.

General Education: Science & Engineering (SE).

VEN 200 – Introduction to Scientific Methods (2 units)

Course Description: Processes involved in conducting scientific research. Topics covered will include conducting literature review, formulating hypotheses, and analyzing and reporting results. Students will complete an annotated bibliography and complete a written and oral research proposal.

Prerequisite(s): Graduate standing or consent of instructor.

Learning Activities: Lecture/Discussion 1 hour(s), Term Paper 1 hour(s).

Grade Mode: Letter.

VEN 210 – Grape Development & Composition (3 units)

Course Description: Anatomy, physiology and biochemistry of grape berry development, with emphasis on the development of grape composition relevant to winemaking.

Prerequisite(s): (BIS 102, BIS 103) or BIS 105.

Learning Activities: Discussion 1 hour(s), Lecture 2 hour(s).

Grade Mode: Letter.

VEN 213 – Flavor Chemistry of Foods & Beverages (3 units)

Course Description: Become familiar with basic principles of flavor chemistry, analysis, and formation in fresh and processed foods.

Required to read and critically evaluate flavor chemistry literature.

Prerequisite(s): CHE 008B; ((VEN 123, VEN 123L) or FST 103); or consent of instructor.

Learning Activities: Lecture/Discussion 3 hour(s).

Cross Listing: FST 213.

Grade Mode: Letter.

VEN 215 – Sensometrics (3 units)

Course Description: Experimental design and statistical analysis, including multivariate analysis, for both sensory and instrumental data in enology and food-related studies.

Prerequisite(s): FST 117; ((VEN 125, VEN 125L) or (FST 107A or FST 107B)); or equivalent to FTS 117.

Learning Activities: Lecture 3 hour(s).

Grade Mode: Letter.

VEN 216 – Sustainable Vineyard Development (5 units)

Course Description: 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.

Prerequisite(s): (VEN 101A, VEN 101B, VEN 101C); (VEN 115 or VEN 118); or consent of instructor.

Learning Activities: Lecture/Discussion 3 hour(s), Fieldwork 3 hour(s), Term Paper.

Grade Mode: Letter.

VEN 217 – Field & GIS Evaluation of Soils (3 units)

Course Description: Principles and practices used to evaluate agricultural soils in the field, including soil pits, soil cores, electrical conductivity meters, ground penetrating radar, geomorphology and surface terrain analysis. Use of geographic information sciences, soil databases, digital elevation models and geostatistics.

Prerequisite(s): PLS 120; (PLS 205 or PLS 206); (SSC 100 or SSC 105 or SSC 107); VEN 101C; consent of instructor; ABT 180 is recommended.

Learning Activities: Lecture/Lab 4 hour(s), Fieldwork 3 hour(s).

Grade Mode: Letter.

VEN 219 – Natural Products of Wine (3 units)

Course Description: 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, oak volatiles and other wine constituents.

Prerequisite(s): VEN 123; VEN 124; or natural products background, and consent of instructor.

Learning Activities: Lecture 3 hour(s).

Grade Mode: Letter.

VEN 223 – Instrumental Analysis of Must & Wine (4 units)

Course Description: 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.

Prerequisite(s): VEN 123 or FST 103; ((BIS 102 and BIS 103) or BIS 105), (CHE 107B or CHE 115) recommended.

Learning Activities: Lecture 2 hour(s), Laboratory 3 hour(s), Discussion 1 hour(s).

Enrollment Restriction(s): Open to upper division students in Viticulture & Enology, Food Science and Technology; students in Food Science, Ag & Environmental Chemistry and Viticulture & Enology graduate groups.

Grade Mode: Letter.

VEN 224 – Advances in the Science of Winemaking (3 units)

Course Description: Selected topics in the science and technology of winemaking. Topics will be drawn from current research of participating enology and viticulture faculty. Critical analysis of the technical content of published material will be emphasized.

Prerequisite(s): VEN 125; VEN 126; or consent of instructor; graduate standing.

Learning Activities: Lecture 3 hour(s).

Grade Mode: Letter.

VEN 225 – Advanced Sensory Analysis of Wines (3 units)

Course Description: Sensory descriptive analysis experiments will be designed and conducted using standard sensory science methods. Data will be analyzed by analyses of variance, principal component analyses and generalized Procrustes analysis to evaluate the judges performance and interpret the significance of the results.

Prerequisite(s): ((VEN 124, VEN 125) or FST 107); AMR 120; or the equivalent.

Learning Activities: Lecture/Discussion 2 hour(s), Laboratory 4 hour(s).

Grade Mode: Letter.

VEN 235 – Winery Design (4 units)

Course Description: Design of wineries. Includes process calculations, equipment selection, process layout and building choice and siting. Project scheduling, capital costs, and ten-year cash flow analysis for the winery. One field trip required.

Prerequisite(s): VEN 124; VEN 135; or consent of instructor.

Learning Activities: Lecture 2 hour(s), Discussion 1 hour(s), Independent Study.

Grade Mode: Letter.

VEN 270 – Critical Evaluation of Scientific Literature (2 units)

Course Description: Contemporary research topics in biological sciences. Discussion of recent research articles in a special topic area chosen by instructor. Intended to develop skills in critical evaluation of scientific publications.

Prerequisite(s): Consent of instructor.

Learning Activities: Discussion 2 hour(s).

Repeat Credit: May be repeated.

Grade Mode: Satisfactory/Unsatisfactory only.

VEN 290 – Seminar (1 unit)

Course Description: Seminar.

Prerequisite(s): Consent of instructor.

Learning Activities: Seminar 1 hour(s).

Grade Mode: Satisfactory/Unsatisfactory only.

VEN 290C – Advanced Research Conference (1 unit)

Course Description: Planning and results of research programs, proposals, and experiments. Discussion and critical evaluation of original research being conducted by the group. Discussion led by individual research instructors for research group.

Prerequisite(s): Consent of instructor; graduate standing.

Learning Activities: Discussion 1 hour(s).

Repeat Credit: May be repeated.

Grade Mode: Satisfactory/Unsatisfactory only.

VEN 291 – Advanced Viticulture (2 units)

Course Description: Critical evaluation of scientific and popular literature on selected topics of current interest that relate viticulture to fruit or wine sensory attributes or quality.

Prerequisite(s): VEN 110; VEN 116; VEN 124; VEN 125; VEN 210 recommended.

Learning Activities: Lecture/Discussion 2 hour(s).

Repeat Credit: May be repeated 1 time(s).

Grade Mode: Letter.

VEN 292 – Advanced Internship (1-15 units)

Course Description: Work experience related to Fermentation Science (Enology) or Plant Science (Viticulture) majors. Internships must be approved and supervised by a graduate group faculty member or students major professor, but are arranged by the student.

Prerequisite(s): VEN 123; VEN 123L; VEN 124; VEN 124L; VEN 125; VEN 125L; VEN 126; VEN 126L; VEN 128; VEN 128L; and consent of instructor.

Learning Activities: Internship 3-45 hour(s), Variable.

Enrollment Restriction(s): Restricted to Viticulture & Enology Graduate Group graduate students.

Repeat Credit: May be repeated 15 unit(s).

Grade Mode: Satisfactory/Unsatisfactory only.

VEN 297T – Tutoring in Viticulture & Enology (1-5 units)

Course Description: Designed for graduate students who desire teaching experience, but are not teaching assistants. Student contact primarily in laboratory or discussion sections, and under direction of a faculty member.

Prerequisite(s): Consent of instructor; graduate standing.

Learning Activities: Variable.

Grade Mode: Satisfactory/Unsatisfactory only.

VEN 298 – Group Study (1-5 units)

Course Description: Group study.

Prerequisite(s): Consent of instructor.

Learning Activities: Variable.

Grade Mode: Satisfactory/Unsatisfactory only.

VEN 299 – Research (1-12 units)

Course Description: Research.

Prerequisite(s): Consent of instructor.

Learning Activities: Variable.

Grade Mode: Satisfactory/Unsatisfactory only.

VEN 396 – Teaching Assistant Training Practicum (1-4 units)

Course Description: Teaching assistant training practicum.

Prerequisite(s): Graduate standing.

Learning Activities: Variable.

Repeat Credit: May be repeated.

Grade Mode: Pass/No Pass only.