

CHEMICAL ANALYSIS of JUICE AND WINE
HORT 499/HORT 600 - Spring - 2007 Thursday 7:45 to 10:30 am
Contact: Dr. Vince Hebert: 372-7393; vhebert@tricity.wsu.edu; RM # 126 East Building

Fundamental principles of analytical chemistry as they relate to specific methods used in winemaking. Laboratory exercises demonstrating various chemical, physical and biochemical enzymatic methods. Data will be analyzed and results interpreted in weekly lab reports. Enrollment will first be given to students in viticulture & enology; others by approval of instructor

Thursday	January 11	Hebert/Merriman/ Felsot	<ul style="list-style-type: none"> • Overview of wine analysis and wine production techniques (syllabus) and student responsibilities (lab writeup) • Units of measurement • <i>Carbohydrates</i> Soluble Solids “Brix”, reducing sugars, polysaccharides • Principles behind refractometry
Thursday	January 18	<i>Carbohydrates</i> Merriman	<ul style="list-style-type: none"> • Estimating soluble solids by hydrometry and refractive index • Chemical analysis of reducing sugars
Thursday	January 25	<i>Acidity</i> Hebert/Merriman	<ul style="list-style-type: none"> • Acidity constants (pH and pK_a) and buffer capacity • Principles behind measuring titratable and volatile acidity • Wet chemistry titratable acid analysis
Thursday	February 1	<i>Acidity</i> Merriman	<ul style="list-style-type: none"> • Buffer capacity of wines • Measurement of volatile acids by steam distillation
Thursday	February 8	<i>Sulfur Dioxide</i> Hebert/Merriman	<ul style="list-style-type: none"> • Role of sulfur dioxide (antioxidant and microbial inhibitor) • Sulfur dioxide temperature, pH, and pK_a considerations • Ripper titration analysis
Thursday	February 15	<i>Sulfur Dioxide</i> Merriman	<ul style="list-style-type: none"> • Aeration-Oxidation (AO) distillation method
Thursday	February 22	<i>Alcohol and Extract</i> Hebert/Merriman	<ul style="list-style-type: none"> • Importance in assessing alcohol content and complexity • Determination of ethanol content (Raoult’s Law) • Hydrometric and ebulliometric analysis
Thursday	March 1	<i>Alcohol and Extract</i> Merriman	<ul style="list-style-type: none"> • Ebulliometric analysis (con’t)

			<ul style="list-style-type: none"> • <i>Laboratory Evaluation (30 minutes)</i>
Thursday	March 8	<i>Enzymatic Evaluations</i> Felsot/Merriman	<ul style="list-style-type: none"> • Overview of enzymatic evaluations and how their utility in wine production • Nutrient Analysis of Free Amino Nitrogen (NOPA) testing • Ammonia enzymatic techniques
Thursday	March 15	SPRING BREAK	
Thursday	March 22	<i>Specialized and Specific Analytical Techniques</i> Hebert	<ul style="list-style-type: none"> • Principles of chromatography • Overview and instruction on chromatographic instrumentation that will be used in subsequent laboratories
Thursday	March 29	<i>Specialized and Specific Analytical Techniques</i> Felsot	<ul style="list-style-type: none"> • Quantifying glucose and fructose by HPLC
Thursday	April 5	<i>Specialized and Specific Analytical Techniques</i> Hebert	<ul style="list-style-type: none"> • Gas chromatographic analysis of ethanol and fusel oils
Thursday	April 12	Hebert/Felsot/Merriman	<ul style="list-style-type: none"> • <i>Laboratory Evaluation (30 minutes)</i> • <i>Completion of chromatographic lab assignments</i>
Thursday	April 19	<i>Tour of Wine Chemistry Laboratory: St. Michelle Winery</i>	
Thursday	April 26	Hebert/Felsot/Merriman	<ul style="list-style-type: none"> • Summation

Optional Text: Wine Analysis and Production by Zoecklein, Fugelsang, Gump and Nury.1999. Aspen Publishers, Inc. Gaithersburg, MD. The Chapman and Hall EnologyLibrary. ISBN 0-412-98921-2

Optional Text: Chemical Analysis of Grapes and Wine; Techniques and Concepts. P Hannd, N Bruer, G Edwards, S Weeks, and E Wilkes. Winetitles Pub. 2004