**FS 465/565 Wine Microbiology and Processing Lecture (3 cr)**

**Fall Semester 2011**

**LECTURES:**
MWF 12:10-1:00 pm, MURW 53 (Pullman), TWST 209 (TriCities), Hamilton Hall (Prosser)

**RESEARCH DISCUSSIONS:**
One hour per week to be determined (FS 565 only)

**PREREQUISITES:**
General microbiology (equivalent to MBioS 305) and general biochemistry (equivalent to MBioS 303) are required.

**INSTRUCTOR:**
Dr. Charles Edwards (509-335-6612 or edwardsc@wsu.edu).
Food Science Human Nutrition Building room 320.

**REQUIRED TEXT:**

**RECOMMENDED TEXTS:**


**COURSE SYNOPSIS:**
Scientific and technical principles related to the processing of wines with an emphasis on microbiology during vinification. The course will be comprised of lectures, two mid-term examinations, and a comprehensive final. Students are strongly recommended to bring their lecture notes to each lecture.

**COURSE OUTLINE:**

<table>
<thead>
<tr>
<th>Topics (text reading assignment)</th>
<th>Approximate number of lectures</th>
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<tbody>
<tr>
<td>A. Wine statistics/SO₂.</td>
<td>1-2</td>
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<tr>
<td>B. Must &amp; wine microorganisms.</td>
<td>3-4</td>
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<tr>
<td>C. Harvest/must preparation.</td>
<td>6-7</td>
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<tr>
<td>D. Microbial nutrients/ecology/alcoholic fermentation.</td>
<td>7-9</td>
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<tr>
<td>E. Sulfur/volatile compounds.</td>
<td>3-4</td>
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<tr>
<td>F. Malolactic fermentation.</td>
<td>2</td>
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<tr>
<td>G. Finishing operations (racking, fining, stabilization).</td>
<td>6-7</td>
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<tr>
<td>H. Spoilage issues/other.</td>
<td>9</td>
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<tr>
<td>Comprehensive final exam.</td>
<td>1</td>
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<tr>
<td>Monday, December 12 (1:00 to 3:00 pm).</td>
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CLASS CANCELLATIONS:

Lecture will NOT be held on the following dates: September 5 (holiday), November 11 (holiday) and November 21-25 (Thanksgiving).

GUEST LECTURES (TENTATIVE):

A. Yeast strain selection in October (Gordon Specht, Lallemand).
B. Filtration basics in October (Rodger Pachelbel, Gusmer Enterprises).
C. Cooperage in November (Yuri DeLeon, World Cooperage).

GRADING:

Examination 1 100
Examination 2 100
Comprehensive Final Exam 150
Critique 100
Participation 25

475 points (FS 465)

Research discussion 50

525 points (FS 565)

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<thead>
<tr>
<th>Grade</th>
<th>% of Total Points</th>
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<tbody>
<tr>
<td>A</td>
<td>&gt;93.0</td>
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<tr>
<td>A-</td>
<td>90.0 - 92.9</td>
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<tr>
<td>B+</td>
<td>87.0 - 89.9</td>
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<tr>
<td>B</td>
<td>83.0 - 86.9</td>
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<tr>
<td>B-</td>
<td>80.0 - 82.9</td>
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<tr>
<td>C+</td>
<td>77.0 - 79.9</td>
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<tr>
<td>C</td>
<td>73.0 - 76.9</td>
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<tr>
<td>C-</td>
<td>70.0 - 72.9</td>
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<tr>
<td>D+</td>
<td>67.0 - 69.9</td>
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<tr>
<td>D</td>
<td>60.0 - 66.9</td>
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<tr>
<td>F</td>
<td>&lt;59.9</td>
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Dictionaries, cell phones, computers, ipods, or ANY other electronic equipment cannot be used, played, or consulted during examinations. Those students receiving the class at Prosser will need to travel to the WSU-TriCities campus to take examinations.
COURSE OBJECTIVES:

1. Understand the science of wine processing, from harvest to final product.
   a. Identify and contrast typical processing methods used to prepare wines.
   b. Identify and compare various microorganisms found in grape musts/wines, describing conditions that affect growth as well as impact on wine quality.
   c. Describe types and functions of SO$_2$ (includes calculations).
   d. Apply biochemical principles towards understanding microbial metabolism under vinification conditions.
   e. Examine microbial and chemical changes (both desirable and undesirable) during winemaking.

2. Employ and integrate scientific knowledge to solve technical problems encountered in the wine industry.

3. Critically review current original research literature.

INSTRUCTIONAL METHODS:

This course will stress an understanding of scientific concepts and principles towards an application of critical thinking skills to solve technological problems. Examinations feature students providing explanations for “scientific observations” using principles and theories taught in class. Students will be asked to write a critique of a refereed original research article of their choosing, an unique exercise requiring students to not only understand the underlying principles discussed in the article but to evaluate the strength and rigor of published research. Another technique used in lecture to improve participation will be a “question, discussion, and answer” approach. Rather than directly providing answers to student asked questions, the instructor will ask the student(s) their professional view(s) and to logically work through the problem to arrive at a possible answer (frequently, there is more than one possible path to an answer). Though sometimes challenging, this strategy encourages critical thinking as opposed to the memorization of facts.

STUDY HELP:

As everyone has their own learning style, many differs in how to study for examinations. To help students with their studying, a professor at the State University of New York (Buffalo campus) has designed an excellent website titled, “How to study: A brief guide.” The website contains information from how to take notes in lecture to studying ideas for examinations. If your grades are not what you would like them to be, see if there is information on this professor’s website that could be useful:

http://www.cse.buffalo.edu/~rapaport/howtostudy.html
CRITIQUE OF A RESEARCH PAPER:

Select a published research paper which discusses some aspect of wine microbiology or processing and write a critique. The chosen paper should describe original, refereed research and NOT be a review article, a general interest paper, or a paper to be reviewed in FS 565. Suitable journals to search include (but not limited to) American Journal of Enology and Viticulture, Applied and Environmental Microbiology, International Journal of Food Microbiology, Journal of Agricultural and Food Chemistry, Journal of Applied Microbiology, Journal of Wine Research, Australian Journal of Grape and Wine Research, South African Journal of Enology and Viticulture, or Vitis. Though not required, an article of no more than five (5) years old would be highly preferred.

Once you find the research paper you want to critique, submit the citation to the instructor for review. Be sure that your citation is written in the proper format described by the most recently published Guide to Authors American Journal of Enology and Viticulture (refer to the most recently published fourth issue). Students who select the same research paper to critique will be asked to search for different paper.

Without prior approval of the article that you wish to critique, your critique will not be accepted (score = 0).

Due date for reference citation: September 2, 2011 (by 5 pm)

Your critique should state the objectives of the investigation along with the experimental approach (briefly) and a summary of the results. These elements should be followed by an in-depth discussion of the authors’ interpretation of results and conclusions. An important question to be answered in your review is whether or not the objectives of the investigation were completed as stated in the introduction. Your critique should include possible alternative interpretations and conclusions, different experimental approaches, and suggestions for future research. Keep in mind that a critique does not imply identifying only criticisms; most critiques contain a mixture of positive and negative comments that evaluate scientific merit of the research performed.

Your critique will be graded for both technical and written quality. The paper must be typed double-spaced with numbered pages. A penalty of 10 points per working day (no later than 5 pm that day) will be assessed to critiques submitted after the due date. Be sure to attach a copy of the research article to your review. Email submissions of either the citation or the critique will not be accepted.

Due date for critique: November 4, 2011 (by 5 pm)
ADDITIONAL ASSIGNMENTS (FS 565 ONLY):

Discussion of current research

Time will be reserved every ______________________ for graduate students to discuss the assigned research papers with the instructor. These papers are listed below and understanding this information will be required for examination purposes. Each student will be required to obtain their own copy of the paper and individual students will be assigned to lead the discussion.

Proposed papers and schedule (week of)

August 29     Establish format and schedule presentations/oral critiques


Examinations

Approximately 10 to 20% of each examination, primarily essay questions, will be different for students taking FS 465 from FS 565. Here, students taking FS 565 will be asked more “thought-provoking” questions, commonly based on required reading assignments of current research.
STUDENT POLICIES:

Students are encouraged to consult the WSU Student Handbook for information related to student policies and procedures (https://saed.wsu.edu/Content/Documents/saed/student%20handbook%2006061092.pdf).

Students with Disabilities

Reasonable accommodations are available for students with a documented disability. If you have a disability and may need accommodations to fully participate in this class, please schedule an appointment with the Disability Resource Center (DRC, also known as the Access Center) at Washington State University or Disability Support Services (DSS) at the University of Idaho. All accommodations must be approved through the DRC (Room 217 in Washington Building; 509-335-3417) or DSS (Room 306 in Idaho Commons Building; 208-885-6307; dss@uidaho.edu). For WSU online students, the Online Center and DRC work together to provide reasonable accommodations for students registered with WSU Online Center and the DRC. To get started, contact WSU Online’s liaison to the DRC (800-222-4978 or distance@wsu.edu). All accommodations must be approved through the DRC. Additional information is available at: http://accesscenter.wsu.edu/default.asp?PageID=5626. All students are strongly recommended to notify DRC or DSS as soon as possible.

Academic Regulations & Student Affairs Policy Regarding Absences

It is the policy of the WSU Office of Student Affairs to assist students during crisis situations where they are unable to notify their instructors prior to a hurried emergency departure. The Office of Student Affairs will send professors an “Emergency Notification” in those instances where the student will be away for more than two days. The Office of Student Affairs will not issue notifications retroactively or for “one-day emergencies.” Attendance will only impact earned grade if student does not participate in lecture.

Academic Dishonesty/Etiquette/Safety

Cases of academic dishonesty shall be processed in accordance with academic integrity policies as stated in the Washington State University Student Handbook, Faculty Manual (WSU students) or the University of Idaho Faculty Staff Handbook (UI students). In general, avoid conversations with fellow students, do not read a newspaper, and turn off cellular phones during class.

Washington State University is committed to maintaining a safe environment for its faculty, staff, and students. Safety is the responsibility of every member of the campus community and individuals should know the appropriate actions to take when an emergency arises. In support of our commitment to the safety of the campus community the University has developed a Campus Safety Plan (http://safetyplan.wsu.edu). It is highly recommended that you visit this web site as well as the University emergency management web site (http://oem.wsu.edu/emergencies) to become familiar with the information provided. Other safety information can be accessed through the WSU ALERT site (http://alert.wsu.edu).
PLAGIARISM:

Plagiarism is defined by Webster’s Dictionary as, “to steal and pass off the ideas or words of another as one’s own.” There are two general forms of plagiarism:

(a) Unintentional: the use of other writers’ words, phrases, sentences, paragraphs as though they were your own without understanding the need to cite the original source. Unintentional plagiarism normally occurs when the individual does not understand the conventions of scientific writing and the need to cite sources of information.

(b) Intentional: the use of another writers’ work and claiming it as your own. Intentional plagiarism includes knowingly copying or incorporating sections of books, articles, or other sources into your work without citation.

To evade plagiarism, you must acknowledge the source of information. In scientific writing, this can be performed in the text of your work through the use of surnames of authors and the year of publication (e.g., Edwards et al., 2003) or by using numbers enclosed by parentheses which correspond to specific citations in the reference section. In addition to employing citations in the text, plagiarism can be avoided by applying special techniques when writing about information obtained from a source:

(a) Paraphrase: rewording information in which you accurately present the main ideas from the source but do so using your own organization, words, and sentence structures.

(b) Summary: a concise statement of the main idea from a section within a source.

(c) Direct quotation: use of quotes surrounding the passage written by another author.

In general, paraphrasing (a) and the use of summary statements (b) are very common techniques used in scientific writing. Use of quotations (c) in scientific writing is rare and should be avoided.

Plagiarism is dishonest and is not tolerated. If caught using all or portions of a current or former classmate’s writing or other sources of information (e.g., purchase a paper), a grade of “zero” will be given for the exercise. Additional penalties for plagiarism are possible as outlined in the Washington State University Student Handbook.