

FS 405 Ciders and Other Fermented Foods (3 cr) Spring Semester 2018

LECTURES	TuTh 1:10-2:00; Clark Hall 149
LABORATORIES	Th 2:10 to 5:00; location to be specified
PREREQUISITES	FS 304 Cereal Products and FS 465 Wine Microbiology and Processing are <u>recommended</u> .
COORDINATOR	Dr. Charles Edwards (335-6612) 320 Food Science Human Nutrition Building edwardsc@wsu.edu
INSTRUCTORS	Ms. Bri Ewing (360-416-5208) Mount Vernon Research and Extension Center bri.ewing@wsu.edu Dr. Jan Busboom (335-2880) 123 Clark Hall busboom@wsu.edu
OFFICE HOURS	Call/email for an appointment but avoid the hour prior to lectures or laboratories (instructor preparation time).
TEACHING ASSISTANT	<i>to-be-determined</i>
REQUIRED TEXTS	<i>FS/HORT 405 Ciders and Other Fermented Foods Laboratory Manual</i> , Washington State University, Pullman, WA (2018). Available at Crimson & Gray (800-469-2998).

SAFETY

Safety glasses **MUST** be worn at all times when in laboratory or processing various foods. Students should bring their own safety glasses. Clothing should be comfortable, avoiding loose items (scarves, jewelry, etc.) or open-toed shoes. Be sure to wear clothing suitable for being stained or soiled during processing days as fermentations can be very messy.

ATTENDANCE POLICY

Students are strongly encouraged to participate in lecture through (a) asking of questions and/or (b) providing ideas/thoughts in response to questions from the instructors.

Make-up quizzes and examinations will be available to those students with excused absences only. In these cases, the instructor must know of the intended absence for an examination three days prior to the quiz/examination date so a substitute quiz/examination can be written and the date for the examination established. Those students who miss a quiz/examination due to an unexcused absence will receive a score of zero ("0") for that quiz/examination.

Make-up laboratories will not be available. Each unexcused absence from a laboratory period will result in a 25-point reduction in attendance/participation score. A penalty of 10 points/day will be assessed for those reports that are turned in after specified due dates and times.

LECTURE OUTLINE (30)

<u>Week</u>	<u>Lecture</u>	<u>Instructor</u>
Week 1	Lecture 1: Microbes Lecture 2: Microbes	Edwards Edwards
Week 2	Lecture 1: Microbes Lecture 2: Microbes	Edwards Edwards
Week 3	Lecture 1: Fermentation conditions Lecture 2: Conditions/vegetable fermentations	Edwards Edwards
Week 4	Lecture 1: Vegetable fermentations Lecture 2: Vegetable fermentations	Edwards Edwards
Week 5	Lecture 1: Vegetable fermentations Lecture 2: Vinegar fermentation	Edwards Edwards
Week 6	Lecture 1: Vinegar fermentation Lecture 2: Beer microbiology	Edwards Edwards
Week 7	Lecture 1: Beer microbiology Lecture 2: Cider processing	Ewing Ewing
Week 8	Lecture 1: Cider processing Lecture 2: Cider processing	Ewing Ewing
Week 9	Lecture 1: Cider processing Lecture 2: EXAMINATION 1	Ewing Edwards & Ewing
<i>Week 10</i>	<i>Spring break</i>	
Week 11	Lecture 1: Meat fermentations Lecture 2: Meat fermentations	Busboom Busboom
Week 12	Lecture 1: Guest lecture Lecture 2: Sherry	Edwards Edwards
Week 13	Lecture 1: Sourdough breads Lecture 2: Distillation basics	Edwards Edwards
Week 14	Lecture 1: Distillation basics Lecture 2: Distillation basics	Edwards Edwards
Week 15	Lecture 1: Asian fermentations Lecture 2: Asian fermentations	Edwards Edwards
Weeks 16	Lecture 1: Asian fermentations Lecture 2: Asian fermentations	Edwards Edwards

FINAL EXAMINATION (Edwards & Busboom) → May XX, 2018 (X:00 to X:00 pm).

GUEST LECTURES (TENTATIVE)

1. (cidery or brewery or distillery)

LABORATORY OUTLINE (15)

<u>Week</u>	<u>Laboratory</u>	<u>Instructor</u>
Week 1	Introduction	Edwards
Week 2	Use of microscopes	Edwards
Week 3	Pea fermentation	Edwards
Week 4	Sauerkraut	Edwards
Week 5	Vinegar	Edwards
Week 6	Beer	Edwards
Week 7	Cider	Ewing
Week 8	Field trip to cidery/brewery/distiller	Edwards
Week 9	Cider blending	Ewing
<i>Week 10</i>	<i>Spring break</i>	
Week 11	Fermented meats	Busboom
Week 12	Fermented meats (cont'd)	Busboom
Week 13	Open laboratory (complete analyses)	Edwards
Week 14	Distillation and Food fair	All
Week 15	Presentations of sauerkraut data	All
Week 16	Presentations of sauerkraut data	All

CLASS CANCELLATIONS (2018)

Lecture/laboratory will NOT be held on the following dates: March 13-17 (Spring Break).

LEARNING OBJECTIVES

At the end of this course, students will:

1. Identify typical processing unit operations used to prepare a range of fermented foods.

[Assessments: examinations, field trip(s), & laboratory exercises and reports]

2. Understand the science of fermentation.

- a. Identify and characterize microorganisms important for conducting fermentations.

[Assessments: examinations, laboratory exercises and reports]

- b. Analyze how extrinsic and intrinsic conditions create desirable and undesirable microbial and chemical changes.

[Assessments: examinations, laboratory exercises and reports]

- c. Apply biochemical principles towards understanding microbial metabolism and ecology under fermentation conditions.

[Assessments: examinations, laboratory exercises and reports]

3. Improve written and oral presentation skills.

[Assessments: laboratory exercises and reports]

4. Employ and integrate scientific knowledge to solve technical problems encountered in fermentation industries.

[Assessments: examinations]

GRADING

Examination 1	100
Examination 2	100
Quizzes (5 x 10 points each)	50
Pea fermentation laboratory report	
Written report	50
Sauerkraut fermentation	
Written report	50
Oral presentation	50
Attendance/participation	50
	450 points

<u>Grade</u>	<u>% of Total Points</u>
A	≥93.0
A-	90.0 – 92.9
B+	87.0 – 89.9
B	83.0 – 86.9
B-	80.0 – 82.9
C+	77.0 – 79.9
C	73.0 – 76.9
C-	70.0 – 72.9
D+	67.0 – 69.9
D	60.0 – 66.9
F	≤59.9

Dictionaries, cell phones, computers, ipods, or ANY other electronic equipment cannot be used, played, or consulted during quizzes or examinations. Examinations will include material covered in lecture and laboratory.

PEA FERMENTATION: WRITTEN REPORT

1. Description

Student groups will monitor fermentation of dried green peas by lactic acid bacteria under various conditions. Over the span of a week, students will measure calculate changes in titratable acidities of their fermentations. During week 4, data from all groups will be shared with the the class.

2. Format of written report

Each student group should work as a team towards the interpretation of the results to prepare and write individual reports. The technical report will include title, author, brief summary, purpose/objectives, procedures, data/results of the experiments, and interpretations and conclusions.

Citation of at least two references supporting your results is required. All reports should be typed with double spacing. Use of headers within the reports is highly encouraged. Reports should be limited to five (5) pages or less.

DUE DATE OF WRITTEN REPORT **February 16, 2018** by 5:00 pm (PST) [week 6]

SAUERKRAUT: WRITTEN REPORT/ORAL PRESENTATION

1. Description

Sauerkraut, literally “sour cabbage”, results from the lactic acid fermentation of cabbage that has been shredded. However, producing sauerkraut is a natural process where native bacteria on the cabbage carry out a sequential fermentation with different lactic acid bacteria dominating at different times. Conditions such as salt concentration, degree of anaerobic environment, and incubation temperature greatly affect the microflora.

In this exercise, students will be conducting cabbage fermentations and apply various treatments. During the course of fermentations, titratable acidity will be determined twice a week. In addition, samples during week 4 (approximately days 0 and 3) and week 7 (approximately day 21) will be evaluated for the types of microorganisms present. Here, the lactic acid bacteria will be isolated, characterized and tentatively identified using methods outlined in the laboratory manual.

2. Format of written report

Formats will vary but should include a cover memorandum to a “fictional boss” attached to your technical report. The report should include title, author, executive summary, purpose/objectives, procedures (can cite the laboratory manual), data/results of the experiments, discussion, and conclusions/recommendations. Citation of references that help support your results and conclusions is very strongly encouraged. Do not cite course lecture notes, instructor(s), or laboratory partners as references. Caution should be exerted if using the internet to find citations (information should be refereed by non-biased referees as those used in publishing original research). All reports should be typed with double spacing. Use of headers within the reports is highly encouraged. Reports must be submitted in hard copy format rather than by electronic means (the instructor is not responsible for printing).

Each student group should work as a team towards the analysis of the sauerkraut fermentations including isolation of while individual members within a group will prepare and write their own report. Although it would be ideal for all members of a student group to agree on conclusions and recommendations, this may not always be the situation.

Whether members agree or not, individual reports must provide adequate support for the conclusions presented.

Citation of at least three references supporting your results is required. All reports should be typed with double spacing. Use of headers within the reports is highly encouraged.

DUE DATE OF WRITTEN REPORT **April 13, 2018** by 5:00 pm (PST) [week 14]

3. Format of oral report

Student groups will orally present results from their cider fermentation experiments. Each group presentation will be 20 minutes in length, followed by questions from fellow students and faculty for up to an additional 10 minutes. Instructors and fellow students will evaluate all presentations using the attached evaluation form.

EVALUATION OF WRITTEN REPORTS

1. Background and existing research (10 points maximum)
 - Low score: Information from irrelevant sources and is not organized or unrelated to experiments.
 - High score: Synthesis of in-depth and relevant information; information organized to reveal insightful trends or patterns related to experiments.
2. Description of experiments & data presentation (10 points maximum)
 - Low score: Experiments and data are not clearly or described adequately.
 - High score: Experiments and data are clearly and comprehensively described.
3. Logic, clarity, and conciseness of findings (10 points maximum)
 - Low score: Writing difficult to follow with unclear arguments that are not well developed or verbose.
 - High score: Writing easy to follow and understand; arguments clearly and succinctly developed.
4. Conclusions (10 points maximum)
 - Low score: Ambiguous, illogical, or unsupportable conclusions.
 - High score: Conclusions are logical and in-depth extrapolations from findings.
5. Mechanics and grammar (5 points maximum)
 - Low score: Sentences and paragraphs are difficult to read and understand due to poor mechanics or grammar.
 - High score: The article does not contain obvious grammatical or mechanical errors.
6. References/citations (5 points maximum)
 - Low score: Fewer than three (3) references, lack of original research or refereed articles, and/or not following correct *Journal of Food Science* format.
 - High score: Minimum of three (3) references (two must be refereed that describe original research) with citations following *Journal of Food Science* format.

EVALUATION OF ORAL PRESENTATIONS

Presenters' Names: _____ **Group Number:** _____

Date: _____ **Final Score:** _____

1. Depth of discussing fermentation treatments (were reasonable arguments presented? Were references and other information used to explain treatments?)

1 2 3 4 5 6 7 8 9 10 (points)

2. Overall logic and clarity of ideas (presentation easy to follow and understand?)

1 2 3 4 5 6 7 8 9 10 (points)

3. Appropriate use of visual aids (too many/too few and readability?)

1 2 3 4 5 6 7 8 9 10 (points)

4. Evidence of teamwork (did the group work together?)

1 2 3 4 5 6 7 8 9 10 (points)

5. Presentation of wines (appropriate set-up and organization?)

1 2 3 4 5 (points)

6. Handling of questions/comments (understanding beyond what was presented?)

1 2 3 4 5 (points)

7. Other comments

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>

STUDENT POLICIES

Current academic policies and procedures can be found on the WSU Registrar website located at the following address: <http://www.registrar.wsu.edu/Registrar/Apps/AcadRegs.ASPX>.

Students with Disabilities

Reasonable accommodations are available for WSU students with a documented disability. If you have a disability and need accommodations to fully participate in this class, please either visit or call the Access Center (Washington Building 217; 509-335-3417) to schedule an appointment with an Access Advisor. All accommodations MUST be approved through the Access Center.

Reasonable accommodations are available for UI students who have documented temporary or permanent disabilities. All accommodations must be approved through Disability Support Services located in the Idaho Commons Building, Room 306 in order to notify your instructor(s) as soon as possible regarding accommodation(s) needed for the course. Contact DSS at www.access.uidaho.edu (email: dss@uidaho.edu; phone: 208-885-6307).

Academic Integrity

WSU expects all students to behave in a manner consistent with its high standards of scholarship and conduct. Students are expected to uphold these standards both on and off campus and acknowledge the university's authority to take disciplinary action. The purpose of these standards and processes is to educate students and protect the welfare of the community. The standards of Conduct for Students can be found at <http://conduct.wsu.edu>. University instructors have the authority to intervene in all situations where students are suspected of academic dishonesty. In such instances, responsible instructors retain the authority to assign grades to students considering, from an academic standpoint, the nature of the student action. More information regarding responding to academic integrity violations can be found at <http://academicintegrity.wsu.edu/>. Feel free to contact the Office of Student Standards and Accountability (509-335-4532) if you would like more specific information about the process. Writing Programs (509-335-7959) can assist with proactive assignment design that minimizes intentional or unintentional academic dishonesty.

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 or complete crosswords, and turn off cellular phones during class.

Safety

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:

1. 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.
2. 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., Smith 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:

1. 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.
2. Summary: a concise statement of the main idea from a section within a source.
3. 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*.