

## FS 460 Food Chemistry (3 cr) Fall Semester 2016

<b>LECTURES</b>	MWF 10:10 to 11:00 am (Clark room 149)
<b>PREREQUISITES</b>	Organic chemistry (equivalent to CHEM 345) and general biochemistry (equivalent to MBioS 303) are <u>required</u> while a general food processing course (equivalent to FS 302/303) is highly recommended.
<b>INSTRUCTOR</b>	Dr. Charles G. Edwards 320 Food Science Human Nutrition Building 509-335-6612 or edwardsc@wsu.edu
<b>OFFICE HOURS</b>	Call/email for an appointment but avoid the hour prior to lectures or laboratories (instructor preparation time).
<b>REQUIRED MATERIAL</b>	Edwards, C.G. <i>Lecture Notes: Scientific Names, Structures, Pathways, and Data</i> . FS 460 Food Chemistry Lecture, Washington State University, Pullman (2016). Available at Crimson & Gray in Pullman (800-469-2998 or <a href="http://www.crimsongray.com">www.crimsongray.com</a> ).
<b>RECOMMENDED TEXTS</b>	Brady, J.W. <i>Introductory Food Chemistry</i> . Cornell University Press. ISBN 978-0-8014-5075-4 (2013). Available at Crimson & Gray or <a href="http://amazon.com">amazon.com</a> .
<b>WEB-BASED MATERIAL</b>	Food Fats and Oils booklet → Go to <a href="http://www.iseo.org/httpdocs/publications/FoodFatsOils2006.pdf">http://www.iseo.org/httpdocs/publications/FoodFatsOils2006.pdf</a>
<b>TEACHING ASSISTANT</b>	Emily Walsh ( <a href="mailto:emily.walsh@wsu.edu">emily.walsh@wsu.edu</a> ; FSHN Building room 116).

### COURSE OUTLINE

<u>Topics</u>	<u>Approximate number of lectures</u>
Introduction/opening	1
Library and information retrieval	1
Water/dispersions	3
Carbohydrates	7
Polysaccharides	5
Midterm examination	1
Lipids	6
Proteins	4
Enzymes	5
Color and pigments	8
Flavors and additives	3
Review of final exam and course evaluation	1

Final examination → **Tuesday, December 13, 2016** (8:00 to 10:00 am)

### CLASS CANCELLATIONS

Lecture will NOT be held on the following dates: Monday September 5 (Labor Day), Friday November 11 (Veterans Day), and November 21-25 (Thanksgiving).

## GUEST LECTURES

1. Ms. Lara Ann Ursin Cummings (WSU Libraries) will give a presentation on finding information as part of the Thinking Exercise on Friday, August 26 in Terrell 20E (no meeting in Clark Hall).
2. Dr. Deborah Dihel (Director of Research and Development, ConAgra Foods) will share approaches to "technical problem solving in the food industry" on Friday, December 9.

## GRADING

Midterm examination	100
Comprehensive final examination	150
Thinking assignments	
Assignment 1 (written paper; individual graded)	100
Assignment 2 (oral presentation; group graded)	50
Class participation	<u>25</u>
Total points possible	425

<u>Grade</u>	<u>% 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 examinations. For University of Idaho (UI) students, minus (-) or plus (+) designations assigned to course grades will be removed upon entering the grades into their computer system.

## CLASS PARTICIPATION AND ATTENDANCE

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 instructor. A total of 25 points will be awarded for those students who frequently participate and attend >90% of lectures with less points assigned to those students who infrequently participate and attend.

In accordance with Academic Regulation 73, absences impede a student's academic progress and should be avoided. Those students who must miss a lecture for university-sponsored activities such as field trips, judging teams, sports, etc. should obtain an official Class Absence Request form from the faculty or staff member supervising the off-campus activity. Scheduling conflicts with employment and non-university activities will be considered unexcused absences. Classes listed in the official university time schedule as "to be arranged" must be scheduled to avoid conflicts with FS 460. Students who are excessively absent (≥4 unexcused absences) will receive an email warning related to the importance of attending class.

The mid-term examination will be scheduled one to two weeks before the intended dates based on majority vote of the students. This policy will hopefully limit conflicts due to student participation in other university-approved activities or having other scheduled examinations. However, the instructor reserves the right to ultimately decide examination dates if a majority decision cannot be easily reached. Make-up 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 examination date so a substitute examination can be written and the date for the examination established. Those students who miss an examination due to an unexcused absence will receive a score of zero ("0") for that examination.

## **STUDENT LEARNING OBJECTIVES**

At the end of this course, a student will:

1. Understand individual and integrated chemical behaviors of food components.

*Assessment → midterm and final written examinations*

- a. Recall and draw selected common components of foods (e.g., glucose, oleic/linoleic acids).
- b. Recognize (not memorize) structural formula of a range of food constituents.
- c. Explain how processing and storage can encourage or inhibit reactions and interactions of food components.
- d. Describe the relationship between chemical structure and function/reactivity of components.

2. Integrate knowledge to propose solutions to hypothetical technological problems encountered in the food industry.

*Assessment → midterm and final written examinations*

3. Develop and express informed opinions regarding controversial topics involving food chemistry.

*Assessment → thinking assignments (written and oral)*

## **INSTRUCTIONAL METHODS**

This course will stress an understanding of scientific concepts and principles so that critical thinking skills and scientific reasoning can be applied to solve hypothetical technological problems encountered by the global and local wine industry. Examinations feature "observation" questions that require providing scientific explanations based the principles taught in class. A 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 apply scientific reasoning towards arriving at a possible answer (frequently, there is more than one possible path to a viable answer). Though sometimes challenging for students and instructors, this strategy encourages critical thinking and scientific reasoning as opposed to the memorization of facts.

## **THINKING ASSIGNMENT**

### Background

One of the core competencies in the Institute of Food Technologists (IFT) education standards is for students to achieve competency in communication skills (i.e., oral and written communication, listening, interviewing, etc.). By the time students graduate, they should not only be able to search for and condense information, but also be able to communicate technical information to technical and non-technical audiences. If writing is a form of thinking, and if students write better, they will think better too. In addition, better writing requires better thinking which generates deeper understanding."

## Description

Students will be initially assigned to groups of 4 to 6 individuals (labeled Groups 1, 2, 3, or 4) and then divided into two sub-groups (Groups 1a/1b, 2a/2b, 3a/3b, or 4a/4b). Each group will be given a controversial topic within food chemistry by the instructor, with one subgroup supporting its use in foods and the other subgroup opposing. The goal of this exercise will be to develop "informed opinions" regarding controversial topics where each student may or may not agree with the assigned position.

When preparing their arguments, students should consider all opinions (political, moral, ethical, economic, and medical) and not just technical. Students working with the same topic may work together to develop general themes or ideas; however, each paper must reflect the work of the individual student and not just copied from fellow students.

## Format and due dates

Individual students within a sub-group will write a paper defending the stated position. When preparing their arguments, students should consider all opinions (political, moral, ethical, economic, and medical) and not just technical. Group members may work together to develop general themes or ideas; however, each paper must reflect the work of the individual student and not just copied from other group members.

Each student's paper will be graded for both technical and written quality according to the attached rubric. Papers will be no longer than 1200 words (**maximum**). Please indicate the actual number of words somewhere on the document. The paper must be typed double-spaced with numbered pages. Use of headers within the paper is encouraged. Minimum of three (3) references (two must be refereed describing original research) will be used to write your paper and cited using the *Journal of Food Science* format. References are not included in the 1200 word maximum requirement.

A penalty of 10 points per working day will be assessed to papers submitted after the due date (no later than 5:00 pm PST that day). Email submission of the paper will not be accepted.

**DUE DATE: Friday, October 21, 2016 (by 5:00 pm PST)**

Once the written papers are completed, members of each sub-group will work together to develop a single oral presentation discussing their position. Here, the two sub-groups representing a single issue will give their presentations to the class on a single day and then field questions from each other and/or the audience (both class and non-class members). The length of the oral presentation should be a **maximum** of 15 minutes and involve all members of that sub-group (powerpoint is encouraged). **NOTE: Class members not participating in the particular debate will provide an evaluation of each subgroup using the attached rubric. These comments will be summarized and available for review by each group at the end of the semester.**

## **DATES OF PRESENTATIONS:**

Issue #1 (Groups 1a and 1b): **Wednesday, November 30, 2016**

Issue #2 (Groups 2a and 2b): **Friday, December 2, 2016**

Issue #3 (Groups 3a and 3b): **Monday, December 5, 2016**

Issue #4 (Groups 4a and 4b): **Wednesday, December 7, 2016**

## Evaluation (written paper)

### 1. Explanation of issue (10 points maximum)

- Low score: Issue is not clear nor described adequately.
- High score: Issue is clear and comprehensively described.

### 2. Existing evidence, research, and views (25 points maximum)

- Low score: Evidence from irrelevant sources and is not organized or unrelated to issue.
- High score: Synthesis of in-depth and relevant information; information organized to reveal insightful trends or patterns related to issue.

### 3. Logic, clarity, and conciseness of ideas (25 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 (20 points maximum)

- Low score: Ambiguous, illogical, or unsupportable conclusions.
- High score: Conclusions are logical and in-depth extrapolations from findings.

### 5. Mechanics and grammar (10 points maximum)

- Low score: Sentences and paragraphs are difficult to read and understand due to poor mechanics or grammar; number of words greatly exceeded 1200 or were not indicated.
- High score: The article does not contain obvious grammatical or mechanical errors; number of words completely described the issue and were <1200.

### 6. References/citations (10 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 (oral presentation)

Topic: \_\_\_\_\_

Date: \_\_\_\_\_

Support (Group \_\_\_\_): \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

Oppose (Group \_\_\_\_): \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

1. Explanation of issue (were reasonable arguments presented? Viewpoints thoroughly questioned?)

Support:           1     2     3     4     5     6     7     8     9    10 (points)  
Oppose:           1     2     3     4     5     6     7     8     9    10 (points)  
comments:

2. Analysis of existing knowledge & views (in-depth synthesis from relevant sources?)

Support:           1     2     3     4     5     6     7     8     9    10 (points)  
Oppose:           1     2     3     4     5     6     7     8     9    10 (points)  
comments:

3. Conclusions (logical extrapolation supported by facts?)

Support:           1     2     3     4     5     6     7     8     9    10 (points)  
Oppose:           1     2     3     4     5     6     7     8     9    10 (points)  
comments:

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

Support:           1     2     3     4     5     6     7     8     9    10 (points)  
Oppose:           1     2     3     4     5     6     7     8     9    10 (points)  
comments:

5. Appropriate use of visual aids (too many/too few? Readability?)

Support:           1     2     3     4     5 (points)  
Oppose:           1     2     3     4     5 (points)  
comments:

6. Cooperation within subgroup (did members of the subgroup work together/share responsibilities?)

Support:           1     2     3     4     5 (points)  
Oppose:           1     2     3     4     5 (points)  
comments:

7. Instructor comments

## 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](http://www.access.uidaho.edu) (email: [dss@uidaho.edu](mailto: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 Conduct (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

Classroom and campus safety are of paramount importance at Washington State University, and are the shared responsibility of the entire campus population. WSU urges students to follow the "Alert, Assess, Act" protocol for all types of emergencies and the "Run, Hide, Fight" response for an active shooter incident. Remain *ALERT* (through direct observation or emergency notification), *ASSESS* your specific situation, and *ACT* in the most appropriate way to assure your own safety (and the safety of others if you are able).

Please sign up for emergency alerts on your account at MyWSU. For more information on this subject, campus safety, and related topics, please view the FBI's *Run, Hide, Fight* video and visit the WSU safety portal.

## 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, or paragraphs as though they were your own *without understanding* the need to cite the original source. Unintentional plagiarism normally occurs when the student or individual does not understand the conventions of scientific writing and the need to cite sources of information.
2. Intentional: the use of other 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*.