

ADVANCED FOOD CHEMISTRY
FOS 6315C
Fall 2020, 4 credits (Lecture and Lab combined)

Lectures: VIRTUALLY (M, W, F; Period 8, 3-3:50pm)

Lab: FSHN Bldg., Room 310 (Thursday; Period 7-9, 1:55-4:55pm)

- COVID Safety:**
1. Students and instructors will be required to wear face masks and maintain appropriate physical distance (minimum 6ft.) while inside UF owned buildings (including during entering/exiting the classroom). Note we will only meet IN PERSON for 2 Exams and 5 Labs.
 2. Sanitizing supplies are available in the classroom if you wish to wipe down your desks prior to sitting down and at the end of the class. Gloves will be worn while in the laboratory space and sanitary wipes are expected to be used by the student before using any shared equipment.

Instructor: Dr. Paul Sarnoski
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Instructor Office Hours: by appointment

Course Description:

The course deals with the chemistry of the principal components of foods, their properties and interactions, and the changes that occur during processing, storage, and utilization. Emphasis will be on evidence derived from research literature, interpretation of research findings, and problem solving based on the scientific principles.

Prerequisites: Undergraduate courses in Organic Chemistry, Biochemistry (BCH 4024), and preferentially Food Chemistry (FOS 4311) or permission of the instructor.

Objectives:

1. Understand the chemical function and properties of major food components.
2. Understand the chemical interactions of food components and their effects on sensory and nutritional quality, functional properties, and safety of foods.
3. Understand the chemical basis of food preservation and the effects of processing and storage on food quality.
4. Familiarize the student with common analytical and experimental methods used in the study of the major food components.
5. Examine the basis of food chemistry-related issues in food safety, regulation, and current events.

Format: Hybrid (in-person/online). Lectures, laboratory exercises, discussion of scientific literature. Lectures will either be posted or given through Zoom. At minimum we will have a weekly Zoom discussion. Participation in class discussion virtually is expected. We will conduct 5 labs in person, and exams will also be given in person. We will have an approximate total of 7 in person meetings over the course of the semester.

Exams: Written exams will be given IN PERSON covering approximately each third of the course. The last exam will NOT be cumulative but will be administered through Canvas. You will have 2 hrs to complete each exam.

The exams will be in short essay format and will include questions involving: (a) basic factual material with emphasis on major topics/principles; (b) solving practical problems in food chemistry by application of food chemistry principles; and (c) application of the course material in the interpretation of research data.

Tentative Exam schedule:	Exam 1	10/7/20 (Wed.)
	Exam 2	11/13/20 (Fri.)
	Exam 3	12/15/20 (Tue.) - Online

Grading:	Percent of Grade
Written examinations (3)	70
Laboratory: Reports (~5 written)	30

Please note that the University of Florida grading system includes the use of plus and minus grades, with the corresponding point values for each grade. Please see <https://student.ufl.edu/minusgrades.html> for additional information.

Grade Values for Conversion May 11, 2009 and After												
Letter Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E, I, NG, S-U, WF
Grade Points	4.0	3.67	3.33	3.00	2.67	2.33	2.00	1.67	1.33	1.00	.67	0.00

The grading scale is consistent with the university policies on grading that can be found at: <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Book and Class Notes:

There is no current text that is a perfect fit for the graduate level food chemistry course. However, Fennema's Food Chemistry, 5th Edition (Damodoran, Parkin and Fennema, eds.) is the current best choice that exists at this time and will be our primary text and reference book. We will use this text as the major source of information for the lectures, and I will also assign readings from this textbook. The UF library currently owns a print and eBook version. The eBook version can be found at the following link <https://uf.catalog.fcla.edu/uf.jsp?ix=k&st=Fennema&V=D&S=0571564773307713&I=0#top>

This is an important book for any Food Scientist. I recommend that you have a copy of either the print or eBook (pdf) version for your own personal reference.

The lecture notes will be posted on Canvas. We will primarily go through the lecture notes during class time.

Classroom Policies: Please don't check or send e-mail, texts, etc., during class or lab. Students are expected to be on time for lectures and lab. Students are expected to be familiar with the topic to be covered in lectures and labs and participate in class discussion. Makeup exams are frowned upon and will only be given with the **advance** permission of the instructor. Late assignments or lab reports will receive deductions at 2pts/day for each day late.

Class Recordings

Our class sessions may be audio visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

COVID-19 Addendums

We will have face-to-face instructional sessions to accomplish the student learning objectives of this course. In response to COVID-19, the following policies and requirements are in place to maintain your learning environment and to enhance the safety of our in-classroom interactions.

- You are required to wear approved face coverings at all times during class and within buildings. Following and enforcing these policies and requirements are all of our responsibility. Failure to do so will lead to a report to the Office of Student Conduct and Conflict Resolution.
- This course has been assigned a physical classroom with enough capacity to maintain physical distancing (6 feet between individuals) requirements. Please utilize designated seats and maintain appropriate spacing between students. Please do not move desks or stations.
- Sanitizing supplies are available in the classroom if you wish to wipe down your desks prior to sitting down and at the end of the class.
- Follow your instructor's guidance on how to enter and exit the classroom. Practice physical distancing to the extent possible when entering and exiting the classroom.
- If you are experiencing COVID-19 symptoms ([Click here for guidance from the CDC on symptoms of coronavirus](#)), please use the UF Health screening system and follow the instructions on whether you are able to attend class. [Click here for UF Health guidance on what to do if you have been exposed to or are experiencing Covid-19 symptoms](#).
- Course materials will be provided to you with an excused absence, and you will be given a reasonable amount of time to make up work. [Find more information in the university attendance policies](#).

Academic Honesty

As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: “*We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.*” You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied: “*On my honor, I have neither given nor received unauthorized aid in doing this assignment.*”

It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: <http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code>.

Software Use:

All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

Campus Helping Resources

Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university’s counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575,

www.counseling.ufl.edu/cwc/

Counseling Services
Groups and Workshops
Outreach and Consultation
Self-Help Library
Wellness Coaching

- U Matter We Care, www.umatter.ufl.edu
- Career Resource Center, First Floor JWRU, 392-1601, www.crc.ufl.edu/

Disability Statement

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, <https://disability.ufl.edu/>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester

Online Course Evaluations

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

Student Complaints:

- Residential Course: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf

Course Outline:

I. Physical and Chemical Properties of Water (Fennema Chapters 2 & 12)

- A. Structure and chemical properties
- B. Solute effects on water: state of water in foods
- C. Water activity: principles, measurement, control, effects, related concepts
- D. Acid-base chemistry of foods and common additives

II. Carbohydrates (Fennema Chapter 3)

- A. Simple sugars, sugar derivatives and oligosaccharides
 1. Basic chemistry; conformation, anomeric forms, equilibria, reactivity, sweetness
 2. Sugar derivatives: sugar alcohols, glycosides, etc.
 3. Browning and related reactions
 4. Case studies – acrylamide and furan formation in foods
- B. Polysaccharides
 1. Basic structures and properties: starches, celluloses, gums, modification techniques
 2. Dietary fiber: components, properties, analysis

III. Lipids (Fennema Chapter 4)

- A. Content and role in foods
- B. Analytical methods
- C. Chemical, nutritional and physical properties
- D. Processing of fats and oils
- E. Degradation reactions

IV. Proteins (Fennema Chapter 5)

- A. Physical properties of proteins in relation to protein structure
- B. Analytical methods
- C. Basic properties: hydration, ionization, colloidal behavior
- D. Functional properties
- E. Effects of food processing: changes occurring in chemical, functional & nutritional properties of proteins
- F. Nitrite function, chemistry and nitrosamine formation

ADVANCED FOOD CHEMISTRY LAB SCHEDULE – Fall 2020 (subject to change as needed)

Dates -----	Topic -----	Relative Point Value -----
9/3/20	No Lab	no report assigned
9/10/20	Lab procedures and safety review; Water activity measurement, principles, demonstration of water activity measurement	20 (Report 1 = Water activity due 9/24/20)
9/17/20	Amylose/Amylopectin Gelatinization and Gelation	30 (Report 2 = gelation due 10/1/20)
9/24/20	Lipid Extraction (You will perform the Folch extraction, TA will make FAMES and run GC)	30 (Report 3 = lipids due 10/22/20)
10/1/20	Protein Isolation/Protein Databases	30 (Report 4= isolation, databases due 11/5/20)
10/8/20	Protein Electrophoresis	20 (Report 5 = PAGE due 11/23/20)
10/15/20	To be scheduled if needed	
10/22/20	To be scheduled if needed	

Total pts = 130 pts (30% of the FINAL GRADE)