

Food Chemistry 2017

FOS 4311 - FOOD CHEMISTRY: Offered every Spring Semester
3 Credits, M W F – Period 4

Instructor:

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Office Hours

I will announce office hours through Canvas before and after scheduled Exams. If you need to meet with me at other times during the semester you are encouraged to make an appointment (email or call to setup an appointment). I generally have an open door policy, but I may not always be in my office or available if you decide to stop by without notification.

Course Prerequisites

CHM 2200 or CHM 2210 (Organic Chemistry 1), CHM 2211 (Organic Chemistry 2) sequence (with labs)
Biochemistry recommended but not required

Course Co-requisites

FOS 4310L (Experimental Foods Lab) or FOS 4311L (Food Chemistry Lab)

Course Description

This course is designed for food science and nutrition professionals who are interested in the relationship of food composition and their resultant properties in foods. We will also discuss beneficial and detrimental changes in foods that relate to chemical reactions that occur during processing, storage, and utilization.

Course Objectives

The core competency of this course is for students to differentiate chemical interactions and reactions of food components and their effect on sensory, nutritional, and functional properties of foods, and how processing influences these properties. Other course objectives include:

1. Students will be able to identify the structure of food constituents and relate the structure to the constituents function and importance in foods with respect to food quality, nutrition, safety, processing, etc.
2. The student will explain how environmental factors such as temperature, pH, ionic characteristic and strength, bonding, light, etc. affect chemical changes in food systems and judge how to adjust these conditions to improve or minimize chemical and biochemical deterioration of food systems.
3. Finally, the student will integrate chemistry and biochemistry principles into real-world food science and nutritional problems.

Learning Activities

These include classroom lecture, use of in-class assessment technology (classroom clickers), active learning assignments (group problem solving work), in-class demonstrations, and possibly guest lectures.

Assessment Tools

Exams (3) - 300 pts

Final - 100 pts (The Final Exam is **not** optional)

Food Label Term Paper - 50 pts

In Class Participation - iClickers/in class problem solving- 50 pts

Recommended Text

Food Chemistry: Principles and Applications, 3rd Edition. 2012. Y.H. Hui Ed., Science Technology System, Sacramento, CA. ISBN 9781891796081 (available for purchase from the UF bookstore, may or may not be available from off-campus bookstores, not available on Amazon)

Required Technology

iClicker in-class response system. You have the option to purchase the iClicker 2 or iClicker+ remotes or iClicker Go (works with smartphone, tablet, or laptop). For more information: <https://www1.iclicker.com/products/iclicker-go/>

Recommended Supplemental Reading

Fennema's Food Chemistry, 2007. 4th Edition, S. Damodaran, K. Parkin, O. Fennema Eds. CRC Press.

Principles of Food Chemistry, 1999. 3rd Edition. John deMan, Aspen Publishers, New York.

Grading

Assessment	Points
Exams (3 @ 100 pts)	300
Final Exam	100
Assignment – Food Label Term Paper	50
In Class Participation	50
Total	500

In Class Participation

50 pts maximum will be attributed to the in class iClicker responses (clickers) and some in-class problem solving group work (details TBD). Correct clicker answers will receive 2 pts, while incorrect answers will receive 1 pt. Bonus points will be built in to account for technological issues with the iClicker software (i.e. there will be at least 60 pts worth of questions during the semester).

Assignment - Food Label Term Paper

You will be required to produce a typewritten report with tables and the chemical composition of 3 food products found in local supermarkets. You are free to choose the products and can work as a group of up to 3 people to submit a joint report. **(Caution: Choose people you can depend on because you will all be receiving the same grade if you work as a group)**. Details are under the Assignments tab, and more details will be addressed closer to the due date. **Due on 4/12/17 by 4:30PM.**

Make up Exam Policy

Make up exams are frowned upon and **will only be given with advance permission of the instructor**. Each examination will include the following statement: *“On my honor, I have neither given nor received unauthorized aid on this examination.”* **Cheating is NOT tolerated and will be reported.**

Grading Scale

450 pts. and above	A	350 – 374 pts.	C
440 – 449 pts.	A-	340 – 349 pts.	C-
425 – 439 pts.	B+	325 – 339 pts.	D+
400 – 424 pts.	B	300 – 324 pts.	D
390 – 399 pts.	B-	290 – 299 pts.	D-
375 – 389 pts.	C+	289 pts. and below	E

Or on a percentage basis.

90-100%	A	70-74.9%	C
88-89.9%	A-	68-69.9%	C-
85-87.9%	B+	65-67.9%	D+
80-84.9%	B	60-64.9	D
78-79.9%	B-	58-59.9	D-
75-77.9%	C+	below 58%	E

General Course Outline

Part 1. Water

- Water's importance in Food Chemistry
- Phases of water
- The role of water as a solvent in food systems
- The concept of water activity

Part 2. Simple Sugars and other Carbohydrates

- Carbohydrate classification
- Carbohydrate nomenclature
- Carbohydrate reactions (isomerization, caramelization, Maillard Browning, etc.)

Part 3. Polysaccharides

- Major types of starch
- The process of starch gelatinization
- The process of staling
- Modified starches and other polysaccharides used in foods

Part 4. Lipids

- Lipid classification and nomenclature
- Reactions of lipids (hydrogenation, oxidation)
- Lipids as emulsifiers

Part 5. Proteins

- Amino acid nomenclature
- Amino acid and protein interaction
- External factors that influence protein systems in foods

Part 6. Enzymes

- Enzyme kinetics
- Important enzymes in food, and the role of the enzyme in the food system (role of enzymes in baking, brewing, HFCS production, cheese making, etc.)

Part 7. Food Colorants and Additives (if time permits)

- Natural and artificial colorants
- Roles of commonly used food preservatives

Exam Dates

Exam 1 – Water/Sugars – 2/1/17 (tentative)

Exam 2 – Polysaccharides/Lipids – 3/15/17

Exam 3 – Proteins/Enzymes – 4/10/17

Final Exam – Cumulative – Group 27D - 4/27/17 (Thurs.) 3:00pm - 5:00pm

Classroom Policies

Smartphone use is allowed only for iClicker Responses. In class participation will be evaluated using the iClicker system. This system is being implemented to offer a better learning experience, and increase student performance. Clicker questions will start by **week 2** at the latest, and points will officially start counting towards your final grade by the **end of week 2 or early in week 3**. Questions may include material recently covered in class, opinion questions, or other types of “informational” questions. **Questions may be asked at any point during class**, and on some days more than one question may be asked. You will be given a set amount of time to respond, but once the “polling time” has ended, it will not be possible to register your response. **Therefore you should get to class on time and have your response system with you and ready to use.**

Academic Honesty – iClicker Use

In addition **you are on your honor to register iClicker responses only for yourself**. This means you personally must be **in class** and register your own answers. *Registering responses for someone else or having someone register responses for you is considered a form of cheating. Registering responses from outside of the classroom will also not be tolerated. If you are caught cheating the system, you and the other party(ies) involved will, at minimum, forfeit all of your clicker points for the semester, and could be prosecuted through Student Honor Court.*

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/honorcodes/honorcode.php>.

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

Training Programs

Community Provider Database

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

Services for Students with Disabilities

The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. Students requesting classroom accommodation must first register with the Dean of Students Office. **The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation.**

0001 Reid Hall, 352-392-8565, www.dso.ufl.edu/drc/