

# Principles of Food Science 11:400:201

## Fall, 2017

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### General Information

**Course Web site:** <http://sakai.rutgers.edu/11:400:201>

### Learning Goals:

1. Gain an overview of Food Science and its interdisciplinary nature in an introduction to:
  - common food systems, their composition, behavior, and uses
  - fundamental molecules (water, proteins, lipids, carbohydrates) that provide the structure, function, and chemical/physical properties of foods.
  - microbiology and biotechnology in food systems.
  - physical, chemical and microbial forms of food deterioration and preservation
  - various forms of processing used for food preservation and their effects on food quality.
2. Develop a fundamental working knowledge of basic concepts in food science.
3. Develop critical thinking and problem solving skills and ability to apply working knowledge to real life situations (see pages 6-7).
4. Become familiar with food science literature and information resources.

### Course materials:

Course notes, worksheets, exams, and support materials available on Rutgers Sakai website:

<https://sakai.rutgers.edu>

Most of the lectures and exercises are already on the website, some will be loaded onto the website throughout the semester, along with other useful references. Watch for notices about additions and changes.

Lessons: contains all lecture material

Assignments: contains study guide worksheets

Resources: contains useful supplementary material with additional background and explanations

It is strongly recommended that students supplement the Notes by reading additional reference materials on Sakai and in the library in preparing for in-class discussions and for exams.

A large number of relevant books, journals, and other references are available in Chang Library.

See especially Encyclopedia of Food Science and Technology,

Food Science and Technology Abstracts

Agricola, Web of Science, ScienceDirect, SciFinder Scholar data bases for lit searches

The Science of Food. 1980. M. Bennion, Harper & Row, San Francisco.

Food Science. 1995. N.N. Potter and H.H. Hotchkiss, Chapman and Hall, New York.

The Science of Food. 1994. P.M. Gaman and K.B. Sherrington, Pergamon, Oxford, UK.

An excellent book explaining some of the science underlying food behaviors is *On Food and Cooking: the Science and Lore of the Kitchen* by Harold McGee (First edition is now available in paperback for under \$10).

Other suggestions for general learning: watch Good Eats, Food Detectives, etc on the Food Network. Read Food Technology (journal available in Chang Library).

**You may earn extra credit points by reading outside materials or watching relevant food programs, etc. then writing a report.** The template for the reports is included on **page 7** of this syllabus. In general, two points are awarded for each extra credit exercise. These points are added to the totals of either exam or worksheet scores, wherever you need the increase most. Bonus points may be awarded for an exceptional extra credit exercise.

## Course Structure and Grading Basis:

### Course Philosophy: Three R's of learning – Respect, Responsibility, and Reward

**Respect** – mutual: LEARNING IS A TEAM EFFORT. Professors respect students as individuals with different backgrounds and different ways of learning, having common goal of mastering material of course on the way to becoming professionals.

Students respect knowledge and commitment of professors, as well as courage to try many different ways to foster student learning and provide learning experiences that are interesting and challenging.

**Responsibility** – mutual: Professors provide interesting materials and exercises and treat students fairly and with consideration.

Students assume responsibility for studying course materials before class, coming to class on time and regularly, and taking initiative to read beyond the limited assigned readings, particularly when they find topics of personal interest.

**Reward** – mutual: students feel accomplishment in learning (and hopefully earn good grades) and professors see positive results of their efforts when students can actually apply course information creatively and to solve problems.

### Course format:

Attendance at all classes is expected and will be recorded. If you must miss class for any reason, you must contact Dr. Schaich **before** class to obtain an excused absence.

Class periods in each unit will explain the fundamental concepts in class notes and apply these to various food systems or food situations. Discussions and case studies in class will examine in more depth material not necessarily covered in the course packet or on exams. Applications will be in various forms, including case studies, demonstrations, discussions, audiovisuals, etc.

Students are encouraged to keep a journal with notes from class notes or outside readings, background explanations, extra information that may be useful in the case studies, etc.

Worksheets under Assignments on Sakai are provided as study guides. These are voluntary and for your own use so you can ignore them if you want. However, the points covered in the worksheet are important information that you will need to know as Food Scientists and much of the material will be covered again on exams.

### Grade basis:

<b>Exams</b>	<b>75%</b>
<b>Final exam</b>	<b>20%</b>
<b>Attendance</b>	<b>5%</b>

The final exam will require integration of information from the entire semester. Most questions will be taken from the Worksheets posted on Sakai, so it is to your advantage to study these.

Due to increased course size, exams and quizzes are now necessarily electronic. They will be take-home since large amounts of material are covered and they are designed to be study guides as well as exams. **EXAMS ARE OPEN BOOK BUT NO COLLABORATION, ASSISTANCE, OR USE OF PAST EXAMS FROM FORMER STUDENTS IS ALLOWED. CHEATING IS TOTALLY UNACCEPTABLE. ANY STUDENT CAUGHT CHEATING WILL BE REPORTED TO THE UNIVERSITY AND PROSECUTED FOR ACADEMIC INTEGRITY INFRACTIONS.** See <http://academicintegrity.rutgers.edu>. A tutorial explaining policies and procedures is available at <http://academicintegrity.rutgers.edu/academic-integrity-tutorial/>, or log in to your [Sakai account](#) and click the "AI Tutorial-FA15-SAS" tab.

**Course Web site <http://sakai.rutgers.edu/11:400:201>**

**Go to <http://sakai.rutgers.edu>.**

**Log in with your scarletmail user name and password.**

**All the course sites of which you are a member will be shown on individual tabs.**

**Click on 11:400:201 (or 11:400:202 for the lab).**

**Click on the topics in the left-hand margin to find:**

**Announcements -- periodic announcements about class (including class closing or time changes), assignments, etc.**

**Syllabus – course requirements, schedule of lectures and requirements**

**Schedule – calendar with special assignment and exam dates**

**Assignments – exams (scantron answer sheets handed out in class)**

**Lessons -- lectures for each section, worksheets covering important information that you should learn**

**Resources – supplementary material for each course topic**

**Chat room and discussion sites – available for student use**

## Lecture Schedule

	<b>Date</b>	<b>Topic</b>	<b>EXAMS</b>
Sept	5	Course Introduction and requirements Integrating multiple disciplines to make Food Science	
	7	Water properties	
	12	Water in foods	
	14	Acids, bases, and pH in foods	Exam 1 out
	19	Protein structures	
	21	Proteins in specific foods	Exam 1 due
Oct	26	Protein functions in foods	
	28	Enzymes	Exam 2 out
	3	Lipid structures	
	5	Lipid functionality - emulsions	Exam 2 due
	10	Lipid functionality - melting point and crystal structure	
	12	Lipid reactions - modification and degradation	
	17	Lipid reactions - oxidation	Exam 3 out
	19	Carbohydrate structures - sugars	
	24	Sugar function	Exam 3 due
	26	Hydrocolloid/gum structure and function	
Nov	31	Starch structure and function	
	2	Browning reactions in food	Exam 4 out
	7	Microbiology -- Microbial growth	
	9	Productive fermentations	Exam 4 due
	14	Microbial spoilage of foods	
	16	Food poisoning	
	21	Food Biotechnology	Exam 5 out
	23	Thanksgiving	
Dec	28	Engineering and Processing -- unit operations	Exam 5 due
	30	Preservation by dehydration	
Dec	5	Preservation by heat and freezing	
	7	Preservation by novel methods – radiation, high pressure, ohmic,	
	12	Preservation by chemicals Last date for extra credit submissions	Final exam out
	20	Final exam due	

**The Final Exam is comprehensive over the entire semester and also contains a section focusing on Preservation and Processing.**

## ACADEMIC INTEGRITY

All students in this course will be expected to uphold the highest standards of academic integrity in all forms. Cheating and dishonesty will not be tolerated.

Students are expected to do their own work on all class assignments and exams – do not use past exams, do not discuss exam questions with others, do not copy answers or share answers, do not ask for assistance with exam from anyone else.

The following are examples of academic dishonesty listed by West Los Angeles College. They should apply in any university and will provide the minimum standard for this course:

### **Plagiarism**

- Submitting someone else's scholarly work, such as essays, term papers, extra credit projects as your own.
- Copying, in part or in full, someone else's assignment.
- Including in your work the ideas or language of another author without proper citation.
- Including in your work information downloaded from the Internet without proper citation.

### **Cheating**

- Consulting concealed notes during a quiz, test or exam given in class.
- Using unauthorized prepared materials during a quiz, test or exam in class.
- Receiving information or answers from another individual during any quiz, test or exam (in class or take home)
- Copying information or answers from a classmate's paper, report, or from any exam.
- Using electronic devices that have not been authorized by the instructor during a quiz, test or exam in class.
- Inventing data for a laboratory experiment, case study, or extra credit assignment.
- Submitting work prepared previously for another course.
- Talking during a quiz, test, or exam given in class or consulting with any other persons (students, faculty, professionals, etc.) during take-home exams. You may, however, ask the professor for clarification of exam questions.

### **Other examples of academic dishonesty:**

- Providing your work for someone else to copy.
- Turning in someone else's work.
- Allowing a fellow student to use answers on your paper during a quiz, test or exam or any other assignment.
- Using "cheat sheets" of any kind on in-class exams unless specifically allowed
- Showing a fellow student your paper during an exam or quiz (take home or in class), or passing information in any way.
- Purposely allowing a classmate to copy your original work product, such as answers to assignments, lab reports, term papers, etc.
- Stealing tests or examinations or using exams given in previous years to provide your answers.
- Removing tests or exams from a campus facility without the permission of the instructor.
- Looking at a fellow student's paper during an exam or quiz, in class or take home.

### **Violators of Academic Integrity policies will be subject to stringent disciplinary action.**

According to University policy, students caught cheating will be reported to the Dean and taken before the Judicial Board. Although the Board decides the punishment with relation to Rutgers University (e.g. total expulsion), the Food Science Dept. has a No Tolerance policy toward cheating. Thus, as noted above, at a minimum, students caught cheating will be ejected from the Food Science program and also face the possibility of expulsion with CHEATING marked on your transcript.

**YOU DON'T WANT ANY OF BAD THINGS TO HAPPEN TO YOU SO DO NOT CHEAT IN ANY WAY!!!**

## Required information from the University:

### STUDENT WELLNESS SERVICES

#### **Just In Case Web App** <http://codu.co/cee05e>

Access helpful mental health information and resources for yourself or a friend in a mental health crisis on your smartphone or tablet and easily contact CAPS or RUPD.

#### **Counseling, ADAP & Psychiatric Services (CAPS)**

(848) 932-7884 / 17 Senior Street, New Brunswick, NJ 08901 / [www.rhscaps.rutgers.edu/](http://www.rhscaps.rutgers.edu/)

CAPS is a University mental health support service that includes counseling, alcohol and other drug assistance, and psychiatric services staffed by a team of professional within Rutgers Health services to support students' efforts to succeed at Rutgers University. CAPS offers a variety of services that include: individual therapy, group therapy and workshops, crisis intervention, referral to specialists in the community and consultation and collaboration with campus partners.

#### **Violence Prevention & Victim Assistance (VPVA)**

(848) 932-1181 / 3 Bartlett Street, New Brunswick, NJ 08901 / [www.vpva.rutgers.edu/](http://www.vpva.rutgers.edu/)

The Office for Violence Prevention and Victim Assistance provides confidential crisis intervention, counseling and advocacy for victims of sexual and relationship violence and stalking to students, staff and faculty. To reach staff during office hours when the university is open or to reach an advocate after hours, call 848-932- 1181.

#### **Disability Services**

(848) 445-6800 / Lucy Stone Hall, Suite A145, Livingston Campus, 54 Joyce Kilmer Avenue, Piscataway, NJ 08854 / <https://ods.rutgers.edu/>

Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation:

<https://ods.rutgers.edu/students/documentation-guidelines>. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete the Registration form on the ODS web site at: <https://ods.rutgers.edu/students/registration-form>.

#### **Scarlet Listeners**

(732) 247-5555 / <http://www.scarletlisteners.com/>

Free and confidential peer counseling and referral hotline, providing a comforting and supportive safe space.

# **TEMPLATE FOR EXTRA CREDIT PROJECTS**

**Title of article, resource, or program:**

**Author and Source:**

**General overview of content:**

**Relationship of resource to general or specific material in Principles of Food Science course:**

**What you learned from this resource:**

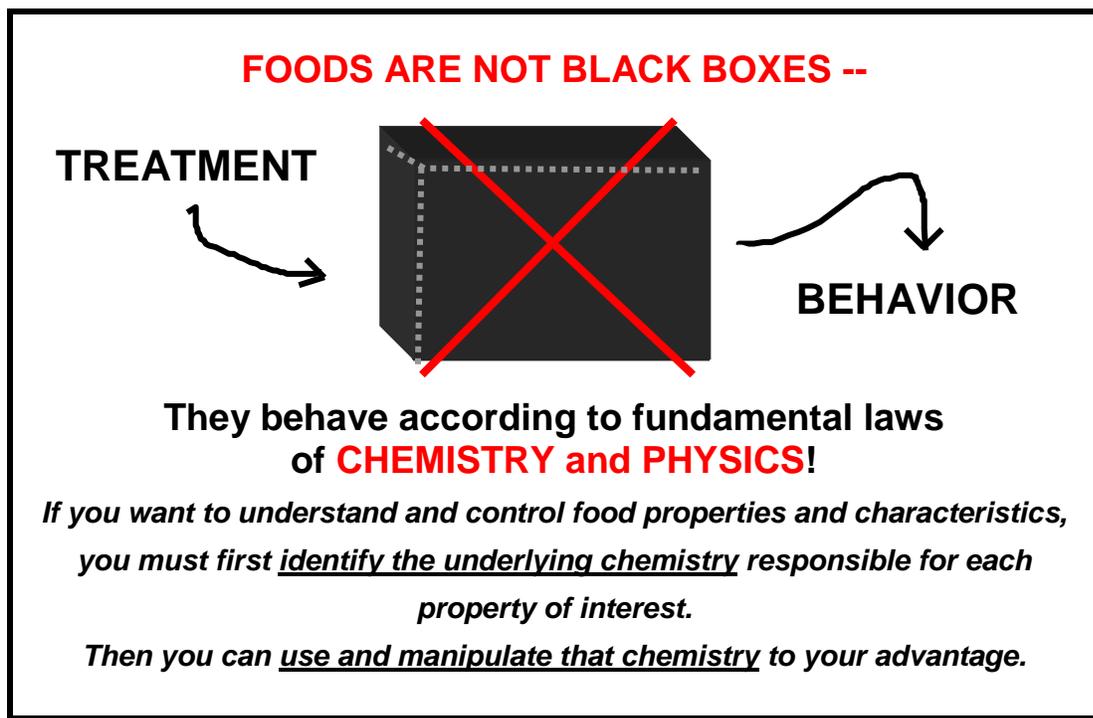
**Most interesting feature of resource and why:**

**Problem aspects of resource and why:**

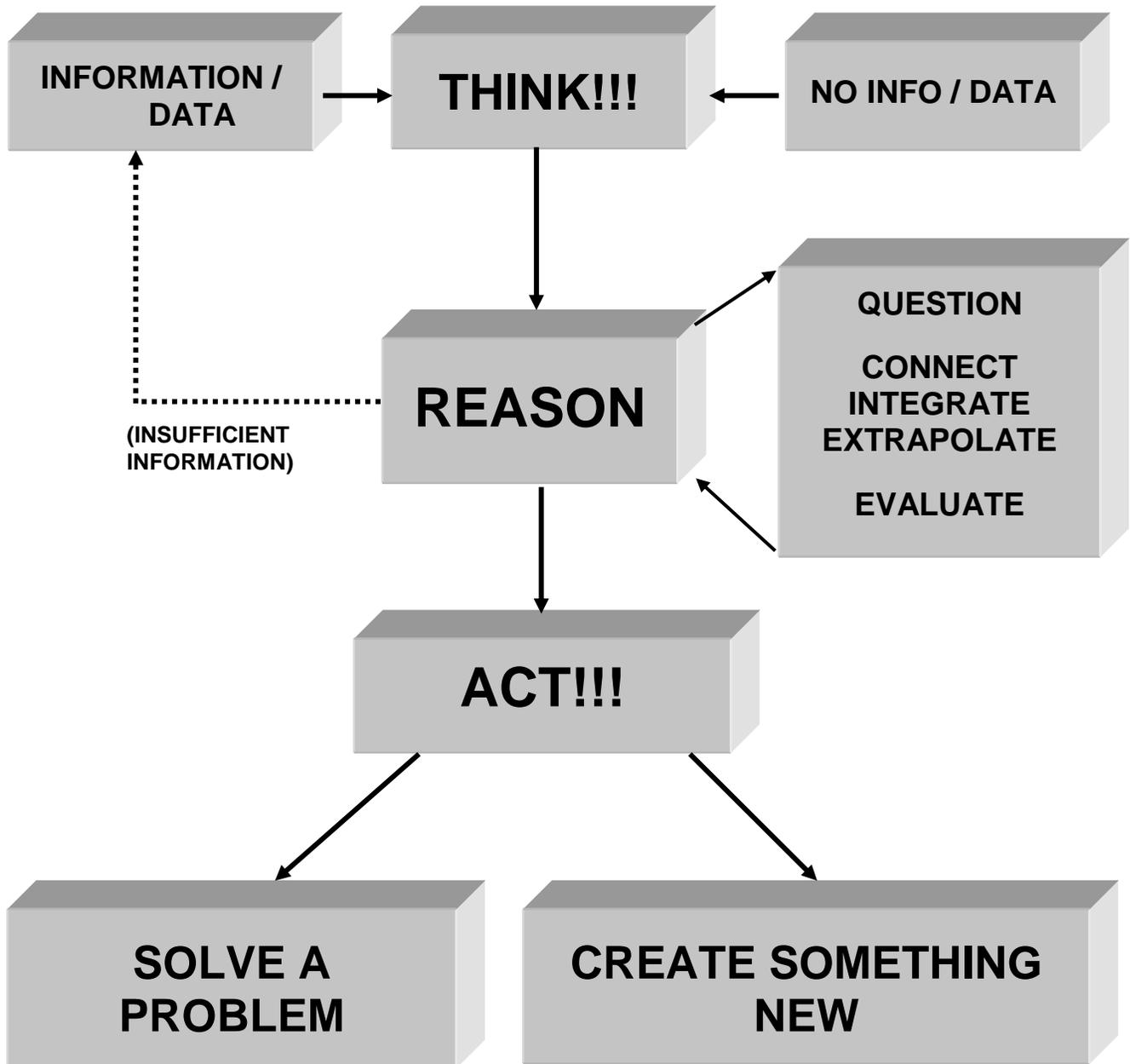
**Would you recommend this resource to other students? Why or why not?**

## Learning Principles applied in this course:

### SCHAICH'S LAW



## ACTIVE LEARNING PROCESS



Use this process to help you become aware of the complexities involved in learning and make learning a mindful, conscious process rather than a series of memorizations.