RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY
SCHOOL OF ENVIRONMENTAL and BIOLOGICAL SCIENCES

Department of Food Science

COURSE SYLLABUS: Fall 2020

COURSE TITLE	**Food Chemistry**
COURSE NUMBER	11:400:411
CREDITS	4
SEMESTER(S) OFFERED	Fall
CLASS DETAILS	
Days/Time(s)	Lecture: Tuesday, Thursday 4:00- 5:15 pm Laboratory: At your convenience
Location	Lecture: Zoom Teleconference (invitations will be sent) Laboratory: Your kitchen
PREREQUISITES	Principles of Food Science 11:400:201 Pre-req or Co-req: Biochemistry11:115:301/403
INSTRUCTOR INFORMATION	
Name	Dr. George M. Carman
Phone	office: 848-932-0267 cell: 609-802-7004 (voice and text)
Email Web page	gcarman@rutgers.edu http://foodsci.rutgers.edu/carman/index.html
Office/teleconference hours	By appointment
Office Address	IFNH Building, Room 012 61 Dudley Road New Brunswick, NJ 08901
TA INFORMATION	
Name	Xin Luo
Email	xl478@scarletmail.rutgers.edu

COURSE DESCRIPTION

The course applies basic scientific principles to food systems and practical applications. Chemical/biochemical reactions of carbohydrates, lipids, proteins, and other constituents in fresh and processed foods are discussed with respect to food quality. Reaction conditions and processes that affect color, flavor, texture, nutrition, and safety of food are emphasized. Students are given a role in the learning experience through research by student groups and class presentations and discussions related to real world problems associated with both the private and public sectors of the world. Students take an active role in development and learning of course content.

COURSE OBJECTIVES

Students are expected to:

- understand and be able to control the major chemical/biochemical (enzymatic) reactions that influence food quality with emphasis on home and food industry applications.
- understand how the properties of different food components and interactions among these components modulate the specific quality attributes of food systems
- understand the principles that underlies the biochemical/enzymatic techniques used in food analysis.

PROGRAM LEARNING GOAL (S) SATISFIED BY THIS COURSE:

LG # 2: **Graduates will demonstrate and apply knowledge of the core competencies in Food Chemistry and analysis.**

Student Learning Goals and Outcome

2.1: Understand the chemistry involved in the properties and reactions of various foods and its components.

2.2: Understand and effectively applies the principles behind analytical techniques associated with food.

2.3: Understand and effectively applies food chemistry and analysis methods

Reference book and readings: Fennema's Food Chemistry, fourth edition, edited by S. Damodaran, K.L. Parkin, and O. R. Fennema, 2007, published by CRC Press may be used as a reference, but not required.

Students are responsible for reading articles that may be found online as directed on the Sakai web site for the course.

Learning Assessments: Course content is assessed through written examinations (October 6, November 10, and December 8), the depth and quality of formal class presentations, and class participation. Emphasis is placed on problem solving related to real life situations. Lecture/discussion will count for 75% of the final grade. Laboratory reports will count for 25 % of the final grade. Class participation will be factored into the final grade

Course Topics:

- Cellular basis of foods (animal, plant, and microbial sources)
- Enzymes: basic principles and roles in food production, processing, and quality attributes (concepts emphasized in a laboratory experiment)
- Postharvest physiology of fruits and vegetables (concepts emphasized in a laboratory experiment)
- Water activity and water migration; basis for controlling biochemical reactions (concepts emphasized in a laboratory experiment)
- Proteins and meat: biochemical influences on controlling structure, color, flavor, and texture (concepts emphasized in a laboratory experiment)
- Carbohydrates: biochemical influences on controlling structure, color, flavor, and texture (concepts emphasized in a laboratory experiment)
- Lipids and emulsions: biochemical influences on food structure, color, flavor, and texture (concepts emphasized in a laboratory experiment)
- Browning reactions: biochemical influences on color, flavor, and texture (concepts emphasized in a laboratory experiment)
- Color: biochemical influence on development and loss of pigments
- Flavor: biochemical influences on desirable and undesirable

Laboratory:

The Food Chemistry laboratory will take place in your own kitchen. Simple experiments will be performed with readily available foods/ingredients that emphasize basic concepts of food chemistry/biochemistry discussed in lectures.

Laboratory reports:

Each person is responsible for their own report. It must be submitted via the Assignments portal in Canvas by the date and time specified. A late report will receive a compromised grade, and if a report is not submitted it will be graded as zero.

The report should be typed (double-space) and prepared in a professional manner following the format used for publication in the Journal of Food Science.

Abstract: Provide a summary of the lab experiment, purpose, and results (1/4 page).

Introduction: Provide a brief background of the topic that leads to a stated hypothesis and objective of the lab. Make sure you cite the literature when making statements about the topic. Explain how the concept explored in the experiment(s) applies to a practical application in a fresh or processed food (3/4 to 1 page).

Materials and Methods: Describe the procedure followed for each experiment, indicating the materials used in each step. Briefly explain any analytical methods in a way that the experiment could be replicated. Do not copy/paste from any source. It is not necessary to make a list of the materials used (1-2 pages).

Results: When describing the results, give a one sentence preamble as to why you did the experiment, how you did the experiment, and what you found. Do this for each experiment. If you

performed an experiment where you examined the effects of something on a food quality, include the results in a table, bar chart, or line drawing as appropriate (use a program such as Microsoft Excel or Google Sheets. Include pictures if they add to the explanation (2-3 pages).

Discussion: In the first paragraph, repeat the rationale for doing the experiment. Summarize the results, and then discuss why you think they happened. You should consult the literature to back your discussion. Present your conclusions in the last paragraph. The conclusions should respond to the objectives and should not refer to literature (1 page).

References: Provide a list of citations that were used in the main body of the report. Use the format for citing papers according to the Journal of Food Science. For the references, give the original people who did the work the credit. You may cite a reference book if you cannot find original citations. **You may NOT cite class notes from this or any other course.**

Length: The length of the laboratory report should be no more than 5-6 typed pages (double space) excluding figures, tables, and references.

Grade rubric (20 points total): Abstract (2), Introduction (4), Methods (4), Results (4), Discussion (4), References (2).

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/
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/
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.