Instructors: This course is team-taught by Drs. Liwei Gu (course coordinator), Diana Taft, and Bin Liu.
Phone: (352) 294-3730 (Liwei Gu)
Email: LGu@ufl.edu (Liwei Gu)
Time: Period 4 (10:40-11:30 am), Monday, Wednesday, Friday
Classrooms: Food and Environmental Toxicology Lab Room 3
Mechanical & Aerospace Eng B, room 230
Office Hours: Dr. Gu has an open-door policy; please feel free to drop by at any time.

Course Description and Objectives

This course comprehensively explores the chemistry, analysis, processing, bioavailability, and health benefits of bioactive food components. It combines foundational knowledge with insights into cutting-edge research trends in the field. Course materials will be provided or accessible through e-books and e-journals from the University of Florida library.

By the end of this course, students will be able to:

1. Develop a strong understanding of fundamental concepts and principles of functional foods.
2. Critically evaluate and discuss scientific literature on bioactive food components.
3. Investigate and assess emerging trends and breakthroughs in nutraceutical research.
4. Apply acquired knowledge to design and develop functional food products for real-world applications.

Course content and format:

There is no required textbook for this course. Reading materials are from peer-reviewed journals or e-books from the UF library. Chapters 8, 11, and 16 are optional content and may not be covered in lecture.

Chapter	Content	Instructor
1	Introduction	Gu
2	U.S. regulations on dietary supplements, nutraceuticals, and functional foods	Gu
3	Market and international issues	Gu
4	Antioxidants and oxidative stress	Gu
5	Absorption, disposition, metabolism, and elimination of nutraceuticals	Gu
6	Phytochemical-based nutraceuticals	Gu
7	Extraction, enrichment, and concentration of nutraceuticals	Gu
8	Nutraceutical analysis on HPLC-MS	Gu
9	Prebiotics, probiotics, and gut microbiome (and human milk) (March 2, 4, 6, 8)	Taft
10	The impact of diet on cardiac health, cellular and molecular mechanisms (Feb 2, 4, 6)	Liu
11	Fermented functional foods (Dr. Mac will be on leave this semester)	Mac
12	Functional food and metabolic syndrome	Gu
14	Nanotechnology and functional foods	Gu
15	Lipid-based nutraceuticals and Nutraceuticals from other sources	Gu
16	Food and inflammation	Gu

Spring break is March 14-21, 2026.

Course Grading (325 total points)

- Quiz in class (15 points, 3-4 quizzes)
- Assignments (88 points)
  - Question and short answer assignment (1 for 7 points)
  - Critical reading and summary of assigned papers (7 for 81 points)
- Group project: develop a functional food product and marketing plan (60 points)
- Term paper and presentation: 5–6-page narrative review paper (90 points)
- Final exam (open book, 72 points)

This course will be graded according to the latest UF grade policy
https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Letter grade	Grade point	Percent value
A	4.0	100-94%
A-	3.67	<94 to 90%
B+	3.33	>90 to 87%
B	3.0	>87 to 84%
B-	2.67	<84 to 80%
C+	2.33	<80 to 77%
C	2.0	<77 to 74%
C-	1.67	<74 to 70%
D+	1.33	<70 to 67%
D	1.0	<67 to 64%
D-	0.67	<64 to 60%
E	0	<60%

Attendance

Students are required to attend all lectures and discussions in accordance with university policy (https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx). The non-justified absences and absences of more than three will be penalized each with 5% from the maximum final grade. Special circumstances will be addressed with the instructor and assessed on a case-by-case basis.

Critical reading of research papers and constructive peer review assignments **(8 for 91 pts)**

After critically reading an assigned paper, write a concise summary using the following headings:

1. *Research Objectives*: Summarize research objectives in one clear sentence.
2. *Research Findings and Merits*: summarize major research findings and highlight scientific significance, including novelty and innovations.
3. *Limitations and Drawbacks*: Identify and summarize at least two limitations or weaknesses in the experimental design, methods, interpretation of results, or other aspects of the study.
4. *Creative Thinking and Novel Ideas*: Propose at least three new ideas or applications inspired by the study. For example, propose novel molecular or cellular mechanisms, connect the results to a broader context, or suggest new research directions.
5. *Answers to other questions*: Address any additional questions on the paper. If no questions are provided, this section can be omitted.
6. *References:* Cite the assigned paper and any additional sources to support your viewpoints.

Your summary must include all required sections and should be concise. Aim for 1-2 pages in length.

Peer review is a cornerstone of scientific progress. Following each summary assignment, students will provide constructive comments using the following rubric:

1. Clarity and Concise: Is the summary of research findings and scientific merits clear and concise?
2. Thoroughness and Insight: Does the summary effectively analyze the study's limitations and drawbacks?
3. Creativity and Applicability:
   - Are the proposed novel ideas and creative insights meaningful and innovative?
   - Do these ideas offer valuable perspectives for addressing critical food or nutrition science questions?
   - Is there potential for practical application?
   - How could these ideas be refined or improved for better impact?

Focus on providing constructive, actionable feedback to help your peers improve their analyses and encourage thoughtful scientific discussion.

Grading rubric:

Items	**Points**
One-sentence objective	**1**
Clear and concise summary of findings and scientific merits	2
Thorough and insightful summary of limitations	2
Creative ideas have a high level of novelty, creativity, scientific merit, and application potential	3
Constructive, fair, and thoughtful comments in peer review	3

Product Development Group Project **(60 points total)**

In groups of 3–4, students will develop a brand-new functional food product (not a dietary supplement) for the marketplace. This project aims to simulate real-world product development, requiring creativity and scientific rigor. Your project should contain the following elements.

1. A Written Product Development and Commercialization Plan:
   - Design a functional food product with realistic potential for commercialization.
   - Ensure the product addresses the needs of a specific demographic and includes practical, real-world applications.
2. Your written plan should include the following components:
   - Product Name: A creative and marketable name.
   - Basic Composition: Include main ingredients and their functional benefits.
   - Production Method: Outline the steps for production, including equipment and scale.
   - Functions: Describe the product's health benefits and intended outcomes.
   - Labeling: Create a label compliant with FDA regulations.
   - Target Consumers: Specify the demographic for your product (e.g., age, health conditions, lifestyle).
   - Price Range: Include a competitive yet realistic pricing strategy.
   - Marketing Strategies: Develop a marketing plan tailored to your demographic. Include branding, distribution, advertising, and promotional tactics.
3. Research and Literature Application:
   - Use scientific literature and classroom material to substantiate your product's development and marketing strategies.
   - Ensure your work is evidence-based, showing creativity grounded in science.
4. Presentation Requirements:

- Deliver a 25-minute presentation to the class, simulating a persuasive pitch to a management and marketing team.
- Business Casual Attire is required.
- Present your product as if you were an R&D Scientist, emphasizing its potential success in the marketplace.
- Include visuals and other creative elements to engage your audience and demonstrate your product's viability.

5. Grading criteria

Items	**Point Total**
Innovative and practical ingredients and production methods	10 pts
A thoughtful marketing plan	10 Pts
Application of scientific literature and classroom materials	10 Pts
Real World Applicability/Scientific Merit	10 Pts
Presentation	10 Pts
Creativity	10 Pts
Total	60 pts

6. Timeline

Date	**Activities**
2/20	R&D Lectures and Handout Assignment
04/03	Oral presentations and Marketing Plans Due

Term Paper and presentation **(90 points)**

1. Write a narrative review, 6 pages, 12 pt Calibri, single space, excluding references.
   - Emphasis on interpretation, comparison, and integration of findings
   - Must have a logical organization by concepts, mechanisms, themes, or outcomes
   - Must have a critical discussion
   - Cited sources must be relevant and justified
2. Suggested structure
   A descriptive title (3 points)
   Abstract (200 words, 5 points)
   Introduction (half a page, 5 points)
   The main body of the review (5 pages, 40 points)
   Discussion of Knowledge Gaps and Future Trends (0.5-1.0 page, 7 points)
   References-choose your reference style and be consistent throughout the paper
3. Paper oral presentation (25 min): Oral presentations must be done in MS PowerPoint. They need to contain all the aspects of the written paper.
   Verbal clarity and fluency (10 points)
   Clarity of slides (5 points)
   Ability to convey complex concepts (10 points)
   Timing and Enthusiasm (5 points)
4. Timeline

Date	**Activities**
02/27	Send the topic / preliminary title to Dr. Gu for approval
04/17, 20, 22	Oral presentation of the term paper

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.

Class evaluation

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/."

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.

Campus Helping Resources

Students experiencing crises or personal problems that interfere with their general wellbeing 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/