

FOS 4435C
Food Product Development: Principles and Practice
Current Syllabus
3 Credits, Spring 2024

Course Instructor and Office Hours

Keith R. Schneider, Professor

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Office Hours: Thursday, 10-11 am; or by appointment

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Course Hours/Location

Time/Location:

- M W Period 2 (8:30 am – 9:20 am): Weimer 1076
- T Periods 2-3 (8:30 am – 10:25 am): Weimer 1076 or FSHN Pilot Plant and Teaching Lab as needed and announced. If a Tuesday is designated as **Lecture**, we will normally only utilize period 2 for that lecture

Overall Course Objectives

The overall goals are to provide the opportunity for students to integrate their training in food science and technology courses and related disciplines and to gain experience with the theory and practice of developing food products. Lectures and labs/discussion sessions will involve understanding and applying practices to develop food products with traditional and novel food ingredients and processes in the context of existing and projected national and international legal, regulatory, economic, environmental, and social constraints. Nutritional and health implications relating to food products will be considered.

This course will help prepare the student for positions in industry, government and/or graduate/professional education. This is the IFT-required senior level capstone course that incorporates and unifies principles from the total undergraduate curriculum. Projects completed in this course may be used in IFT and other sponsored food product development competitions. This course will also serve as a node for assessment of student learning outcomes (SLOs) for graduating seniors as required by University of Florida/IFAS rules.

For **graduate students** who are entering the field of food science from another institution and/or another major, this course will serve as a foundation for many food science and technology research areas and will provide a basis for an introduction and then more thorough understanding of the discipline of food science.

Prerequisites

As a capstone course in the Food Science undergraduate program, it is expected and designed that success in this course is dependent on the integration of prior knowledge brought into the course. Therefore, it is departmental policy to require concurrent registration and/or completion of (3) 4000-level FOS courses as a prerequisite for registering for FOS 4435C. Undergraduate FOS majors generally register for this course in their final semester of their Food Science Program.

Graduate students in UF/IFAS Food Science and related programs may enroll in the class (as 5437C) if they have not taken FOS 4435C or an equivalent course at another institution **and** with permission of instructor. The graduate section will have different and/or additional work assignments during the semester as compared to the undergraduate requirements; please refer to the *Spring 2024 FOS 5437C* syllabus for grading details.

Electronic Communication and Archives

Most lecture outlines and mini-lectures, as well as supplemental material, will be archived electronically through the UF eLearning website Canvas (<https://lss.at.ufl.edu/>) under Resources. I generally post the material for each week on the weekend the material is presented. I will make occasional announcements at the “Recent Announcement” part of the site, but the most updated posted syllabus is the definitive document for due dates, lecture topics, etc. Be sure to consult it on a regular basis. For those unfamiliar with Canvas, there are tutorials available.

I will answer individual student emails promptly during stated office hours, and generally within 24-48 hr at other times, if you denote FOS 4435/5437 in the “Subject” line in your email. Please send them to keiths29@ufl.edu and utilize your official ufl.edu email account for course correspondence. Please do not use Canvas mail as I do not check that as frequently as my university account. This will ensure a prompt response to your inquiries. It’s a good idea to keep your email inbox as empty as possible so that messages from the instructors are not rejected.

Class Rules

I do not take roll for routine lecture classes (designated as **Lecture** on the syllabus), but my experience is that classroom/virtual classroom attendance and attention to the full lecture provides the best possibility of mastering the concepts of food science and food product development. However, **attendance and promptness are required** for all other sessions that involve group discussion, labs, project work, i.e., anything that is not

designated **Lecture** on the syllabus. This is consistent with university policies that can be found at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

Other rules for the class are simple and essentially involve common sense and courtesy towards your colleagues and the instructor. We will follow UF Spring 2024 COVID-19 recommendations for the duration of the semester, should there be any. Additionally, there is no eating or drinking in the classroom EXCEPT for reclosable water bottles; no side conversations; keep cell phones and other communication devices muted and stored away; if you are late, take your seat quietly and unobtrusively. If you use laptops/tablets for note taking, please “type” quietly and do not distract your neighbors.

Keep in mind that these general guidelines will be what is expected in business or government environments, as well as graduate and professional schools.

Textbook and References

There is no required text for this course. Many of the recommended materials are available on reserve at the Marston Science Library under FOS 4435C/5437C at the Reserve Desk or electronically through the UF library system. Other publications of interest, including trade and scientific journals will be made available for use in Room 349, FSHN Building in 2-hour blocks of time.

Reference Texts:

Aramouni, F. and Deschenes, K. 2015. Methods for Developing New Food Products. DEStech Publications, Inc., Lancaster, PA.

Brody, A.L. and Lord, J. 2008. Developing New Food Products for a Changing Marketplace, 2nd Edition. CRC Press, Boca Raton, FL

Campbell-Platt, G. 2009. Food Science and Technology. Blackwell Publishing Ltd., Oxford, UK.

deMan, J.M. 1999. Principles of Food Chemistry, 3rd Ed. Aspen Publishers, Gaithersburg, MD.

Fuller, G.W. 2011. New Food Product Development, 3rd Edition. CRC Press, Boca Raton, FL.

Heagney, J. 2012. Fundamentals of Project Management, 4th Ed. American Management Association, New York.

Moskowitz, H., Saguy, I. S., and Straus, T. 2009. An Integrated Approach to New Food Product Development. CRC Press, Boca Raton, FL.

Murano, P. 2003. Understanding Food Science and Technology. Wadsworth/Thompson Learning, Belmont, CA.

Grading

- Exams (3) 60%

The exams will each cover approximately 1/3 of the course material. The exams (100 points each) will be administered in-person during Tuesday class double-periods. Exams are comprised of material from the lecture, assignments, suggested readings and group project concepts. Make-up exams will only be administered with an official excuse. Currently, exams are scheduled to take place in person and on-campus, although instructor reserves the right to change format/times should it become prudent to do so. All changes will be announced at least a week in advance of any exam. Total points for this part of course are 300.

- Assignments 20%

Assignments/exercises represent a significant part of the course grade, and their successful completion is critical in ensuring mastery of the material. Assignments should be submitted as directed; no late assignments will be accepted without an official excuse. There will be 6 assignments worth 25 points each; the lowest assignment grade will be dropped. Material from the assignments will likely appear on exams. Graduate students will prepare an additional, comprehensive assignment for 100 points which is not optional (see separate syllabus). Total points for this part of course are 125 (UG) and 225 (Grad).

- Group Product Development Project 20%

There are three major parts to this project which will have specific due dates (see course outline section), as well as a group presentation at the end of the semester. Details pertaining to the requirements for each phase will be distributed separately, although the relative point distribution and coverage, which will be assessed from reports prepared by each group, is summarized here. Each group member will receive the same grade on the reports and the final presentation. Individual effort will be scored through a peer evaluation. Total points for this part of the course are 260.

Phase 1: Ideation and product justification – brief report (1) (50 points)

- *Brainstorming process, project title and concept, market justification, product description, project development plan.*

Phase 2: Initial product development – brief report (2) (50 points)

- *Includes product formula, prototype, nutrition label, process flow diagram, regulatory aspects of product.*

Phase 3: Refined product development and comprehensive final report (100 points)

- *Includes executive summary, final formula, food safety plan(s), packaging concepts, sensory or market research test, conclusions, and launch/no launch justification. Include all previous report material, edited/updated as needed.*

Phase 4: Presentation and team collegiality (60 points)

- *Final team presentation (all members must present; 50 points; same grade for entire group)*
- *Team collegiality and professionalism will be assessed through peer evaluation (5 points) and instructor assessment (5 points). Unexcused absences from Tuesday group or lab sessions,*

significant tardiness (arriving after roll call) and/or disengagement from group activities/labs/discussions/presentations as outlined in the syllabus as lab and/or discussion or as scheduled with group members may result loss of points in this section. This will be an individual score of 10 total points added to the 50-point presentation grade and will reflect the entire course.

Course Average Grade Equivalents:

92 – 100 A
90 – 91 A-
88 – 89 B+
82 – 87 B
80 – 81 B-
78 – 79 C+
72 – 77 C
70 – 71 C-
68 – 69 D+
65 – 67 D
< 65 E

This course will not be graded on a curve. Course averages will be rounded to the nearest whole number to obtain the final grade. Please consult the updated University website for additional grading information and discussion of GPA calculations:

<http://www.isis.ufl.edu/minusgrades.html>

Specific Course Objectives (following IFT Curriculum Requirements)

1. The student will be able to **apply and incorporate the principles of food science in practical, real-world situations** and problems by completing a team project consisting of the development and theoretical launch of a new consumer product. This project will also allow students to **define a problem, identify potential causes and possible solutions, and make thoughtful recommendations.**
2. Students will **integrate food chemistry, food microbiology, food processing and engineering concepts** and will be able to **synthesize and explain** these various facets of a given food ingredient or commodity.
3. Students will **demonstrate written and oral communication skills** through the completion of various assignments including the authoring of a scientific review paper, the development and delivery of a PowerPoint presentation, and completing of written essay-type questions on formal exams.
4. Students will **learn to use computers to solve food science problems** by developing a PowerPoint presentation, organizing team project formulas, cost,

and nutritional data (Excel), and authoring a formal and informal written works in scientific format (Word).

5. Students will **understand the basic principles of sensory analysis and apply statistical principles to food science applications** through performing and reporting on team project sensory test results.
6. Students will **be aware of current topics of importance to the food industry** by completing a writing assignment reporting on a “hot topic” related to food product development and through the summarizing information learned from lectures on specific subjects (for example, BSE discussion during Meat and Poultry Products lecture).
7. Team project requires students to **work and interact with individuals from diverse cultures and work effectively with others, dealing with individual and/or group conflict.**
8. Various assignments will **require independent research of both scientific and nonscientific information** and will **require competent use of library resources.**
9. Team project multiple milestones and course completion will **require organization skills including managing time effectively and handling multiple tasks and pressures.**

General Course Policy on Writing

All writing for this course should be clear and concise (including emails to instructor, exams and particularly assignments). While this is of course a science-based class, employers and graduate/professional programs seek graduates who can communicate effectively through standard scientific and business writing. Please familiarize yourself with the *Journal of Food Science* as it is a major journal in our discipline, and we will be following its citation style. All work to be original work written by the student. The use of ChatGPT or other AI bots is not allowed.

Proposed Course Outline

Week 1

- 1.8.24: **Lecture:** The US food industry (Brody, Chap. 7); review of syllabus; submit signed last page (p. 10) of syllabus to instructor by 11:59 pm on 1.12.24
- 1.9.24: **Group Project Discussion:** Overview of FPD group project and rubric; IFT and corporate student product development contests
- 1.10.24: **Lecture:** Organizational structure for food product development (Brody, Chap. 7); Begin Assignment 1

Week 2

- 1.15.24: **Holiday – No Class**
- 1.16.24: **Group Project Discussion:** Phase 1 specific requirements and report format; project group assignments and introductions; review initial communication strategy with instructor before leaving classroom
- 1.17.24: **Lecture:** Food product development process (con't.); Assignment 1 due

Week 3

- 1.22.24: **Lecture:** The ideation and screening process
- 1.23.24: **Lecture:** FP marketing and market research
- 1.24.24: **Lecture:** Process development in FPD & manufacturing principles; Begin Assignment 2

Week 4

- 1.29.24: **Lecture:** Legal and financial aspects of FPD
- 1.30.24: **Group Project:** Progress check with instructor and project work session
- 1.31.24: **Lecture:** Food Product Development for Kids – Insights (Moskowitz et al., Chap. 13); Assignment 2 due; **Exam 1 cut-off**

Week 5

- 2.5.24: **Lecture:** QC/QA Aspects of FPD Part 1: FSMA and other food safety regulations related to FPD
- 2.6.24: **Exam:** Exam 1 (90 min, closed book/notes/computer)
- 2.7.24: **Lecture:** Technical aspects of NPD – formulating organic food products recorded lecture; Begin Assignment 3; Written report for phase 1 group projects due by 11:59 pm (electronic copy, email to keiths29@ufl.edu and copy teammates; one report per group)

Week 6

- 2.12.24: **Lecture:** Microbial aspects of NPD
- 2.13.24: **Group Project Discussion:** Phase 2 project guidelines; Work on group projects; Begin graduate paper (graduate students only; see rubric); Assignment 3 due
- 2.14.24: **Lecture:** Micro (con't.)

Week 7

- 2.19.24: **Lecture:** Technical aspects of NPD – formulating with prebiotics and probiotics
- 2.20.24: **Demo/Product Sampling Session:** Assignment 4 – Prebiotic, probiotic, and fermented ingredients, and food products. *Instructions: Report to FSHN Pilot Plant and be ready to take notes and get started by 8:45 am. Review Assignment 4 handout and associated reading (posted in assignments)*
- 2.21.24: **Lecture:** Technical Aspects of NPD – sourcing food ingredients

Week 8

- 2.26.24: **Lecture:** Technical aspects of NPD – Flavors and working with flavor companies
- 2.27.24: **Group Project:** Progress review by instructor; Work on group projects; Assignment 4 due
- 3.28.24: **Lecture:** Packaging development and shelf life of packaged food

Week 9

- 3.4.24: **Lecture:** Packaging development and shelf life of packaged foods (con't.); **end of material for Exam 2**
- 3.5.24: **Exam #2** (90 min closed book/notes/computer)
- 3.6.24: **Lecture:** Reverse engineering of existing food products

Week 10

3.9.24 through 3.17.24: Spring Break – no classes

Week 11

- 3.18.24: **Lecture:** Technical aspects of NPD – food ingredient PD
- 3.19.24: **Group Project:** In-class work session; Written report for phase 2 group projects due by 11:59PM (electronic copy, one each per group, email to goodrich@ufl.edu, copy teammates)
- 3.20.24: **Lecture:** Technical Aspects of NPD – food trends over time with a closer look at convenience as a new product driver; Begin Assignment 5

Week 12

- 3.25.24: **Lecture:** Health and wellness in FPD: trends and strategies for meeting consumer needs
- 3.26.24: **Group Project Presentation:** Phase 3 deliverables; Begin work on Phase 3 of project
- 3.27.24: **Lecture:** Technical aspects of NPD – Nutrients and fortification; Assignment 5 due

Week 13

- 4.1.24: **Lecture:** Technical Aspects of NPD – Labeling of food products; Begin Assignment 6
- 4.2.24: **Lecture:** Labeling (con't.)
- 4.3.24: **Lecture:** Technical aspects of NPD – formulating gluten-free products

Week 14

- 4.8.24: **Lecture:** QC/QA aspects of FPD Part 2 – Food safety hazards analysis for new products and implementing a food safety plan; Assignment 6 due
- 4.9.24: **Lecture:** Technical aspects of allergen control and FPD, including sesame case study
- 4.10.24: **Lecture:** Technical aspects of plant-based meat analogs and lab-grown meats

Week 15

- 4.15.24: **Lecture:** Influence of the restaurant industry on FPD; **End of Exam #3 material**
- 4.16.24: **Exam #3** (90 min, closed book/notes/computer)
- 4.17.24: **Group Project Presentations:** Project presentations (15 – 20 min); Groups 1 - 2

Week 16

- 4.23.24: **Group Project Presentations:** Project presentations (15 – 20 min); Groups 3 - 4
- 4.24.24: **Group Project Presentations:** Project presentations (15 – 20 min); Groups 5 - 9
- 4.25.24: **Course Wrap Up:** Finish presentations; Group 10 – x (15 – 20 min); Last day of classes for Spring 2024 semester – thank you!

Week 17

4.29.24: Final phase 3 report write-up and peer assessments (part of Phase 4) due by 11:59 pm

Information for All Students

Academic Honesty:

In the process of enrolling and registering for classes at the University of Florida, every student has signed and presumably understands the following statement: "I understand that the University of Florida expects its students to be honest in all their academic work. I agree to adhere to this commitment to academic honesty and understand that failure to comply with this commitment may result in disciplinary action up to and including expulsion from the University." The following information is implicit in all exams and assignments:

On my honor, I have neither given nor received unauthorized aid on this exam/assignment.

Online Course Evaluation Process:

Student assessment of instruction is an important part of efforts to improve teaching and learning. At the end of the semester, students are expected to provide feedback on the quality of instruction in this course using a standard set of university and college criteria. These evaluations are conducted online at <https://evaluations.ufl.edu>. Evaluations are typically open for students to complete during the last two or three weeks of the semester; students will be notified of the specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results>.

Use of Library, Reference Material, Computer Programs, and Electronic Databases:

These items are university property and should be utilized with other users in mind. Never remove, mark, modify nor deface resources that do not belong to you.

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.

We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.

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; for more information please visit 0001 Reid Hall, 352-392-8565, www.dso.ufl.edu/drc/

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/

Please return this page to instructor by end of the first week of classes (via email scan to keiths29@ufl.edu; mail slot in front office; or in person – thank you!)

This confirms that I've read and understand the syllabus for 2024 Food Product Development.

Student Signature and Date: _____

Preferred Name in Class: _____

Miscellaneous Info about yourself (optional)

Favorite Area or Class in Food Science Program to date?

Future Professional Plans?

What you hope to get out of Food Product Development class?

Favorite Food(s):