

# FOS 4427 Principles of Food Processing Syllabus

Lecture: M W F 9:35-10:25AM Location MAEB 234  
Laboratory A: F 12:50-3:50 PM Food Science Pilot Plant/ MCCB3086  
Laboratory B: F 3:00-6:00 PM Food Science Pilot Plant/ MCCB3086

**Instructors:** Dr. Andrew MacIntosh    **Phone:** 352-294-3594  
**Office:** AFPP (Bldg 120)    **E-mail:** andrewmacintosh@ufl.edu  
Room 126

**Office Hours:** Monday (13:30-14:30) These may be adjusted during the first week of class as to not conflict with the FS student schedule.

**Instructors:** Dr. Katherine Thompson-Witrick    **Phone:** 352 294 3908  
**Office:** AFPL (Bldg 461)    **E-mail:** kthompsonwitrick@ufl.edu  
Room 214

**Office Hours:** Monday (13:30 – 14:30) These may be adjusted during the first week of class as to not conflict with the FS student schedule.

**Course Description:** This class will introduce non-thermal methods of foods processing, including: cooling, freezing, heating, dehydrating, concentrating, irradiating, and fermentation. Laboratories provide students with hands-on experience working with food processing equipment.

## **Required Textbook:**

Singh, R.P. and D.R. Heldman. 2013. Introduction to Food Engineering. 4<sup>th</sup> edition. Academic Press.  
Note: Supplemental notes and handouts will be distributed to class via Canvas and/or email.

## *Readings from text:*

Week 1 Non Thermal Intro & Hurdle  
Week 2 653-658 Water Activity  
Week 3 Evaporation 543-545, 548, 551  
Week 4 Distillation  
Week 5 Brewing Fermentation & acids  
Week 6 pH and secondary metabolites  
Week 7 Exam I  
Week 8 754-766Packaging and MAP  
Week 9 Preservatives 68 & CIP  
Week 10 Spring break (Wooo!)  
Week 11 571-584 Psychrometrics  
Week 12 663-670 Air Dry & Vapor Cycle  
Week 13 455-474 Refrigeration and Freezing  
Week 14 501-530 Plank and Ice Cream  
Week 15 Adv concepts  
Week 16 Exam

**Course Outcome:**

1. Students will be able to apply the concepts of food engineering to food processing systems to compare methods and evaluate safety.
2. Students will test food processing theories during laboratories.
3. Students will apply food processing theories to scenarios and quantify parameters.
4. Students will analyze food processing problems and determine optimal solutions.

**Learning Activities:** These include classroom lectures, laboratory sessions and reports (with application based problems), group discussions, guest lectures on select topics (as available) and a term project with presentation.

**Assessment Tools:** Written exam(s), laboratory reports, and performance in term project/presentation will be used to assess students' learning outcomes. In addition, observations during classroom discussion and reflections during laboratory sessions will also be conducted to determine success of the learning outcomes.

**Grading Policy:**

Lab reports (nominally 6)	36%	A: 90 – 100
Tutorial (nominally 6)	18%	A-: 87-89.99
Exam I	20%	B+: 85 – 86.99
Exam II	20%	B: 80 - 84.99
Project	6%	C+: 75 - 79.99
Total	100%	C: 70 - 74.99
		D+: 65 - 69.99
		D: 60 - 64.99
		E: Below 60

- <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

**Lab Reports:** Laboratory reports are due one week from the date of the laboratory. A 20% penalty will be assigned for late assignments or reports turned in within 3 days after the due date. No lab report will be accepted after 3 days past the due date. Reports should be started early so that any questions may be asked well in advance of the due date (ideally during office hours). It is the student's responsibility to ask any questions about the report before the last minute.

Lab reports are typically allowed to be completed in groups assigned at the beginning of term. Group work allows student to poll knowledge and skills, and the ability to compromise/communicate is invaluable in industry. However, as the consequences of poor involvements are very different in industry, if a student for any reason does not wish to work as part of a group, they may complete the report individually. A group may NOT expel a member, but all members can choose to work individually. This must be clearly communicated to the other group members/TA at least three days before the due date.

**Term Project:** All students in this course are required to complete a term project covering a topic related to the class content. Each individual student will create an oral presentation outlining an improvement proposal for one of the laboratories. This will be presented at the end of the term.

**Absences and Make-Up Work**

Requirements for class and laboratory attendance and make-up exams, assignments, and other work are consistent with university policies that can be found at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>.

**Other Course Information:**

**Participation:** Students will not be assigned a grade based on their attendance, however, preparedness for the laboratory is essential and students who have not reviewed the laboratory manual will not be permitted to participate in the laboratory.

### ***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/](http://www.dso.ufl.edu/drc/)

***Academic Honesty:*** The University of Florida requires all members of its community to be honest in all endeavors. Cheating, plagiarism, and other acts diminish the process of learning. When students enroll at UF they commit themselves to honesty and integrity. Students are fully expected to adhere to the academic honesty guidelines they signed when they were admitted to UF. As a result of completing the registration form at the University of Florida, every student has signed 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 my failure to comply with this commitment may result in disciplinary action up to and including expulsion from the University.”* Furthermore, on work submitted for credit by UF students, 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 to be assumed all work will be completed independently unless the assignment is defined as a group project as indicated explicitly by the professor. This policy will be upheld at all times in this course.

***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.

### ***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>.*

### **Student Complaints:**

Residential Course: [https://www.dso.ufl.edu/documents/UF\\_Complaints\\_policy.pdf](https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf)

***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/](http://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/](http://www.umatter.ufl.edu/)*
- • *Career Resource Center, First Floor JWRU, 392-1601, [www.crc.ufl.edu/](http://www.crc.ufl.edu/)*

## Approximate Class Schedule Summary (Subject to Change):

Weekly Topic		Monday	Wednesday	Friday	Friday Lab	Demo
Intro	17	08-Jan Intro into processing -	Hurdle revisit how food spoils	Aw as spoilage prevention		
migration and model	18	15-Jan	aw migration & coatings	aw comp recipe & model	Steam Flaking	lab
Evaporation	19	22-Jan Membranes & filtration	Vapor pressure	Evaporation	Evaporation (vacuum dry demo)	T evaporation Q
distillation	20	29-Jan Industrial Evaporators examples	Distillation	More Distillation	Evaporation	lab evap
Fermentation and pH	21	05-Feb fermentation (non yeast) & pH	Brewing (Process) overview	CIP and chemical cleaning	T mash demo ferm/ carb tutorial,	T non yeast/mash Q
Brewing & CIP	22	12-Feb Carbonation I	Fermentation (yeast count)	micro growth model (eqn) kinetics	Gator Bubbly	bubbly
packaging	23	19-Feb Considerations of Food Packagir	canning/ liner video	Modified Atmosphere Packaging	packing demo (Can gator bubbly?)	T yeast count/MAP/carb Qs
Exam III	24	26-Feb	Exam Prep	Previous Exam Review	EXAM	
MAP	25	04-Mar Preservatives when/dosing	Preservatives when/dosing II	Secondary metabolites	ferm comp (use mash from mash)	T preserve/2nd metabolites Qs
Spring Break (woo)	26	11-Mar				
psychrometrics	27	18-Mar Malting (transition)	Dry 1	Dry 2	Drying Lab	Dry lab
Air dry calcs	28	25-Mar Dry 3	Dry Examples	adv freeze/Dry	Dry tut (freeze dry example)	Dry tutorial
chilling and r cycle	29	01-Apr (amac d refrigeration cycle)	Chilling food (refrigeration)	freeze point depression	Freeze Tutorial (popcicle)	Freeze
Freezing theory	30	08-Apr ice cream (FP)	Ice cream 2	thawing food	ice cream	Freeze
adv applications	31	15-Apr Chocolate processing (ferm)	Wine Making (all aspects)	Probiotics		ice cream
EXAM IV	32	22-Apr exam prep	exam prep (crystalization)			

**Materials and Supplies Fees:** There is a \$20 supplies fee, and a \$20 equipment fee to support the running and maintenance of the laboratory.

### GatorEvals

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/>.”

### Class Recordings

Our class sessions will be audio/visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate in class and/or with their camera engaged or utilize a profile image are agreeing to have their video/audio or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and/or participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

### COVID Addendums:

We will continue face-to-face instructional sessions to accomplish the student learning objectives of this course (subject to change at any time). In response to COVID-19, the following policies and requirements are in place to maintain your learning environment and to enhance the safety of our in-classroom interactions.

You are encouraged to wear approved face coverings at all times during class and within buildings.

Sanitizing supplies are available in the classroom if you wish to wipe down your desks prior to sitting down and at the end of the class.

If you are experiencing COVID-19 symptoms ([Click here for guidance from the CDC on symptoms of coronavirus](#)), please use the UF Health screening system and follow the instructions on whether you are able to attend class. [Click here for UF Health guidance on what to do if you have been exposed to or are experiencing Covid-19 symptoms.](#)

### **Specific requirements:**

- Requirements for students – If you choose to attend in person you must take precautions as directed by the university.
- Requirements for instructors – The professor/TAs will wear a face covering and will take other precautions as directed by the university
- As this class is small (~20) lines at doors are not expected.
- To protect your safety with respect to shared laboratory equipment make use of sanitizing solutions.
- Contingency plans for student or instructor illness –
  - If the professor becomes ill, the lecture will either be given by a TA in the same hybrid format, or by the professor via online video conference - as appropriate.
  - If a student becomes ill, or feels uncomfortable attending live, they are EXPECTED to attend via video conference ONLY, and to self-quarantine as per university instructions for an appropriate amount of time (as directed by the university). If they are too unwell to attend the remote lecture, they will make up the material via recorded lecture once recovered. If they miss a laboratory/lectures due to illness, it will be considered an acceptable reason as per university policy.

### **COVID Attendance addendum.**

Laboratory and tutorial attendance is mandatory. A missed laboratory session will result in a grade of zero unless the absence is excused as per university policy (of which a COVID-19 absence IS acceptable). Laboratory zoom recordings will not be posted after the session. The TAs will only answer questions concerning the laboratory and tutorials during office hours, and during tutorial periods.

### **Makeups**

Due to the availability of equipment, time required, and nature of the laboratories/exams, there will be NO Makeups for labs, tutorials or midterms. If you miss a section of this course for an acceptable reason as per university policy (of which a COVID-19 absence IS acceptable) you will be graded as though the lab/test did not exist (you must communicate the absence and reason to the professor for this to apply). The only exception to this policy is the final exam which MUST be taken during the examination period, or a grade of incomplete will be submitted.

Lectures are expected to be attended in person, and lecture attendance is also mandatory. In the event that a student has been exposed to an individual with COVID-19 or are self-isolating, they may attend over live zoom at the scheduled time. If a student is unwell, the lectures are recorded and are made available via UF onedrive. My experience with this course has shown that classes with active participation in discussions and questions are far superior to pre-recorded lectures, and that students who attend the scheduled lectures (either in person OR through video conference) perform better on exams and during laboratories. I strongly encourage all students to attend every lecture (either in person OR zoom) and interact during the discussions and examples. This is a difficult course, and we move at a fast pace with each lecture building upon the last. I understand that there are sometimes extenuating circumstances, however if you miss more than 4 lectures (10% of the class) without acceptable reasons (<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>), you will be assigned a failing grade for excessive absences. I will make a recording of every lecture available for review to assist in exam preparation, and to give students the opportunity to review examples.