FOS XXXXC Principles of Food Engineering (4 credits)
Syllabus

Lecture: M W F period 2 8:30-9:20 AM
Laboratory A: R 5,6,7 (11:45-2:45) PM Food Science Pilot Plant/WEIL 408D
Laboratory B: R 8,9,10 (3-6) PM Food Science Pilot Plant/ WEIL 408D

Instructor: Dr. Andrew MacIntosh **Phone**: 352-294-3594
Office: AFPP (Bldg 120) **E-mail**: Andrewmacintosh@ufl.edu
Room 126
Office Hours: Wed (9:30-10:30)

Course Description: This class will introduce fundamental principles of Food Engineering: Engineering Units, Food Properties, Microbial Death, Thermal Conduction, Phase Changes, Thermal Convection, Heat Exchangers, Steady State Heat Transfer, Extrusion, Unsteady State Heat Transfer, and Radiation. The goal will be to use and comprehend these concepts as they relate to food science.

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

	Readings from text:
Week 1	1-19 Intro and Units
Week 2	19-29 Food Properties
Week 3	413-422 Food Microbiology (Death)
Week 4	51-55 & 257-266 Thermal Properties of Food & Conduction
Week 5	232-236 Thermocouples
Week 6	29-46 Mass Balance 187-200 Steam,
Week 7	266-274 &285-286 Convection, Nu and Frying
Week 8	Exam I (Laboratory Period - Oct 10th)
Week 9	248-252 Heat Exchanger 270, 285-306 SSHT
Week 10	84-88 Reynolds number
Week 11	65-73 Pumps 721-735 Extrusion
Week 12	337-350 USSHT
Week 13	422 – 433 Lethality Rate
Week 14	269-270 Radiation HT 371 – 379 Microwave
Week 15	Irradiation - Handout
Week 16	Exam II (As Assigned)

Course Outcome*:* Students will be able to apply the principles of food engineering to food processing systems to contrast methods and evaluate safety. Students will also be able analyze food processing scenarios 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.

Exams: A midterm and final exam will be given. ***Note:*** All exams are open book, open notes, open computer.

Grading Policy:

			A: 90 – 100
Lab reports x 6 (6 % each)	36%		A-: 87-89.99
Tutorial x 6 (3% each)	18%		B+: 85 – 86.99
Exam I (20% each)	20%		B: 80 - 84.99
Exam II (20% each)	20%		C+: 75 - 79.99
Project (6% each)	6%		C: 70 - 74.99
Total	100%		D+: 65 - 69.99
			D: 60 - 64.99
			E: Below 60

- For information on current UF policies for assigning grade points, see https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Attendance and Make-Up Work
Requirements for class 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

Reports: Laboratory and Tutorials reports are due before the beginning of the next laboratory or Tutorial. A 20% penalty will be assigned for late assignments or reports turned in within 3 days after the due date. No reports 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.

***Project*:** The project has the same value as a laboratory report, and the same amount of effort is expected. The idea to improve an aspect of the course, from material, to laboratories and present your results to the class. Thus, the particulars of the project change each year. Details will be given the first week of class.

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. If you do not attend the tutorial/laboratory, any report will not be marked.

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/**

- "Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester."

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.

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Student Complaints:
Residential Course: 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/**

  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/**

***Class Schedule Summary**:*

Week	Topics	Laboratory
1	Introduction Units/Eng. Toolbox	Lab walk-around, safety discussion (PPE),
2	Properties of food Report Writing	1 Food properties
3	History Microbial Death	1 Food properties
4	Microbial Death Examples Energy Sources Thermal Conduction	2 Steam Flaking
5	Conduction Examples Temperature Measure Phase Change	2 Steam Flaking
6	Steam Energy/Mass Balance Steam Examples	3 Steam
7	Convective Heat Transfer Frying	3 Steam
8	Exam Prep/Presentations	EXAM I
9	SSHT Heat Exchangers HE examples	4 SSHT
10	Fluid Flow Reynolds HE D & Z Calculations Rheology	4 SSHT
11	Pumps Extruder Examples	5 Extruder
12	Blanching USSHT USSHT Examples	5 Extruder
13	LR Canning LR Examples	6 USSHT
14	Sous-vide Radiation HT Examples	6 USSHT
15	Irradiation	
16	Exam Prep/ Presentations	EXAM II