

FOS 4410C Introduction to Unit Operations in Food Processing (4 credits) (Intro Food Processing) Syllabus

Lecture: M W F period 2 8:30-9:20 AM - NPB 1001
Laboratory A: R 5,6,7 (11:45-2:45) PM Food Science Pilot Plant
Laboratory B: R 8,9,10 (1:55-4:55) PM Food Science Pilot Plant

Instructor: Dr. Andrew MacIntosh **Phone:** 352-294-3594
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Room 126

Office Hours: Wed (9:30-10:30) These may be adjusted during the first week of class as to not conflict with the FS student schedule.

Course Description: This class introduces the fundamentals of food processing and is designed for non-engineering students. Primary concepts are applied in context of the field of food science, and include: Engineering Units, Food Properties, Conduction, Convection, Phase Changes, Microbial Death, Heat Exchangers, Steady-State-Heat-Transfer, Unsteady-State-Heat-Transfer, Extrusion and Radiation.

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

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 x 6 (6 % each) | 36% | A: 90 – 100 |
| Tutorial x 6 (3% each) | 18% | A-: 87-89.99 |
| Exam I (20% each) | 20% | B+: 85 – 86.99 |
| Exam II (20% each) | 20% | B: 80 - 84.99 |
| Project (6% each) | 6% | C+: 75 - 79.99 |
| Total | 100% | C: 70 - 74.99 |
| | | 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>

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

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.

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.

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>.

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>.

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.

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.”

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*

Counseling Services Groups and Workshops Outreach and Consultation Self-Help Library
Wellness Coaching

- U Matter We Care, www.umatter.ufl.edu/
- *Career Connections Center, First Floor JWRU, 392-1601, <https://career.ufl.edu/>.*

Student Complaints:

- Residential Course: <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>.
- Online Course: <http://www.distance.ufl.edu/student-complaint-process>

Approximate Class Schedule Summary (Subject to Change):

FALL 20

| | Monday | Wednesday | Thursday (LAB) | Friday | Summary | |
|-----|-----------|---------------|-------------------|----------|----------------|------------|
| | 24-Aug-20 | | | | | |
| W1 | 31-Aug-20 | Intro/energy | Units | INTRO | History | INTRO |
| W2 | 7-Sep-20 | | Food prop | INTRO | Intro Excel/FP | FOOD PROP |
| W3 | 14-Sep-20 | Energy/mass | Thermal Prop | FLAKE | Conduction | TP&COND |
| W4 | 21-Sep-20 | Cond ex | Convection | FLAKE | Q Conv + Cond | CONV |
| W5 | 28-Sep-20 | Phase & Steam | Temp measure | STEAM | | STEAM |
| W6 | 5-Oct-20 | Micro Death | Micro Death | STEAM | Conv fry | MICRODEATH |
| W7 | 12-Oct-20 | REVIEW | REVIEW | EXAM I | Return | EXAM I |
| W8 | 19-Oct-20 | SSHT/HE | SSHT/HE DnZ | HE DZ | Pumps | SSHT |
| W9 | 26-Oct-20 | Fluid flow RE | Fluid Flow | HE DZ | Blanching | FF&RE |
| W10 | 2-Nov-20 | USSHT BI | USSHT | USSHT | Sous vide | USSHT |
| W11 | 9-Nov-20 | LR canning | | USSHT | LR canning | LR |
| W12 | 16-Nov-20 | Extrusion | Extrusion | EXTRUDER | Pasta | EXT |
| W13 | 23-Nov-20 | Irradiation | | | | IRAD |
| W14 | 30-Nov-20 | Microwave | HPP | EXTRUDER | RF/PL | ALTERNATE |
| W15 | 7-Dec-20 | REVIEW | REVIEW | | | EXAM II |

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

Class Recordings

Our class sessions may 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 offer optional 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 required to wear approved face coverings at all times during class and within buildings. Following and enforcing these policies and requirements are all of our responsibility. Failure to do so will lead to a report to the Office of Student Conduct and Conflict Resolution.

This course has been assigned a physical classroom with enough capacity to maintain physical distancing (6 feet between individuals) requirements. Please utilize designated seats and maintain appropriate spacing between students. Please do not move desks or stations.

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.

Follow your instructor's guidance on how to enter and exit the classroom. Practice physical distancing to the extent possible when entering and exiting the classroom.

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](#).

Course materials will be provided to you with an excused absence, and you will be given a reasonable amount of time to make up work. [Find more information in the university attendance policies](#).

Specific requirements:

- Requirements for students – If you choose to attend in person you must wear a face covering and take other 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. However, to avoid contact at dismissal, egress will be staggered to maintain physical distance.
- To protect your safety with respect to shared laboratory equipment, a combination of gloves for labs, and sanitizing solutions will be used for regular cleaning of shared equipment.
- The assignment of a classroom has been handled centrally to ensure sufficient seating for proper social distancing
- 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 (14 days, or as long 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, however can be attended either in person, or over live zoom at the scheduled time. A missed laboratory session will result in a grade of zero unless the absence is excused as per university policy. 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.

Lectures can also be attended either in person OR video conference and lecture attendance is also mandatory (either in person, or over live zoom) at the scheduled time. 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.