

FOS6428C: Advanced Food Processing Syllabus

Lecture: M W F 1:55 2:45PM @ TUR 2322 (Turlington Hall)
Laboratory: M 3:00-6:00PM Food Science Pilot Plant

Instructor: Dr. Andrew MacIntosh **Phone:** 352-294-3594
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Room 126
Office Hours: Open door policy
TA

Description: This course will build upon food processing fundamentals to better understand and apply the available technology. The course is divided among thermal, non-thermal and low temperature technologies. Laboratory sessions will provide students with hands-on experience working with food processing equipment to assess the principles learned in class.

Textbook:

Supplemental notes and handouts will be distributed to class via Canvas and/or email from:

Singh, R.P. and D.R. Heldman. 2013. Introduction to Food Engineering. Fifth Edition. Academic Press. **New York, NY**

Fellows, P.J. 2009. Food Processing Technology: Principles and Practice. 3rd edition. Woodhead Publishing Ltd.

Course Outcome: Students will become familiar with the principles of food processing to the extent that the students will be able to manipulate parameters to design for specific outcomes. Students will be able to use research literature on the subjects and analyze situations in which advanced food processing technologies may be utilized.

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

Assessment Tools: Written exam, laboratory reports, and performance in term project and 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 the learning outcomes.

Exams: A midterm and final exam will be given.

Grading Policy:

| | | |
|--------------------|------|----------------|
| Lab reports (5 ea) | 50% | A: 90 – 100 |
| Term Project | 20% | A-: 87-89.99 |
| Midterm | 10% | B+: 85 – 86.99 |
| Final | 20% | B: 80 - 84.99 |
| | | C+: 75 - 79.99 |
| | | C: 70 - 74.99 |
| Total | 100% | D+: 65 - 69.99 |
| | | D: 60 - 64.99 |
| | | E: Below 60 |

Note: All exams are open book, open notes. Absence from any exam without prior notice/excuse will result in a zero score.

Homework/Lab Report: Homework and lab report are typically due one week from the date they are distributed. A 20% penalty will be assigned for late assignments or reports turned in within 3 days after the due date. No homework or lab report will be accepted after 5 days past the due date. Homework and lab report should be started early so that any questions may be asked well in advance of the due date. It is the student's responsibility to ask any questions about the assignment or lab report before the last minute.

Term Project: All students in this course are required to complete a term project covering a topic related to the class content.

Other Course Information:

Participation: Students will not be assigned a grade based on their attendance, preparedness for the laboratory is essential and students who have not reviewed the laboratory manual will not be able to participate in the laboratory. Students are expected to provide conduct for discussion, attentiveness, and class participation.

Students with Disabilities Act: The Dean of Students Office coordinates the needed accommodations of students with disabilities. This includes the registration of disabilities, academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services, and mediating faculty-student disability related issues. Dean of Students Office, 202 Peabody Hall, 392-7066. www.dso.ufl.edu. Students with disabilities can take exams earlier, under special supervision. Every effort will be made to accommodate these students.

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.

Campus Helping Resources: Students experiencing crisis or personal problems that interfere with their general well-being are encouraged to utilize the university's counseling resources. Both the Counseling Center and Student Mental Health provide confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career and academic goals, which interfere with their academic performance. The Counseling Center is located at 301 Peabody Hall (next to Criser Hall). Student Mental Health is located on the second floor of the Student Health Services in the Infirmary.

| Service | Location | Phone | Services provided |
|---|-----------------------------|----------|---|
| University Counseling Center | 301 Peabody Hall | 392-1575 | Personal and career counseling www.counsel.ufl.edu |
| Student Mental Health | Student Health Care Service | 392-1171 | Personal counseling www.hsc.ufl.edu/shcc/smhs.htm |
| Sexual Assault Recovery Services (SARS) | Student Health Care Service | 392-1161 | Sexual assault counseling |
| Career Resource Center | Reitz Union | 392-1601 | Career development assistance, counseling |

Class Schedule Summary:

| Week | Date | | Period | Topic | Laboratory |
|------|------|------|--------|---|--|
| 1 | M | 8/21 | 7 | History / Topics Introduction /Adv. Units/Eng. Toolbox Mass/Energy Balance/Steam | Lab walk-around, safety discussion (PPE), report style, etc. |
| | MLab | 8/21 | 8-10 | | |
| | W | 8/23 | 7 | | |
| | F | 8/25 | 7 | | |
| 2 | M | 8/28 | 7 | Adv. Properties of food/Rheology Pumps in the Food Industry Pump Application/Filtration | 1 Steam |
| | MLab | 8/28 | 8-10 | | |
| | W | 8/30 | 7 | | |
| | F | 9/1 | 7 | | |
| 3 | M | 9/4 | 7 | Flow/Pressure Measurement Extraction Kinetics Non-Linear R/Size Reduction/Mixing | No Laboratory |
| | MLab | 9/4 | 8-10 | | |
| | W | 9/6 | 7 | | |
| | F | 9/8 | 7 | | |
| 4 | M | 9/11 | 7 | Thermal Processing Review Temperature Measurement Adv. Thermal Properties of Food | 2 Filter Laboratory |
| | MLab | 9/11 | 8-10 | | |
| | W | 9/13 | 7 | | |
| | F | 9/15 | 7 | | |
| 5 | M | 9/18 | 7 | Bacterial TDC (Models) High Temp Unit Operations Applications of HT (S vs P) | 3 Temperature Measurement |
| | MLab | 9/18 | 8-10 | | |
| | W | 9/20 | 7 | | |
| | F | 9/22 | 7 | | |
| 6 | M | 9/25 | 7 | Heat Exchangers Process Flow Applications of Steam & HE | 4 Blanching |
| | MLab | 9/25 | 8-10 | | |
| | W | 9/27 | 7 | | |
| | F | 9/29 | 7 | | |
| 7 | M | 10/2 | 7 | Preventing Growth / Biofilms Hurdle Technology and Review | 5 Heat exchangers |
| | MLab | 10/2 | 8-10 | | |
| | W | 10/4 | 7 | | |
| | F | 10/6 | 7 | | |
| 8 | M | 10/9 | 7 | Non Thermal Processing Review | EXAM |

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|----|------|-------|------|--|--------------------------------|
| | MLab | 10/9 | 8-10 | Water Activity and Manipulation Moisture Content/Isotherms | |
| | W | 10/11 | 7 | | |
| | F | 10/13 | 7 | | |
| 9 | M | 10/16 | 7 | Psychrometrics refresh High Temp Drying Drying Air AC Evaporation/ Distillation | 6 Roasting |
| | MLab | 10/16 | 8-10 | | |
| | W | 10/18 | 7 | | |
| | F | 10/20 | 7 | | |
| 10 | M | 10/23 | 7 | Vacuum Evaporation/ Distillation Spray Drying/Microwave Drying Freeze Drying/Sublimation | 7 Evaporation |
| | MLab | 10/23 | 8-10 | | |
| | W | 10/25 | 7 | | |
| | F | 10/27 | 7 | | |
| 11 | M | 10/30 | 7 | Low Temp Processing Review Removing Heat Chilling/Freeze concentration | 8 Drying |
| | MLab | 10/30 | 8-10 | | |
| | W | 11/1 | 7 | | |
| | F | 11/3 | 7 | | |
| 12 | M | 11/6 | 7 | Freezing/ Plank Review Ice Cream | 9 Freezing |
| | MLab | 11/6 | 8-10 | | |
| | W | 11/8 | 7 | | |
| | F | 11/10 | 7 | | |
| 13 | M | 11/13 | 7 | Fermentation Raw Materials Mashing and Boiling Fermentation | 10 Fermentation I or Ice Cream |
| | MLab | 11/13 | 8-10 | | |
| | W | 11/15 | 7 | | |
| | F | 11/17 | 7 | | |
| 14 | M | 11/20 | 7 | Packaging and Gas Solubility | 11 Fermentation II |
| | MLab | 11/20 | 8-10 | | |
| | W | 11/22 | 7 | | |
| | F | 11/24 | 7 | | |
| 15 | M | 11/27 | 7 | Emerging tech I Emerging tech II Emerging tech III | Poster Presentations |
| | MLab | 11/27 | 8-10 | | |
| | W | 11/29 | 7 | | |
| | F | 12/1 | 7 | | |
| 16 | M | 12/4 | 7 | Exam review | No laboratory |
| | MLab | 12/4 | 8-10 | | |
| | W | 12/6 | 7 | | |
| | F | 12/8 | 7 | | |
| 17 | M | 12/14 | B | Final Exam | |