

## **Food and Bioprocess Engineering Design**

### **ABE 5815C Section 1532**

**Class Periods:** MWF Period 6, 12:50 PM– 1:40 PM; M Period 7-8, 1:55 PM -3:50 PM

**Location:** Frazier Rogers Hall Rm. 110, and online via Zoom

**Academic Term:** Fall 2021

#### **Instructor:**

Ziyne Boz

[ziynetboz@ufl.edu](mailto:ziynetboz@ufl.edu)

\_(352) 294-7690

Frazier Rogers Hall, Room 105

Office Hours: MF 11:00 AM-12:00 PM or by appointment. Office hours can be held online via Zoom

#### **Teaching Assistant/Peer Mentor/Supervised Teaching Student:**

John L. Nemenyi, [nemenyi93@ufl.edu](mailto:nemenyi93@ufl.edu), Please contact through the Canvas website.

#### **Course Description**

Design and analysis of fermentation, thermal, freezing, evaporation, dehydration; and mechanical, chemical and phase separation processes as governed by principles of conservation of mass and energy, reaction kinetics and rheology of food and biological materials

#### **Course Pre-Requisites / Co-Requisites**

- MAC1147 Precalculus Algebra and Trigonometry
- ABE 3612C Heat and Mass Transfer in Biological Systems, CWR 3201 Hydrodynamics, or EGN 3353C Fluid Mechanics

#### **Course Objectives**

After completing this course students will be able to:

- Perform mass and energy balances on various food and bioprocess unit operations
- Understand the fundamentals of design, testing, and analysis of unit operations employed in the process industries like food, pharmaceutical, and biotechnology industries (sterilization, pasteurization, drying, evaporation, and separation processes).
- Understand mass, momentum, and heat transfer applications in real-world food and bioprocess engineering
- Depict process flow diagrams and understand the design improvements in various set of unit operations
- Develop simulation tools to model unit processes in food and bioprocess operations
- Articulate and discuss on contemporary issues reflected in current agri-food industry processing applications

#### **Materials and Supply Fees**

N/A

#### **Required Textbooks and Software**

- Singh, R.P., and D.R. Heldman. 2013. Introduction to Food Engineering. 4th edition. Academic Press.

Note: Access to additional readings and course materials will be provided to students on Canvas. Required software is also available

#### **Recommended Materials**

- Handbook of food engineering. Heldman, D. R., Lund, D. B., & Sabliov, C. (Eds.). (2018). CRC press.

#### **Course Schedule**

**Food and Bioprocess Engineering Design, ABE 5815C Section 1532**  
**Ziyne Boz, Fall 2021**

Week	Topic	Deliverables	Textbook chapter
1	Course introduction, Dimensions and engineering units, material balances, energy balances	Assignment 1	1
2	Fluid Flow (transport and handling systems) and Energy (Steam generation, Fuel, and electric power utilization)	Assignment 2, Final project topic selection	2,3
3	Reaction kinetics (Inactivation of bacteria and spores)	Assignment 3	5
4	Thermal processing	Assignment 4	4
5	<b>Virtual Laboratory (Canning)</b> , Heat Transfer Fundamentals, Heat Exchangers		4
6	<b>Laboratory (Heat Exchangers)</b> , Refrigeration	Laboratory Report (Canning)	6
7	Freezing	<b>Mid-term Exam, Oct 4<sup>th</sup>, Monday</b>	7
8	<b>Laboratory (Freezing)</b> , Mass Transfer Fundamentals	Laboratory Report (Heat Exchangers)	10
9	Psychometrics, Drying	Laboratory Report (Freezing)	9,12
10	<b>Laboratory (Drying)</b> , Evaporation	Assignment 6	8
11	Mechanical Separations, Chemical Separations	Laboratory Report (Drying)	11
12	<b>Laboratory (Filtration)</b> , Chemical separations	Assignment 7	Supplemental reading will be provided
13	Phase Separations (Distillation and Fractionation) Extrusion Processes	Laboratory Report (Filtration)	Supplemental reading will be provided, 14
14	Packaging	Holidays	15
15	Process design, process economics		Supplemental reading will be provided
16	<b>Projects Due</b>		
Finals Week	<b>Final Exam on Dec 13<sup>th</sup>, Monday</b>		

*\*Schedule is subject to change based on the requirements of the specific course material and laboratories*

### **Attendance Policy, Class Expectations, and Make-Up Policy**

- This course utilizes theoretical and applied laboratory sessions. For the learning objectives to be achieved, attendance is expected. The attendance is required for the laboratory sections.
- Excused absences must be consistent with university policies in the undergraduate or graduate catalog and require appropriate documentation:  
<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>  
<http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#attendance>
- Class meetings will be recorded. See the Online Course Recoding Policy on the next page. Links to class recordings will be posted on the course Canvas site for students to refer to and for students who are unable to attend live.
- All assignments/laboratory reports/class deliverables are due by 11:59 pm on the day specified for full credit. 10% deduction/day thereafter. Maximum deduction is 50%.

### ***Evaluation of Grades***

<b>Assignment</b>	<b>Total Points</b>	<b>Percentage of Final Grade</b>
Weekly assignments	100 each	20%
Laboratory Reports (x4)	100 each	20%
Mid-term Exam	100	20%
Final Exam	100	20%
Project	100	20%
		100%

### ***Grading Policy***

<b>Percent</b>	<b>Grade</b>	<b>Grade Points</b>
93.4 - 100	A	4.00
90.0 - 93.3	A-	3.67
86.7 - 89.9	B+	3.33
83.4 - 86.6	B	3.00
80.0 - 83.3	B-	2.67
76.7 - 79.9	C+	2.33
73.4 - 76.6	C	2.00
70.0 - 73.3	C-	1.67
66.7 - 69.9	D+	1.33
63.4 - 66.6	D	1.00
60.0 - 63.3	D-	0.67
0 - 59.9	E	0.00

More information on UF grading policy may be found at:

<http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#grades>

### ***Students Requiring Accommodations***

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

### ***Course Evaluation***

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/>.

### ***In-Class Recording***

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

### ***University Honesty Policy***

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students 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.” The Conduct Code (<https://sccr.dso.ufl.edu/process/student-conduct-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. If you have any questions or concerns, please consult with the instructor or TAs in this class.

### ***Commitment to a Safe and Inclusive Learning Environment***

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- Jennifer Nappo, Director of Human Resources, 352-392-0904, [jpennacc@ufl.edu](mailto:jpennacc@ufl.edu)
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, [taylor@eng.ufl.edu](mailto:taylor@eng.ufl.edu)
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, [nishida@eng.ufl.edu](mailto:nishida@eng.ufl.edu)

### ***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 uphold ourselves and our peers to the highest standards of honesty and integrity.

### ***Student Privacy***

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: <https://registrar.ufl.edu/ferpa.html>

### **Campus Resources:**

#### Health and Wellness

##### **U Matter, We Care:**

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu) so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

**Counseling and Wellness Center:** <https://counseling.ufl.edu>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

##### **Sexual Discrimination, Harassment, Assault, or Violence**

If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, [title-ix@ufl.edu](mailto:title-ix@ufl.edu)

##### **Sexual Assault Recovery Services (SARS)**

Student Health Care Center, 392-1161.

**University Police Department** at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

#### Academic Resources

**E-learning technical support**, 352-392-4357 (select option 2) or e-mail to [Learning-support@ufl.edu](mailto:Learning-support@ufl.edu).  
<https://lss.at.ufl.edu/help.shtml>.

**Career Resource Center**, Reitz Union, 392-1601. Career assistance and counseling; <https://career.ufl.edu>.

**Library Support**, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

**Teaching Center**, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.  
<https://teachingcenter.ufl.edu/>.

**Writing Studio, 302 Tigert Hall**, 846-1138. Help brainstorming, formatting, and writing papers.  
<https://writing.ufl.edu/writing-studio/>.

**Student Complaints Campus:** <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>; <https://care.dso.ufl.edu>.

**On-Line Students Complaints:** <http://www.distance.ufl.edu/student-complaint-process>.