

Syllabus
11:400:302

FOOD PROCESS ENGINEERING

Class Schedule: <https://sis.rutgers.edu/soc/#home>

3 credits

INSTRUCTOR: Dr. Kit Yam

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Phone: 848 932 5467

Food Science Room #415, Rutgers University
65 Dudley Road, New Brunswick, NJ 08901

Office Hours: By appointments

COURSE WEBSITE, RESOURCES AND MATERIALS

All of the materials that you will need for this course will be posted in the class Canvas website (<https://tlt.rutgers.edu/canvas>).

Recommended Textbook: Introduction to Food Engineering, Singh and Heldman (fifth edition), Academic Press, 2014. Food Processing Engineering Course Outline

COURSE DESCRIPTION

Engineering principles of food processing and preservation. Laboratory experiments designed for hands-on experience using state-of-the-art equipment to understand the engineering principles associated with food processing and preservation taught in lectures. Material balances, gas and vapors, psychrometry, energy balances, fluid mechanics, heat and mass transfer, and dehydration.

Pre-requisite: Food Processing Technologies 11:400:301

LEARNING GOALS

This course fulfills Food Science Program Learning goal #1: Graduates will demonstrate and apply knowledge of the core competencies in Food Processing and Engineering.

Course Learning Goals

In this course, students will:

1. learn advanced concepts and principles of food processing engineering.
2. gain a deep understanding in the topics related to mass and energy balances, fluid mechanics, psychometrics, heat and mass transfer, food preservation, dehydration, and packaging.
3. develop analytical skills to efficiently solve practical problems relating to food processing.

ASSIGNMENTS/RESPONSIBILITIES, GRADING & ASSESSMENT

- The purpose of this course is to help the students understand and apply the concepts and principles of food processing engineering. The topics to be covered are mass and energy balances, fluid mechanics, psychometrics, heat and mass transfer, food preservation,

dehydration, packaging, and others. The emphasis is to develop the analytical skills of the students to solve practical problems relating to food processing.

- The students will work in teams of two on the problem sets and laboratory reports. By the end of class 3, each team should email Professor Yam a short description of how they will work effectively together.
- Problem sets must be completed on MS Excel.
- Formulas must be shown in Excel worksheets.
- To earn full marks, adequate steps to reach the answer and reasonable neatness must be shown.
- Laboratory reports must be completed on a computer using appropriate software.
- At the beginning of each submission, it should briefly state the contribution of each person (for example, 50/50 if the partners contribute equally).
- Do not hesitate to inform Professor Yam or the teaching assistant if you have issues with your teammate.

GRADING SYSTEM

| | |
|---------------------|------|
| Mid-term exam | 20% |
| Final examination | 30% |
| Problem sets | 25% |
| Laboratory reports | 20% |
| Class participation | 5% |
| Total | 100% |

GRADING GRID

| |
|---|
| “A” = 90 and above |
| “B+” = 85-89 |
| “B” = 80 – 84 |
| “C+” = 75-79 |
| “C” = 70 - 74 |
| “D”: 60-69 |
| “F” = below 60% <u>and/or</u> if you do not attempt 1 or more exam(s) |

Final Exam/Paper Date and Time: [Online Final Exam Schedule](#).

ACCOMODATIONS FOR STUDENTS WITH DISABILITIES

Please follow the procedures outlined at <https://ods.rutgers.edu/students/registration-form>. Full policies and procedures are at <https://ods.rutgers.edu/>

Disability Services: (848) 445-6800 / Lucy Stone Hall, Suite A145, Livingston Campus, 54 Joyce Kilmer Avenue, Piscataway, NJ 08854 / <https://ods.rutgers.edu/>

Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation:

<https://ods.rutgers.edu/students/documentation-guidelines>. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete the Registration form on the ODS web site at: <https://ods.rutgers.edu/students/registration-form>.

ABSENCE POLICY

Class attendance is required. A student may miss up to two classes without penalty. For each additional class missed, 2% of the total scores will be deducted.

Rutgers Dean of Students <http://deanofstudents.rutgers.edu/>

The University does recognize that temporary conditions and injuries can be problematic and may adversely affect a student's ability to fully participate in class.

Absences or making up work: <https://temporaryconditions.rutgers.edu/>

The Dean of Students Office at Rutgers University-New Brunswick provides solutions, services, and support to help students navigate Rutgers University. By focusing on students' educational, social, and personal development, staff in the Office promote academic success and student retention. The Office serves as a student support network by providing advocacy, problem resolution, and critical incident intervention for those times when additional assistance is needed.

- **Self-Reporting Absences:** For absences in class or labs less than a week that are not confidential in nature, students need to inform faculty directly by using the Absence Reporting System (ARS) (<https://sims.rutgers.edu/ssra/>).

- **Longer Periods of Absence:** If you anticipate missing more than one week of classes for serious illness, confidential, or sensitive personal reasons, you should also consult with a New Brunswick Dean of Students who will help to verify your extended absences from classes.

- **Absences due to illnesses:** If your absence is due to illness, visit New Brunswick Health Services for information about campus health services, including information about: how to make an appointment, self-care advice for colds/flu, mental health and counseling options.

Class Schedule

| Lecture | Topic |
|---------|--|
| 1 | Course introduction and basic concepts (Chapter 1) |
| 2 | Basic concepts (Chapter 1) |
| 3 | Mass and energy balances (Chapter 1) |
| 4 | Mass and energy balances (Chapter 1) |

- 5 Fluid flow in food processing (Chapter 2)
Due date of Problem Set 1
- 6 Fluid flow in food processing (Chapter 2)
- 7 Fluid flow in food processing (Chapter 2)
Lab 1
- 8 Fluid flow in food processing (Chapter 2)
- 9 Fluid flow in food processing (Chapter 2)
Due date of Lab 1 report
- 10 Psychrometrics (Chapter 9)
Due date of Problem Set 2
- 11 Psychrometrics (Chapter 9)
- 12 Psychrometrics (Chapter 9)
- 13 Heat transfer in food processing (Chapter 4)
Due date of Problem Set 3
- 14 Heat transfer in food processing (Chapter 4)
- 15 Heat transfer in food processing (Chapter 4)
Spring recess
Spring recess
- 16 Mid-term Exam
- 17 Heat transfer in food processing (Chapter 4)
Lab 2
- 18 Heat transfer in food processing (Chapter 4)
- 19 Preservation processes (Chapter 5)
Due date of Problem Set 4
- 20 Preservation processes (Chapter 5)
- 21 Preservation processes (Chapter 5)
Due date of Lab 2 report
- 22 Preservation processes (Chapter 5)
- 23 Dehydration (Chapter 12)
Due date of Problem Set 5
- 24 Dehydration (Chapter 12)
- 25 Dehydration (Chapter 12)
Lab 3
- 26 Dehydration (Chapter 12)
- 27 Food packaging
Due date of Problem Set 6
- 28 Food packaging

Due date of Lab 3 report

Final Exam/Paper Date and Time: [Online Final Exam Schedule](#).

ACADEMIC INTEGRITY

The university's policy on Academic Integrity is available at <http://academicintegrity.rutgers.edu/academic-integrity-policy>. The principles of academic integrity require that a student:

- properly acknowledge and cite all use of the ideas, results, or words of others.
- properly acknowledge all contributors to a given piece of work.
- make sure that all work submitted as his or her own in a course or other academic activity is produced without the aid of impermissible materials or impermissible collaboration.
- obtain all data or results by ethical means and report them accurately without suppressing any results inconsistent with his or her interpretation or conclusions.
- treat all other students in an ethical manner, respecting their integrity and right to pursue their educational goals without interference. This requires that a student neither facilitate academic dishonesty by others nor obstruct their academic progress.
- uphold the canons of the ethical or professional code of the profession for which he or she is preparing.

Adherence to these principles is necessary in order to ensure that

- everyone is given proper credit for his or her ideas, words, results, and other scholarly accomplishments.
- all student work is fairly evaluated, and no student has an inappropriate advantage over others.
- the academic and ethical development of all students is fostered.
- the reputation of the University for integrity in its teaching, research, and scholarship is maintained and enhanced.

Failure to uphold these principles of academic integrity threatens both the reputation of the University and the value of the degrees awarded to its students. Every member of the University community therefore bears a responsibility for ensuring that the highest standards of academic integrity are upheld.

Cheating and Plagiarism

(From Spring 2010 Andy Egan 01:730:252 Eating Right): “Cheating on tests or plagiarizing materials in your papers deprives you of the educational benefits of preparing these materials appropriately. It is personally dishonest to cheat on a test or to hand in a paper based on unacknowledged words or ideas that someone else originated. It is also unfair, since it gives you an undeserved advantage over your fellow students who are graded on the basis of their own work. In this class we will take cheating very seriously”.

Turnitin will be used to assess students’ submissions and all suspected cases of cheating and plagiarism will be automatically referred to the Rutgers Academic Integrity office.

Just In Case Web App <http://codu.co/cee05e>

Access helpful mental health information and resources for yourself or a friend in a mental health crisis on your smartphone or tablet and easily contact CAPS or RUPD.

Counseling, ADAP & Psychiatric Services (CAPS)

(848) 932-7884 / 17 Senior Street, New Brunswick, NJ 08901 / www.rhscaps.rutgers.edu/
CAPS is a University mental health support service that includes counseling, alcohol and other drug assistance, and psychiatric services staffed by a team of professional within Rutgers Health services to support students' efforts to succeed at Rutgers University. CAPS offers a variety of services that include: individual therapy, group therapy and workshops, crisis intervention, referral to specialists in the community and consultation and collaboration with campus partners.

Violence Prevention & Victim Assistance (VPVA)

(848) 932-1181 / 3 Bartlett Street, New Brunswick, NJ 08901 / www.vpva.rutgers.edu/

The Office for Violence Prevention and Victim Assistance provides confidential crisis intervention, counseling and advocacy for victims of sexual and relationship violence and stalking to students, staff and faculty. To reach staff during office hours when the university is open or to reach an advocate after hours, call 848-932- 1181.

Scarlet Listeners

(732) 247-5555 / <http://www.scarletlisteners.com/>

Free and confidential peer counseling and referral hotline, providing a comforting and supportive safe space.