16:400:507 Food Engineering Fundamentals (4 credits)

Instructor-in-Charge: Prof. Mukund V. Karwe

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Prerequisite courses: First Year college level physics and mathematics (calculus) courses. If you have NOT taken these courses, please see the Prof. Karwe as soon as possible, before signing up for this course.

Topics Covered

Introduction Food Engineering: an Overview **Engineering Units** Material Balance Thermodynamics Psychrometry **Energy Balance Rheology Foods** Flow of Fluids Steady State Heat Transfer Unsteady State Heat Transfer **Reaction Kinetics** Thermal Processing of Foods Freezing Evaporation Steady State and Unsteady State Mass Transfer Food Dehydration/Drying Introduction to Non-thermal Processes for Food Preservation

NOTE: Most topics are covered at introductory level. We may or may not be able to cover all the listed topics, depending upon the pace of the class.

Expected Outcomes

- To understand physical principles and engineering approximations to mathematically describe a food processing/manufacturing operation.
- To be able to break down a food processing/engineering problem into parts so that one can apply appropriate principles and approximations to solve the problem.
- To be able to do quantitative analysis calculations accurately.
- To be able to integrate knowledge from various topics to understand food processing operations.
- To be able to interpret the results of the analysis and make a judgment based on the answer.

Assessment

- Weekly homework.
- Several quizzes, conceptual, closed-book.
- Three tests, open notes/book, increasing weightage.
- Quantitative accuracy.
- Correct approach and methodology.
- Organization, neatness, and clarity.

Grading Criteria (subject to revision):

Homework: 12%; Quizzes 18%; Test I: 20%; Test II: 23%; Test III: 27%.