

FST-342, Thermal Processing Engineering for Food Industry 3(3-0)

Educational Objectives

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.

Course outcomes

In this course, students will:

- learn advanced concepts and principles of food processing engineering.
- 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.
- develop analytical skills to efficiently solve practical problems relating to food processing.

Course Contents

- Overview
- Unit conversion
- Material and energy balance
- Fluid flow properties
- Engineering properties of food
- Types of food processing
- Thermal processing
- Non-thermal processing
- Drying and dehydration process
- Solar drying
- Oven drying
- Forced convection drying
- Microwave drying
- Ohmic heating
- Low temperature processing
- Air circulation freezing

- Immersion freezing
- Cryogenic freezing
- Evaporation
- Introduction
- Types of evaporator
- Membrane separation
- Emulsification process
- Filtration
- Minimal processing
- Electrostatic coating
- Design of coatings

Recommended Books

1. Engineering Aspects of Thermal Food Processing, Ricardo Simpson, CRC Press 2019

2. **Maria Micali, Marco Fiorino, Salvatore Parisi, 2016, The chemistry of thermal food processing procedures, Springer International Publishing.**

Thermal Processing of Packaged Foods, Donald Holdsworth, Ricardo Simpson, Springer 2007