

## UCH716: FOOD ENGINEERING AND SCIENCE

<b>L</b>	<b>T</b>	<b>P</b>	<b>Cr</b>
<b>3</b>	<b>1</b>	<b>0</b>	<b>3.5</b>

**Course Objectives :** To impart knowledge to the students about food process engineering, preservation, packaging, related hazards and safety.

**Introduction:** General aspects of food industry, Composition of foods, quality and nutritive aspects, Characteristic features of processed and natural food, Mass and energy balance in food processing operation.

**Food Rheology:** Characteristics of non-Newtonian fluids, Time-independent and time-dependent non-Newtonian fluids, linear viscoelastic fluids.

**Thermal Processing:** Canning/retort processing – process design and equipments. Equipment design aspects of pasteurizer, sterilizers, evaporators and concentrators, Dryers and their design parameters – tray dryer, spray dryer, fluidized bed dryer.

**Food Preservation:** Microbial Survivor Curves, thermal death of microorganisms and D, Z and F value calculation, Spoilage probability, Food preservation by dehydration, irradiation, Food preservation by adding preservatives.

**Food Production, Packaging and Storage:** Process design aspects for liquid foods such as milk and juices. Concentration with thermal and membranes processes, Food packaging & product shelf life, Modified atmosphere and controlled atmosphere storage, Aseptic packaging, Freezing and Thawing calculations

**Food laws:** Legislation, safety and quality control.

### Course Outcome

The students will be able to:

1. calculate rheological properties of foods.
2. identify and evaluate various design parameters for equipment involved in thermal processing of food.
3. quantify thermal death of micro-organism and calculate spoilage probability
4. evaluate effect of food processing and packaging /storage on food quality
5. analyze food related hazards and HACCP method.

### Text Books:

1. Potter Norman N., Hotchkiss Joseph, Food science, CBS (2005).
2. Toledo Romeo, Fundamentals of Food Process Engineering, CBS (2007).

### Reference Books:

1. Potty V.H. and Mulky, M.J., Food Processing, Oxford and IBH (1993).
2. Heldman D.R. and Singh R.P., Food Process Engineering, Chapman and Hall (1984)
3. Frazier, Food Microbiology, Tata McGraw Hill, (2007).

**Evaluation Scheme:**

<b>S. No.</b>	<b>Evaluation Elements</b>	<b>Weightage (%)</b>
1	MST	30
2	EST	50
3	Sessional (May includes assignments/ quiz's etc)	20