TYPE OF COURSE: Rerun Core & Elective | UG | PG

COURSE DURATION: 12 weeks (26 Jul'21 - 15 Oct'21)

EXAM DATE: 23 Oct 2021

INTENDED AUDIENCE: BTech/MSc/MTech/PhD students or faculties from reputed academic and technical institutions interested in acquiring knowledge of thermal processing technologies. Those who are pursuing a career as a chemical engineer or food engineer or biotechnologist designing thermal processing technologies for food processing or working with thermal processing of foods. Executives, engineers and researchers from manufacturing, service and government organizations including R&D laboratories working in the area of thermal food processing.

INDUSTRIES APPLICABLE TO: Food Corporation of India, Department of food and public distribution. India Central Food Technological Research Institute, Institute of Food Security and Central Warehousing Corporation. Some of the private sectors such as Amul, Perfetti Van Melle India Pvt. Ltd., Parle Products Ltd., PepsiCo India Ltd. etc.

COURSE OUTLINE:
The Food and Agriculture Organization (FAO) of the United Nations (UN) issued a report on the importance and complexities associated with feeding the projected 9.1 billion world population in 2050. Sustainable production of safe and nutritious foods, development of foods that have a long shelf life and foods that are either ready-to-eat or easy to prepare are of greater importance towards meeting this goal. Understanding “Food Engineering” and “Thermal Processing of Foods” serves as basic requirement means of meeting this goal.

ABOUT INSTRUCTOR:
Prof. R. Anandalakshmi is an Associate Professor in the Department of Chemical Engineering, Indian Institute of Technology, Guwahati. Her research interests are in the area of Computational Heat Transfer and Fluid Flow, Process Modeling and Simulation, Solar Thermal Energy Conversion, Energy Efficient Design of Thermal Systems, Microwave Assisted Food and Material Processing, Food Packaging and Preservation, Refrigeration and Air-conditioning Systems.

COURSE PLAN:

**Week 1:** Food microbiology: microbial growth and concerns in various foods, Blanching, Pasteurization, Ultra-pasteurization, Hot fill and UHT

**Week 2:** Thermal processing equipment, Milk pasteurization, Canning operations

**Week 3:** Temperature distribution and heat penetration, Kinetics of reactions, F value and process requirements

**Week 4:** Quality considerations and process optimization, Shelf life studies, Validation of heat processes

**Week 5:** Fundamentals of aseptic processing, Aseptic equipment design, Aseptic process design

**Week 6:** Microwave and radio frequency heating, Ohmic heating, Overview of non-thermal processing technologies

**Week 7:** Advanced separation processes high pressure, Dialysis ultrafiltration and reverse osmosis nanofiltration, Electro dialysis and membrane separation

**Week 8:** Various types of heat exchangers for food process engineering. Various types of driers for food process engineering

**Week 9:** Importance and applications of extrusion technology in food processing. Changes of properties and functional components of extruded foods

**Week 10:** Food biosensors Types of functional foods: Probiotics and nutraceuticals

**Week 11:** Packaging considerations: Barrier and mechanical properties of different food packaging materials biocomposite/bionanocomposite materials for food packaging applications

**Week 12:** Sanitary components and requirements, Regulatory considerations