

20FT023 - FOOD PROCESS AUTOMATION

Hours per Week:

L	T	P	C
3	1	-	4

Total Hours:

L	T	P
45	15	-

WA/RA	SSH/HSB	CS	SA	S	BS
45	15	-			

Course Description and Objectives:

- This course deals with various tools related to maintenance of food quality and safety. The objective of this course is to impart skill and knowledge required for the various activities like data analysis, modelling, data acquisition etc which ultimately affects the quality of processed food products.

Course Outcomes:

The students will be able to:

- Understand the tools and techniques used in food processing plants.
- Know about data analysis, modelling and control systems used in automated plants.
- Discuss various UNIT operations involved in an automated process.

SKILLS:

- Identify and predict a particular Modelling system for a process
- Suggest quality control and CIP for an automated process.
- Handle various tools used in automated industries.

ACTIVITY:

Layout for automatic mango juice processing unit

UNIT - I

Introduction: Food quality, automated evaluation of food quality, food quality quantization and process control, typical problems in food quality evaluation e.g., beef quality evaluation; food odor measurement, continuous snack food frying quality.

UNIT - II

Data acquisition: Sampling elaboration with examples, concepts and systems for data acquisition such as: ultrasonic signal acquisition for beef grading, electronic nose data acquisition for food odor measurement, snack food frying data acquisition for quality process control, Image acquisition: elaboration with examples.

UNIT - III

Data analysis: Data preprocessing, Static data analysis, Dynamic data analysis, Image processing: Image segmentation, Image feature extraction etc. Modeling: Modeling strategies: Theoretical and empirical modeling, Static and dynamic modeling, Linear statistical modeling, ANN modeling etc.

UNIT - IV

Prediction: Prediction and classification, Sample classification for beef grading, examples such as, based on linear statistical and ANN models, Electronic nose data classification for food odor pattern recognition, Snack food classification for eating quality evaluation based on linear statistical and ANN models, One-step-ahead prediction

UNIT - V

Control: Process control, Internal model control, Predictive control, Neuro-fuzzy PDC for snack food frying process, Systems integration: Food quality quantization systems integration, Food quality process control systems integration, Food quality quantization and process control systems development.

REFERENCE BOOKS:

1. Earle, R.L. 1985. UNIT Operations in Food Processing. Pergamon Press. London.
2. Geankoplis J. Christie. 1999. Transport Process and UNIT Operations. Third Edition, Prentice Hall of India, New Delhi.
3. Albert Ibarz, Gustavo V. Barbosa – Canovas, “UNIT Operations in Food Engineering”. 2nd Edition, Taylor & Francis, 2014.
4. Smith, PG. Introduction to food process engineering, 2nd edition, Springer 2011. 3. Chapman & Hall. USA, CBS publications New Delhi, 2007.