

## 17FT023 AUTOMATION IN FOOD PROCESSING

Hours Per Week :

| L | T | P | C |
|---|---|---|---|
| 3 | 1 | - | 4 |

Total Hours :

| L  | T  | P | WARA | SSH/HSB | CS | SA | S | BS |
|----|----|---|------|---------|----|----|---|----|
| 45 | 15 | - | 15   | 30      | -  | 5  | 5 | -  |

### 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, modeling, 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, modeling and control systems used in automated plants.
- Discuss various UNIT operations involved in an automated process.

### SKILLS:

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

### UNIT - I

Introduction: electronic nose, food quality evaluation, indication variables, Data acquisition, elastography, ultrasonic, Data analysis, intramuscular fat, wavelet, marbled meat, statistical textural feature extraction from, elastography, Sampling, concept and system for data acquisition, image acquisition, ultrasonic B-mode imaging. DataAnalysis – Data processing, Dynamic data analysis, Image processing.

### UNIT - II

Modeling system identification, Modeling strategy, linear statistical modeling, ANN Modeling, F statistic, null hypothesis Prediction Levenberg Marquardt algorithm, recurrent neural networks, gradient descent.

### UNIT - III

Control objective function, neuro-fuzzy, membership functions Systems integration assembly language, high-level programming language. System integration, Robotics, Application of robotics and basic components of robotics, Features of II and II generation robots.

### UNIT - IV

Bottle Washing Machine Automaton, Bottling Plant Drive System, Demineralization Plant Control System, Labeling Machine Control system, Charger level automation, Reverse Osmosis plant automation, Thermal plant automation, Dehydration and freezing pant automation.

### UNIT - V

Automation in different UNITS of food processing, preparation of raw food and materials, sorting, grading, size reduction, mixing and agitation, thermal processing, dehydration, packaging, CIP, quality control.

### TEXTBOOKS:

1. Considine 2001. Process Control. AVI Publ.
2. Huang Y & Lacey RE. 2003. Principles of Robotics. CRC Press.
3. Huang Y,WhittakerAD & Lacey RE. 2001. Automation for Food Engineering. CRC Press.

### REFERENCEBOOKS:

1. Automation in food processing, D.G.Caldwell
2. Robotics and *Automation* in the Food Industry by D. Caldwell
3. Automation and process control, Jasin Mohamad.

### ACTIVITY:

- o List out various requirements for a Dehydration and freezing plant automation.