



FACULTY OF ENGINEERING & TECHNOLOGY

Effective from Academic Batch: 2022-23

Programme: Bachelor of Technology (Food Processing Technology)

Semester: V

Course Code: 202070502

Course Title: Food Process Instrumentation and Control

Course Group: Professional Core Course

Course Objectives: Basic concept of process controls, types of control & their application, concept of automatic control and its classification. This will give in hand knowledge about instrumentation and its control of typical food processing units like reactor, evaporator, dryer, heat exchanger and many more. The purpose of process control is to reduce the variability in final products so that legislative requirements and consumers' expectations of product quality and safety are met. It also aims to reduce wastage and production costs by improving the efficiency of processing.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				Internal	External	Internal	External	
2	0	2	3	50/18	50/17	25/9	25/9	150/53

* J: Jury; V: Viva; P: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	Temperature Measurement: Mercury thermometers, Bimetal thermometers, Capillary type thermometers, Recording thermometers, Thermocouples, Resistance thermometers, thermistor.	08
2	Pressure Measurement: Pressure gauge, Elastic deformation elements, Basic concept of pneumatic pressure transmitter, Pressure current and Pressure resistance transducers.	05
3	Flow Measurement: Positive displacement meter, Turbine type, Float type, Timed flow and magnetic meters.	05
4	Transducers: Types & classification and selection criteria, Basic principles, Construction and applications of transducer elements, Strain gauge with bridge circuits and calibration procedures.	06



5	Miscellaneous Measurements: Weight measurement - Mechanical scale, Electronic tank scale, Conveyor scale and measurement of specific gravity, Measurement of humidity, Measurement of viscosity, Measurement of density, Automatic valves.	06
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List of Practicals / Tutorials:

1	Introduction to various electronic measurement equipments like CRO, DMM, Regulated Power Supply
2	To study the characteristics of IC temperature sensors
3	To study the characteristics of Resistance Temperature Detector using PT100
4	To study the characteristics of NTC thermistor
5	To study the characteristics of Strain gauge
6	To study the characteristics of Linear Variable Differential Transformer(LVDT)
7	To study the characteristics of K type thermocouple
8	To study the working of rotameter
9	To study the working of bourdon tube pressure gauge
10	To study the working principle of pH meter

Reference Books:

1	Process system analysis and control by Donald RC., Mc-GrawHill.
2	Process Instrumentation by Patranobish., Tata Mc-GrawHill.
3	Process Control Instrumentation Technology by Johnson C. Prentice Hall ofIndia.
4	Transducers and Instrumentation by Murty DVS., Prentice Hall ofIndia
5	Manual for plant operators by Milk industry foundation, Washington,DC.

Supplementary learning Material:

1	https://app.knovel.com/kn/resources/kpISFIE008/toc
2	https://onlinecourses.nptel.ac.in/noc22_ag04/preview
3	https://www.foodprocessing.com/assets/wp_downloads/pdf/2014/FP1405-Instrumentation-eBook2.pdf
4	https://www.branom.com/instruments-industry-food-beverage

Pedagogy:

- Direct classroom teaching
- Audio Visual presentations/demonstrations
- Assignments/Quiz
- Continuous assessment
- Interactive methods
- Industrial/ Field visits
- Course Projects

Internal Evaluation:

The internal evaluation comprised of written exam (40% weightage) along with combination of various components such as Certification courses, Assignments, Mini Project, Simulation, Model making, Case study, Group activity, Seminar, Poster Presentation, Unit test, Quiz, Class Participation, Attendance, Achievements etc. where individual component weightage should not exceed 20%.



Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	U	A	N	E	C	
20%	20%	22%	19%	19%	0%	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	To enable the students to gain skills and knowledge in instrumentation and process control of the food process system.	30
CO-2	To Apply principles of process control to analyze the performance of industrial processes.	30
CO-3	To Apply concepts of measurement and sensor selection to specify, install, configure, calibrate, troubleshoot, and maintain various process instruments commonly used in industry.	40

Curriculum Revision:

Version:	2
Drafted on (Month-Year):	June-2022
Last Reviewed on (Month-Year):	
Next Review on (Month-Year):	June-2025