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UNIVERSITY

Aegis: Charutar Vidya Mandal (Estd.1945)

FACULTY OF ENGINEERING & TECHNOLOGY

Effective from Academic Batch: 2022-23

Programme: Master of Technology (Food Technology)

Semester: 2

Course Code: 202380204

Course Title: Advanced Thermal Processing of Foods

Course Group: Program Elective III

Course Objectives:

1. To impart thorough understanding and knowledge of principles, operation, techniques and equipment for thermal processing of foods and recent developments in this field.

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	
3	0	2	4	50/20	50/20	25/10	25/10	150/60

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

Detailed Syllabus

Sr.	Contents	Hours
1	Overview of conventional thermal operations carried out in food processing	5
2	Measurement and prediction of thermos-physical properties of foods, mass and energy balances and heat transfer considerations for thermal processing of foods.	6
3	Blanching, sterilization, pasteurization and cooking, concentration and evaporation, crystallization and freezing, ohmic and microwave heating.	6
4	Heat penetration in packaged foods, kinetics of thermal processing and loss of nutrients.	4
5	Equipment used for batch and continuous thermal processing of foods. Retort technology	3
6	Combined high pressure thermal treatment of foods.	3
7	Process evaluation techniques, optimization and validation of thermal processes	4
8	Thermal processing plant operation, safety considerations and maintenance	4



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List of Practicals / Tutorials:

1	Study of different thermal processing equipments for their construction & operation.
2	Determination of quality of selected thermally processed foods.
3	Thermal processing of selected food products.
4	Detailed study of different crystallization & freezing equipments.
5	Study of freezing characteristics of selected foods.
6	Kinetics of loss of food nutrients during thermal processing.
7	Design calculation for different equipment for thermal processing.
8	Selected microbial kinetics during thermal processing of foods.

Reference Books:

1	Sun Da-Wen 2006. Thermal food processing. CRC Press
2	Thermal Technologies in Food Processing, 1st Edition, by P Richardson, ISBN: 9781855735583
3	Richardson P. 2004. Improving the thermal processing of foods. CRC Press
4	Richardson P. 2001. Thermal technologies in food processing. Woodhead Publishing Ltd
5	Sandeep K.P. 2011. Thermal Processing of Foods: Control and Automation. Blackwell Publishing
6	Holdsworth S.D. & Simpson R. 2007. Thermal Processing of Packaged Foods. Springer
7	Introduction to Thermal Processing of Foods, Samuel A. Goldblith, Maynard Alexander Joslyn, John T.

Supplementary learning Material:

1	https://www.sciencedirect.com/topics/food-science/thermal-food-processing
2	https://www.newfoodmagazine.com/article/7640/thermal-processing-in-the-food-industry/
3	https://swayam.gov.in/nd1_noc19_ag07/preview

Pedagogy:

- Direct classroom teaching
- Audio Visual presentations/demonstrations
- Assignments/Quiz



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- 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						R: Remembering; U: Understanding; A: Application, N: Analyze; E: Evaluate; C: Create
R	U	A	N	E	C	
20	30	20	20	10	00	

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	Understanding the need and outcomes of thermal processing of foods	25
CO-2	Understanding of types of thermal processing principles and techniques used in food industry.	25
CO-3	Operation of thermal processing equipment for different foods.	30
CO-4	Knowledge of process evaluation techniques and safety considerations in thermal processes	20

Curriculum Revision:	
Version:	2.0
Drafted on (Month-Year):	June-2022
Last Reviewed on (Month-Year):	-
Next Review on (Month-Year):	June-2025