FACULTY OF ENGINEERING & TECHNOLOGY

Effective from Academic Batch: 2022-23

Programme: **Bachelor of Technology (Electrical Engineering)**

Semester: **V**

Course Code: **202070522**

Course Title: **Principles of Food Engineering**

Course Group: **Open Elective Course**

Course Objectives:

To acquaint the student with fundamental knowledge of food processing and engineering. The students will also get exposed to fundamentals of energy balance, mass balance, basic unit operations in food processing

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
				Theory		J/V/P*		Total
Lecture	Tutorial	Practical		Internal	External	Internal	External	
3	0	0	3	50/18	50/17	-	-	100/35

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

Detailed Syllabus:

Sr.	Contents	Hours
1	**Introduction:** Introduction to Food Engineering, Status of food processing in India. Important institution related to food regulations: FSSAI, APEDA, ISO, CFTRI, MoFPI	4
2	**Accounting for Material and Energy balance:** Forms of water infoods, Sorption of water, Water activity**,** Material balance, Energy balance for closed and open system, Application of mass and energy balances in food engineering operations	6
3	**Engineering properties of agricultural materials:** Physical properties, Mechanical properties, Thermal properties, Rheological properties, Aero and hydrodynamic properties, Frictional properties	6
4	**Principal Units Operations :** Equipment and Machinery deployed in food processing Industry, Cleaning, Grading, Peeling, Cutting, Blanching, Pulping, Size reduction, Separation, Drying, Freezing, Evaporation, Distillation, Extraction, Centrifugation, Homogenization, Crystallization	10
5	**Fundamentals of Preservation Processes:** Survivor curve, Concept of Thermal Death Time, Thermal resistance curve and z value, Commercial sterility, Probability of spoilage. Pasteurization, Sterilization, Aseptic processing	9

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6	**Introduction to Food Packaging & Storage:** Importance, Types of packagingmaterials, Processes and equipment. Food storage requirements andmethods	**7**

Reference Books:

1	Introduction to food engineering by Singh, R. P., & Heldman, D. R. (2001), Gulf Professional Publishing.
2	Fundamentals of food process engineering by Toledo, R. T., Singh, R. K., & Kong, F. (2007), (Vol. 297), Springer
3	Food engineering operations by Brennan, J. G., Butters, J. R., Cowell, N. D., & Lilly, A. E. V. (1976). (No. Ed. 2). Applied Science Publishers Ltd.
4	Food processing technology: principles and practice by Fellows, P. J. (2009), Elsevier.
5	Food processing: principles and applications by Smith, J. S., & Hui, Y. H. (Eds.). (2008), John Wiley & Sons.
6	Food processing: principles and applications by Ramaswamy, H. S., &Marcotte, M. (2005). CRC Press.

Supplementary learning Material:	
1	http://foodscience.uark.edu/
2	http://www.ucc.ie/en/ace-dfsct/
3	http://www.sciencedirect.com/science/book/
4	http://ciftinnovation.org/food-processing

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**	
23%	17%	22%	21%	17%	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.

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Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Tounderstand the status of food industry in India. To learn engineering properties of food materials	**15**
CO-2	To understand mass and energy balances in various food processing operations	**20**
CO-3	To get a preliminary idea about the basic unit operations in food processing	**25**
CO-4	To understand the fundamentals of preservation process and about sterilization, pasteurization aseptic processing used for food processing	**20**
CO-5	To understand the fundamentals of food packaging and storage for food products	**20**

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

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