

GUJARAT TECHNOLOGICAL UNIVERSITY
B. E. SEMESTER: V
FOOD PROCESSING TECHNOLOGY

Subject Name: **Food Engineering Operations-I**

Subject Code: **151404**

Teaching Scheme				Evaluation Scheme		
Theory	Tutorial	Practical	Total	University Exam (Theory) (E)	Mid Sem Exam (Theory) (M)	Practical (I)
4	0	2	6	70	30	50

Sr. No.	Course Content	No. of Lectures
1.	Introduction: Structure and composition of food grains, Engineering properties of agricultural materials, Physical properties, Mechanical properties, Thermal properties, Rheological properties.	6
2.	Cleaning, Grading and Separation: Screening, Types of screens, Grizzly, Revolving screen, Shaking screen, Rotary screen, Vibratory screen, Horizontal screen, Perforated metal screen, Wire-mesh screen, Ideal and actual screen, Effectiveness of screen, Air-screen cleaners, Screen analysis, Fineness modules, Crushing efficiency, Size reduction procedures, Grading- Size grading, Colour grading, Specific gravity grading, Magnetic separation, Energy requirements in size reduction.	14
3.	Heat and Mass Transfer: Heat Transfer: Law of conduction, Steady and unsteady state conduction, Natural convection, Forced convection in laminar and turbulent flow, Emission of radiation, Combined heat transfer by conduction, Convection and radiation, Mass transfer: Theory of diffusion, Prediction of diffusivities, Mass transfer theories- Film theory, Boundary layer theory, Two film theory, Mass transfer coefficients, Transport phenomena, Finite element techniques and molecular transport in gas, Solids and liquid.	15
4.	Storage: Direct damages, Indirect damages, Sources of infestation, Traditional storage structures, Improved storage structures, Modern storage structures, Storage of agricultural perishables, Controlled and modified atmospheric storage, Sources of infestation and control.	9
5.	Material Handling: Belt conveyors, Belt tension, Bucket Elevator, Screw conveyor, Drive mechanism, Pneumatic and hydraulic conveying systems.	5

Reference Books:

1. Unit Operations of Agricultural Processing by Sahay K.M. and Singh K.K., Vikas Publishing House.
2. Physical Properties of Plant and Animal Products by Mohsenin N.N., Gordon and Breach.
3. Unit operations of chemical engineering by McCabe and Smith, McGraw-Hill.
4. Introduction to Food Engineering, 3rd Edition, R Paul Singh, Dennis R Heldman, Academic Press, USA.
5. Food Processing Technology: Principles and Practice, by P J Fellows, Woodhead Publishing Limited, Cambridge England.