GUJARAT TECHNOLOGICAL UNIVERSITY

Food Processing & Technology

B. E. SEMESTER: VI

Subject Name: **Food Drying and Dehydration**
Subject Code: **161404**

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	Total Hrs.
1.	**Introduction**: Drying definition, Moisture removal and its need, Dehydration of food, Evaporation of water below its boiling point, Utilities of drying, Theoretical aspects of drying, Thermal properties related to drying of foods.	07
2.	**Food Moisture:** Moisture content measurement, representation and determination, Equilibrium moisture content (EMC), its determination, methods, models and importance, Moisture sorption curves, Hysteresis phenomenon.	07
3.	**Drying Theory and Mechanisms:** Drying process and methods, Drying rate periods – constant and falling rate periods and their calculation, Heat and mass transfer coefficient calculations, Capillary and diffusion theory, Thin layer and deep bed drying, Dryer performance indices – overall thermal efficiency, specific energy consumption, coefficient of performance.	10
4.	**Classification and Selection of Dryers:** Classification and selection, Quality criteria for dryer selection.	04
5.	**Types of Dryers and Their Applications:** Basic construction and application of the following dryers – Grain dryers, Tray dryers, Vacuum dryers, Spray dryers, Fluidized bed dryers, Freeze dryers, Flash Dryers, Super-heated steam drying, Solar energy based dryers, Osmotic Dehydration, Drum dryer.	10

6.	**Dryer Design**: Basic design steps and calculations – Tray dryer, Vacuum dryer, Freeze dryer, Fluidized bed dryer.	06
7.	**Properties of Dried Products:** Physical, Chemical and Microbiological characteristics of dehydrated foods, Re-hydration ratio, size and density, shelf-life, water activity, Microbial stability of selected foods.	06
8.	**Emerging Trends in Drying Technologies:** Novel drying techniques, Hybrid dryers, Energy and environment conservation.	04

Reference Books:

1. Unit operations of chemical engineering by McCabe and Smith. McGraw-Hill
2. Chemical engineering handbook by Perry RH. McGraw-Hill
3. Dairy plant engineering and management by Tufail Ahmad, Kitab Mahal Publications
4. Engineering for dairy and food product by Farrall AW. John Wiley and Sons
5. Milk Pasteurization by Hall CW. The AVI Publication
6. Introduction to Chemical Engineering By Salil K Ghosal, Shyamal K Sanyal, Siddhartha Datta, Tata Mcgraw Hill