

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E Semester: 4

Food Processing Technology

Subject Code 141405

Subject Name Principles of Food Engineering

Sr.No	Course content
1.	Food Spoilage & Control: Factors causing food spoilage – Temperature, Moisture, Enzymes, Micro-organisms, Control measures, Forms of water in foods, Sorption of water, Water activity.
2.	Accounting for Material & Energy Balance: System Processes, Principles, Operation & Practice, Non-steady systems, Practical problems.
3.	Chemical & Microbial Kinetics in Food Products: Processing by Heat application, Temperature dependence of reaction rates, Orders of reaction, Basic equations & process parameters, Nutrient preservation, Calculation of thermal process times, Quality factor degradation and control.
4.	Principal Unit Operations: Drying, Evaporation, Distillation, Extraction, Centrifugation, Homogenization, Crystallization, Physical separation processes - sieving & gravity separation
5.	Engineering Properties of Food Materials: Mechanical, Physical & Rheological properties.
6.	Principles of Heat & Mass Transfer: Introduction, Heat transfer system – Conduction, Convection, Radiation, Heat transfer coefficients, Heat transfer characteristics of food, Heat penetration in foods and their determination, Types of heat exchangers, Heat exchanger effectiveness, Freezing and thawing calculations, Aseptic processing of foods, Elements of mass transfer, Mass transfer coefficients.
7.	Radiation Processing of Foods: Introduction, Ionizing reactions, Radiation sensitivity of micro-organisms, Effect of ionizing radiation on nutrients, insects, rodents, Applications of food irradiation.
8.	Introduction to Food Packaging & Storage: Importance, Types of packaging materials, Processes and equipment. Food storage requirements and methods.

Reference Books:

1. Unit Operations of Agricultural Processing, K.M.Sahay & K.K.Singh, Vikas Publishing House.
2. Engineering of Dairy & Food Products, A.W.Farral.
3. Food Engineering Fundamentals, J.Clair Batty, Steven L Folkman, John Wiley & Sons.
4. Fundamentals of Food Process Engineering, Romeo Toledo, Van Nostrand Reinhold, New York.
5. Chemical Process Principles, Part I – Material & Energy Balances, Hougen O. A. & Watson, K. M. , John Wiley & Sons, New York.
6. Unit Operations in Chemical Engineering, Mc Cabe & Smith, Mc Graw- Hill.