

## FT311 ENGINEERING PROPERTIES OF FOOD MATERIALS (ELECTIVE - I)

### Course Description & Objectives:

This course will impart knowledge about the various properties of food and their handling and storage. By the end of the course students will be able to understand physical, chemical and mechanical properties of food and their handling and storage.

### Course Outcomes:

By the completion of the course students will be able to understand

1. Engineering properties of food and biomaterials.
2. Structure and chemical composition of foods, Physical properties.
3. Water activity, food stability sorption and desorption isotherm of food materials.
4. Newtonian and non-Newtonian fluid.
5. Thermal properties and Electrical and magnetic properties of food.
6. Aero- and hydrodynamic characteristics, application of frictional properties in grain handling, processing and conveying.

### UNIT I- Introduction to engineering properties of food

Introduction to engineering properties of food and biomaterials, Structure and chemical composition of foods, Physical properties (size, shape, surface area, volume, density, sphericity, porosity, specific gravity, color), Properties of powdery materials.

### UNIT II-Moisture and water activity

Moisture in food and biological materials. Water activity, food stability sorption and desorption isotherm of food materials.

### UNIT III- Mechanical properties of food

Mechanical properties (strain and stress), viscosity, elasticity, visco-elasticity, Newtonian and non-Newtonian fluid, time dependent fluids, creep and relaxation phenomena, texture profile.

### UNIT IV- Thermal properties of food

Thermal properties (specific heat capacity, thermal conductivity, and thermal diffusivity), Convective heat transfer coefficient, Cooling and phase change. Electrical and magnetic properties.

### UNIT V-Friction and grain handling

Friction of solids and flow of granular solids, angle of repose, coefficient of friction, Aero- and hydrodynamic characteristics, application of frictional properties in grain handling, processing and conveying.

### TEXTBOOKS:

1. Rao MA and Rizvi SSH. (Eds.) Engineering Properties of Foods. Marcel Dekker
2. Steffe, J.F. Rheological methods in Food Process Engineering. 2nd ed East Lansing, MI: Freeman Press