Course No.	Course Name	L-T-P - Credits	Year of Introduction
FT204	Engineering Properties of Biological Materials	4-0-0-4	2016

Prerequisite : Nil

Course Objectives

To familiarize with physical, thermal, aero and hydrodynamic properties of food and their role and determination. Also texture and mechanical damages were to be studied

Syllabus

Physical properties - Aero and hydrodynamic properties - Frictional properties - Mechanical Damage -Rheological Properties - Texture of food materials

Expected outcome.

Students will be able to know about different properties of food and their role in food texture and characteristics.

Text Book:

1. Mohensenin N N, *PHYSICAL PROPERTIES OF PLANTS ANIMAL MATERIALS, GORDON AND BREACH PUBLISHERS, NEW YORK, 1980*
2. Rao M A , Rizvi S S H,Azim K Datta and Jasim Ahmed, *Engineering properties of foods* 4th Ed., CRC Press

References:

1. Singhal,O.P. and Samuel,D.V.K, *"Engineering Properties of BiologicalMaterials".* Saroj Prakasan, Allahabad 2003.
2. Peleg, M.and BagelayE.B., *"Physical properties of foods".* AVI publishing Co. USA 1983.

Course Plan

Module	Contents	Hours	Sem. Exam Marks
I	**Physical properties** Shape and size – criteria for describing shape and size Volume and density – platform scale , specific gravity balance, specific gravity gradient tube, air comparison pycnometer, pycnometer method, porosity, surface area measurement methods fruits egg and porous pack.	9	15%
II	**Aero and hydrodynamic properties** Drag coefficient, terminal velocity – for spherical and non-spherical bodies Surface properties – Gibb's Absorption equation, contact angle measurement techniques.	9	15%
	FIRST INTERNAL EXAMINATION		
III	**Frictional properties:** Laws of friction, effect of load and properties of contacting bodies. Effect of sliding velocity and contact surface temperature, effect of water film and surface roughness. Rolling resistance, angle of repose, angle of internal friction, pressure distribution in storage structures and compression chambers.	10	15%

IV	**Mechanical damage:** Definitions related to external damage – causes of mechanical damage , detection and evaluation of mechanical damage - Damage under dead load –impact damage - vibration damage – stress cracking	8	15%
SECOND INTERNAL EXAMINATION			
V	**Rheological properties:** Basic concepts and definitions – physical states of matter – classical Ideal materials – viscoelasticity. Force deformation behaviour – stress strain behaviour – uniaxial compression, tension, shear, bending. Elastic plastic behaviour	10	20%
VI	**Texture of food materials:** Dimensional analysis of food texture. Subjective measurements – physiological aspects, psychological aspects, mechanical aspects. Imitative measurements, texture profile method, dynamic test for evaluation of food texture, mechanical test applicable to food materials – firmness and hardness , effect of age, water content and temperature on texture of foods.	10	20%
END SEMESTER EXAM			

QUESTION PAPER PATTERN

Max. marks: 100, Time: 3 hours

The question paper shall consist of three parts

Part A

4 questions uniformly covering modules I and II. Each question carries 10 marks

Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part B

4 questions uniformly covering modules III and IV. Each question carries 10 marks

Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part C

6 questions uniformly covering modules V and VI. Each question carries 10 marks

Students will have to answer any four questions out of 6 (4X10 marks =40 marks)

Note: In all parts, each question can have a maximum of four sub questions, if needed.