DISCIPLINE SPECIFIC ELECTIVE COURSE

DSE FT 08: FOOD RHEOLOGY

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITE OF THE COURSE

Course Title & Code	Credits	Credit Distribution of the Course			Eligibility Criteria	Pre-requisite of the Course (if any)
		Lecture	Tutorial	Practical		
Food Rheology DSE FT 08	4	2	0	2	Studied XII	Nil

Learning Objectives

- To appreciate the significance of food rheology in food product designing and development.
- To understand the chemistry and rheology of cereal based and meat and dairy food products.
- To study the various instrumental techniques/ measurements used in evaluating rheological properties.

Learning Outcomes

- Apply the principles of food rheology in product development and optimization of process parameters.
- Evaluate food quality attributes of final products in relation to rheological properties.

SYLLABUS OF DSE FT08

THEORY
(Credit 2; Hours 30)

UNIT I: Introduction to Rheology of Foods **10 Hours**

- Definition of rheology, viscosity, viscoelasticity, and plasticity of foods.
- Classification of texture- based on chemical composition and physical structure of foods.
- Essential elements of texture measuring devices.
- Approaches to Instrumental Measurement of Texture- Fundamental, Empirical, and Imitative tests.
- Basic rheological models and forces involved in texture measurement.
- Importance and rheological applications in food measurements.
- Texture profile Analysis.

UNIT II: Rheological Applications in Cereal food products **10 Hours**

- Chemistry of bread and biscuit/ cookie making- type of flours, protein content etc.
- Rheological properties of Dough- Effect of stress on dough, Viscosity Modulus Quotient.
- The three – phase concept of bread making.
- Instrumental measurement of rheological properties of dough- mixing, load extension, viscosity measurements.

UNIT III: Rheological Applications in Meat **4 Hours**

- Compositional and textural attributes influencing meat quality.
- Instrumental measurement of meat quality: compression, shear, torsion etc.
- Texture profile analysis of meat

UNIT IV: Rheological Applications in Dairy **6 Hours**

- Rheology of Cheese: structure, model of cheese rheology, texture and factors affecting structure of Cheddar cheese.
- Instrumental measurement of cheese quality.
- Rheology of Milk fat and Butter: Body and texture, rheological properties- spreadibility, plasticity.

PRACTICAL
(Credit 1; Hours 30)

1. Determine the flow properties of Newtonian and Non-Newtonian fluids using two tube capillary viscometers.
2. Study the viscosity of various food products using Brookfield's Viscometer.
3. Determine the force required to penetrate butter/ ghee/ margarine using penetrometer.
4. Study the pasting behaviour of various starches.
5. Study the rheological properties of dough (Viscosity Modulus Quotient).
6. Study the consistency of various foods using Bostwick consistometer.
7. Texture Profile Analysis of any given food product- Biscuits/ cookies/ chips/ fruits.
8. Textural evaluation of various food products.

Essential Readings

- Rao, E. S. (2013). *Food Quality Evaluation* (I ed.). Variety Book Publishers, New Delhi.
- Fox, P.F., Guinee, T.P., Cogan, T.M. & McSweeney, P.L.H. (2017). Cheese: Structure, Rheology and Texture. In: Fundamentals of Cheese Science. Springer, Boston, MA.

Suggested Readings

- Wright, A. J., Scanlon, M. G., Hartel, R. W., & Marangoni, A. G. (2001). Rheological properties of milkfat and butter. *Journal of food science*, *66*(8), 1056-1071.

- De Ávila, M. D. R., Cambero, M. I., Ordóñez, J. A., de la Hoz, L., & Herrero, A. M. (2014). Rheological behaviour of commercial cooked meat products evaluated by tensile test and texture profile analysis (TPA). *Meat science*, *98*(2), 310-315.

Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.

DISCIPLINE SPECIFIC ELECTIVE COURSE

DSE FT 09: FOOD PLANT DESIGN SANITATION

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITE OF THE COURSE

Course Title & Code	Credits	Credit Distribution of the Course			Eligibility Criteria	Pre-requisite of the Course
		Lecture	Tutorial	Practical/Practice		
Food Plant Design Sanitation DSE FT 09	4	2	0	2	Studied Semester VI	Nil

Learning objectives

- To study the principles and design of plant and processing equipment.
- To understand the concepts of food storage, warehousing and Cold chain Management.
- To develop comprehensive understanding of waste product handling, management, cleaning and sanitation processes.

Learning Outcomes

- To understand the principles and draw/design food processing plant and processing equipment.
- To get an understanding of warehousing and cold chain management used for storage and transportation of foods.
- To be able to develop waste management and sanitation schedules and designs for food industry and Effluent treatment plant.

SYLLABUS OF DSE FT 09

Theory
(Credits 2; Hours 30)