



## FACULTY OF ENGINEERING & TECHNOLOGY

### First Year Master of Technology

#### Semester I

**Course Code: 102380105**

**Course Title: Advanced Food Rheology**

**Type of Course: Program Elective I**

**Course Objectives: To develop the concept of types of rheological behavior the fluid and solid foods exhibit and to describe the experimental methods for measuring rheological properties and textural attributes of food material.**

#### Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Internal		External		Total
				Theory	J/V/P*	Theory	J/V/P*	
3	0	2	4	30 / 15	20 / 10	70 / 35	30 / 15	150 / 75

\* J: Jury; V: Viva; P: Practical

#### Detailed Syllabus:

Sr.	Contents	Hours
1	Rheological Classification of Fluid Foods, Rheological Models for Viscous Foods, Structure of Fluid Foods via Solution Viscosity and Physicochemical Approach Effect of temperature and concentration on viscosity of food.	7
2	Viscoelasticity, Transient test for viscoelasticity, Stress relaxation behavior, creep behavior, Dynamic Viscoelastic Behavior, Failure and Glass Transition in Solid Foods, Operating Mode of Oscillatory Testing Instrument, Deborah Number, Difficulties in Oscillatory testing of food.	9
3	Viscosity Measurement: Capillary viscometers, Orifice viscometer, Falling-sphere viscometer, Rotational viscometers, Vibrational Viscometer, Rheometers. Comparative assessment of different types of Viscometers, and their Merits and Limitations	8
4	Texture of Food: Texture Profile Analysis, Instrumental methods of Texture Measurements. Dough Testing Instruments: Farinograph, Mixograph, Extensograph, Alveograph and Amylograph	6
5	Rheological and textural properties of selected food products: Starch and Hydrocolloid Solution, Dough, Juice Concentrates. Effect of processing and additives on food product rheology	7

#### Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks						R: Remembering; U: Understanding; A: Application, N: Analyze; E: Evaluate; C: Create
R	U	A	N	E	C	
15	20	20	20	25	0	



Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

### Reference Books:

1	Bourne, M. Food Viscosity and Texture, 2nd Edition, Academic Press, New York, 2002
2	Rao, M. A.; Rizvi, S. S. H.; Datta, Ashim K. 2005, Engineering Properties of Foods. Taylor & Francis
3	Macosko, Ch.W. Rheology: Principles, Measurements, and Applications (Advances in Interfacial Engineering), Wiley-VCH, 1994
4	Morrison, Faith. Understanding Rheology, Oxford University Press, 2001
5	Phan-Thien, N. Understanding Viscoelasticity. Basics of Rheology. Springer, 2002
6	James F Steffe. Rheological Methods in Food Process Engineering, Freeman Press, USA

### Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	To develop the concept of rheological classification and rheological models for food materials.	20
CO-2	To understand the Viscoelastic behaviour of food and the dynamic oscillatory test for measurement of rheological properties.	23
CO-3	To learn the principle of various viscosity measuring equipments and their comparative analysis.	20
CO-4	To develop the concept of textural attributes of food, dough testing and rheological properties of selected food materials.	37

### List of Practicals / Tutorials: [Click or tap here to enter text.](#)

1	To measure and analyze the viscosity of fluid food such as milk, shortening
2	To measure and analyze the viscosity of solid food such as apple.
3	Measurement and analysis of Dynamic Properties of foods
4	Study and measurement of Glass Transition temperature in foods
5	Study and measurement of textural attributes of fruits and vegetables
6	Study and measurement of textural attributes of baked products
7	Study of dough properties using Farinograph and Mixograph
8	Study of dough properties using Extensograph, Alveograph
9	Study of pasting properties of starch
10	Study of interaction effect of hydrocolloid on rheological properties

### Supplementary learning Material:

1	<a href="http://www.onlinelibrary.wiley.com/journal/10.1111/(ISSN)1365-2621">www.onlinelibrary.wiley.com/journal/10.1111/(ISSN)1365-2621</a>
2	<a href="http://www.journals.elsevier.com/lwt-food-science-and.../open-access-articles">www.journals.elsevier.com/lwt-food-science-and.../open-access-articles</a>

### Curriculum Revision:



**CVM**  
**UNIVERSITY**

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