

Course Syllabus

1	Course title	Physical Properties of Foods
2	Course number	0603713
3	Credit hours (theory, practical)	3
	Contact hours (theory, practical)	3
4	Prerequisites/corequisites	
5	Program title	MSc in Food Science and Technology
6	Program code	037
7	Awarding institution	The University of Jordan
8	School	Agriculture
9	Department	Nutrition and Food Technology
10	Level of course	Graduate
11	Year of study and semester (s)	
12	Final Qualification	MSc
13	Other department (s) involved in teaching the course	None
14	Language of Instruction	English
15	Date of production/revision	12/2/2020

16. Course Coordinator: Prof. Mohammed Ismael Saleh

Office numbers, office hours, phone numbers, and email addresses should be listed.

Office hours						
Day/Time	Sunday	Monday	Tuesday	Wednesday	Thursday	
Day						
Time	10:00 – 12:00	11:00-12:30	9:00 – 12:00	11:00-12:30		

17. Other instructors:

Office numbers, office hours, phone numbers, and email addresses should be listed.

Office hours						
Day/Time	Sunday	Monday	Tuesday	Wednesday	Thursday	
Day						
Time	10:00 – 12:00	11:00-12:30	9:00 – 12:00	11:00-12:30		

18. Course Description:

This course introduces the basics of physical properties describing the steady shear, dynamic, visco-elastic, solid behavior and texture of food and similar materials. Topics include viscosity, stress/strain in foods, food properties and their relation to food texture and measurement techniques and data analysis. Topics also include biomechanics of texture perception and measurements of texture in food products.

19. Course aims and outcomes:

Learning Objectives

Students will be able understand research literature, design experiments, conduct experiments to understand rheological and texture of food products and analyze data.

Intended Learning Outcomes (ILOs):

Successful completion of the course should lead to the following outcomes:

- A. Knowledge and Understanding:** Student is expected to
- A1- Understand the concept of texture and rheology of foods.
 - A2- Understand the basics concept of food viscoelastic and texture measurement methodology in food models.
 - A3- Understand the applications and use of rheological and texture properties in food science applications.
 - A4- Understand the concept of statistical modelling of physical properties of food products.
- B. Intellectual Analytical and Cognitive Skills:** Student is expected to
- B1- Develop a detailed application and use basic principles of food physical properties and apply these principles by solving food processing problems.
- C. Subject- Specific Skills:** Students is expected to
- C1- Apply, analyze and use food physical properties in solving food related problems.
 - C2- Able to perform and evaluate the needs/requirements for performing physical testing methodology of foods including viscosity, stress/strain in foods, food properties and their relation to food texture and measurement techniques and data analysis.
- D. Transferable Key Skills:** Students is expected to
- D1- Convey basic food physical properties information and use in concepts in manufacturing organizations.
 - D2- Critically review requirements of food applications that can be used to improve food quality and minimize losses.

20. Topic Outline and Schedule:

Week/lectures	Subject	Sources/ Chapter	ILOs	
Wk1/ 3 lectures	Introduction, Overview of Rheology	Steffe, J.F. / Ch 1	A1	
	Math Review Deformation and stress Definition of stress and strain			
Wk 2/ 3 lectures	Flow Behavior Time Independent Models Apparent Viscosity		Steffe, J.F. / Ch 1	A1-3
	Time-Dependent Models Modeling Rheological Behavior			
	Yield Stress Extensional Flow Viscoelasticity Attacking Rheological Problems Examples			
Wk 3/ 3 lectures	Yield Stress Extensional Flow Viscoelasticity Attacking Rheological Problems Examples	Steffe, J.F. / Ch 2 Malcolm, C.B. / Ch 6	A1-3, B1, C1, 2, D1-2	
Wk 4/ 3 lectures	Tube Viscometry Types Rabinowitz-Mooney Equation	Steffe, J.F. / Ch 3 Malcolm, C.B. / Ch 6	A1-3, B1	
Wk 5/ 3 lectures	Rotational Viscometry Derivation of Basic Equations	Steffe, J.F. / Ch 3 Malcolm, C.B. / Ch 6	A1-3, B1	

	Derivation of Basic Equations Shear Rate Determination		
Wk 6/ 3 lectures	Cone and Plate Parallel Plate		A1,3, C1, 2, D1-2
	Data Corrections- Cup and Bob Cone and Plate/Parallel Plate		
Wk 7/ 3 lectures	Viscoelasticity Stress Relaxation and Creep	Steffe, J.F. / Ch 4 Malcolm, C.B. / Ch 6	A1,4, B1, C1, 2
	Dynamic Testing, Deborah Number		
Wk 8/ 1 lectures	Food Texture: concept and measurement	Malcolm, C.B. / Ch	A1
Wk 8/ 2 lectures	Demonstration and group project assignments		B1, C1-2, D1-2
Wk 9/ 2 lectures	Visco-elasticity	Malcolm, C.B. / Ch 1	A1-3
Wk 10/ 1 lectures	Texture: A sensory property	Malcolm, C.B. / Ch 7	A1-3, C2, D2
Wk 10/ 2 lectures	Body-Texture Interactions	Malcolm, C.B. / Ch 2	A1-3, B1, C1-2
Wk 11/ 2 lectures	Meat Texture	Faridi and Faubion, Malcolm	A1-3, B1
Wk 11/ 1 lectures	Texture of Horticultural Crops		A1-3, B1
Wk 12/ 3 lectures	Texture of Cereal Products		A1-3, B1
Wk 13 / 3 lectures	Texture of Dairy Products		A1-3, B1
Wk 14 / 3 lectures	Non Destructive Methods	Malcolm, C.B. / Ch 1	A1-3, B1
Wk 15 / 2 lectures	Correlating instrumental and sensory	Malcolm, C.B. / Ch 7	A4
Wk 15-16/ 4	Group Projects Presentations		C1-2, D1-2

21. Teaching Methods and Assignments:

The format for this class will vary from traditional lectures, group discussions, group learning, example problem solving, and laboratory demonstrations.

Homework- There will be between 4 or 6 homework assignments through the semester. These will typically be due one week from the date they are distributed. Assignments are due at the beginning of class. A 10% penalty will be assessed for assignments turned in by 4:00 pm on the due date. A 30% penalty will be assessed for assignments turned in by 4:00 pm on the following day, and a 50% penalty will be assessed for assignments turned in at the next class period. It is the student's responsibility to ask any questions about the assignment before the last minute.

22. Evaluation Methods and Course Requirements:

Participation- you will be assessed a grade based on attendance, preparedness for discussions, attentiveness, and class participation. Excessive absences will result in a forfeiture of the participation grade. Periodic quizzes will be given to monitor information retention and progress.

23. Course Policies:

Students and instructors each have an important role in maintaining a classroom environment optimal for learning, and are expected to treat each other with respect during class, using thoughtful dialogue, and keeping disruptive behaviours to a minimum. Class discussions are interactive and diverse opinions will be shared; please be thoughtful in sharing your perspectives and responses with one another. Other behaviours that can be disruptive are chatting and whispering during class, the use of electronic equipment, preparing to leave before class is over, and consistently arriving late to class. Please keep these disruptions to a minimum. Inappropriate behavior in the classroom may result in a request to leave the class and/or subject to penalty.

24. Required equipment: (Facilities, Tools, Labs, Training....)

Classroom facilities

25. References:

Main References:

1. Steffe, J.F. **1996**. Rheological Methods in Food Process Engineering, 2nd edition, Freeman Press, East Lansing, MI. This text is available free in PDF format at:
<http://www.egr.msu.edu/~steffe/freebook/offer.html>
2. Bourne, Malcolm. **2002**. Food Texture and Viscosity: Concept and Measurement, end edition. ISBN: 978-0-12-119062-0
3. Faridi, H. and Faubion J.M. **1990**. Dough Rheology and Related Products Texture. ISBN: 978-4612-8207-5 (Print), ISBN: 978-4613-0861-4 (Online),

Additional Sources:

1. Kramer, A. and Szczesniak, A.S. **1973**. Texture Measurements of Foods: Psychophysical Fundamentals: Sensory, Mechanical, and Chemical Procedures, and their Interrelationships. ISBN: 978-94-010-2564-5.
2. Singh, R.P and Heldman, D.R. **2003**. Introduction to Food Engineering. 3rd edition. Academic Press, San Diego California.

26. Additional information:

Name of Course Coordinator: **Prof. Mohammed Ismael Saleh** Signature: ----- Date: -----

Head of curriculum committee/Department: ----- Signature: -----

Head of Department: ----- Signature: -----

Head of curriculum committee/Faculty: ----- Signature: -----

Dean: ----- -Signature: -----