

RISE Program Short Course in Rheology

Description

- This course is an introduction to rheology and viscoelasticity. In particular, the flow behavior of Non-Newtonian Fluids and Viscoelastic Fluids will be covered. Rheometry, the technique for characterization of fluids, will be discussed.

Objectives

At the end of this course, students:

- understand the concepts of non-Newtonian and viscoelastic behavior;
- can explain linear and nonlinear viscoelastic behavior; and
- can discuss the rheological behaviors in terms of material functions.

Reference

- Handouts will be provided by instructor.

Topics Covered and Schedule

- May 16, 2016, 9 am to 12 pm:
 1. Newtonian and Non-Newtonian Fluids
 2. Flow fields
 3. Shear and extensional rheometry
 4. Linear and non-linear viscoelasticity
- May 16, 2016, 1 pm to 3 pm: Hands-on rheological measurement on:
 1. Newtonian fluids, such as honey, glycerol
 2. Non-Newtonian fluids, such as butter, mayonnaise
- May 17, 2016, 9 am to 12 pm:
 1. Viscoplastic behavior
 2. Material functions
 3. Complex fluids (emulsions, suspensions, and biofluids).
- May 17, 2016, 1 pm to 3 pm: Hands-on rheological measurement on:
 1. Typical viscoelastic fluids, e.g. protein solution, dead cell culture (microalgae)
 2. Typical viscoplastic fluids, e.g. concentrated protein solution