

EML 6235 - MECHANICAL PROPERTIES OF POLYMERS  
Common Course Syllabus

Catalog Description: 3 Credits. Prerequisite: EGM 3524 or equivalent. Review structure and processing methods of engineering plastics. Structure-property relationships, analysis of creep and stress relaxation. Viscoelastic models. Dynamic-mechanical response. Rubber elasticity.

Goals: This course is designed to provide students with the basic chemical and physical structure of plastics, and how the time and temperature dependent (viscoelastic) mechanical response of such materials can be described and analyzed. A project is assigned that requires the student to focus in-depth on a particular plastic, i.e. its synthesis, behavior, and applications.

Topics:

1. Introduction
2. Structure of polymers.
3. Description of some common plastics.
4. Processing
5. Viscoelastic behavior.
6. Analysis of viscoelastic bodies.
7. Molecular phenomena responsible for viscoelasticity.
8. Time-temperature superposition.
9. Transitions in polymers.
10. Viscoelastic models.
11. Rubber elasticity
12. Deformation and yield behavior of polymers.
13. Impact behavior of polymers.

Course Outcomes:

1. The students will understand the molecular and physical structure of thermosets and thermoplastics.
2. The students will be able to analyze the time and temperature dependent viscoelastic response of such materials.
3. The students will understand the design of injection molded plastic parts.

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