

COURSE ID SHEET



Course No.	5103	NTUA			
Semester:	1st	Core	Elective	X	Mandatory

TITLE Dynamic Mechanical Properties of Materials-Rheology

AIM The scope of this course is the enlargement and enhancement of knowledge of the students in the field of dynamic and mechanical properties, rheology and processing techniques of materials, focusing on polymeric systems, aiming at the production of final products with the desired, pre-designed properties.

CONTENT
 Polymer melt rheology: viscosity, analysis of simple flows (Pressure flow, Drag flow).
 Rheometry. Extrudate swell and melt flow instabilities.
 Polymer melt processing:
 - extrusion,
 - injection moulding,
 - blow moulding,
 - thermoforming,
 - rotation moulding.
 Polymers melt mixing technology.
 Polymer solutions.
 Structure of polymeric solids.
 Rubber elasticity.
 Viscoelasticity: Maxwell model, Voight model, Creep - Stress relaxation experiment.
 Dynamic properties.
 Mechanical properties: tensile, bending, impact test.
 Design aspects of polymeric products: plastic packaging materials, polymeric biomaterials, products made of recycled plastics.

HOURS PER SEMESTER	LECTURES	39	EXERCISES	20	LABORATORY	-	HOME-WORK	39	TOTAL HOURS: 98
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STUDENT PERFORMANCE/EVALUATION
 The evaluation of the students will be done through:

- A Final (written) examination (FE), including the use of books and notes,
- An optional literature-based project, where a written report (OR) is submitted and graded.

 The Final Grade results as follows:
Final Grade = 0.7 x (FE) + 0.3 x (OR)
 or
Final Grade = 1 x (FE)
 Prerequisite: FE ≥ 5