

RHEOLOGY

1.1. Identification

University:	Alma Mater Studiorum – Università di Bologna											
School:	School of Engineering											
Course:	Rheology											
ECTS:	3											
Semester:	<i>Winter</i>				X	<i>Summer</i>						
Category	<i>Fundamental course</i>				X	<i>Specialisation course</i>						
Module	<i>MFI</i>		<i>MFII</i>	X	<i>MFIII</i>		<i>MSI</i>		<i>MSII</i>		<i>MSIII</i>	
Teachers:	Ferruccio Doghieri											
Language:	<i>English</i>	X	<i>Italian</i>	X	<i>Swedish</i>		<i>Spanish</i>					

1.2. Learning-outcomes

- knowledge of fundamentals in rheological characterization and analysis of either solid and fluid materials
- basic knowledge of models for stress-strain constitutive relations for elastic, viscous, linear and non linear viscoelastic materials

1.3. Competencies

▪ General

- to have critical understanding of technical and scientific tools
- communication skills
- to work in an international context

▪ Specific

- to understand of significance and limits of most common characterization experiments for viscosity, elastic modulus and linear viscoelastic properties of materials
- to correctly use elastic, viscous and viscoelastic models for material properties in fluid mechanics application
- to design experiments for the optimal characterization of rheological properties relevant to specific industrial applications

1.4. Contents

1. Strain and stress measurements and evaluation

2. Stress-strain constitutive equations for general elastic materials
3. Stress-strain rate equations relations for general viscous fluids
4. Stress-strain constitutive equations for linear viscoelastic fluids:
5. Relations among linear viscoelastic properties
6. Non linear viscoelastic models
7. Rheometry: limits and applicability of rheological instruments
8. Application of results from rheological analysis

1.5. Teaching Methodology

- Lecture sessions
- Laboratory sessions

1.6. Evaluation

- oral evaluation

1.7. Bibliography

- Christofer W. Macosko, Rheology: Principles, Measurements and Applications, VCH 1994