MECHANICAL PROPERTIES OF MATERIALS

1.1. Identification

University:	Kungliga Tekniska Högskolan (Stockholm)													
School:	School of Chemical Science and Technology													
Course:	Mechanical Properties of Materials													
ECTS:	7.5													
Semester:	*Winter*						X	*Summer*						
Category	*Fundamental course*						X	*Specialisation course*						
Module	*MFI*		*MFII*	X	*MFIII*			*MSI*		*MSII*		*MSIII*		
Teachers:	Ulf W. Gedde, Lars Wågberg													
Language:	*English*	X	*Italian*		*Swedish*	X	*Spanish*							

1.2. Learning-outcomes

- knowledge about the fundamentals of mechanical properties of materials
- knowledge about mechanical testing techniques

1.3. Competencies

- **General**
  - to have critical understanding of technical and scientific tools
  - to work and manage teams
  - communication skills (both written and oral)
  - to work in an international context

- **Specific**
  - to look for and determine which test methods are suitable for measurement of mechanical properties
  - to understand the difference in influence of static and dynamic stress
  - to perform energy balances to industrial processes
  - to analyse how different material parameters and external factors affect the mechanical properties
  - to determine the fundamental differences and likenesses between mechanical properties of organic and inorganic materials at small deformations, plastic deformation and deformation to fracture

1.4. Contents

Mechanical properties of inorganic materials (metals, cerams) and organic materials (polymers, fibres) and composites (material blends, nanocomposites, filled and reinforced systems). Mechanical testing, enthalpy elasticity, rubber elasticity,

viscoelasticity, plasticity, viscoplasticity, fracture properties, deformation velocity and temperature influence. Molecular and morphological influence on the mechanical properties. External influence including moisture, solvents and oxidation.

1.5. Teaching Methodology

- Lecture sessions
- Practical sessions: “cooperative work” for solving problems
- laboratory sessions

1.6. Evaluation

- written exams
- oral evaluation of the problems solved by “cooperative work”
- oral evaluation of laboratory work

1.7. Bibliography

- Soboyejo, W.O., “Mechanical Properties of Engineered Materials” Dekker Publ.