MECHANICAL PROPERTIES AND TESTING OF POLYMERS

1.1. Identification

University:	Kungl Tekniska Högskolan (KTH), Stockholm, Sweden											
School:	School of Chemical, Science and Technology											
Course:	Mechanical Properties and Testing of Polymers											
ECTS:	6											
Semester:	*Winter*					X	*Summer*					
Category	*Fundamental course*						*Specialisation course*					X
Module	*MFI*		*MFII*		*MFIII*		*MSI*		*MSII*	X	*MSIII*	
Teachers:	Mikael Hedenqvist											
Language:	*English*	X	*Italian*				*Swedish*	X	*Spanish*			

1.2. Learning-outcomes

- knowledge about the mechanical properties of polymers and which will give deepened studies plus a basis for engineering work after exam within this field

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 determine how different material parameters and external factors affect the mechanical properties.
- To decide which test methods are suitable for measurement of mechanical properties.
- Knowledge of the difference in influence in statical and dynamical stress.
- Knowledge of compliance, Poisson's ratio, bulk modulus. The consequences of viscoelasticity on calculation of mechanical properties of polymers.

1.4. Contents

Mechanical testing of polymer materials, linear and non-linear viscoelasticity of polymers, dependence of deformation velocity and temperature on viscoelasticity, temperature graph of modulus, creeping, stress relaxation and dynamic-mechanical properties. Tensile stress and yielding of polymers. Orientation about viscoelasticity

and break properties of rubber materials and polymer blends. Mechanical properties of oriented materials, nanocomposites and renewable polymers.

1.5. Teaching Methodology

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

1.6. Evaluation

- written exams
- laboratory work

1.7. Bibliography

- An introduction to the mechanical properties of solid polymers / I.M. Ward and D.W. Hadley Chichester [etc.]. John Wiley & Sons, cop. 1993.

- Mechanical properties of polymers and composites / Lawrence E. Nielsen, Marcel Dekker, 1974

-Kompendium:

a) Mechanical Properties of Polymers: Viscoelastic properties

b) Mechanical Properties of Polymers: Yield &Fracture