

POLYMER TECHNOLOGY WITH CELLULOSE TECHNOLOGY

1.1. Identification

University:	Kungl Tekniska Högskolan (KTH), Stockholm, Sweden											
School:	School of Chemical, Science and Technology											
Course:	Polymer Technology with Cellulose Technology											
ECTS:	7.5											
Semester:	<i>Winter</i>					<i>Summer</i>				X		
Category	<i>Fundamental course</i>						<i>Specialisation course</i>					X
Module	<i>MFI</i>		<i>MFII</i>		<i>MFIII</i>		<i>MSI</i>		<i>MSII</i>	X	<i>MSIII</i>	
Teachers:	Ann-Christine Albertsson											
Language:	<i>English</i>		X	<i>Italian</i>		<i>Swedish</i>	X	<i>Spanish</i>				

1.2. Learning-outcomes

- Knowledge about the synthetic and natural polymers and their chemical, physical and mechanical properties.
- Knowledge about different crystalline and amorphous morphologies of polymers. The characteristic mechanical properties of polymers and how these are tested. The polymerisation process and the results achieved by different techniques
- Knowledge for the election of a suitable characterization method and describe how it works.
- Knowledge, from a required information choose a suitable characterization method and describe how it works.
- Knowledge, from a given simple application choose a suitable polymeric material with regard to function, formability and environmental interaction

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 Identify and describe the different building stones of a polymeric material, and explain in which different ways these can be joined.
- To describe the connections between chemical structure and material properties.

- To describe summarily the recycling processes for polymers

1.4. Contents

Introduction to polymer chemistry with definition of basic conceptions and history. The polymer structure and the relation structure-properties. Rheology and solubility. Molecular weight and molecular weight determination. Characterization of chemical, physical-chemical and mechanical properties of polymers. Natural polymers. Stepwise polymerization. Ion- and coordination polymerization. Radical polymerization. Copolymerization. Modification of polymers and additives and chemical reactions. Processing of polymer materials. Plastic waste handling. Environmental aspects on plastic waste.

Summary of production, properties and use of paper- and other cellulose based materials.

1.5. Teaching Methodology

- Lecture sessions
- Practical sessions: "cooperative work" for solving problems

1.6. Evaluation

- Written examination
- Study trip
- Project work

1.7. Bibliography

- Chemistry and technology of biodegradable polymers / edited by G.J.L. Griffin