TOMSK POLYTECHNIC UNIVERSITY ТОМСКИЙ ПОЛИТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ

Course Name *Chemistry and Properties of Polymer Materials*

Course Overview

Level of study	**Bachelor Degree**
Workload	**ECTS:** *3* **Total Hours: 32** **Contact Hours:** • **Lectures: 24** • **Labs: –** • **Seminars: 8**
Course Code	
Semester	***Winter***
Prerequisites	*Organic Chemistry* *Mathematics* *Introductory materials science and thermodynamics*
Course Objectives	This module is intended to integrate elements of polymer chemistry and physics with polymer processing and design. Also module examines the use of polymers and demonstrates how their properties are controlled by their molecular structure. You will learn how this structure determines which polymer to use for a particular product.
Learning Outcomes	Having successfully completed this module, you will be able to: – use basic terms from the field, assess basic physical-chemical structure of polymers and their thermal behavior; – identify the repeat units of particular polymers and specify the isomeric structures which can exist for those repeat units; – estimate the number- and weight-average molecular masses of polymer samples given the degree of polymerization and mass fraction of chains present; – calculate the molecular mass distribution for chain and step growth polymerizations from the concentrations of reactants and degree of conversion of monomer; – describe fundamental converting techniques of polymer materials, including technology and material limitations; – make a preliminary selection of an appropriate polymer for a particular product specification.
Syllabus	1. Classification and nomenclature of polymers 2. Chemical structure of the polymer molecule 3. Structure and properties of polymeric solids 4. Polymer processing 5. Reinforced plastics and polymer design
Labs	–

Projects	–
Assessment	*Credit Test (Pass/Fail)*
Resources	*IUPAC Gold Book http://iupac.org/polyedu/index.html* *Website of the Open University:* *http://www.open.edu/openlearn/science-maths-technology/science/chemistry/introduction-polymers/content-section-1.1* *Virtual Textbook of Organic Chemistry* *https://www2.chemistry.msu.edu/faculty/reusch/VirtTxtJml/intro1.htm#contnt*
Instructors	*Kukurina Olga Sergeevna, assoc. prof., Department of Technology of Organic Substances and Polymer Materials,* kukurina@tpu.ru http://portal.tpu.ru/SHARED/k/KUKURINA/English