Polymer Science (POLY)

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5098. Variable Topics in Polymer Science

Variable (1-3) credits.

5351. Polymer Physics

Three credits.

Modern concepts relating to glassy, rubbery and organized states of bulk polymers. Considers rubber elasticity, glass-to-rubber transitions, networks, elements of crystallization, blends and interfacial phenomena.

5352. Polymer Properties

(Also offered as CHEG 5352.) Three credits.

Interrelationships between solid state structure, dynamics, and mechanical properties of non-crystalline and semi-crystalline polymers. Considers polymer viscoelasticity, diffusion, failure mechanism, and elementary polymer rheology.

5367. Polymer Rheology

(Also offered as CHEG 5367.) Three credits.

Analysis of the deformation and flow of polymeric materials. Topics include non-Newtonian flow, viscoelastic behavior and melt fracture with application to polymer processing.

5380. Polymer Synthesis

(Also offered as CHEM 5380.) Three credits.

Chemistry of the formation of high polymers, including kinetics, mechanisms, and stereochemistry of step growth and addition polymerization. Recent advances in polymer synthesis.

5381. Polymer Physical Chemistry

(Also offered as CHEM 5381.) Three credits.

A molecular description of the fundamental physico-chemical aspects of polymer solutions and solids. Considers thermodynamics, chain statistics, dynamics, and structure of polymer molecules.

5382. Polymer Characterization I

(Also offered as CHEM 5382.) Three credits.

Experimental techniques for characterizing polymers on a molecular level, with emphasis on the provision of a working knowledge of instrumental analysis. Experiments include dilute solution viscosity, vapor pressure osmometry, gel permeation chromatography, chemical and spectroscopic analysis.

5384. Polymer Characterization II

(Also offered as CHEM 5384.) Three credits.

Experimental techniques for characterizing polymers on a macroscopic scale, with emphasis on provision of a working knowledge of instrumental analysis. Experiments include calorimetry, mechanical analysis, surface characterization, and structure determination.

5395. Biopolymers

Three credits.

Thermodynamics and kinetics of biopolymers (carbohydrates, proteins, DNA/RNA, lipids/biomembranes). Properties, applications, and connections to current research.

5396. Polymer Processing

Three credits.

Various polymer processing techniques: extrusion; injection molding; film and sheet processing; blow molding; thermoforming; fiber spinning; processing of thermosets and special polymers. Also offered as CHEG 5395 Special Topics

5397. Nanostructural Characterization

Three credits.

Various types of scattering techniques (diffraction, small angle scattering, reflectometry) to investigate global structure of polymeric or other soft materials ranging from Å to submicron using different probes (X-ray, neutron, light).

6001. Seminar in Polymer Science and Engineering

One credit. Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Presentations by invited guest speakers on topics of current interest in various areas of Polymer Science and Engineering.