POLYMER SCIENCE (PLYS)

PLYS 601 Polymer Chemistry (4 Units)
Prerequisite: CHEM 264 and CHEM 314 or equivalent course or permission of instructor. Introduction to fundamentals and practical aspects of (co)polymer synthesis and reactions of polymers; use of polymerization kinetics and thermodynamics to understand polymerization mechanisms; structure-reactivity relationships. (Formerly 9871:601)

PLYS 604 Special Projects in Polymer Science (1-3 Units)
Prerequisite: permission. Research projects of limited nature assigned to student entering polymer science program. Intended to familiarize student with typical problems and techniques in this field. (Formerly 9871:604)

PLYS 607 Seminar in Polymer Science I (1 Unit)
Prerequisite: limited to first-and second-year resident graduate students. Participants are to present a 25-minute lecture on some aspect of polymer science and to participate in discussions of lectures presented by other seminar participants. (Formerly 9871:607)

PLYS 608 Seminar in Polymer Science II (1 Unit)
Prerequisite: limited to first-and second-year resident graduate students. Participants are to present a 25-minute lecture on some aspect of polymer science and to participate in discussions of lectures presented by other seminar participants. (Formerly 9871:608)

PLYS 613 Polymer Science Laboratory (3 Units)
Pre/Corequisite: PLYS 601 or PLYS 631 or PLYS 674. Laboratory experiments focused on common techniques for polymer molecular characterization and characterization of polymer morphology, with a few polymer synthesis experiments. (Formerly 9871:613)

PLYS 615 Laboratory Computer Applications in Polymer Science (3 Units)
Prerequisites: Basic knowledge of computer programming and permission of instructor. Laboratory use of computers in polymer science research for data acquisition, data analysis, graphing, and preparation of reports and thesis. (Formerly 9871:615)

PLYS 631 Polymer Physics I (4 Units)
Prerequisites: 2 semester of undergraduate physics or permission of instructor. First half of an overview of polymer physics including the deal chain, chain in dilute solution, solution thermodynamics, polymer blends, and gels and networks. (Formerly 9871:631)

PLYS 632 Polymer Physics II (4 Units)
Prerequisite: PLYS 631 or permission of instructor. Phenomenological description of viscolasticity in polymers; molecular models for chain dynamics of solutions and melts; mechanical properties of polymers; polymer crystallization; electrical properties. (Formerly 9871:632)

PLYS 674 Polymer Characterization (2 Units)
Prerequisites: 2 semesters of undergraduate chemistry and 2 semesters of undergraduate physics and PLYS 631 or permission of instructor. Principles of operation, strategies for experimentation design and concepts of data interpretation for most important characterization techniques applied in polymer science and engineering. (Formerly 9871:674)

PLYS 685 Introduction to Biomacromolecules (2 Units)
Prerequisites: 2 semesters of undergraduate chemistry or permission of instructor. Develops understanding of biomacromolecular structure and function, hierarchical self-assembly, functions of biological materials (e.g. silk, collagen) and principles for bio-inspired materials design. (Formerly 9871:685)

PLYS 699 Master's Thesis (1-6 Units)
Prerequisite: permission. For properly qualified candidate for master's degree. Supervised original research in polymer science, under direction of faculty member, followed by submission of thesis. (Formerly 9871:699)

PLYS 701 Polymer Technology I (2 Units)
Principles of compounding and testing, processing principles and types of operation, design principles. (Formerly 9871:701)

PLYS 702 Polymer Technology II (2 Units)
Prerequisite: PLYS 701. Rubber industry, rubber compounding and processing, vulcanization methods, physical testing, plastics preparation and compounding, manufacturing processes. Lecture/laboratory. (Formerly 9871:702)

PLYS 703 Polymer Technology III (2 Units)
Prerequisite: PLYS 702. Flow properties, extrusion, calendaring and milling, molding, mixing, bond operations, engineering properties, rubber springs, viscoelastic analysis design consideration. Lecture/laboratory. (Formerly 9871:703)

PLYS 704 Condensation Polymerization (2 Units)
Prerequisite: CHEM 463. Survey of the theory and practice of condensation polymerization. Numerous commercial examples are presented with special emphasis being placed on the properties and applications of polymers prepared by this technique. Structure-property relationships are highlighted for each major polymer class. (Formerly 9871:704)

PLYS 705 Free Radical Reactions in Polymer Science (2 Units)
Prerequisite: CHEM 463. Covers the kinetics and mechanisms of free radical initiated reactions encountered in polymer science, including polymerization methods, detailed considerations of the initiation, propagation and termination steps in vinyl polymerizations and copolymerization, preparation of block and graft copolymers by free radical initiated reactions and the mechanisms of free radical induced polymer degradation reactions. (Formerly 9871:705)

PLYS 706 Ionic & Monomer Insertion Reactions (2 Units)
Prerequisite: CHEM 463 or permission of instructor. Covers the scope, kinetics and mechanisms of polymerizations initiation by anions, carbenium ions and onium ions as well as polymerizations induced by coordination catalysts. Living polymerizations, molecular weights, molecular weight distributions, stereo-chemistry, solvent effects, counter-ion effects, temperature effects, Ziegler-Natta catalysis, olefin metathesis, functionalization of polymers, graft and block copolymer synthesis. (Formerly 9871:706)

PLYS 711 Special Topics: Polymer Science (1-3 Units)
Prerequisite: permission. Topics of current interest in polymer science, encompassing chemistry, physics or technological aspects of macromolecular substances, including laboratory work where applicable. (Formerly 9871:711)

PLYS 712 Special Topics: Polymer Science (2 Units)
Prerequisite: permission. Topics of current interest in polymer science, encompassing chemistry, physics or engineering aspects of macromolecular science. (Formerly 9871:712)

PLYS 720 Elastomers (2 Units)
Pre/Corequisites: PLYS 601 and PLYS 631 or equivalent as determined by instructor. The course will provide a comprehensive coverage of the fundamental aspects of elastic soft materials, their chemical, physical and mechanical properties as related to their current technological applications. (Formerly 9871:720)

PLYS 899 Doctoral Dissertation (1-16 Units)
Open to properly qualified students accepted as candidates for Doctor of Philosophy in Polymer Science depending on the availability of staff and facilities. (Formerly 9871:899)