INTERDISCIPLINARY - POLYMER SCIENCE AND POLYMER ENGINEERING (9821)

9821:100 Introduction to Polymers (3 Credits)
Polymers are ubiquitous in modern society. They are in everything from everyday products (tires, paint, and milk jugs) to specialty items (bullet proof vests, lithium batteries, and graphite shaft golf clubs) to the human body (DNA and proteins). This undergraduate course introduces students to unique properties of polymers starting from their early history and discovery to modern day efforts in advanced materials, recycling and sustainability.

9821:201 Introduction to Polymer Science (3 Credits)
Prerequisites: 3150:151 and 3450:221. Introduction to the field of polymer science including molecular weight distributions, polymerization, chain statistics, polymer mixtures, rubber elasticity, polymer glasses, semi-crystalline polymers and viscoelasticity.

9821:202 Introduction to Polymer Engineering (3 Credits)
Prerequisites: 3450:222 and 3650:291. Introduction to the field of polymer engineering including classification of polymer materials, mechanical properties, fundamentals of polymer melt flow, polymer processing operations and compounding.

9821:281 Polymer Science for Engineers (2 Credits)
Prerequisites: 3150:151 and 3150:152. Chemical bonds and structure of organic molecules, polymer chain structure, amorphous and crystalline morphology and structural characterization, polymerization and copolymerization, experimental demonstrations, typical solid-state and flow properties.

9821:301 Polymer Materials Science and Engineering (3 Credits)
Corequisites: 3150:313 or 3650:340 or 4600:300 or permission. Materials science and engineering of polymers. Topics covered are the phase behavior and morphology of polymer solutions and blends, glassy polymers, polymer crystallization, materials characterization and multi-component polymer materials.

9821:310 Impacts of Polymers on Modern Life (3 Credits)
Prerequisite: High school chemistry of equivalent. Qualitative introduction to plastics and polymers, intended for non-science majors. Course explores the history and use of polymers in commercial products including food, cosmetics, and medicine. The course will also explore the socioeconomic trade-offs in the use of polymers, where quality of life, food safety, lifesaving technologies are weighed against environmental and health impacts.

Gen Ed: - Complex Issues Facing Society

9821:381 Polymer Morphology for Engineers (3 Credits)
Prerequisites: 9821:281, 3150:151, 3650:292. Fundamental understanding of solid structure, crystallography and morphology, processed polymers, co-polymers and their blends.

9821:411 Special Topics in Polymer Science and Polymer Engineering (3 Credits)
Prerequisite: Permission of instructor. Special topics in polymer science and polymer engineering is an elective course focused on advancing students’ knowledge in specialized topics in polymers.