



Course Syllabus

Department/Faculty School of Engineering
Graduate Program Materials Engineering and Nanotechnology
Degree <input checked="" type="checkbox"/> Academic Master's <input checked="" type="checkbox"/> Doctorate (PhD) <input type="checkbox"/> Professional Master's
Course Name Nanostructured Devices and Nanosensors
Professor(s)
Office hours 48
Course Overview <p>This discipline is intended to understand the concepts of the area of polymer materials applied to polymer blends and composites. Among other subjects, the theory, methods of characterization, processing and prediction of properties for both materials will be explored. This discipline has as main objective to provide the necessary information for the students to understand the physical and chemical phenomena that involve the synthesis, processing and characterization of polymer blends and composites.</p> <p>This course has two main focuses: one on chemical sensors and the other on photonic and optoelectronic devices. It, therefore, requires two lecturers with complementary expertise.</p>
Topics outline <p>Polymer Blends:</p> <ul style="list-style-type: none">• Properties determination, prediction and modification in conjugated materials and Polymer Blends, through different conditions and processing methods, developing a product with desirable characteristics;• Concepts applied to Polymer Blends;• Thermodynamic concepts applied to Polymer Blends;• Polymer Blends processing equipment;• Main characterization methods of Polymer Blends. <p>Polymer Composites:</p> <ul style="list-style-type: none">• Concept of Polymer Composites;• Additives;• Main fillers;• Fiber fillers reinforcements;• Mixing Rules;• Methods for obtaining Polymer Composites;• Polymer composite processing equipment;• Mechanical characterization of polymer composites.



Letter Grade Assignment

Grade A (Excellent) - Grade points between 9 and 10

Grade B (Good) - Grade points between 8 and 8.9

Grade C (Satisfactory) - Grade points between 7 and 7.9

Grade D (Unsatisfactory) - Grade points between 0 and 6.9

Texts, Materials, and supplies

DELHAES, P. *Fibers and composites*. London: CRC Press, 2003.

GERDEEN, J. C.; LORD, H. W.; RORRER, R. A. L. *Engineering design with polymers and composites*. London: CRC Press, 2005.

MILTON, G. W. *The theory of composites*. New York: Cambridge, 2002.

RUDD, C.D. *Composites for Automotive Applications*. *Rapra Review Reports*. v. 11, n.6, Report 126, 2001.

UTRACKI, L. A. *Polymer blends handbook*. Netherlands: Kluwer Academic, 2003.

UTRACKI, L.A. *Polymer Blends*. *Rapra Review Reports*. v. 11, n.3, Report 123, 2000.

VASILE, C. and KULSHRESHTHA, A.K. *Handbook of Polymer Blends and composites*. UK: Rapra Technology, 2003.

WESTON, N. E.; WALLENBERGER, F. T. *Natural fibers, plastic and composites*. Netherlands: Kluwer Academic, 2003.