ENGINEERING DESIGN OF PLASTIC PRODUCTS SPRING 2013

ME-678-102

Tuesday: 6:00 PM - 9:05 PM, MEC 219

INSTRUCTOR: Dr. K.A. Narh, 202 MEC
Phone: (973) 596-3353
Email: kwabena.a.narh@njit.edu

TEXTBOOK: Engineering Design with Polymers and Composites, James C. Gerdeen, Harold W. Lord and Ronald A.L. Rorrer (2006); ISBN: 0-8247-2379-1

REFERENCE BOOKS

1. Plastics Product Design and Process Engineering, Harold Belofsky, Hanser/Gardner, (1995)
2. Moldflow Design Guide by Jay Shoemaker (Ed.)
3. Plastics Part Design for Injection Molding by R.A. Malloy, Hanser/Gardner
4. Mechanical Properties of Polymer and Composites, L.E. Nielsen and R.F.Landel, Mercel Dekker, Inc.1994
5. Design and Manufacture of Plastic Parts, R.L.E. Brown, John Wiley & Sons, New York, 1980
6. Principles of Polymer Engineering, by N.C. McCrum, C.P. Buckley and C.B. Bucknall.

For some useful simulations on characteristics of Polymers, Check out the following Case Western Reserve University website: http://plc.cwru.edu/tutorial/enhanced/main.htm

HOMEWORK: About 6 in total. Homework assignments are usually due one week after being issued. Late homework will not be accepted except in the case of an excused absence. Solutions will be discussed in class. There will be an afternoon or evening review session scheduled (some time before each exam) in which the homework problems will be discussed.

FINAL GRADE: Course average is based on term paper, exams, homework and a design project Report.

Item	**Weight (%)**
Exam 1	20
Term Paper	20
Homework	10
Design Project	30
Final Examination	20

GRADING SCALE: The grading scale will be as follows: A (90-100); B^+ (85-89); B (80-84); C^+ (75-79); C (70-74); D (56-69) (not applicable for graduate course); F ($\leq$ 55)

CLASS RULES: Late Homework submissions NOT ALLOWED.
Sleeping in class unacceptable. TURN OFF ALL CELL PHONES

OFFICE HOURS: Monday 2 PM - 3:30 PM, Wednesday 2 PM - 3:30 PM or by appointment only. There will be no office hours a day either before any scheduled exam nor during the exam day

NJIT STUDENT HONOR CODE

THIS WILL BE STRICTLY ENFORCED. ANY VIOLATIONS WILL BE REPORTED TO THE DEAN OF STUDENTS.

NOTE: All the above items may be subject to change on the instructor's discretion.
(For example, the Grading Scale may be adjusted to reflect the class average.)

COURSE DESCRIPTION AND OBJECTIVES

This is a project-based graduate course which not only introduces the student to the unique properties of the various commercial thermosetting and thermoplastic resins but also the opportunity to design and analyze the manufacturability of plastic products using the available commercial computer software.

The Catalog description for this course has been thoroughly revised to take into account recent trends in plastics design. In particular, the course introduces the student to concurrent engineering practices used in designing and manufacturing injection molded plastic products. The use of a commercial computer aided design (CAD) and/or a computer aided engineering (CAE) software to perform design and process iterations on high speed computers, testing variations of part design, material selection, tool design and process parameters for injection molding, will be reviewed. It is anticipated that students who complete the course will understand and appreciate various processing techniques, and be able to exploit high performance computing tools for design and process optimization of injection molded products.

Pre-requisite

A background in plastic materials or plastics processing techniques is an advantage but not a pre-requisite for this course.

Students must be able to use Pro/Engineer (or IDEAS) for drawing CAD models.

All students will be first trained on the use of MOLDFLOW, a computer aided engineering (CAE) software for simulation of plastic product manufacturing by injection molding process.