

Department of Mechanical Engineering and Manufacturing

Course Outline

Fall 2007

MFGT 216- Introduction to Plastics– 3.0 Units

Prerequisite: Chemistry 28, MATH 5

Course Times:	Lecture	MW 500-550PM	LANG 104
	Section 1	M 600-850PM	LANG 118
	Section 2	W 600-850PM	LANG 118

Instructor: Daren Otten dmotten@csuchico.edu

Lab Assistant:

Office:	Location-	OCNL 427
	Hours	M,W 4-450 T 8-9 and by appointment
	Phone	873-1053 (DT Office) 898-4316 (CSU Office) 521-7418 (Mobile)

Course Objective: Provide students an overview of the plastics and composites industry by investigating materials, manufacturing, design, and business aspects.

Laboratory Objectives: Provide students an opportunity to gain practical experience on operating equipment for plastics manufacturing, material characterization, and secondary operations.

Textbook: Plastics- Materials and Processing, A.B. Strong, Prentice Hall, New Jersey, (2000)

Fee: \$10 fee paid by the 3rd week of the semester or the student will be dropped.

Safety: Safety glasses with side shields must be purchased by the student and worn at all times in the lab. Failure to do so will result in the student being removed from the lab and being dropped from the class. The student must read, understand

and follow all safety procedures at all times. If there are any questions about the process, operation, or safe handling of materials, the student must talk to the instructor.

Grading

1 Midterm exam	10%
1 Final exam	20%
Unannounced quizzes	10%
Homework	10%
Lab (notebook)	25%
3 Reports- paper of 3 to 4 typed pages *	20%
Attendance / Participation	<u>5%</u>
	100%

* 1 Report may be substituted with SPE Field Trip/Trip Report

Note: Quizzes and tests can have 1 page of notes. Make-up exams and quizzes are closed book and notes unless prior arrangements are made.

Note: All written assignments will be typed 12 font, New Roman Times, double spaced with 1" margins.

Note: Late assignments, will not be accepted. No make up work is permitted.

Exams will be given on scheduled dates in our regular lecture room. Make-up exams will only be given for documented emergencies.

Lab Work (Teams of 3-4 students)

Lab Notebook

- The lab notebook will be used to record material and manufacturing information during the lab experiments. The experiments will test the effects of additives and reinforcements on the physical and mechanical properties of the polymer systems as well as the effects on polymer processing. The information will include polymer material data, manufacturing methods, equipment, experimental methods, measurement techniques, experimental data, observations, and conclusions.
- Lab Notebooks will be collected and graded in your lab section according to the Schedule

Note: Each lab report must be signed by each lab member signifying that each member worked on the lab. Each Lab must also be signed by an instructor or TA at the end of each lab to checkout that you have cleaned up the work area. NO SIGNATURES = NO CREDIT

Reports:

1. Report Material – Due Date Sept 17, 2007

The report will explain a plastic material that will be given to you by the instructor. The report needs to be a minimum of 3 to 4 pages typed and double-spaced. It should include the following:

- Commercial name and Manufacturer or Supplier(Including contact names and phone numbers of resin suppliers)
- Chemical name
- Chemical structure of repeating unit
- Origin of polymer. What raw materials are used to make the polymer (Natural gas, petroleum, acidic acid, etc...)
- Different forms that you can order the plastic in (powder, pellets, film, etc...)
- Commercial applications
- Cost (\$/lb) and typical cycle time
- Physical properties- Density, paintability, flammability, etc...
- Mechanical properties in Tensile, Shear, Compression, Flexural, and sensitivities to moisture and chemicals
- Typical processing methods for Manufacturing
- Advantages and limitations of the material
- 2 minimum references on Journal articles that study the material, (e.g., SPE ANTEC, Plastics World, Plastics Technology, Modern Plastics)

2. Report Manufacturing– Due Date Oct 15, 2007

The report will explain a manufacturing process that will be given to you by the instructor. The report needs to be 3 to 4 pages typed and double-spaced. It should include the following:

- Commercial name and Manufacturer of equipment (Including contact names and phone numbers equipment suppliers)
- Drawing of each piece of the equipment with all of the parts labeled
- Materials that are manufactured with the process
- Typical cycle times
- Cost of the equipment
- Typical parts and industry using the equipment.
- Advantages and limitations of the manufacturing process.
- 2 minimum references on Journal articles that study the process, (e.g., SPE ANTEC, Plastics World, Plastics Technology, Modern Plastics)

3. Report Recycling– Due Date _____ Nov 26, 2007

The report will explain a recycling topic that will be given to you by the instructor. The report needs to be 3 to 4 pages typed and double spaced. It should include the following:

- History of the process
- Steps in the recycling process
- Feedstock and resultant recycled product
- Equipment used
- Plastics used with recycling process
- Cost of equipment
- Advantages and Disadvantages
- Companies and countries using the process
- Future uses and possibilities with recycling

Note: The paper on recycling can be replaced with membership in the student chapter of SPE and a trip report from a class trip to a local plastic manufacturing facility.

Homework

- Homework is due according to the Schedule and will not be accepted late.