

# **Syllabus for 635:252 Laboratory I – Spring 2010**

## **Materials Science and Engineering Department**

### **Course Instructor:**

Professor Jack Wenzel, Office: CCR 141

Phone: (732) 445-5092

E-mail: [wenzel@rci.rutgers.edu](mailto:wenzel@rci.rutgers.edu)

### **TAs:**

1. Ben Groth [bengroth@eden.rutgers.edu](mailto:bengroth@eden.rutgers.edu)

2. Josh Yearsley [jdyearsley@gmail.com](mailto:jdyearsley@gmail.com)

### **Office Hours:**

Professor Wenzel will be available prior to each laboratory recitation in his office. Appointments for other times can be made via e-mail.

### **Description:**

This laboratory course focuses on helping the student develop skills for the planning, execution, analysis and reporting of formal experimental results relating to the processing of materials. Various experiments expose students to processing topics such as characterization of polymers, powders, forming methods and characterization of components processed in different ways. Analysis of results will also expose students to basic statistics for experimental research.

### **Objective:**

To give the students a qualitative knowledge and hands-on experience in materials processing and train them for the planning, execution, analysis and reporting of experimental results. Students will also develop communication skills, both written and oral, and teamwork ability. In addition, this course serves as a precursor to advanced materials processing courses and advanced labs in the MSE curriculum.

### **Prerequisites:**

There are no prerequisites for this class.

### **Attendance:**

Attendance is required.

### **Projects:**

All experiments in this lab course are team projects. Three or four students form a team to perform the experiments. A group presentation will be required at the end of the semester.

**Texts:**

1. J. Reed, **Principles of Ceramic Processing**, 2<sup>nd</sup> Edition, John Wiley and Sons, 1995 (Recommended).

**Communication:**

It is the student's responsibility to make sure the Professor and TAs have their current email accounts. All communications will be made via email. Handouts and course correspondence will be emailed to students. Students are required to read emails sent up to 24 hrs. prior to class.

**Topics Covered:****Experiment Number Subject**

- 1 Cross-link density in polymers
- 2 Cross-link density and the glass transition temperature in polymers
- 3 Extrusion of Mixed Plastics
- 4 Stokes Law and Sedimentation
- 5 Particle packing
- 6 Compaction and Dry pressing.
- 7 Slip Casting
- 8 Firing shrinkage, unfired modulus of rupture.
- 9 Bulk density, apparent porosity and water absorption
- 10 Evaporation of Thin Films

*Note:*

*The topics outlined above are subject to change during the semester. Students will be advised of these changes in a timely manner.*

**Grade:**

The final grade for the course will be compiled as follows:

Attendance/attitude/performance during lab 20%

Lab reports/revised lab reports 60%

Presentation 20%

NOTE –

1. All Laboratory Reports will be required to be handed in the following class after the experiments were performed. No Reports will be accepted LATE!!
2. Students are advised that improper referencing of work will be considered plagiarism.
3. A single report will be submitted per group. As part of the cover page, each student must indicate which part of the report they were responsible for.