

## **MS&E 361 Materials Laboratory II Spring 2012**

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### **Resources:**

#### **1. Course Homepage**

eCow2: <https://ecow2.engr.wisc.edu/new/course/view.php?id=247> or  
<http://go.wisc.edu/1mw3m4>

#### **2. Library Reserves are at Wendt Library.**

### **Lab Safety**

Laboratory safety is extremely important. Actions that endanger you or others will not be tolerated. We will review safety issues as they come up – but please also be sure to bring any concerns to the instructors.

### **Goals, Assignments, and Grading**

There will be a series of weekly assignments, lab-book evaluations, and in-class activities. Together these will account for 80% of the grade. A laboratory report on the Pb-Bi system will account for the remaining 20% . There will be no exams.

Each student will complete five challenging laboratory exercises over the course of the semester. Evaluation of performance is based upon in-class participation, effort and success and on out-of-class assignments. Several of the laboratory activities will be conducted in groups.

Students should approach their work in this course with the following goals:

- Become acquainted with the lab equipment and experimental techniques
- Be able to keep clear and complete records of the experiments
- Become aware of the different ways to convey results and their interpretations

- Be able to work in a team with a common project and deadline
- Be able to relate experimental results with concepts/theory presented in lecture, as well as with concepts presented in other courses

### **Laboratory Notebooks**

We will require a laboratory notebook for many of the activities in this class. This notebook **must** have numbered, non-removable pages. Write in ink. Do not erase. Bring your lab notebook to class each week for Gareth to review during the lecture meeting.

This is the place where you will keep all of the observations and measurements you make in the lab and during in-class data analysis activities.

We'll give some further guidelines in a lecture in the third or fourth week.

## MS&E 361 Class Schedule

January 23, 2012

| <b>Meeting Number</b> | <b>Date</b> | <b>Topic</b>                   | <b>Lab Activity</b>                                                 |
|-----------------------|-------------|--------------------------------|---------------------------------------------------------------------|
| 1                     | 1/24        | Introduction and Lab 1 Sess. 1 | Powder x-ray diffraction - single phase identification              |
| 2                     | 1/31        | Lab 1 Session 2                | Powder x-ray diffraction - multiple phase identification            |
| 3                     | 2/7         | Lab 1 Session 3                | Powder x-ray diffraction - precise lattice constant measurements    |
| 4                     | 2/14        | Lab 2 Session 1                | Carburization - Sample preparation and heat treatment               |
| 5                     | 2/21        | Lab 2 Session 2                | Carburization - Mechanical and optical characterization             |
| 6                     | 2/28        | Lab 3 Session 1                | Shape memory alloys - Sample preparation, identify phase trans.     |
| 7                     | 3/6         | Lab 3 Session 2                | Shape memory alloys - Phase transition dynamics and cycling fatigue |
| 8                     | 3/13        | Lab 4 Session 1                | ZnO quantum dot synthesis - Chemical synthesis procedures           |
| 9                     | 3/20        | Lab 4 Session 2                | ZnO quantum dot synthesis - Optical characterization                |
| 10                    | 3/27        | Lab 4 Session 3                | ZnO quantum dot synthesis - X-ray characterization                  |
|                       | 4/3         | Spring Recess: No Meeting      |                                                                     |
| 11                    | 4/10        | Lab 5 Session 1                | Pb-Bi phase diagram I                                               |
| 12                    | 4/17        | Lab 5 Session 2                | Pb-Bi phase diagram II                                              |
| 13                    | 4/24        | Lab 5 Session 3                | Pb-Bi phase diagram III                                             |
| 14                    | 5/1         | Lab 5 Session 4                | Pb-Bi phase diagram IV                                              |
| 15                    | 5/8         | Demo/Field Trip                |                                                                     |