EMA 3012C Experimental Techniques in Mechanics and Materials (Laboratory)
Spring 2004

Laboratory:	Monday	1:30 PM – 3:30 PM	Sec # 1	ENGR 157
	Tuesday	1:30 PM – 3:30 PM	Sec # 2	ENGR 157
	Wednesday	1:30 PM – 3:30 PM	Sec # 3	ENGR 157
	Thursday	1:30 PM – 3:30 PM	Sec # 4	ENGR 157

Instructor: Dr. Samar Jyoti Kalita, ENGR 245, Tel: (407) 823-3159,
E-mail: samar@mail.ucf.edu

Contact Person: Mr. Pushkar Katiyar, ENGR 222, Tel: (407) 823-4987

List of Experiments:

	Week of Jan 05	Introduction to EMA3012C and Temperature Measurement
1.	Week of Jan 12	Metallurgical Sample Preparation
2.	Week of Jan 20	Optical Metallography and Specimen Mounting
3.	Week of Jan 26	Hardness Measurement
4.	Week of Feb 02	Effect of Heat Treatment on Microstructure and Hardness
	Week of Feb 09	Effect of Heat Treatment on Microstructure and Hardness
5.	Week of Feb 16	Estimation of Hardenability by Jominy End Quench Test
	Week of Feb 23	Estimation of Hardenability by Jominy End Quench Test

Week of Mar 01 Mid-Term Examination

	Week of Mar 08	SPRING BREAK
6.	Week of Mar 15	Tensile Testing
7,8.	Week of Mar 22	Shear Testing and Impact Testing
9.	Week of Mar 29	Structure Determination by X-ray Powder Diffraction Method
10.	Week of Apr 05	Scanning Electron Microscopy/ Chemical Analyses
11.	Week of Apr 12	Tour of Materials Characterization Facility (MCF) at UCF

Week of April 19 Final Examination

Laboratory Reports: A report will be due one week after the particular laboratory experiment is completed. The Report should be subdivided into Sections such as Objective of the Experiment, Materials Used, Experimental Procedure, Results and Conclusions/ Comments. No late submission will be accepted. Don't forget to write your name and UCF ID on the Report!

p.s. Attn: Sec#1 students, Jan 19 is a holiday, please select another day (Tu/ W/ Th) for the week of Jan 20

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Spring 2004

Prerequisites: ENG 3365 (Structure and Properties of Materials)
EML 3601 (Solid Mechanics)

Credit Hours: 3

Lectures: Tuesday and Thursday 12:00 – 12:50 PM ENGR 224

Instructor: Dr. Samar Jyoti Kalita, ENGR 245, Tel: (407) 823-3159,
E-mail: samar@mail.ucf.edu

Office Hours: Monday and Wednesday 11:00AM – 12:00PM

Contact Person (for laboratory):

COURSE OUTLINE:

The course will provide hands-on experience with various experimental techniques that are used in characterizing materials, which include crystal structures, microstructures and mechanical properties such as hardness, strength ad toughness. The course will consists of two hours of lecture and two hours of laboratory every week. The lectures will cover topics such as metallography (optical and scanning electron microscopy), X-ray diffraction, heat treatment and its influence on microstructure and hardness, mechanical testing)hardness, tensile, compression, impact, fatigue) and corrosion behavior. Emphasis in the laboratory will be on hands-on experience.

At the completion of the course, the students are expected to be fully familiar with broad spectrum of techniques available for materials characterization. The students are also expected to be able to decide on the best technique(s) to characterize the given material for a specific application.

TEXTBOOK:

No specific textbook available. The students are expected to depend on class notes, handouts, and materials that may be on reserve in the Library.

GRADING:

Two class examinations based on theory (20% each)	40%
Two laboratory examinations (10% each)	20%
Laboratory reports	40%

University of Central Florida
Department of Mechanical, Materials and Aerospace Engineering

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Class Schedule:

January	06 (Tuesday)	Overview of the course
	08 (Thursday)	Metallurgical Specimen Preparation
	13 (Tuesday)	Metallography
	15 (Thursday)	Optical Microscopy
	20 (Tuesday)	Optical vs Electron Microscopy
	22 (Thursday)	Information derivable from Microstructure
	27 (Tuesday)	Basics of Crystallography
	29 (Thursday)	X-Ray Diffraction
February	03 (Tuesday)	Structure Determination
	05 (Thursday)	Fe-C Phase Diagram
	10 (Tuesday)	Heat Treatment of Steel
	12 (Thursday)	Heat Treatment of Steel
	17 (Tuesday)	Hardenability
	19 (Thursday)	Hardenability
	24 (Tuesday)	Hardness Measurement
	26 (Thursday)	Hardness Measurement
March	02 (Tuesday)	**Review**
	04 (Thursday)	**Class Examination I**
	09 (Tuesday)	SPRING BREAK
	11 (Thursday)	SPRING BREAK
	16 (Tuesday)	Tensile Testing
	18 (Thursday)	Tensile Testing
	23 (Tuesday)	Impact Testing
	25 (Thursday)	Fatigue Testing
	30 (Tuesday)	Fatigue Testing
April	01 (Thursday)	Creep Testing
	06 (Tuesday)	Corrosion
	08 (Thursday)	Corrosion
	13 (Tuesday)	Scanning Electron Microscopy
	15 (Thursday)	Failure Analyses
	20 (Tuesday)	**Review**
	22 (Thursday)	**Class Examination II**