Department : Undergraduate Engineering Programs

Course number : MMAT 236W

Course title: Materials Characterization

Credits : 3

Contact Person : Marty Wood

WQ: W

Catalog Copy :

MMAT 236W. Materials Characterization

Semester by arrangement. Three credits. Two class periods and, every other week, a 3-hour laboratory period. Laboratory sections in addition to those initially listed will be arranged. Prerequisite MMAT 201 or 243.

Principles and experimental methods of optical, electron, and x-ray examination of engineering materials. Emphasis on use of x-ray analysis, with introduction to electron microscopy, Auger spectroscopy, scanning electron microscopy, and microanalysis.

W Criteria:

1. The seven laboratory experiments demonstrate principles covered in the lectures and reading assignments. Although students conduct the lab experiments in small groups, each student is required to submit an individual lab report consisting of five typed finished pages totaling at least 4000 words in length. Each lab report is worth 7% of the overall grade for a total of 50% of the final course grade. Failure to complete the written portion of the course satisfactorily will result in failure of the course.

Students must integrate previously learned theory, knowledge of equipment operations and data acquisition and analytical and writing skills to produce a well-organized, concise, precise and comprehensive report. The laboratories are:

1. Micro-structural Examination with the Scanning Electron Microscope.

2. Micro-structural Investigation with the Transmission Electron Microscope.

3. X-ray Emission and Absorption Spectra.

4. Measurement and Calculation of X-ray Peak Intensities.

5. Precise Lattice Parameter Determination and Identification of Unknown Metal.

6. Order - Disorder Reactions in Ni 3 A1.

7. Identification of Unknown Compounds and Residues.

2. The primary modes of written instruction to students are:

– Formal classroom instruction supplemented by a handout prescribing a format or an example.

– Written commentary from the teacher of record or faculty project advisor

– Individual/group conferences

– Oral presentation instruction is by example

3. The reports will be graded based on both technical content and the quality of writing and returned to the student before or during the subsequent laboratory period. So that feedback on the previous report can be reviewed and incorporated into the next laboratory report.

Role of Grad Students : The TA's, usually two per section, are responsible for attending and grading pre-lab oral conferences with students and for overseeing laboratory safety and equipment operation during all experiments. They do not grade the written reports. Faculty instructors supervise them.

Supplementary Information :