**Course number and name: MTSE 3100: Materials Science and Engineering Lab II**

**Credits and contact hours:** 1 Credit. Walk in or by appointment

**Instructor’s or course coordinator’s name**: Dr. **Zhenhai Xia**

**Text book, title, author, and year**

Reporting Results – A Practical Guide for Engineers and Scientists, by David C. Van Aken and William F. Hosford

1. *Other supplemental materials*

The instructor will provide the laboratory manual and references.

**Specific Course Information**

1. *Brief description of the content of the course (catalog description)*

Polymer and processing, computational materials, nanocomposite materials, glasses.

1. *Prerequisites or co-requisites*

MTSE 3090

1. *Indicate whether a required, elective, or selected elective course in the program*

Required

**Specific goals for the course**

1. *Specific outcomes of instruction*

|  |
| --- |
|  |
| **Specific Course Learning Outcome** |
| 1. Understand how heat treatments and cold working affect the microstructure of a structural alloy. (metals lab) |
| 2. Conduct property testing and optical/SEM characterization. (metals lab) |
| 3. Understand how ceramic powders can be processed into bulk specimens. (ceramics lab) |
| 4. Determine how sintering affects microstructure and properties. (ceramics lab) |
| 5. Use a 4-point probe and UV-VIS spectrophotometer to measure electrical sheet resistance/resistivity and optical transmittance of different electronic and optoelectronic materials, respectively. (electronic and optical materials lab) |
| 6. Determine the thermal properties of a polymer, metallic alloy and ceramic. (electronic and optical materials lab) |

1. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes that are addressed by the course.*

This course addresses ABET Student Outcomes 4,5,6 and 7

**Brief list of topics to be covered**

|  |  |
| --- | --- |
| **Date** | **Lab session** |
| **Lab Week 1** | **General introduction and overview, Lab safety** |
| **Lab Week 2-4** | **Polymers** |
| **Lab Week 5-7** | **Computational** |
| **Lab Week 8-10** | **Ceramic processing** |
| **Lab Week 11-13** | **Composite Materials** |