**Course number and name: MTSE 3090 - Materials Science and Engineering Laboratory I**

**Credits and contact hours:** 1 Credit. Tuesday (10:30-11:30am). Other times available on request via e-mail.

**Instructor’s or course coordinator’s name**: Dr. Mohamed El Bouanani

**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)*

Laboratory designed to introduce students to some of the most common materials testing and characterization methods. Topics will include optical metallography, tensile testing, hardness testing, impact testing, heat treating, melting and casting.

1. *Prerequisites or co-requisites*

MTSE 3000, 3001

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

Required

**Specific goals for the course**

1. *Specific outcomes of instruction*

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| **Specific Course Learning Outcome** |
| 1. Students will learn how to conduct module-specific processing or computational techniques *(e.g., heat-treatments, sintering, thin films growth, finite element analysis)* |
| 1. Students will learn how to characterize materials using the different techniques specific to each of the modules *(e.g., optical microscopy, SEM, EDS, X-Ray Diffraction, Raman Spectroscopy, 4 points probe, finite element analysis)* |
| 1. Students will collect, analyze, and interpret data in teams and will share data with other teams assigned to other roles within each lab module. |
| 1. Students will learn materials structure-property relationships for each module |
| 1. Students will analyze and interpret data related to each of the modules and present the data in the form of original laboratory reports conforming to research and academic standards |
| 1. Students will learn to relate concepts learned in the lab modules involving modern engineering tools to solve practical engineering problems |

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 5,6 and 7

**Brief list of topics to be covered**

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| **Date** | **Lab session** |
| **Lab Week 1** | **General introduction and overview, Lab safety** |
| **Lab Week 2-6** | **Metals** |
| **Lab Week 7-10** | **Ceramics** |
| **Lab Week 11-14** | **Electronic materials** |