

### Title: 5A. Nanomaterials and Manufacturing

**Goal:** Provide an overview of a number of the manufacturing processes employed in building products that incorporate nanomaterials

**Module Objectives:** Create an understanding of manufacturing nanomaterials and of applying both these materials and naturally occurring nanomaterials in manufacturing.

#### Prerequisite by Topic:

- Introduction to Nanomaterials
- Basic Chemistry

**Required Text:** None

**Reading:** Write-up of this module

**References:** [Refs. 14-17, 21-24]

#### Student Learning Outcomes:

- Understand the concept of manufacturing nanomaterials
- Demonstrate understanding of actions required to ensure safe handling of nanomaterials
- Be able to respond properly in the event of a manufacturing issue
- Ensure that proper controls and record keeping is understood

**Topics Covered:** (Green highlighted topics are priority#1, Yellow highlighted are if time permits)

- **Lecture I:**
  - Manufacturing Nanomaterials for Industrial Applications
  - Control, Storage, and Recording
  - Naturally Occurring Nanomaterials
  - (Nano)Materials Safety Data Sheets
  - Med-Bio Nanomaterials Manufacturing
  - Environmental
- **Lecture II:**
  - Equipment Calibration
  - Metrology
  - Record Keeping
    - Medical Baseline & History
    - Training Records
    - Equipment Records
  - Safety Requirements
  - Emergency Procedures

**Relationship to ABET Program Outcomes**

[Note: Please, refer ABET program outcomes list (a) through (l) in attached standard template.]

- (a) An ability to design and conduct experiments, as well as to analyze and interpret data
- (e) An ability to identify, formulate, and solve engineering problems
- (f) An understanding of professional and ethical responsibility
- (h) The broad education necessary to understand the impact of engineering solutions in a global societal context
- (j) A knowledge of contemporary issues.