



**Miami University**

**Department of Mechanical and Manufacturing  
Engineering**



## **Pursue Advanced Technical Training Through Hands-on Workshops**

The Department of Mechanical and Manufacturing Engineering (MME) is offering hands-on engineering workshops for students and industry professionals at any stage in their career. These workshops have no prerequisite course requirement and are held at the state-of-the-art engineering laboratories on Miami's Oxford campus.

### **Winter 2022 Workshops**

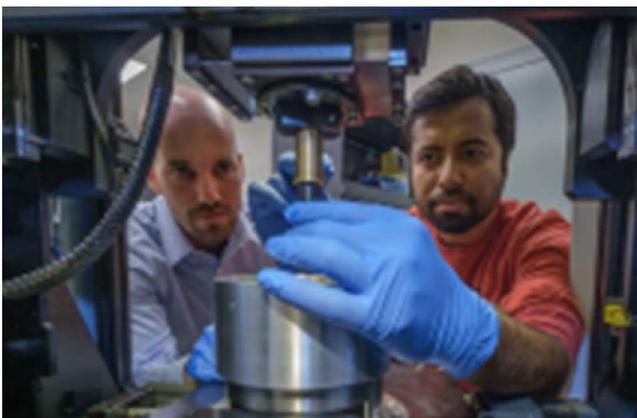
- [Sample Preparation and Mechanical Testing Workshop \(Jan 03-07\)](#)
- [Workshop on Additive Manufacturing Processes and Techniques \(Jan 10-14\)](#)
- [Workshop on Manufacturing Processes: From Material Selection to Part Fabrication \(Jan 17-21\)](#)

### **Workshop Team:**

Miami faculty and staff with comprehensive experience in industrial consulting and specialized workforce training will lead the workshops. The hands-on nature of workshops will be highly suitable for technical, design, purchasing, and quality control personnel.

### **What will you learn:**

- Attain new skill sets to stay ahead of the rapid pace of technological evolution through specialized training in manufacturing and materials
- Learn how current and new manufacturing processes, such as additive and materials evaluation techniques, can be applied to improve operational efficiency and product development cycles
- Have access to cutting edge facilities and extensive faculty knowledge that is highly applicable to industrial operations and technology adoption



# Sample Preparation and Mechanical Testing Workshop

Approximately 20 hours of instruction

Ensuring the quality of components built using traditional or new manufacturing methods requires an evaluation of the components and/or the manufacturing processes. This is especially true in additive manufacturing, where several build parameters must be specified which can significantly affect the performance of the printed part. This workshop is designed to provide training on test selection, sample preparation, machine selection and programming, and data analysis to evaluate materials and build processes.

## Why is it important:

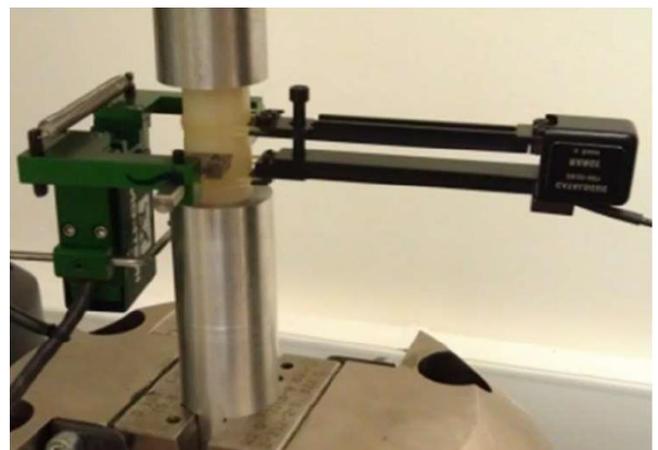
- New manufacturing techniques such as fused deposition modeling and selective laser melting/sintering/lithography to create parts with mechanical and surface properties quite distinct from cast and forged parts.
- Understanding the origin of defects, directionality, and inherent variability in properties is critical for producing reliable parts and process optimization.

## Topics covered:

Developing test protocols, creating samples, machine configuration and data collection

## Participants will gain skills and the ability to:

- Select and/or prepare metallic and non-metallic samples to produce reliable and repeatable data.
- Compute test parameters, configure machines for testing, and perform tests for mechanical property determination.
- Generate and analyze test data in conformance with professional testing codes.



# Workshop on Additive Manufacturing Processes and Techniques

Approximately 25 hours of instruction

This workshop will introduce the main technologies available for additive manufacturing. The focus will be on evaluating process capabilities, resulting component/material properties, and process limitations. The workshop is intended to enable the attendee to make informed decisions about the value added by such technologies to existing, more traditional operations.

## Why is it important:

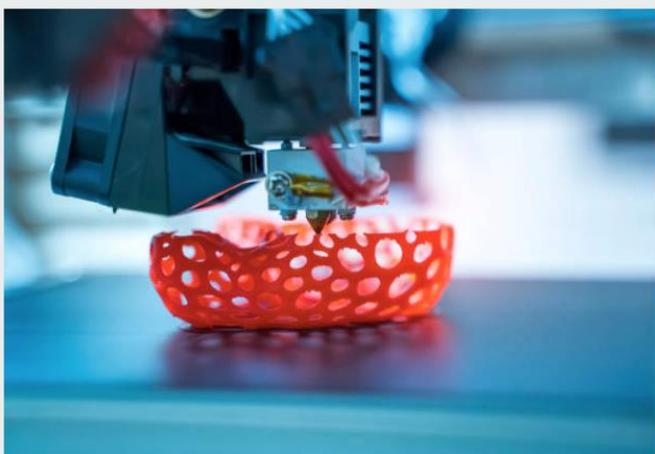
- A hands-on workshop designed to provide experience in additive manufacturing, focusing on setup, operation, post-printing operations, and property evaluation. The lab will use modern equipment and discuss steps to improve feature/part quality. Post-processing techniques will also be covered.
- The benefits of additive manufacturing can include new part features, the creation of custom parts, and reduced development time through faster prototyping.

## Topics covered:

- Introduction to the capabilities of additive manufacturing processes
- Component design – from CAD design to a physical part which is evaluated for quality and continuous improvement
- Process optimization and the basis for selecting the most suitable process

## Participants will gain skills and the ability to:

- Recognize the importance and applications of additive manufacturing
- Create polymeric and metallic parts with specific constraints.
- Devise and perform post process and/or cleaning steps.
- Use additive manufacturing processes to create specialized components.



# Workshop on Manufacturing Processes: From Material Selection to Part Fabrication

Approximately 25 hours of instruction

Knowledge of manufacturing operations can inform decision making at the product design stage and help guide the process development phase of a new product. This workshop is structured to introduce participants to common manufacturing process, help recognize process capabilities and sources of defects in myriad applications.

## Why is it important:

- Efficiencies and unique capabilities in manufacturing can provide a competitive advantage in cost, lead time, and quality. Optimal control of manufacturing processes can reduce manufacturing related defects and extend equipment service life.
- Manufacturing operations can change material properties, sometimes in ways that are beneficial, while at other times leading to defects and susceptibility to corrosion. Metals and polymeric materials will be discussed with particular emphasis on process and material property interaction.

## Topics covered:

This short course will adopt a hands-on approach to demonstrate how manufacturing parameters affect part quality (dimensional and positional tolerances, surface finish etc). The program will also cover a broad range of manufacturing operations such as machining, water jet cutting, etc and the attributes of manual and CNC control.

## Participants will gain skills and ability to:

- Select materials, tooling, fixturing, and process parameters on common industrial machines.
- Prepare, read and implement engineering part and assembly drawings.
- Prepare and/or evaluate process plans.

## For more information about these workshops, please contact:

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