

# MANUFACTURING ENGINEERING (MFG)

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**MFG 3723 Manufacturing Processes 3 s.h.**

Introduction to properties and uses of engineering materials. Introduction to mechanical testing methods, metrology, tolerances, testing and inspection; semi-finished product manufacturing; macro-processing (forming, casting, powder metallurgy, metal working, composite fabrication); joining; nontraditional manufacturing processes; and surface processing.

**Prereq.:** MATH 1572 and MECH 2606.

**MFG 3723L Manufacturing Processes Laboratory 1 s.h.**

Laboratory to accompany MFG 3723. Lab provides hands-on experience with basic manufacturing processes including: casting, forming, machining, welding, and injection molding. or concurrent MFG 3723.

**Prereq.:** Prereq.

**MFG 3771 Additive and Digital Manufacturing 3 s.h.**

Introduction to the principles and practices of digital manufacturing with emphasis on additive manufacturing processes. Historical and modern perspectives on geometric representation and file formats. Toolpath generation. Capabilities, limitations, and design criteria for additive manufacturing processes. Digital representation of part geometries. Pre-processing, post-processing, and inspection of additively manufactured parts. Contemporary issues of data management for digital manufacturing.

**Prereq.:** MFG 3723.

**MFG 4821 Manufacturing Capstone 3 s.h.**

The application of manufacturing engineering techniques to real-world, open-ended questions. Problems will include elements of process and component analysis and design and will incorporate manufacturability, performance, and cost criteria. Design exercises will include data gathering, simulation, prototyping, and design verification. Students will be required to submit a final written report and accompanying technical documentation, including drawings.

**Prereq.:** Prereq. or Coreq.: MFG 4823 and MFG 4861 and junior standing or special approval.

**MFG 4823 Manufacturing Processes 2 3 s.h.**

Broad discussion of manufacturing processes and underlying phenomena with analytical methods. Builds upon foundational understanding of processes established in MFG 3723 and focuses on the development of appropriate mathematical models to predict process parameters and effects on produced geometries and material properties.

**Prereq.:** ISEN 3723 and must be taken concurrently with MFG 4823/L.

**MFG 4823L Manufacturing Processes 2 Laboratory 1 s.h.**

Laboratory to accompany Manufacturing Processes II. Experimental validation of manufacturing process analyses. Experimental design methods. Data collection, process automation, monitoring and control. 1 s.h.

**Prereq.:** Must be taken concurrently with MFG 4823.

**MFG 4861 Design for Manufacturability 3 s.h.**

Introduction to the concepts of "Design for X" with particular emphasis on Design for Manufacturability and Assembly (DFMA). Implications of emerging additive manufacturing processes and associated Design for Additive Manufacturing (DFAM) principles will be discussed.

**Prereq.:** MFG 3723.

**MFG 4871 Stress Plasticity and Deformation with FEA for Manufacturing 3 s.h.**

Investigation of the deformation characteristics of various manufacturing materials with emphasis on the plastic regime. Temperature and strain rate effects will be discussed. Applicability to the analysis of manufacturing deformation processes will be emphasized.

**Prereq.:** ISEN 3723.