

# GLOBAL MANUFACTURING SYSTEMS ENGINEERING TECHNOLOGY

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## Courses

### **MFG 108L. Manufacturing Processes Laboratory. 1 Hour**

Application of metal-cutting theory using single- and multiple-point cutting tools, basic metal removal process of toolroom and production machines. Experience on conventional milling machines, shapers, lathes, surface grinders, and drill presses. Three hours of laboratory a week.

### **MFG 204. Materials & Processes. 3 Hours**

Chemical and physical properties of metals, ceramics, and polymers; casting processes; powdered metallurgy; metal forming; plastics processes. Oral and written presentation of a team case study. Prerequisites: CHM 123. Corequisites: MFG 204L.

### **MFG 204L. Materials & Processes Laboratory. 1 Hour**

Testing of materials for tensile strength, impact and hardness properties, cooling curves and equilibrium diagram development, heat treating and hardenability curve determination, cold forming, plastics materials processing, micro polishing and metallography; visits to local industries. Three hours of laboratory a week. Corequisite(s): MFG 204.

### **MFG 206L. Dimensional Metrology Laboratory. 1 Hour**

Theory and practice of precision measurement including the surface plate, angle and sine plates; surface texture and roundness; optical microscope and profile projector; mechanical and electronic gages; co-ordinate measuring machine; length standards and height gages; fixed and functional gages; sources of measurement error. GD&T measurement principles will be covered. Three hours of laboratory a week. Prerequisites: MCT 110L.

### **MFG 208L. Geometric Dimensioning & Tolerancing Laboratory. 1 Hour**

Study of the use of ANSI Y14.5M-1994, the engineering standard for geometric dimensioning and tolerancing. Includes the proper use of GD&T symbols, reading and interpretation of engineering drawings, techniques for determining part adherence to design requirements and workmanship standards. Prerequisite(s): MCT 110L.

### **MFG 240. Manufacturing & Product Design. 3 Hours**

Manufacturing planning; process planning; advanced cutting tools; workholders; power presses-blanking, forming, draw dies, fine blanking; group technology, gage, jig, and fixture design. Prerequisite(s): MCT 110L; MFG 108L, MFG 204.

### **MFG 400. Selected Manufacturing Topics. 1-4 Hours**

Investigation and discussion of current topics in manufacturing engineering technology. May be taken more than once. Prerequisite(s): Permission of department chairperson.

### **MFG 424. Robotics & Computer Numerical Control. 3 Hours**

Programming of CNC turning and machining centers and industrial robots; application of CAM software to design and edit CNC and robot programs, edit programs, and display tool and motion paths. Parametric part programming concepts to produce complex surfaces. Programming of robotic devices. Prerequisite(s): (MCT 110L or MEE104L) or (SET153L or MEE114L).

### **MFG 427. Computer Integrated Manufacturing & Global Manufacturing. 3 Hours**

Computer Integrated Manufacturing (CIM) systems and interrelationships. Industry 4.0 principles will be covered. Also covered are global manufacturing issues and specific country concerns. Prerequisites: MFG 204; SET 153L.

### **MFG 431. Controls for Industrial Automation. 3 Hours**

Topics include: fundamentals of digital logic, pneumatic power, electromechanical sensors and actuators, pneumatic and electrical control circuit analysis and design, industry safety and design standards, concepts of mechatronics, programmable logic controllers, and networking communications. Prerequisites: (ECT 110 or MEE 205), (SET 153L or MEE 114L).

### **MFG 432. Plastics, Composites & Nano Materials & Processes. 3 Hours**

Introduction to the more common plastics, composites, and nano engineering materials and their properties. Study of processes including extrusion, injection molding, blow molding, compression and transfer molding, and forming. Topics on part and tooling design. Prerequisite(s): CHM 123; MFG 204.

### **MFG 434. Robotics & Computer Numerical Control. 3 Hours**

Programming of CNC turning and machining centers and industrial robots; application of CAM software to design and edit CNC and robot programs, edit programs, and display tool and motion paths. Parametric part programming concepts to produce complex surfaces. Programming of robotic devices. Prerequisites: MCT 110L; MFG 108L; SET153L.

### **MFG 435. Advanced Numerical Control. 3 Hours**

Instruction in the programming of complex, multi-axis CNC machines. Extended parametric programming. Programming language techniques. Prerequisite(s): MFG 434.

### **MFG 438. Sustainable Manufacturing & Product Design. 3 Hours**

Design for the environment, sustainable manufacturing processes and business practices to support these topics are developed. Prerequisite(s): MFG 108L, MFG 204.

### **MFG 490. Senior Project. 3 Hours**

Advanced study and research of the product realization process focusing on conceptual design, embodiment design, final design, and prototyping or other design verification. Students work on externally sponsored engineering projects in multidisciplinary teams that perform engineering analysis that includes safety, ergonomics, environmental, cost and sociological impact of their designs. Prerequisites: CMM 100; IET 316, IET 323; MFG 240, MFG 431.

### **MFG 493. Honors Thesis. 3 Hours**

Selection, design, investigation, and completion of an independent, original research study resulting in a document prepared for submission as a potential publication and a completed undergraduate thesis. Restricted to students in University Honors Program.

### **MFG 494. Honors Thesis. 3 Hours**

Selection, design, investigation, and completion of an independent, original research study resulting in a document prepared for submission as a potential publication and a completed undergraduate thesis. Restricted to students in University Honors Program. Prerequisite(s): MFG 493.