ME 311: Manufacturing Processes Laboratory

**Course description:**
Manufacturing processes laboratory in machining, welding, forming; manufacturing project.

**Number of credits:**
1 (0-3). This course is required.

**Course Coordinator:**
K. Hutchinson

**Prerequisites by course:**
ME 310 or concurrent enrollment; certified major in Mechanical Engineering

**Prerequisites by topic:**
1. Stress-strain relationships
2. Time-temperature transformation characteristics of metals
3. Material hardness definitions and scales (i.e., Rockwell, Brinell)

**Postrequisites:**
ME 474, ME 475

**Textbooks/other required materials:**
None.

**Course objectives:**
To provide the student with personal, hands-on experience in the operation of standard machine tools, fundamentals of CNC operations including basic programming, introduction to CAM programming, testing procedures for material properties important in manufacturing, introduction to industrial robotics.

**Topics covered:**
1. Conventional machine tool operation.
2. CNC machine tool operation.
3. CAM programming.
5. Precision measurement/Metrology.
6. Operational introduction to industrial robotics.
7. Geometric dimensioning and tolerancing (GD&T) and ASME Y14.5 standard.

**Expected learning outcomes:**
1. Complete the fabrication four lab assignments—Conventional & CNC
2. Know how to operate an engine lathe, milling machine, and drill press
3. Understand basic operation of a vertical machining center, CNC lathes
4. Know how to utilize precision measurement devices – micrometer, digital calipers, basics of GD&T
5. Understand the relationship between heat treatment process and material properties

**Class schedule:**
None.

**Laboratory schedule:**
One 3-hour laboratory session per week, for one semester.
Contribution to meeting the professional component:

Engineering Topics

Relationship of course to student outcomes:
3 strongly supported; 2 supported; 1 minimally supported

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Prepared by: Andrea Butcherite and Robert Hutchinson  Date: May 30, 2018