various companies utilize CNC machine tools. The student will become acquainted with the ways in which operation of common operating procedures, set-up and maintenance and rigidity will also be discussed.

**MCH 231 CNC Turning Operations Level I: 3 Credits (6 Lab)**
This course is an introduction to CNC Turning Centers and the safe machining. Work holding and its effect on part density, repeatability and this course will serve to reinforce basic machine setup, and programing skills introduced in other classes.

**MCH 109 Mathematics for CNC Machining: 3 Credits (3 Lec)**
MCH 109 is a technical mathematics course taught in the context of CNC Machining with a focus on real world problems encountered by machinists and manufacturing shop management.

**MCH 104 Introduction to Computer Aided Manufacturing Level II: 2 Credits (2 Lec)**
PREREQUISITES: MCH 103. This class is a blended online and lecture to provide an online tutorial for CNC Machining on a Haas GUI interface. This class will serve to reinforce basic machine setup, and programing skills introduced in other classes

**MCH 120 Blueprint Reading: 2 Credits (2 Lec)**
This is a face to face course introducing the fundamental concepts necessary to interpret drawings and produce sketches for machine tool applications as applied to CNC Machining. Topics include advanced sectioning, geometric dimensioning, geometric tolerance, assembly and drawing.

**MCH 122 Introduction to CAM: 3 Credits (3 Lec)**
MCH 122, Intro to CAM, is designed to give students practical experience in the application of a Computer Aided Machining Program to create production code for CNC Mills and Lathes. The class includes basic CAM drafting practices, Coordinate Systems, Modeling (surface and solid) and tool development. Repeatable up to 6 credits.

**MCH 130 Machine Shop: 3 Credits (1 Lec, 4 Lab)**
he content covers a broad range of manual and CNC machining with the emphasis on shop and work area safety. The course will include an introduction to measurement and materials. Job planning, bench work and layout will be presented.

**MCH 160 Machine Shop Level I: 3 Credits (1 Lec, 2 Lab)**
Machine Shop 1 introduces students to the common shop equipment used in the modern machining and manufacturing. Through a combination of lectures and practical lab exercises, the student will utilize common and essential machine shop tools and develop safe and correct practices thru proper use. During this class students will be trained in basic operation of metal lathes, Milling machines, pedestal/bench grinders, saws, and drill press. This course is also an introduction to measurement, materials, job planning, bench work and precision layout.

**MCH 230 Tooling and Work Holding for CNC: 3 Credits (2 Lec, 1 Other)**
MCH 230, Tooling and Fixturing is a course designed to introduce students to the wide variety and complexity of work holding and tooling available for CNC Machining. This class will discuss tool design/shape and its effects on machining. Work holding and its effect on part density, repeatability and rigidity will also be discussed.

**MCH 231 CNC Turning Operations Level I: 3 Credits (6 Lab)**
This course is an introduction to CNC Turning Centers and the safe operation of common operating procedures, set-up and maintenance and control panel. The student will become acquainted with the ways in which various companies utilize CNC machine tools.