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CNC Machine Operator/Programmer Program

Course Curriculum

Semester 01 (Tuition: $2,600 Books: TBD)

Course #	Course Title	Credits
10-105-110	Computer Applications	1

Credits: 1 Lecture Hours: 0 Lab Hours: 36
At the end of this course, the student will be familiar with the use of a word processor, a spreadsheet, the Internet and email, and file management. The student will know the basics of each application and be able to create professional-looking documents. The student will be able to apply these applications to their field of study also.

31-420-320	Intro to Print Reading	1

Credits: 1 Lecture Hours: 36
Introduction to reading and interpreting prints and industrial drawings. Interpretation of views, projection, lines, section, working and assembly drawings relative to manufacturing processes and order of operations. This course integrates math skills with print reading.

31-420-321	Machine Shop Safety Practices & Maintenance	1

Credits: 1 Lecture Hours: 27 Lab Hours: 9
The safety unit includes instruction in topics such as lockout-tagout, personal protective equipment, OSHA compliance, material safety data sheets, handling and storage of materials and emergency response procedures.

31-420-322	Intro to Manual Mill	1

Credits: 1 Lecture Hours: 9 Lab Hours: 27
This course will provide instruction and practice in the use of milling machines and various processes performed on them. Students will learn about mills, associated processes, milling machine tooling, and related safety/maintenance issues.

31-420-323	Intro to Manual Lathe	1

Credits: 1 Lecture Hours: 9 Lab Hours: 27
This course will provide instruction and practice in the use of lathe machines and various processes performed on them. Students will learn about lathe, associated processes, lathe machine tooling, and related safety/maintenance issues.

31-420-324	Manual Machine Speeds & Feeds	1

Credits: 1 Lecture Hours: 18 Lab Hours: 18
Students will determine cutting speeds for high speed steel tooling on manual mill and lathes. Students will calculate feed per tooth and inches per minute for various cutters. Students will calculate proper spindle speeds for twist drills.

31-420-325 Tooling & Materials of Manufacturing 1

Credits: 1 Lecture Hours: 18 Lab Hours: 18
Students will learn about of various types of tooling used in the industry. Students will learn about the materials they are machining and how the materials are processed.

31-420-326 Intro to Quality Practices & Measurement Equipment 1

Credits: 1 Lecture Hours: 18 Lab Hours: 18
Students will perform quality practices used by machine shops for various part checks. Students will learn how to fill out data sheets and use various parts specific measurement equipment.

31-420-327 Intro to Surface Grinding 1

Credits: 1 Lecture Hours: 9 Lab Hours: 27
Students complete basic grinding operations to include installation of grinding wheel, work holding techniques, speeds and feeds and problem solving. Use profilometer to measure roughness average and grind parts specific dimensions.

31-420-328 Intro to Mastercam Mill 2D 1

Credits: 1 Lecture Hours: 36
Introduction to computer aided machining of 2 dimension parts using CAM software. Students will use CAM software to create and machine pockets, slots, bosses, holes and engraved details in CNC milled parts.

31-420-329 Advanced Manual Mill 1

Credits: 1 Lecture Hours: 9 Lab Hours: 27
This course will be a continuation of Intro to Manual Mill. Students will practice in the use of milling machines and various processes performed on them. Students will learn about rotary tables, t-slot cutters and boring bars. Corequisites: Intro to Manual Mill (31-420-322)

31-420-330 Advanced Manual Lathe Machine 1

Credits: 1 Lecture Hours: 9 Lab Hours: 27
This course is a continuation of Intro to Manual Lathe Machine. Students will practice the use of lathe machines and various processes performed on them. Students will learn about lathe, four jaw chucks, face plates, taper attachments and collet puller. Corequisites: Intro to Manual Lathe (31-420-323)

31-420-331 Advanced Print Reading 1

Credits: 1 Lecture Hours: 18 Lab Hours: 18
Print reading is learning a new language in graphic or symbolic form for the purpose of manufacturing or assembling mechanical components. Units include: orthographic projection, sketching, dimensioning, machine process callout, tolerance, finish, title blocks, notes, hole types, threads, symbols and callouts. Corequisites: Intro to Print Reading (31-420-320)

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Semester 02 (Tuition: $2,600 Books: TBD)

Course #	Course Title	Credits

31-420-332 Advanced Measuring Equipment 1

Credits: 1 Lecture Hours: 18 Lab Hours: 18
Provides instruction in the care and use of measurement tools and inspection equipment necessary to maintain quality standards in the manufacturing environment. Semi-precision through high-precision measurement tools, gages, inspection sheets and processes, direct and comparative inspection methods will be covered.

31-420-333 Intro to Mastercam Lathe 1

Credits: 1 Lecture Hours: 36
Introduction to computer aided machining of 2 dimension parts using CAM software. Students will use CAM software to create lengths, diameters, champer, counterbore, external threads and parting off in CNC lathes.

31-420-334 Intro to Computer Numerical Control Prog Mill 1

Credits: 1 Lecture Hours: 18 Lab Hours: 18
Students apply skills in the programming and operation of a machining center using G-code. Explore basic metrology, tool selection and work hold devices. Rapid and Linear Interpolation, Circular Interpolation, Drilling, Bolt Circles, Subroutines and Subprograms, Cutter Compensation and Pocket Milling.

31-420-335 Intro to Computer Numerical Control Prog Lathe 1

Credits: 1 Lecture Hours: 18 Lab Hours: 18
An introduction to planning and writing programs for computer numerically controlled turning centers using G and M code. Students learn to write basic programs for CNC lathes, proof programs and run programs in CNC machine tools. Programming basics will include multiple tool programs, tool nose compensation and canned cycles. Corequisites: Basic CNC Operation Lathe (31-420-337)

31-420-336 Basic CNC Operation Mill 1

Credits: 1 Lecture Hours: 9 Lab Hours: 27
The setup of CNC Machining centers is covered in this course. Applications include selection of tools and workholding devices, setting tool offsets and work coordinate positions, calling programs, proofing programs, and minor edits and machine adjustments. Corequisites: Intro to Computer Numerical Control Prog Mill (31-420-334)

31-420-337 Basic CNC Operation Lathe 1

Credits: 1 Lecture Hours: 9 Lab Hours: 27
The setup of CNC turning centers is covered in this course. Applications include selection of tools and workholding devices, setting tool offsets and work coordinate positions, calling programs, proofing programs, and minor edits and machine adjustments. Corequisites: Intro to Computer Numerical Control Prog Lathe (31-420-335)

31-420-340 Geometric Dimensioning & Tolerance 1

Credits: 1 Lecture Hours: 27 Lab Hours: 9
Recognition and interpretation of geometric dimensioning and tolerancing symbols and application as applied to prints for the manufacture of parts. Prerequisites: Intro to Print Reading (31-420-320) Corequisites: Advanced Measuring Equipment (31-420-332)

31-420-341 Fixture Basic Lathe & Mill 1

Credits: 1 Lecture Hours: 9 Lab Hours: 27
The fundamentals of workholding and fixturing for CNC turning and milling are covered in this course. Students will apply what they learn by determining workholding needs, recognizing problems with CNC machine operation, change and adjust tooling and fixtures and perform multiple part setups. Prerequisites: Basic CNC Operation Mill (31-420-336) Corequisites: Basic CNC Operation Mill (31-420-336) and Basic CNC Operation Lathe (31-420-337)

31-420-342 CNC Machine Speeds & Feeds 1

Credits: 1 Lecture Hours: 18 Lab Hours: 18
Students will determine cutting speeds for carbide tooling on mill and lathes. Students will calculate feed per

tooth and inches per minute for various cutters and materials. Students will calculate proper spindle speeds for milling and drilling operations.

31-420-343 Processes of Manufacturing 1

Credits: 1 Lecture Hours: 18 Lab Hours: 18
Students learn to apply manufacturing requirements to the design of mechanisms by studying manufacturing disciplines. These disciplines include metallurgy, steel identification, casting, forging, cold working metals, plastics, and other specialized processes. The students will receive hands on work with MIG welding. Tours of various area manufacturing facilities will give the students new insight into various manufacturing processes. Corequisites: Basic CNC Operation Lathe (31-420-337) or Basic CNC Operation Mill (31-420-336)

31-420-344 Advanced Mastercam Mill & Lathe 1

Credits: 1 Lecture Hours: 18 Lab Hours: 18
This will be a continuation of Mastercam Mill & Lathe 2D where students will draw within software multiple mill and lathe parts. Then post to CNC machines to finish parts. Prerequisites: Intro to Mastercam Mill 2D (31-420-328) Corequisites: Intro to Mastercam Lathe (31-420-333)

31-420-345 Precision Machining Internship 2

Credits: 2 Lecture Hours: 0 Occupational Hours: 144
Students apply technical theory and skills on the job. Students will setup and perform production part runs. Students will verify critical dimensions on parts and develop appropriate employment attitudes.

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Total Credits: 26

Estimated Total Tuition*: $5,200

Tools/Equipment: $300