

SOUTHEAST COMMUNITY COLLEGE
CONSTRUCTION MANUFACTURING AND TECHNOLOGY DIVISION
Precision Machining & Automation Technology Program
Revision Date: August 26, 2019

I. CATALOG DESCRIPTION

Course Number: MACH2641
Course Title: Advanced CNC Theory
Prerequisite(s): MACH1349, MACH1455
Catalog Description: Theory class covering advanced CNC process and procedure, and CNC support equipment.
Credit Hours: 2.0
Class Hours: 23
Lab Hours: 23
Total Contact Hours: 46

II. COURSE OBJECTIVES: *Course will:*

- A. Demonstrate the operation, programming, and setup of the applicable CNC milling machines, CNC lathes, and additional support equipment such as a robotic cell.
- B. Examine programming techniques and styles that are applicable to the equipment in the lab.
- C. Introduce the students to various styles of programming that lean towards achieving efficiency in the part making process.

III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES:

- A. Student Learning Outcomes: *Student will be able to:*
 - 1. Use proper syntax for required G-Code programming.
 - 2. Wire a program and input or download the program to the CNC mills and lathes.
 - 3. De-bug the program at the machine using the edit features of the CNC mill and lathes.
 - 4. Setup and tool the CNC mills and lathes to produce assigned work pieces.
- B. General Education Learning Outcomes (GELOs)
 - 1. GELO 3: Critical Thinking & Problem Solving
Outcome 2: Synthesize information to arrive at reasoned solutions to problems.

IV. CONTENT/TOPICAL OUTLINE (*course outline may provide more detailed information*)

- A. Learn specific programming techniques for CNC Equipment
 - 1. Programming set-up and running of Haas ST-10 Lathes
 - 2. Programming and set-up of Haas VF Series VMC's
 - 3. Operation and utilization of Renishaw onboard probing
 - 4. Operation and utilization of a M10ia Robotic arm for use of load/unload manufacturing cell
 - 5. Programming and operation of Okuma CNC lathe with Live tooling
 - 6. Programming and operation of Okuma VMC with 32 station ATC
 - 7. Operation of Zoller Presetter

V. INSTRUCTIONAL MATERIALS

- A. No textbook is required for the course. Instructor handouts and information posted on LMS are the main forms of static information.

VI. METHODS OF PRESENTATION/INSTRUCTION

- A. Methods of presentation typically include a combination of the following:
 - 1. Lecture
 - 2. Small and large group discussion
 - 3. Demonstrations
 - 4. Project boards
 - 5. Handouts
 - 6. Observations
 - 7. Assigned lab projects
 - 8. Field trips

VII. METHODS OF EVALUATION (*course outline will provide more detailed information*)

- A. Methods of evaluations, although determined by the individual instructor, traditionally includes a combination of the following:
 - 1. Project grades
 - 2. Participation/class conduct

VIII. SPECIFIC COURSE REQUIREMENTS

- A. Completion of all tests, projects, assignments, and notebook (if required).
- B. Program shop safety rules will be followed. Please see the course outline for any additional safety rules established by the instructor.