SOUTHEAST COMMUNITY COLLEGE
CONSTRUCTION MANUFACTURING AND TECHNOLOGY DIVISION
Precision Machining & Automation Technology Program
Revision Date: August 24, 2020
Syllabus Statements

I. CATALOG DESCRIPTION

Course Number:	MACH2660
Course Title:	Advanced CNC and Automation Lab
Prerequisite(s):	MACH1428, MACH1455, and MACH2510
Corequisite(s):	MACH2641, MACH2652
Catalog Description:	Program and run a multitude of projects on CNC Mills and CNC Lathes using various accessories such as onboard probing, tooling presetters, and Mastercam CAM Software. Also build an automated piece of equipment that was designed in MACH2652
Credit Hours:	6.0
Class Hours:	0
Lab Hours:	270
Total Contact Hours:	270

II. COURSE OBJECTIVES: *Course will:*

A. Put into practice the knowledge they obtained from MACH 2641, MACH 2652 and other MACH courses taken prior to this course by using the machines to build the required list of projects given to them by the instructor.

B. Incorporate the knowledge from MACH 2510 and MACH 2652 into the use of the lab equipment to build the project that they designed in MACH 2652.

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. Write 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.
5. Setup and run the robotic load/unload cell.
6. Build the designed components and assemble them with the necessary fasteners.
7. Install and plumb the pneumatic components to implement automated movement.
8. Trouble shoot any malfunctions and or unwanted actions with in the device.
9. Specify the desired pneumatic devices from various manufactures.

B. General Education Learning Outcomes (GELOs)

1. GELO 3: Critical Thinking & Problem Solving
Outcome 1: Collect, identify, interpret and analyze data.

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

A. Program prescribed components on the Vertical Machining centers.

1. Programming is a combination of hand written and Mastercam.

B. Program and run prescribed components on the CNC two axes lathes.

1. Programming is hand written.

C. Program and run the prescribed projects on the Okuma CNC Lathe with live tooling.

1. Programming is hand written.

D. Successful build of the project that the student designed in MACH 2652. All prints for the components are the prints that the student generated. The student will:

1. Cut all materials listed on project BOM.
2. Machine all components to print and using all necessary equipment that they have properly trained to operate.
3. Specify and request all fasteners for assembly of project.
4. Assemble project per their own specified design.
5. Analyze clearances and all mechanical movements.
6. Incorporate all pneumatic and electrical items to provide automate movement.
7. Troubleshoot any final issues with machine.
8. Present finished machine to instructor and provide a run-off demonstration to verify the functionality.

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.