SYLLABUS

DIVISION: Business and Engineering Technology **REVISED:** Spring 2014

CURRICULA IN WHICH COURSE IS TAUGHT: Precision Machining Technology

COURSE NUMBER AND TITLE: MAC 123 – Numerical Control III

CREDIT HOURS: 2 **HOURS/WK LEC:** 1 **HOURS/WK LAB:** 2 **LEC/LAB COMB:** 3

I. CATALOG DESCRIPTION:

- Focuses on numerical control techniques in metal forming and machine processes.
- Includes theory and practice in lathe and milling machine computer numerical control program writing, setup, and operation.

II. RELATIONSHIP OF THE COURSE TO CURRICULA OBJECTIVES:

- This course is intended to develop further knowledge of milling numerical control systems, operations, and capabilities.

III. REQUIRED BACKGROUND/PREREQUISITES:

- MAC 122, MAC 222

IV. COURSE CONTENT:

A. Three axis Cartesian coordinate system

1. Absolute and incremental programming
2. 4th and 5th Axes

B. CNC Milling Machine

1. Safety and operation
2. Precision setups
3. 4th and 5th axes setups
4. Tool selection
5. Tool pre-setting

C. CNC Programming

1. Sub-programming and “do” loops
2. Mirror imaging
3. Scaling
4. Coordinate rotation
5. Datum shifts
6. Polar coordinates
7. Multiple work-offsets
8. Helical and thread milling
9. 4- and 5-axis programming

V. THE FOLLOWING GENERAL EDUCATION OBJECTIVES WILL BE ADDRESSED IN THIS COURSE (Place X by all that apply)

__X__ Communications	_____ Personal Development
__X__ Critical Thinking	__X__ Quantitative Reasoning
_____ Cultural & Social Understanding	_____ Scientific Reasoning
__X__ Information Literacy	

VI. LEARNER OUTCOMES

VII. EVALUATION

Learner outcome	Evaluation method
• Shall understand the Cartesian coordinate system using absolute and incremental distances and how to incorporate 4th and 5th axes.	Lab exercises In class assignments Written tests
• Demonstrate ability to safely setup and operate the CNC milling machine and tooling using 3, 4, or 5 axes and multiple work offsets.	Lab exercises
• Demonstrate ability to perform tool pre-sets using CNC tool pre-setter and transfer data to CNC milling machines.	Lab exercises In class assignments Written tests
• Demonstrate the knowledge to program G and M code using sub-programs and “do” loops, mirror imaging, scaling, coordinate rotation, polar coordinates and datum shifts.	Lab exercises In class assignments Written tests
• Demonstrate the knowledge to program G and M code using multiple work offsets, helical and thread milling, and 3-, 4-, and 5-axis programming.	Lab exercises In class assignments Written tests

VIII. Over 90% of students will successfully complete this class.