PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

COMPUTER-AIDED MACHINING I
MET 2700

Class Hours: 2.0   **Credit Hours: 4.0**

Laboratory Hours: 6.0   **Date Revised: Spring 01**

Catalog Course Description:

A state-of-the-art machining course in 3-axis CNC milling.

Entry Level Standards:

Students entering this course should have basic math and writing skills, a working knowledge of WordPerfect or MS Word and AutoCAD, and basic machining skills.

Prerequisites:

MET 1020; CID 1100

Corequisite:

MET 2310

Textbook(s) and Other Reference Materials Basic to the Course:

Textbook:
Haas VF-Series Programming & Operations Manual: June 2000.
References:
FeatureCAM User's Guide: Version 7, Engineering Geometry Systems, 2000.
CNC Technology and Programming: Krar and Gill, McGraw-Hill, 1990.

I. Week/Unit/Topic Basis:

Week	Topic
1-3	Machine Set-Up Manual Operation
4-7	MDI Programming
8-15	Computer-Assisted Programming

II. Course Objectives*:

A.   Demonstrate an understanding of the basic principles of CNC milling. I, II

B.   Set-up, maintain, and functionally operate machine. III

C.   Create and input part program using MDI methods. II, III

D.   Create, post-process, and transfer part program using computer-assisted methods. II, III

E.   Inspect a part and analyze results. II, III, V

F.   Communicate technical information. IV

*Roman numerals after course objectives reference goals of the MET program.

III. Instructional Processes*:

Students will:

1. Actively listen to class lectures and participate in class activities that develop and reinforce an understanding of the theories, concepts, principles, and applications of CNC milling. *Communication Outcome, Problem Solving & Decision Making Outcome, Information Literacy Outcome, Active Learning Strategy*

2. Work individually and in teams to complete lab projects and assignments related to the theories, concepts, principles, and applications covered in the lecture or demonstration portion of the course. *Communication Outcome, Personal Development Outcome, Problem Solving & Decision Making Outcome, Technological Literacy Outcome, Numerical Literacy Outcome, Information Literacy Outcome, Active Learning Strategy*

3. Collect, analyze, and tabulate data in an orderly format to prepare a college level technical report using software packages such as AutoCAD, WordPerfect/Word, Uni-Touch Plus, and FeatureMILL. *Communication Outcome, Problem Solving & Decision Making Outcome, Technological Literacy Outcome, Numerical Literacy Outcome, Information Literacy Outcome, Active Learning Strategy*

4. Observe class demonstrations on CNC equipment, practice, and then demonstrate to instructor basic manipulative skills required to set-up, operate, and program equipment. *Problem Solving & Decision Making Outcome, Technological Literacy Outcome, Numerical Literacy Outcome, Active Learning Strategy*

5. Observe class demonstrations on CAM software, practice, and then integrate manipulative and cognitive skills with assimilated knowledge to successfully complete lab projects. *Problem Solving & Decision Making Outcome, Technological Literacy Outcome, Numerical Literacy Outcome, Information Literacy Outcome*

6. Participate in technical meetings, plant tours, and seminars sponsored by local technical societies to increase student knowledge of machining and manufacturing processes and enhance awareness of required job skills and opportunities in industry. *Personal Development Outcome, Problem Solving & Decision Making Outcome, Cultural Diversity & Social Adaptation Outcome, Technological Literacy Outcome, Information Literacy Outcome, Transitional Strategy*

*Strategies and outcomes listed after instructional processes reference Pellissippi State's goals for strengthening general education knowledge and skills, connecting coursework to experiences beyond the classroom, and encouraging students to take active and responsible roles in the educational process.

IV. Expectations for Student Performance*:

Upon successful completion of this course, the student should be able to:

1. Define, explain, and associate the terminology used in CNC milling. A

2.   Apply and associate the principles of CNC milling. A

3.   Identify all safety hazards associated with CNC milling operations. B

4.   Set tool length offsets and part program zero. B

5.   Evaluate machining process during cutting operation and adjust settings to achieve maximum results. B

6.   Construct part and information drawings. C, D

7.   Differentiate absolute and incremental programming. C

8.   Construct an MDI program using basic machine readable codes and canned cycles. C

9.   Edit an existing program. C, D

10.   Create tool data base. C, D

11.   Create geometry, define tool paths, input part program information, and verify cutting operation. C, D

12.   Post-process and generate a machine readable program. C, D

13.   Set-up and initiate a transfer of program. C, D

14.   Measure part features using standard gauging or CMM techniques. E

15.   Accept/reject/rework parts based on standard or geometric tolerancing. E

16.   Relate inspection results to machining process. A, B, E

17.   Locate and extract needed information from operational and programming manuals. F

18.   Document technical information in a neat and orderly format. F

19.   Complete assignments based on oral instructions. F

*Letters after performance expectations reference the course objectives listed above.

V. Evaluation:

A. Testing Procedures: 10 points

Quizzes:
Approximately 3-5 quizzes will be administered during the course. They will include discussion questions, short answer questions, true/false questions, programming, and problem solving.

B. Programming Projects: 80 points

Project 1: MDI Programming (20 Points)
Project 2: Computer-Assisted Programming (20 Points)
Project 3: Special Project (40 Points)
Guidelines and requirements for each project will be provided by the instructor.

C. Field Work:

N/A

D. Participation: 10 points

Based on instructor observation during the course, each student will be evaluated on participation activities. Evaluation parameters to include active participation in class discussions, being prepared, efficient use of lab time, striving to achieve more than minimum requirements, and regular attendance.

E. Grading Scale:

A   92-100
B+ 88-91
B   83-87
C+ 79-82
C   74-78
D 65-73
F   Below 65

VI. Policies:

A. Attendance Policy:

Pellissippi State Technical Community College expects students to attend all scheduled instructional activities. As a minimum, students in all courses must be present for at least 75 percent of their scheduled class and laboratory meetings in order to receive credit for the course.

B. Academic Dishonesty:

Cheating on a quiz or assigned project will not be tolerated. First offense will result in immediate dismissal and automatic failure of the course. Assistance from other students is encouraged during the learning stages of the course, but each student is responsible for completing their own course assignments.

C. Other Policies:

Make-Up Quizzes: As a general rule, no make-up quizzes will be administered during the course.
Safety and Equipment Abuse: Repeated safety violations will result in a reduction of final grade, at the instructor's discretion. Flagrant violations which result in equipment damage or personal injury will result in automatic failure of the course.
Counseling: Counseling is available during posted office hours or by appointment.