Syllabus
Engineering Technology
University of North Texas
Course Title: CNC Programming and Operation
Course Prefix and Course Number: MFET 4220
Semester: Fall, 2017

The Engineering Technology Department, in cooperation with the Office of Disability Accommodation, complies with the Americans with Disabilities Act in making reasonable accommodations for qualified students with disabilities. Please present your written accommodation request to the instructor prior to the fourth day.

SAFETY CATEGORY: 3

ENGINEERING TECHNOLOGY
COLLEGE OF ENGINEERING
UNT RESEARCH PARK

University of North Texas
Engineering Technology

940/565-2022

DATE PREPARED: 8/23/16
PREPARED BY: Phillip R. Foster, Hector R. Siller

COURSE NUMBER, TITLE, CREDIT HOURS:

MFET 4220, CNC Programming and Operation. 3 hours (2;3)

DESCRIPTION:

Local programming and operation of CNC machining and turning centers, including programming of fixed cycles; program troubleshooting, editing and optimizing; setting work coordinate system selections; and setting tool geometry offsets.

PREREQUISITES:

MFET 4210 or consent of instructor

REQUIRED TEXTBOOKS:

Valention, J., and Goldenberg, J. Introduction to Computer Numerical Control (CNC). NY: Pearson, 2013.

Oberg, E. et. Al. (Ed.). Machinery's Handbook, 30th Ed. NY : Industrial Press, 2012. (editions as early as 26 are acceptable)

COURSE OBJECTIVES: At the conclusion of this course, the student will (be able to):

1. Enhance established knowledge base of computer-controlled machine tools.
2. Enhance programming and troubleshooting skills in CNC Milling Center and CNC Turning Center part programs.
3. Explore programming, interfacing and troubleshooting skills regarding machine-tending robotics.

APPROPRIATE PROGRAM OUTCOMES:

Technology Accreditation Commission of ABET, Inc.: An engineering technology program must demonstrate that graduates have:

a. an appropriate mastery of the knowledge, techniques, skills and modern tools of their disciplines,
b. an ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering and technology,
f. an ability to identify, analyze and solve technical problems,
i. an ability to understand professional, ethical and social responsibilities.

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STUDENT LEARNING OUTCOMES: (TAC of ABET Program Outcomes Addressed)

Upon completion of this course, students should be able to

1. Explain the differences between electronics industries association machine tool standards and business communications protocols. (i)
2. Demonstrate competence in writing and reading word address machine tool language, including G and M codes. (b)
3. Explain various machine tool functions. (b)
4. Compose manually and verify a CNC milling center part program. (a,l,m)
5. Compose manually and verify a CNC turning center part program. (a,lm)
6. Demonstrate competence with Bridgeport EZ-CAM software in preparing CNC milling and turning center programs. (a)
7. Compose manually and verify a five-axis robotic part program. (a,l,m)
8. Integrate machine tool and robotic programs. (a,f)

INSTRUCTIONAL OBJECTIVES

1. The lab activity, a group project, as well as the CAD/CAM individual projects are to be completed, adhering to the drawing in the working syllabus, and submitted at the designated date.
2. Quizzes shall consist of free response items from the previous week or previous weeks lecture (as announced by the professor).
3. The two examinations will be forced response items and non-cumulative with reference to semester's content. The items will solicit detailed technical information as well as more broadly-based generalizations regarding processing capabilities, advantages and disadvantages.
4. The oral presentation assignment shall be prepared, adhering to the instructionin the working syllabus, and presented to the class.

LEARNING STRATEGIES:

Lecture/Demonstration/Hands-On Laboratory Activity

COURSE OUTLINE:

Week	Lecture	Assignments
1	Introduction, Organization of Course, Course Policies, Fixed Cycles for Machining Centers	
2	Programming of CNC Machining Centers	Ch. 1 & 2
3	Programming of CNC Machining Centers	Ch. 3 & 4
4	Loading/Editing Programs, Trialing Programs, Optimizing Programs	Ch. 7
5	Setting Tool Geometry and Work Coordinate Offsets Programming of CNC Machining Centers	Ch. 8
6	Programming of CNC Machining Centers	Ch. 9

7	Prep for Midterm Exam	
8	Midterm Exam	
9	Review Midterm Results, Programming of CNC Turning Centers	Ch. 10
10	Programming of CNC Turning Centers	Ch. 11
11	Programming of CNC Turning Centers	Ch. 12
12	Setting Tool Geometry and Work Coordinate Offsets	Ch. 13
13	Loading/Editing Programs, Trialing Programs, Optimizing Programs	Ch. 14
14	Fixed Cycles for Turning Centers	Ch. 15; Lab Activity Due
15	Prep for Final Exam	

GRADING ELEMENTS AND WEIGHTS:

Laboratory Activity (Group Project)	30%
Quizzes	25%
Midterm Examination	20%
Final Examination	25%
TOTAL	100%

GRADING POLICIES:

Quizzes and examinations are graded based on class performance.

The laboratory activity will be a group effort. Formal evaluations will consist of quizzes and two examinations.

The instructor reserves the right to alter the syllabus.

90% to 100%	A
80% to 89.99%	B
70% to 79.99%	C
60% to 69.99%	D
Below 60%	F

NOTICE OF SAFETY REGULATIONS:

1. All students are required to purchase their own eye protection, which is to be worn at all times while in the laboratory.

2. Suitable footwear has non slip soles and hard uppers which completely enclose the foot. Sandals are inappropriate.

3. Long, loose hair styles must be constrained to prevent engagement in moving machinery, tools work, etc.

4. Neckties, necklaces, etc. must be removed or tucked into the shirt to prevent engagement in moving machinery, tools work, etc.

5. Compressed air may be used to clean parts and small tools, but never during cleanup periods, or to clean machinery, clothing or any part of one's body.

6. Consult with the instructor prior to attempting to lift or move heavy objects.

7. One student only may manipulate a CNC controller at a given time.

8. Metal chips may be removed with a brush; never use fingers.

9. Non-essential, distracting conversation with students operating machinery is prohibited.

10. Only official assignments may be undertaken during laboratory periods.

11. Any liquid spills are to be wiped up immediately.

12. Running and any horseplay are expressly forbidden.

13. Only officially enrolled students may enter and work in the laboratory.

14. No food or beverages are permitted in the laboratory.

15. Gloves may not be worn.

16. Audio/visual devices, including cell phones, will not be used in the laboratory.

17. Students with hidden medical conditions or handicaps, which may impact on their safe functioning in the laboratory, are requested to consult with the instructor.

18. Any accident, regardless of severity, will be reported promptly to the instructor.